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Provide a context or background for the study (i.e., the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation; the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be made clear, and any pre-specified subgroup analyses should be described. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

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Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

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## Receptor Tyrosine Kinases Mediated Cell Signalling Pathways

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### ARTICLE INFO

#### How to Cite:

Jawad Ahmad, F. . (2022). Receptor Tyrosine Kinases Mediated Cell Signalling Pathways. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.572>

A small number of signalling pathways, including receptor tyrosine kinases (RTKs) and G protein-coupled receptors (GPCRs), are activated by plasma membrane receptors in order for cells to respond to external cues. In addition to transmitting, these pathways also process, encode, and integrate both internal and external signals. In recent years, it has become clear that different spatio-temporal activation profiles of the same set of signalling proteins lead to different gene-expression patterns and various physiological responses. These findings suggest that the precise temporal control and relative spatial distribution of activated signal transducers are necessary for important cellular decisions such as cytoskeletal reorganisation, cell-cycle checkpoints, and cell death (apoptosis). Due to their crucial function in the control of embryogenesis, cell survival, motility, proliferation, differentiation, glucose metabolism, and apoptosis, RTK-mediated signalling pathways have drawn a lot of attention from scientists.

A significant number of serious human diseases, including diabetes, cancer, chronic inflammatory syndromes, and developmental defects, are caused by RTK signalling dysfunction. RTKs undergo allosteric transitions (the insulin receptor, for instance) or dimerization in response to stimulation, which activates the intrinsic tyrosine-kinase activity. Numerous cytoplasmic proteins receive a biochemical signal from subsequent phosphorylation of numerous tyrosine residues on the receptor, which causes them to move to the cell surface. Through intricate biochemical circuits of protein-protein interactions and covalent modification cascades, the resulting cellular reactions take place.

The earlier theories of discrete linear pathways, which connected extracellular signals to the expression of particular genes, have been replaced by an emerging picture of interconnected signalling networks, raising concerns about the specificity of signal-response events. In actuality, all RTK-mediated pathways share a common protein complement that mediates signal transduction downstream of RTKs. The expression of nuclear transcription factors is induced by the activation of kinase and phosphatase cascades, such as the mitogen-activated protein kinase (MAPK) cascades, which are both activated by GPCRs and RTKs. There is no single protein or gene that determines the specificity of a signal for any given receptor pathway.

Instead, the temporal and spatial dynamics of the components of downstream signalling control specificity. A classic example is the distinctive biological response to EGF and nerve growth factor stimulation of PC12 cell lines (NGF). Cell proliferation is temporarily induced by EGF, whereas cell differentiation is temporarily triggered by sustained MAPK activation by NGF. However, there are many variables that affect how MAPK cascades behave. Depending heavily on their subcellular localization and their recruitment to scaffold proteins, MAPK cascades can produce oscillations, abrupt switches, bistable dynamics.



## Reactive Oxygen Species in Neurodegenerative Disorders

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### ARTICLE INFO

#### How to Cite:

Shabbir, A. . (2022). Reactive Oxygen Species in Neurodegenerative Disorders. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.741>

Progressive brain cell death and neuronal loss, which impede motor or cognitive function, are hallmarks of neurodegenerative disorders which includes Alzheimer's disease, Parkinson's disease and Huntington's disease. These conditions are a major source of health issues, particularly for the ageing population. Chemically reactive molecules called reactive oxygen species (ROS) have been linked to the aetiology of neurodegenerative disorders. They serve crucial roles in mediating cellular functions like inflammation, cell survival, and stressor responses as well as numerous diseases like cardiovascular conditions, muscular dysfunction, allergies, and malignancies.

ROS are known to be formed spontaneously inside the biological system. High ROS concentrations can cause oxidative stress (OS), which is the breakdown of the equilibrium between pro-oxidant and antioxidant levels, and cell death because of their reactivity. Despite the fact that high levels of OS are frequently found in the brains of patients with neurodegenerative illnesses, accumulating evidence suggests that ROS may play a vital role in the complicated pathogenesis of the neurodegenerative diseases. Although oxidative stress and interactions with mitochondria may not be the cause of neurodegenerative illnesses, they are likely to accelerate disease development.

Given the crucial roles OS plays in neurodegenerative illnesses, controlling ROS levels may be a promising therapeutic approach to delay neurodegeneration and relieve its symptoms. Numerous substances with antioxidant qualities, such as glutathione (GSH), vitamin C, vitamin E, and coenzyme Q10, have been investigated in this regard for their ability to lessen neurodegenerative symptoms; nevertheless, the results are conflicting. The molecular aetiology of neurodegeneration is not fully understood at this time. To find new and dependable treatments, further research that examines the effects of ROS in diverse neurodegenerative illnesses may be essential.



## Review Article

## Therapeutic Potential and Nutraceuticals Aspects of Lepidium Sativum

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## ARTICLE INFO

## Key Words:

Olive seed; Lepidium sativum; Biological activity; Industrial applications; Composition; Antioxidant activity; Anticancer activity

## How to Cite:

Syeda Kaniz, T. ., Bader Ul Ain, H. ., Tufail, T. ., Nazia, H. ., Rizwan, B. ., Islam, Z. ., Shamim, F. ., Imran, S. ., Hussain, R. ., Butt, M. ., Riaz, M., Batool Qaisrani, T. . & Shehzad Muzammil, H. . (2022). Therapeutic Potential And Nutraceuticals Aspects Of Lepidium Sativum : Therapeutic Potential And Nutraceuticals Aspects Of Lepidium Sativum . Pakistan BioMedical Journal, 5(7), 03-06.  
<https://doi.org/10.54393/pbmj.v5i7.649>

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Received Date: 2nd July, 2022

Acceptance Date: 11th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

With the rising trend toward the use of natural substances in medicines, the utilization of cress seed mucilage (*Lepidium sativum* L.) has gained significant importance. Since the Vedic period, the subcontinent has employed garden cress (*Lepidium sativum*) for medical reasons. There are several ecological and industrial uses of garden cress that are summarized in this paper. The emerging evidence revealed that in the Unani school of medicine, the seeds and leaves of this plant might be used to treat inflammation, bronchitis, rheumatoid arthritis, and muscle discomfort. Asthma, cough, and peptic ulcers are also said to benefit from their usage. Anti-hemagglutinating, hypoglycemic, antihypertensive, diuretic, and fracture-healing qualities are also attributed to the plant. A special emphasis was placed in the study on the nutritional content of the leaves, which revealed that they are an excellent source of macroelements such as potassium and sodium, but also of calcium and trace minerals such as iron, magnesium and zinc. **Conclusion:** The current study also discusses the culinary items that have been created by combining garden cress seed powder with other ingredients. As an underused oilseed crop, garden cress seeds should be promoted for their production and consumption.

## INTRODUCTION

Brassicaceae family member *Lepidium sativum*, also known as Garden cress. North America, Europe, and Asia have all farmed this fast-growing edible herb as a culinary vegetable. Several sections of Saudi Arabia cultivate *L. sativum*, which is known as rashad or thufa [1]. It is an annual plant that grows between 15 and 45 centimeters tall. White flowers cover the long racemes of *L. sativum*, which produces wide or obovate pods that are emarginated and winged at the tip [2]. Diabetes, arthritis, and hepatitis are among the inflammatory disorders treated with *L. sativum* in traditional medicine. Several investigations have shown that *L. sativum* extracts have antioxidant, antidiarrheal,

antispasmodic, antibacterial, anti-inflammatory and hepatoprotective properties against oxidative damage [3]. *Sativum* seeds contain 24% oil that is mostly constituted of the omega-3 and omega-6 fatty acids, ALA and LA, respectively (12%). Because of the high concentration of antioxidants and phytosterols in this oil, it is very reactively stable [2]. Wistar rats' spleens and lungs showed synergistic effects of *L. sativum* oil (LSO) suppression of platelet aggregation and thromboxane B2 levels. Lymphocyte proliferation and generation of inflammatory mediators from macrophages were reported to be reduced by LSO in another investigation in rats. Another study

demonstrated that feeding Wistar rats a diet containing LSO for 60 days boosted tocopherol levels and the activity of antioxidant enzymes [4]. The seeds of *L. sativum* were mainly used to treat hypertension and renal illness. It is used as a laxative for gastrointestinal disorders, as a cancer preventative because it contains essential fatty acids like arachidic and linoleic acids, as a memory booster because it contains essential fatty acids like arachidic and linoleic acids, and as a mild blood sugar controller in diabetic patients because it contains the phytochemical lepidimoid, which prevents the return of glucose from the kidneys back into the bloodstream. Phosphorus, of course, is essential for the body's normal metabolic functions. The seed of *L. sativum* has also been claimed to aid speed up bone healing, minimize hair loss, and prevent premature greying of the hair [5]. When it comes to the germination of *L. sativum* seeds, selenium is a vital ingredient that must be given. However, as time went on, it became clear that this technique was not financially viable. Seed powder has been shown to aid in the growth of lean muscle mass, which was a big draw for those looking to gain muscle without adding fat. It is widely accepted that whey proteins, rather than milk, are the best approach to achieve this goal. It was chosen to use *L. sativum* seed powder as a complement to whey protein concentrates. In spite of this, such a concept was only of academic curiosity because of the lack of commercial acceptance [6].

**Nutritional composition**

Chemical composition: Oilseeds include cress seed, which falls under this category. Macro and micronutrients are found in abundance in the seeds (see Table 1). (see Table 2) [7,8]. Bioactive composition: *Sativum* seeds contain 24% oil that is mostly constituted of the  $\alpha$ -linolenic acid (ALA) (32%) and linolenic acid (LA) (12%). Due to its high level of antioxidants and phytosterols, this oil is redox-stable [2]. The diuretic lepidin is found in the seeds. Seeds contain antihypertensive Imidazole chemicals. The anti-asthmatic, antioxidant, and anticarcinogenic properties of glucosinolates, flavonoid compounds, and semilepidinose (a and b) may be attributed to each of these substances [9-11]. Gc seeds have been found to include phenolic compounds, alkaloids, cardiac glycosides, anthroquinones glycosides, tannins, steroids, and flavonoids; phenolic compounds in Gc seeds have been identified using mass spectral lines [12].

Nutrient	Nutrient value (per 100 g)	Nutrient value (per 100 g)
Moisture (g)	3.2	4.14 ± 0.05
Fat (g)	24.5	27.47 ± 0.14
Protein (g)	25.3	22.47 ± 0.78
Carbohydrate (g)	33	34.24 ± 0.92
Crude fiber (g)	7.6	7.01 ± 0.08
Total minerals (g)	6.4	4.65 ± 0.09
Calcium (mg)	377	296.60 ± 1.04
Iron (mg)	100	7.62 ± 0.04
Phosphorus (mg)	377	514.59 ± 10.67
Zinc (mg)	---	5.05 ± 0.07
Sodium (mg)	-	24.64 ± 0.02
Niacin (mg)	14.3	---
Riboflavin (mg)	0.61	-
Copper (mg)	---	5.53 ± 0.09
Potassium	-	1193.95 ± 10.51
Energy (kcal)	454	474 ± 1.06

**Table 1:** Nutritive value of garden cress seeds [12].

Fatty acid	Mohammed Ali, (14)	Moser et al. (132)	Diwaker et al. (2)	Zia-Ul-Haq et al. (15)
Linolenic acid	26.42	29.3	34	32.18 ± 0.59
Oleic acid	26.42	30.6	22	30.50 ± 0.16
Arachidonic acid	3.57	2.3	3.4	2.10 ± 0.57
Palmitic acid	9.10	9.4	10.1	10.30 ± 0.12
Palmitoleic acid	0.16	0.3	-	0.70 ± 0.30
Stearic acid	4.40	2.8	2.9	1.90 ± 0.19
Eicosanoic acid	--	11.1	12	13.40 ± 0.66
Linoleic acid	8.64	7.6	11.8	8.60 ± 0.38

**Table 2:** Analysis of fatty acid composition of garden cress seed oil by different researchers

Amino acid	Quantity (g/100 g protein)
<b>Essential amino acids</b>	
Histidine	3.87 ± 0.14
Methionine	0.97 ± 0.02
Arginine	4.51 ± 0.03
Lysine/so	6.26 ± 0.39
leucine	5.11 ± 0.03
Phenyl alanine	5.65 ± 0.03
Valine	8.04 ± 0.03
Leucine	8.21 ± 0.01
Threonine	2.66 ± 0.09
<b>Non-essential amino acids</b>	
Aspartic acid	9.76 ± 0.03
Serine	4.96 ± 0.09
Glutamic acid	19.33 ± 0.19
Tyrosine	2.69 ± 0.09
Alanine	4.83 ± 0.02
Glycine	5.51 ± 0.07
Proline	5.84 ± 0.38

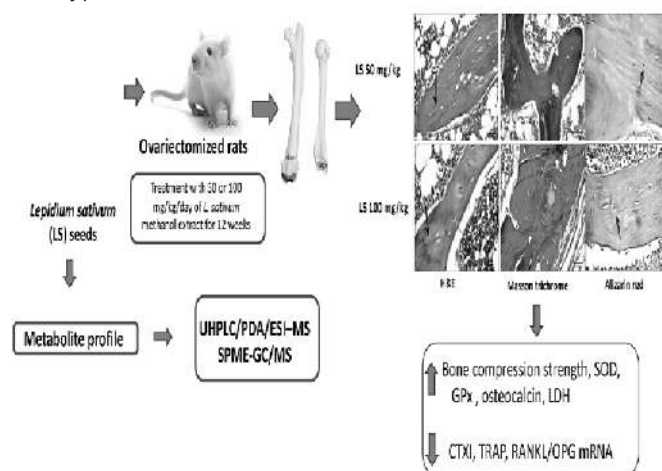
**Table 3:** Amino acid profile of garden cress seed [15].

**Biological activities**

For treatment of anemia: Garden cress seeds are rich in Folic acid and iron, which aids in the improvement of human blood haemoglobin levels. After almost two months of everyday consumption. Anemia, which is caused by an iron deficiency, may be treated with this [13]. In addition to

being a good source of iron, Garden cress seeds (GCS) also aid to raise blood haemoglobin levels. Every day, GCS may help those suffering with anaemia. It is possible to improve iron absorption by drinking vitamin C half an hour after eating these seeds [14]. Treatment of menstrual cycle disorders: Those who suffer from poor or irregular menstruation flow might benefit from this product. Garden cress seeds contain the hormone Estrogen, which acts as a "photochemical" to maintain the hormonal milieu necessary to initiate and sustain the menstrual cycle [15]. Taking seeds of Garden Cress might help regularize an erratic menstrual cycle. When it comes to regulating the menstrual cycle, Garden Cress seeds contain phytochemicals that are highly similar to the oestrogen hormone in terms of activity and effectiveness [16]. For breast milk secretion: A significant role for *Lepidium sativum* seeds has been found in the development and enlargement of the mammary glands in female rats at three different physiological stages: virgins, pregnant women, and nursing mothers. The *Lepidium sativum* has a functional influence on the gland's tissue and hormone levels [17]. Antidiabetic activity: Vegetable gum secretes phytochemicals in Garden cress seeds. Phytochemicals have the ability to reduce blood sugar levels in diabetics because of their characteristics [18]. The methanol extract of *L. sativum* possesses anti-diabetic and antioxidant properties, and it restored the normal state of all biochemical tests and pancreatic tissues [19]. Anticancer activity: *Ligusticum sativum* leaves and seeds contain high concentrations of glucosinolates, a type of thioglycosides that have been demonstrated to suppress carcinogenesis and have chemopreventive actions against the growth and proliferation of cancer cells [20]. Anti-inflammatory effect: Anti-inflammatory properties have been discovered in the leaves and seeds of the plant. As a result, flavonoids, alkaloid compounds, cyanogenic glycosides (traces), tannins, sterols, and triterpens are found in the plant. Inflammation and rheumatic discomfort might be alleviated by applying lime juice combined with bruised seeds [21]. Healing properties of *Lepidium sativum* for bone fractures: To speed up the mending of broken bones, *Lepidium sativum* has long been used as a traditional remedy [22]. Anti-inflammatory activities have been claimed for *Lepidium sativum* group. Folk medicine uses *Lepidium sativum* L. to treat bone fractures. Osteoarthritis-related discomfort, stiffness, edoema, soreness, and difficulties in mobility were reduced by the plant seeds at the conclusion of the study [23]. Anti-hypercholesterolemic effect: In hypercholesterolemic rats, Garden cress seed powder and extract showed a protective effect [24]. Alloxan-treated and hypercholesterolemic rats given 20 mg/kg of aqueous seed

extract daily for four weeks showed substantial reductions in cholesterol, triglycerides, LDL, and HDL levels compared to the control groups [22]. Effect on bronchial asthma/digestive functions: The seeds of garden cress contain goitrogens, which are chemicals that interfere with the absorption of iodine by the thyroid gland [23]. Studies on normotensive and spontaneously hypertensive rats indicated that *L. sativum* aqueous extract has antihypertensive and diuretic effects.



### Antibacterial activity

This research found that sativum extracts were efficient against a variety of microorganisms. *Staphylococcus aureus* (22 mm) and *Bacillus cereus* (16 mm) were found to have the largest zones of inhibition in terms of the antibacterial activity of the methanol extract [23].

### CONCLUSION

Garden cress is a nutritional treasure trove, including high concentrations of macro- and micronutrients. Linolenic and arachidic acids, which are found in high concentrations in seeds and leaves, are excellent sources of high-quality protein and other important fatty acids. For therapeutic purposes, it is rich in several phytochemicals. Anticarcinogenic, antihypertensive, laxative, antidiabetic, and antioxidant activities have been found in the plant. Garden cress seeds have the highest chance of being used as both a medication and a food supplement. A number of studies have shown that garden cress seeds have a good effect on the development of youngsters and teenage females. Many sweet and salty home dishes like biscuits, laddoo, cookies, muffins and dhokla and dahiwalavada may be used to treat anaemia or malnutrition by simply adding it to the ingredients of these recipes. Because of its nutritious content and underused status, garden cress seeds should be widely promoted for their production and uses.

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## Review Article

## Novel Fungal and Bacterial Species exploited for the control of Locust

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## ARTICLE INFO

**Key Words:**

Schistocerca gregaria, Aspergillus spp., Metarhizium spp. and Beauveria spp. and novel bacterial specie Bacillus thuringiensis, and Bacillus cereus

**How to Cite:**

Mazhar, S. ., Yasmeen, R. ., Noor , S. ., & Habib, S. . (2022). Novel Fungal and Bacterial Species exploited for the control of Locust: Fungal and Bacterial Species for Locust Control. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.658>

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Received Date: 11th July, 2022

Acceptance Date: 22nd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

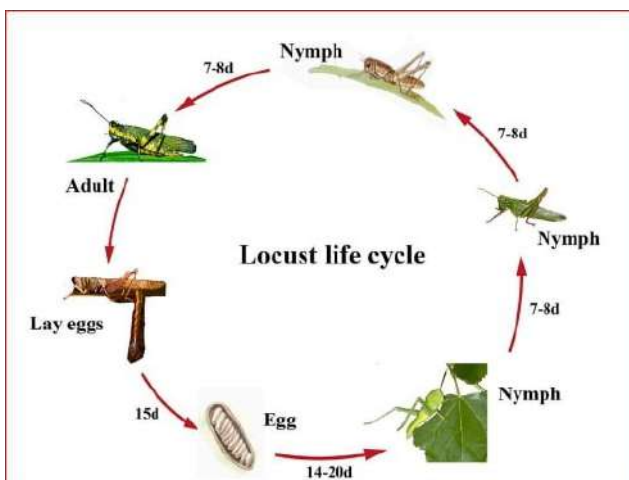
Insects like locusts and grasshoppers are one of the most dangerous bio-pests of cash crop. The locust control requires constant attentiveness. They could cause around 20 million people to be left without products of agriculture and that is only in Asia. Locusts attacked Khyber Pakhtunkhwa and Baluchistan provinces of Pakistan first in June 2019 moving towards Sindh and Southern Punjab. According to the Food and Agriculture Organization (FAO) 2020 the financial damages are range from 353 billion to 464 billion Pakistani rupees. The current environmental issues and high price of insecticides are increasing the demand of biological control. In this paper we have reviewed the microbes that can be effectively used to control locust attack in Pakistan.

## INTRODUCTION

The animal and plant that is harmful to humans or human concerns like agriculture and livestock is called a pest [14]. The pests, weeds, and other pathogens are the factors on which the quality of crops for human use depends on and is currently at risk. About 10,000 years ago numerous applications of agricultural processes came to light and since then farmers have to protect their crops from plant pathogens, weeds, animals, and other pests, including insects, mites, nematodes, rodents, slugs, snails, and birds [16]. There are approximately 10,000 species of insects and pests, more than 30,000 species of weeds, up to 1000 species of nematodes, and over 100,000 associated diseases that cause damage to the world of crops [3]. Locusts, grasshoppers, termites, and cattle ticks are the pests that are responsible for vast economic and agricultural loss in most parts of the world for instance,

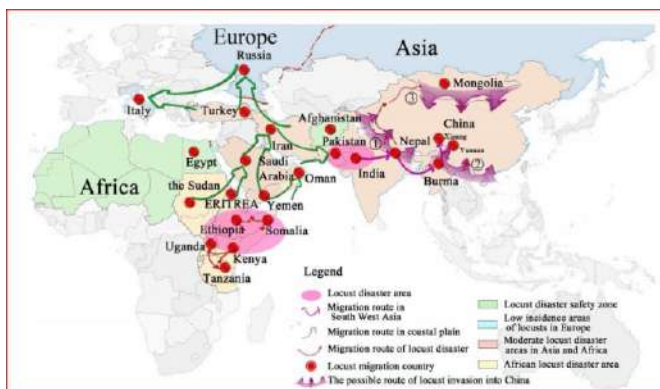
China, Japan, Australia, Malaysia, Africa, Brazil, and Mexico [1]. The family Acrididae's include pests like grasshoppers and locusts are present in grasslands and crops for the entire dry zones of the world [7]. Grasshopper and Locust are similar in appearances but differ in behaviour. The locust demonstrates two kinds of social behaviours; a) solitary and b) gregarious, but grasshoppers do not show this behaviour. The excessive growth of vegetation increases the level of neuro-transmitter serotonin, after a drought, that causes changes in their brain and they start to reproduce exceptionally [23]. The most dangerous of all locust species is considered to be desert locust (*Schistocerca gregaria*) [17]. The breeding sites of desert locust (*Schistocerca gregaria*) are present in Pakistan. The breeding starts in the deserts of Baluchistan in winter and then proceeds to the desert areas of Sindh, Pakistan for

second breeding. These breeding grounds makes the control and prevention methods a bit difficult [21]. The desert locust is the main concern because it has the capability to travel long distances and reproduce rapidly while the migratory locust (*Locusta migratoria*) is the most widespread specie of locusts. The desert locust's life cycle consists of 3 – 6 months and a mature locust may lay over 100 eggs a day. The larva requires only 20 days for maturation as it is a fast growing pest. With the maturation of larva, the next generation of pests initiates. The 25 – 32°C temperature ranges are optimal for its growth with humidity of about 85 – 92%. The desert locust could travel 10 hours a day covering 150kms because of their ability of powerful and long flights(Figure: 1)[17].



**Figure 1:** Life cycle of Locust

The traditional migratory routes of locust may change due to climate change which causes the locust to look for the new breeding and propagation areas [20]. More precipitation and high temperature speed up the growth and increases the number of locust population [5]. The outbreak of desert locust has been seen in 2019 – 2020 in Africa, South Asia, and Arabian Peninsula(Figure 2). This is causing a threat to food supply across the region. The locust found in Pakistan and Iran came from India[23].



**Figure 2:** Chronology of the great locust outbreak in 2020

The desert locust consumes many kinds of crops and plants which includes a wide range of vegetable and cereal crops, banana, citrus, groundnuts, fruit trees, coffee, and many others. Locust also attack economically important crops like wheat, sunflowers, beans, cotton, potatoes, and sugar cane [12]. In order to minimize the effect of chemical pesticides, the spray methodology is being used widely since mid-20<sup>th</sup> century [13]. According to Ilboudo et al, (2014) [8], the chemical pesticide Diazinon risks mostly aquatic invertebrates then crustacean, fish, and algae. His findings suggested that pesticides that are used in the control of locusts create a potential danger to aquatic organisms. The replacement of Dieldrin and BHC pesticides, due to their banning, organophosphates, and synthetic pyrethroids are being used either separately or in combination for locust and grasshopper control. The organophosphates and synthetic pyrethroids have toxic effects on mammals and adverse effect on aquatic organisms and insects that are beneficial [10]. 300,000 litres of Malathion pesticide which is an organophosphates pesticide, has been given to Pakistan by China. This pesticide is being used since March 2020 as reported by DAWN [4]. Banik et al., (2020)[2] reported that Silafluofen pesticide is more toxic to fish as compared to Biphenthrin and Diafenthiuron. It may also be toxic to birds while it shows positive AMES toxic test level, meaning that it could cause DNA mutations. The locust control requires constant attentiveness. They could cause around 20 million people to be left without products of agriculture and that is only in Asia [9]. Locust attack can cause damage to crops in a short period of time that could possibly lead to famine and starvation conditions [22]. But the locust and grasshopper are also important in ecosystem of grassland and are crucial in the nutrient cycle [23]. Locusts attacked Khyber Pakhtunkhwa and Baluchistan provinces of Pakistan first in June 2019, moving towards Sindh and Southern Punjab. It was stated that this attack would cause a financial damage of PKR 688.5 billion (\$4.1 billion) of kharif crops and PKR 705.8 billion (\$4.2 billion) of Rabi crops by FAO [25]. The use of parasites of insects is very common to be used as bio-pesticides against many of the insect species [11]. In this regard the affective microbes found by researchers are mostly fungal species, *Aspergillus spp.*, *Metarhizium spp.*, *Beauveria spp.*, and novel bacterial specie *Bacillus thuringiensis* and *Bacillus cereus*.

### FUNGAL SPECIES

Kumar and Sultana, 2015 [11] collected 1075 Insects from different crops like Rice, Maize, and Sugarcane. Only mycoses infected insects were collected. These insects were kept in clear cages and Zea mays (maize) leaves were provided. For the isolation of fungal species, dead insects were picked up from cages with mycelia. The fungi specie is



isolated with film methods and placed on slides, which are stained with lacto-phenol cotton blue to observe the hyphae and conidia. These slides were studied under Stereoscopes Binocular Microscope. Using that specific microscope, the shape and size was noted. For the identification of isolated fungal species, the observations made of shape and size of fungal isolates were identified according to description provided by previous studies. The results of experiment showed that 438/1075 were observed to be infected by *Aspergillus* and *Beauveria* infection. It was observed that fungal infections increase and could be seen on the side of pronotum and thorax. The insects begin to die slowly by the 3rd day and by the 7th day all insects died. They recommend that earlier stages are more vulnerable to fungal infection. The lateral stages have slight resistance to fungal infections but with increased pathogenic dispersal all stages die in approximately 6 days. They reported that a pathogenic fungus helps in repression of insect population. ***Metarhizium anisopliae***; Kh et al., 2020 [9] collected Moroccan Locust (*Dociastaurus moroccanus*) from pastures of Guzar and Nishan provinces of Kashkhadarya region of the Republic of Uzbekistan. Two experiments were performed, one with *Metarhizium anisopliae* in laboratory experience and used hand sprayer of 120 l/ha. Second experiment with *Metarhizium anisopliae* with addition of 1% betacypermethrin (chemical pesticide) in laboratory and hand sprayer of 120 l/ha. For the control The Green Guard, SC is used in measurement of 0.5 l/ha. In case of *Metarhizium anisopliae*, the results suggested that experimented bio-pesticide if used in 1l/ha and 1.5 l/ha gives maximum results of biological efficiency i.e. 88.4% and 96.8% respectively. *Metarhizium anisopliae* and 1% betacypermethrin; the results suggested that experimented bio pesticide if used in 1 l/ha gives 100 % results of biological efficiency. Sabbour, 2014 [19] researched locust beneath laboratory circumstances for numerous generations on semi-artificial diet. The *Metarhizium anisopliae*, fungus isolated from screening experiments by means of 200 samples. The isolates were inoculating in 50mL Potato Dextrose Broth (PDB) medium for destruxin manufacture. For the bioassays; the fresh citrus leaves containing CLM larvae be collected every day and once counting at least 10 early larvae used in experiments. The extracted destruxin as well as 10, 15, and 20-fold dilutions be used in bioassays. The ready leaves be dipped in concentration for 10sec and dehydrate for about one hour. The treated leaves were then placed in petri dishes and were subjected in an incubator at 27°C. The probit and T-test options of SPSS software were used for analysing time mortality and comprising means of mortality, correspondingly. The extracted destruxin were ready to be subjected for nanoparticles via National Centre

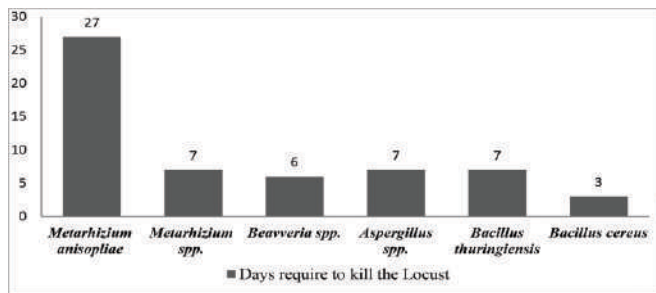
Microbiological Team. Then, scanning microscopy was performed and the results show that the laboratory experiments indicate that the Nano-destruxin is the mainly efficient against the locust *S. gregaria* compared to the destruxin and the control. The infestation of the locust *S. gregaria* under semi-conditions in comparison with destruxin and Nano-destruxin which demonstrate that the infestation present was considerably decreased following treated with Nano-destruxin.

### BACTERIAL SPECIES

*Bacillus thuringiensis* has 2 classes of endotoxins; a) Diptera-specific cytolytic (Cyt) proteins and b) Crystal (Cry) proteins. Crystal (Cry) proteins are insect-specific insecticidal and is encoded by cry genes but it has a narrow range of target insects. It has 3 domains (from N terminus to C terminus). Wu et al., 2011 [24] collected *Bacillus thuringiensis* from Chinese soil sample. The vector plasmid pGEM-T Easy was purchased from Promega and Ziniu Yu of Huazhong Agricultural University provided Vector pQE30 and *Escherichia coli* M15. For cloning of Cry genes, they first amplified a fragment 1.2kb of cry gene from genomic DNA using two step PCR and then this fragment was sequenced. Based on this sequenced 1.2kb fragment, primers were designed and the flanking DNA regions were amplified using genome walking. Purification of PCR product using 1.2% agarose gel was completed. Purified product was then ligated into pGEM-T Easy vector. The recombinant plasmid was transformed into the *E. coli*. For analysis of the Cry gene, the primers were again utilized based on sequenced 1.2kb fragment and amplification was done of strain BTH-13 using PCR. The full cry gene was then sequenced. Structure analysis of Cry protein of BTH-13 was done by NCBI BLAST, Clustal W, Predict Protein, Swiss-model, and Strap. For the expression of Cry protein in *E. coli*, 3 plasmids were prepared; a) pQE-30/7Ca1 (gene encoding the whole cry protein), b) pQE-30/toxin1 (including three domains but without N-terminal and C terminus), and c) pQE-30/toxin2 (three domains and C terminus). Positive transforms were selected on the bases of kanamycin and ampicillin. The cells were lysed and harvested by centrifugation at 13,400 x g for 10min at 4°C and supernatant was stored at -20°C. The crystal protein is prepared and activated by trypsin. This activated protein is then solubilized in 0.1 M NaOH at temperature of 37°C for 30 min. It was then digested by trypsin at a final concentration of 10 mg/ml. The Analysis of  $\delta$ -Endotoxin obtained from transformed cells was done by western blotting, where they prepared crystal proteins from wild type BTH to immune a rabbit and then obtained the anti-serum. The protein isolated was separated by SDS-PAGE and western blotting was performed. Bioassay preparation of  $\delta$ -Endotoxin: the expressed toxin 1 & 2 protein + prepared novel endotoxin and crystal protein was

diluted with distilled water in concentrations of 20, 10, 5, 2.5, and, 1.25 g/ml. These concentrations were applied to 30 migratory locusts (*Locusta migratoria manilensis*) /dilution. For application inoculated corn seedling were fed to locusts. These locusts were kept at 28 °C at 65 to 75% relative humidity. Observations were recorded from 2-7 days. This experiment was repeated 3 times. Observation of  $\delta$ -Endotoxin on the mid-guts of locusts was done by selecting random insects and dissection was performed to get the mid-guts. Phase-contrast microscope was used for the observations. Results of the experiments explained that the segment of 1.2kb and final plasmid vector pGEM-T Easy, ORF has 3432bp, the gene encodes for a protein of 1144 amino acids with a molecular mass of 129kDa. The sequence was then submitted to GenBank. The designed  $\delta$ -Endotoxin was named Cry7Ca1. For the analysis of Cry7Ca1 Structure the wild type domains were compared with designed domains. For Domain I there was difference of 2 loops, for Domain II 3rd loop is 4 residues longer, for Domain III 5 loop difference was noted. The results of expression of Cry proteins in *E. coli* suggested that pQE-30/toxin1: Cry7Ca1 and pQE-30/toxin2 were activated by Cry7Ca1. The expressed product has a weight of 129, 64, and 72kDa. The toxin activated by trypsin was 64kDa and was expressed by toxin 1 which was activated by Cry7Ca1. The bioassay was applied on second instar and results showed that CryCa1 and activated toxin 1 and 2 have significant effect on the locust. The lowest concentration requirement of CryCa1 is 8.98 g/ml, toxin 1 is 0.87 g/ml and toxin 2 is 4.43 g/ml. The examination of mid-gut of locust showed disruption of epithelial cells and it is by action of toxin 1 which is activated by CryCa1. They concluded that in expression of Cry7Ca1, lack of certain molecule chaperons may affect the expression. N-terminus may inhibit toxins action and C-terminus it is not important for the toxins action. So if the terminus is cleaved then activity of Cry protein can be enhanced. Cry7Ca1 activated toxins act on mid-gut only and therefore killing the locusts. The Cry7Ca1 has potential application for an insecticide and transgenic plants that have the activity against locust. **Bacillus cereus**; Reda et al., 2018 [18] acquired the nymphs and adults of desert locust (*Schistocerca gregaria*). The dead were separated from infected ones and bacteria were collected from body surface, internal swap for mid-gut and cavity, and dead locust paste were swabbed and directly streaked on nutrient agar plates. Plates were incubated at temperature of 28 °C for 72 h. In order to identify the bacteria demonstrating activity against locusts. The isolated bacteria were centrifuged at 4000 rpm for 15 min at 4 °C after they were grown overnight at a temperature of 30 °C with 150RPM agitation. The pellets were collected and adjustment of cell density for each isolate was done and

mixed in a beaker of 50ml. The clover leaves were treated with these solutions and dried at room temperature for 10 minutes. These treated leaves were fed to 4th nymph instar locust. 10-day observation was made and 2/30 bacterial isolate showed the activity against the locust. Bacteria were identified morphologically and biochemically. For the preparation of Bioassay 4 dilutions of stock solutions were prepared. Two techniques were opted for the application of bioassay on the locust. (a) Leaf dipping technique; stock solutions of DL3 and DL4  $539 \times 10^6$ ,  $23 \times 10^6$  CFU/ml were prepared respectively. The 4 dilutions were prepared of each stock solution. DL3 stock solution was diluted as; Dilution 1 ( $269 \times 10^6$  CFU/ml), Dilution 2 ( $134 \times 10^6$  CFU/ml), Dilution 3 ( $67 \times 10^6$  CFU/ml) and Dilution 4 ( $33 \times 10^6$  CFU/ml). DL4 stock solution was diluted as; Dilution 1 ( $11.5 \times 10^6$  CFU/ml), Dilution 2 ( $5.7 \times 10^6$  CFU/ml), Dilution 3 ( $2.8 \times 10^6$  CFU/ml) and Dilution 4 ( $1.4 \times 10^6$  CFU/ml). Fresh clover leaves were dipped in each dilution for 3min then then allowed to dry at room temperature for 10 minutes. These treated leaves were fed to 3 sets having 180 insects of 4th instar nymph. (b) Per OS technique: For this the stock solutions of DL3 and DL4  $1078 \times 10^6$ ,  $467 \times 10^6$  CFU/ml were prepared respectively. The 4 dilutions were prepared of each stock solution. DL3 stock solution was diluted as; Dilution 1 ( $539 \times 10^6$  CFU/ml), Dilution 2 ( $270 \times 10^6$  CFU/ml), Dilution 3 ( $135 \times 10^6$  CFU/ml) and Dilution 4 ( $67 \times 10^6$  CFU/ml). DL4 stock solution was diluted as; Dilution 1 ( $233 \times 10^6$  CFU/ml), Dilution 2 ( $117 \times 10^6$  CFU/ml), Dilution 3 ( $58 \times 10^6$  CFU/ml), and Dilution 4 ( $29 \times 10^6$  CFU/ml). The dilutions made from stock solution were applied through 1 cm Hamilton syringe with a needle of 24 gauge. For each isolate 1 set of 30 insects were selected of 4th instar nymph. The results of evaluation of toxicity regression were obtained by using probit analysis. Results of experiment suggested that 30 isolates were found and 2 isolates were selected because of their activity against the locust. Bacterial identification by morphologically, biochemically and sequencing rRNA all resulted that isolates that showed activity against locust were DL3 and DL4. 100% mortality results were observed for cell density of  $539 \times 10^6$  DL3 and  $23 \times 10^6$  DL4 after 48 h and 3 days. Leaf dipping technique was found to be effective. Throughout the treatment the body colour of locusts changed from red to dark red and lastly black. DL4 was found to be virulent as compare to DL3. *Bacillus cereus* produces enteric toxins. The 2 isolates can be potentially used as bio pesticides and decrease the use of chemical pesticides. Novel endotoxins from *Bacillus thuringiensis* - 13 preparations are laborious but can be useful in killing locust. *Bacillus cereus* DL3 and DL4 gives results in just 3 days. It is also present ubiquitous in nature (Figure 3).



**Figure 3:** Comparison of time period required to kill Locusts [11, 9, 19, 24, 18]

## CONCLUSION

The microbes which can be used are *Aspergillus spp.*, *Metarhizium spp.* and *Beauveria spp.* and novel bacterial specie *Bacillus thuringiensis*. *Aspergillus spp.*, *Metarhizium spp.* and *Beauveria spp.* would kill in 6 – 7 days the locust while *Metarhizium anisopliae* would require 20 – 35 days. The novel endotoxins from *Bacillus thuringiensis* 13 would also give results in 6-7 days. *Aspergillus spp.*, *Metarhizium spp.* and *Beauveria spp.* can easily be isolated from nature as they are readily available in soil and only require 6 – 7 days to give results. *Metarhizium anisopliae* despite being easily available requires a time period of 20 – 35 days to give results. According to FAO there in the month of November they do not find any locust in any of the 4 provinces. They predicted that there could some adult locusts present in Baluchistan but the number would not be harmful.

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## Original Article

## Effects of Constraint-induced Movement Therapy on Hand and Arm Functions in Patients With Parkinson's Disease

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## ARTICLE INFO

## Key Words:

Exercise therapy, Hand, Neurological rehabilitation, Parkinson's disease, Upper extremity

## How to Cite:

 Ghazanfar, M. ., Abbas, M. ., Rafiq, S., Kalsoom, U. ., Muhammad Rizwan, Amin, T. ., Razzaq, A., & Sarwar, H. . (2022). EFFECTS OF CONSTRAINT-INDUCED MOVEMENT THERAPY ON HAND AND ARM FUNCTIONS IN PATIENTS WITH PARKINSON'S DISEASE: Constraint-Induced Movement Therapy in Patients with Parkinson's Disease. Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.390>

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Received Date: 19th April, 2022

Acceptance Date: 18th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

**Objective:** The aim of this research was to ascertain the effect of constraint-induced movement therapy on individuals with Parkinson's disease's hand and arm functions. **Methods:** It was a randomized controlled experiment that ran from December 28, 2020, to March 3, 2021, at the physical therapy departments of the University of Lahore Teaching Hospital, Lahore General Hospital and Mayo Hospital. Between the ages of 50 and 80, 40 male and female Parkinson's disease patients were divided evenly into two groups. Patients in the experimental group (n = 20) received both routine physical treatment and constraint-induced movement therapy, while patients in the control group (n = 20) received just normal physical therapy. Six hours a day, for a total of four weeks, were spent treating the patients. Frenchay Arm Test was used to evaluate patients (FAT). The data were examined using IBM's Statistical Package for Social Sciences (SPSS) version 25. **Results:** Data for 40 individuals were evaluated, with 17 (42.5%) men and 23 (57.50%) women, and a mean age SD of 65.28 7.28 with a minimum age of 50 and a maximum age of 78. Patients improved in both groups; the mean difference between pre- and post-test results in the experimental group was 2.060.66 (p=0.000), whereas it was -0.940.64 (p=0.000) in the control group. Contrary to conventional physical therapy alone, however, patients reported greater improvement following treatment with constraint-induced movement therapy (p=0.003). **Conclusion:** According to this study, constraint-induced mobility therapy helped Parkinson's disease patients' hands and arms operate better.

## INTRODUCTION

Parkinson's disease (PD) is one of the most prevalent conditions affecting the central nervous system. This condition results from the destruction of cells inside the mesencephalon in substantia nigra. Typically, it starts in between 58- 62 years of age; nevertheless, cases have indeed been identified in younger people [1,2]. Two out of three major axial symptoms are needed for clinical

diagnosis of Parkinson's disease: bradykinesia, resting tremor, and rigidity [3,4]. In order to detect PD, bradykinesia should be evident [3]. There are also accounts of difficulty handling objects with sufficient speed and agility [5]. Upper extremity participation in PD generally corresponds to a deficit in the preparation and execution of both basic and complicated voluntary

movements, and also a lack of repeating fast motor poly-articular sequences due to disruption of dopaminergic pathway [6]. The number of PD patients have handwriting defects. Micrographia is the handwriting abnormality that is most frequently identified and readily observable in PD [7]. Micrographia is a typical symptom of PD, which presents as either a constant or gradual decline of handwriting size or both [8]. Motor symptoms associated with Parkinson's disease (stiffness, bradykinesia, and tremor) cause three main changes in writing [9]: the size of writing [10] (micrographia [11]), pen-pressure [12], and kinematics. Typically, PD patients are unable to manage the pinch grip very effectively and have difficulty grasping small items because of the resting tremor. Bradykinesia usually effects motions, and most basic actions becomes challenging and cause consumption of time [13,14]. For this reason, CIMT is a very useful intervention. The upper extremity that is affected undergo intensive therapy by limiting the unaffected limb. This causes plasticity and cortical reorganization [15]. As constraint induced movement therapy has been an effective treatment for gross and fine motor performance of upper limb in patients with cerebral palsy [16], multiple sclerosis [17], stroke [18] and Parkinson disease [19]. There are many high-quality researches available regarding the effectiveness of CIMT especially in cerebral palsy and stroke [16,18]. In case of Parkinson's disease, there is not much available evidences regarding its effectiveness. The goal of this study was to give useful data to physicians, researchers, and the general public. This research helped to fill in the gaps left by prior studies in the field of neurorehabilitation. Clinicians and neurorehabilitation experts can employ the more effective procedure on patients to get greater results in less time. Patient choice is taken into account while treating patients, according to evidence-based practice. As a result, the patient will be able to determine which treatment is the most effective. The goal of this study was to see how constraint induced mobility therapy affected Parkinson's disease patients' hand and arm functions.

## METHODS

From December 28, 2020 to March 3, 2021, a retrospectively registered, parallel planned, randomized controlled trial with disguised allocation was undertaken at the physiotherapy department of the University of Lahore Teaching Hospital, Lahore General Hospital, and Mayo Hospital in Lahore, Pakistan. The Research and Ethics Committee of Riphah International University, Lahore, Pakistan (REC/RCR & AHS/20/0214) accepted the study protocol, which was retrospectively filed in the US Clinical Trials Registry (NCT04818528) the study's goal was explained to patients who matched the qualifying

requirements. The permission form was signed by all eligible individuals who consented to participate in the study. Prior to the randomization, the therapist determined eligibility. Following a baseline examination, eligible patients were allocated to one of two groups (experimental or control) in a 1:1 ratio. The study comprised both male and female individuals diagnosed with Parkinson's disease by a neurologist between the ages of 50 and 80. Patients with atypical Parkinsonism, Alzheimer's disease, antidepressants, or significant cognitive impairments were excluded from the study. Random number tables were used to assign participants to two groups in a concealed manner, as per CONSORT guidelines 2010. The experimental group received constraint induced movement therapy (CIMT) in addition to regular physical treatment, Compared to the control group, which just got routine physical therapy. Patients in the standard physical therapy group received care in accordance with clinical recommendations based on a systematic review, with an emphasis on improving aerobic capacity, engaging in muscular strengthening exercises, being able to walk, addressing postural and balance problems, and improving hand-arm function [20]. Three phases made up each session: Active phase (both standing and sitting): upper and lower limb motor control exercises; cool-down phase (sitting): respiratory exercises and mobilization. Warm-up: passive mobilization of main joints and lower limb muscle strengthening [21]. Throughout the research, the usual or baseline treatment was maintained. For four weeks, the experimental group received constraint induced mobility therapy. For four weeks, training was conducted for six hours each day, five days per week. All of the data was gathered utilizing a standardized Frenchay arm test questionnaire. Three components, or therapy packages, make up CIMT: Rough, graded training of the paretic upper extremity for up to 6 hours per day, 5 days per week, for 4 weeks is necessary to improve task-specific use of the injured limb (i.e., shaping where individuals are gradually trained for tasks that steadily increase in complexity). Restraints, often referred to as compelled use treatment, include putting the non-paretic upper extremity in a glove to force the use of the injured arm for 90% of the total number of awakened hours. Compliance gains through lifestyle interventions aimed at applying knowledge gained in the lab or hospital to patients' actual circumstances (i.e., a transfer package). Treatment was provided by a single therapist to eliminate bias. The Frenchay Arm Test was used to evaluate the patients at baseline and after four weeks. This test evaluated upper-limb proximal motor function and agility during daily activities in persons with upper-limb impairments caused by neurological diseases. FAT is a metric for upper-limb activity limitation. The FAT

scale is a two-point ordinal scale (0-1). If you fail, you get a zero, and if you pass, you get a one [22]. The IBM statistical software for social sciences (SPSS) version 25 was used to examine the data. Because the sample size was 50, the Shapiro-Wilk Test was utilized. The data was not considered normally distributed since the Shapiro-Wilk Test Sig. value was less than 0.05. The Wilcoxin signed rank test is used to examine how subjective and objective assessments vary over time. This is a matched group comparison test that is non-parametric. The non-parametric ManWhitney U test was performed to compare two groups at different intervals. Using an 80 percent confidence level and a 13 percent margin of error, a sample size of 40 patients (20 interventions and 20 control group) was chosen, with an estimated percentage of improvement in the intervention group [23]. Value of  $p < 0.05$  was considered statistically significant.

**RESULTS**

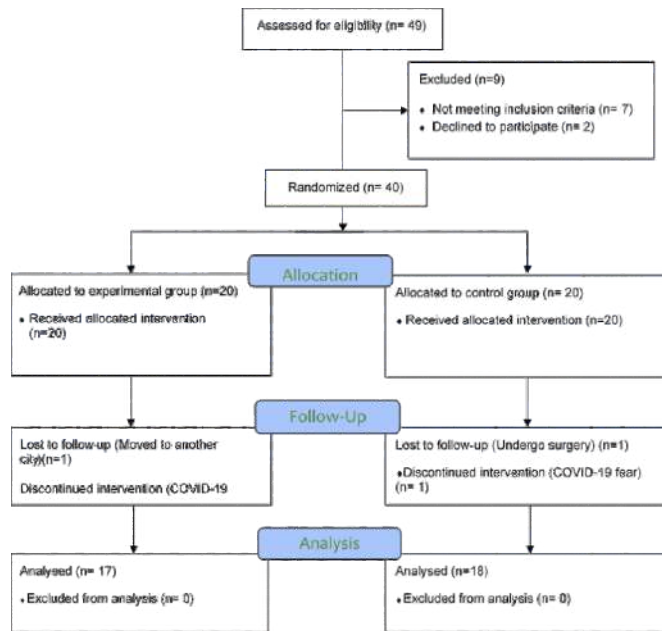
Forty-nine Parkinson's disease patients were assessed for eligibility, out of which 40 participants met the inclusion criteria and were subsequently enrolled in the study. Nine patients were excluded because (n=2) declined to participate because they were from different cities and unable to come consecutively. While (n=3) were considering for surgery, (n=2) were on unstable dopaminergic dose and (n=2) were unable to comprehend the therapist instructions. Forty eligible participants were randomly allocated into experimental group (n=20) and control group (n=20). Table 1 shows baseline characteristics of the participants in both groups. Eight male and twelve female participants were in experimental group with mean (SD) age of 68.25(7.43). While in the control group there were nine males and eleven female participants with mean(SD)age of 64.30(7.39).

Characteristics	Exp (n = 20)	Con (n = 20)
Age (years), Mean (SD)	68.25±7.43	64.30±7.39
<b>Gender, n (%)</b>		
Male	8 (40.00%)	9 (45.00%)
Female	12 (60.00%)	11 (55.00%)
Tremors, n (%)	20 (100%)	20 (100%)
Unilateral Tremors	7 (35%)	6 (30%)
Bilateral Tremors	13 (65%)	14 (70%)

Exp: Experimental group, Con: Control group

**Table 1:** Baseline characteristics of participants

Figure 1 shows that in experimental group (n=1) patient moved to another city therefore unable to follow up and (n=2) discontinued intervention because of prevalent COVID-19 situation. While in control group two patients were drop out because 1 patient became COVID-19 positive and other patient undergo brain surgery.



**Figure 1:** CONSORT flow diagram

Table 2 shows that mean±SD of pre values of FAT was 2.40±0.99 in experimental group (CIMT+RPT), and 2.50±0.83 in control group (RPT) and post values were 4.47±0.62 and 3.56±0.92. Mean difference of experimental group was -2.06±0.66 and of control group was -0.94±0.64. Results between both the groups were significant and the p-value was 0.003.

Outcome	Groups				Difference within Groups		Difference between Groups	
	Week 0		Week 4		Week 4		Week 0	Week 4
FAT	Exp (n=20)	Exp (n=20)	Exp (n=17)	Con (n=18)	Exp Z (p-value)	Con Z (p-value)	Z (p-value)	Z (p-value)
	2.40 (0.99)	2.40 (0.99)	4.47 (0.62)	3.56 (0.92)	-3.72 (0.000)*	-3.49 (0.000)*	-0.55 (0.584)	-2.96 (0.003)*

**Exp:** Experimental group, **Con:** Control group, **FAT:** Frenchay Arm Test, (\*): p-value < 0.05: Significant

**Table 2:** Statistics of Frenchay Arm Test. Mean (SD) of groups, Wilcoxon Signed Ranks test within groups, and Mann-Whitney U Test between groups.

**DISCUSSION**

Forty participants were divided into two equal groups. Participants in experimental group received constraint induced movement therapy by use of mitt on less affected arm to enhance the use of more affected arm. Participants also undergo routine physical therapy for upper limb in both groups. This study reports that the although the hand and arm functions improves in both groups but the CIMT group was superior to the routine physical therapy group, as the statistical mean difference was present. These findings are also supported by the literature. A past study shows that the modified constraint induced movement therapy improve fine and gross motor functions of upper extremity

in PD patients [19]. Although that study used the modified version of constraint induced movement therapy, which is less intensive, but the literature has shown that type of CIMT, intensity and duration does not alter the outcome [24]. Another study suggested that the modified CIMT can improve timing performance of upper limb in PD patients [25]. The improvement in upper limb functions is may be due to the increase number of glial cells derived neurotrophic factors (GDNF) which can derive neuroplasticity. As on study PD rat models suggested that after CIMT the levels of GDNF increases which promote dopamine level [26]. In contrast to our findings, a study suggested that CIMT did not improve upper extremity functions in PD patients, and therefore does not look to beneficial [27]. But their findings were preliminary and were based on a very small sample size of 6 PD patients and also, they provided treatment for 2 weeks only. Therefore, their results are in contrast to the findings of our study and have less generalizability. In other neurological population, CIMT has been strongly recommend for use in rehabilitation settings, especially in the stroke [28] and cerebral palsy [29], but the role of CIMT in Parkinson's disease is less understood and no definite clinical guidance was found. As CIMT has been found promising in improving upper limb functions in different neurological population, this study also supports the use of CIMT for PD patients. Neuroplasticity derive change can make changes for much longer and can contribute towards prolonged betterment instead of short-term benefit. Understanding of the underlying mechanism is essential. As one rat model study pointed out that increase in GNDP levels promote dopamine level. Thus, CIMT training not only provide the therapeutic effects in returns of intensive exercise training but also the neurophysiological changes that can persist for much longer. But yet, the PD is the progressive neurological disorder, therefore, the continuous use of exercise is important for retaining the effects of training. Unlike many other neurological disorders, Parkinson's disease tends to severe over time and may lead to fluctuation in medicine dose and even surgery. Therefore, adjustment in therapy according to patient need may yield better results and follow ups are necessary to improve quality of life. In a previous study it has been found that after strength training of the upper extremity, the power generation of the limb increases but failed to improve the quality of life of PD patients [30]. But CIMT may seems to be promising in improving quality of life in patients, as the patient uses his/her affected hand for 6 hours a day in different tasks may yield better learning and performance thus helping in ADL and improving quality of life.

## CONCLUSION

Constraint induced movement therapy is effective in

managing Parkinson's disease patients.

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## Original Article

## Effect of Core Stability Exercises and Balance Training in Postural Control among Children with down Syndrome

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## ARTICLE INFO

## Key Words:

Core stability, Down syndrome, Postural Control

## How to Cite:

Zulfiqar, H., Hafiz Muneeb Ur Rehman, Razzaq, A., Zaib Un Nisa, Maryam Hina, Bashir, H. ., Saeed, H. . & Ashraf, N. us S. . (2022). Effect Of Core Stability Exercises and Balance Training in Postural Control Among Children with Down Syndrome : Stability Exercises and Balance Training in Postural Control Among Children. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.392>

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Received Date: 22nd April, 2022

Acceptance Date: 5th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Posture, balance, and movement issues are common in children with Down syndrome. Emerging research suggests that balance training may be advantageous for children with Down syndrome, making it a crucial component of physical activity programmes. **Objective:** to ascertain the impact of balance training and activities for core stability on postural control in kids with Down syndrome. **Methods:** single blinded RCT study was conducted, in which assessor was kept blind. While taking into account inclusion and exclusion criteria, children with Down syndrome were randomly divided into two groups with ages ranging from 5 to 17 years. There were 20 patients in the sample. Exercises for core stability were given to Group 2 and balance training to Group 1. The time between treatments was six weeks. The Comprehensive Rehabilitation facility Chakwal is where the data is gathered. The pre- and post-values of postural stability were measured using the paediatric Berg balance scale. **Results:** The present results are significantly better in the group B than in the group A. Core stability exercises shows better results than balance training. **Conclusion:** According to the results of the current study from the data of before the treatment and after the treatment, it revealed a positive change. In the duration of six weeks the core stability exercises were more effective than balance training in developing postural control among children with Down syndrome.

## INTRODUCTION

Down syndrome (DS) also called trisomy 21 is a chromosomal disorder caused by the presence of an extra copy of chromosome 21. This is generally associated with physical growth deficits, mild to moderate intellectual disability and distinctive facial features Children with Down Syndrome have frequent strokes and delayed brain maturation [1]. There may also be many other minor irregularities of the face, head, neck, and clinically inappropriate feet, and the height is generally reduced [2]. Children with Down syndrome also display deficiencies in muscle strength, muscle capacity, and growth of motor skills [3]. Children DS with the shown disparity in

developing both musculoskeletal and active motor control components relative to the developmentally normal children [4]. Most children with Down's syndrome have mild to moderate cognitive impairment [5]. Word is slow, impacting both memories in the short and the long term. Children with DS face a substantial delay in acquiring motor skills and contextual speech discrepancies concerning children without Down syndrome [6]. The word 'core' or 'core stability' encompasses anterior-aspect muscles such as abdominals, later gluteal and paraspinal muscles, and lower pelvic floor with hip girdle musculature Core stability exercises show a vital part in PT strategies and influence

children's equilibrium with DS [7]. These exercises increase muscle strength in the lower extremities, improve motor performance, develop cognitive skills, and activate the locomotive control system [8]. Performing core stability activities daily has the same benefits for older adults with Down Syndrome and strengthens lower limb strength, coordination, and walking skills. This development leads to improving the functional capacities of daily activities and people with DS [9]. Core stabilization can help to increase the balance between fluid and muscle control between the lower and upper extremities and lower the risk of fracture and muscle inequalities [10]. In pain reduction core stability exercises have a beneficial effect, loosening of deep abdominals, improving the strength of the lumbar spine, and increasing muscle strength of patients [11]. The major impact of core stabilization training can be because core stability training increases the performance of the neuromuscular system, resulting in an optimum chain of lumbar-pelvic mobility in DS children [12]. In adolescents with down syndrome suffering from coordination problems, core stability therapy can be used to enhance equilibrium and reduce the risk of collapse and injury, contributing to a better quality of life. Requires core stability preparation to enhance efficiency and reduce incidents [12]. Postural regulation is a term used to describe how our central nervous system (CNS) controls sensory information from other systems to generate sufficient motor activity to sustain a regulated, upright posture. The major sensory mechanisms involved in postural regulation and coordination are the auditory, vestibular, and somatosensory systems [13]. Postural stability is the ability to maintain equilibrium in a gravity field by sustaining or restoring the Body mass center above its support base. Unsupported, standing people are in unstable equilibrium or equilibrium since muscle strength will constantly overcome the force of gravity [14]. People with DS have a sensory impairment attributed to hypotonic and ligamentous laxity, agonist and antagonist muscle co-contraction, and coordination and postural deficiencies [15]. The postural control structure has two core functions: first, building up attitude towards gravity and ensuring equilibrium is sustained; and second, setting the direction and location of the parts that serve as a frame of reference for vision and movement towards the outside world [16]. Children with DS have severe problems when standing up straight in maintaining correct posture and/or balance. In addition, while their physical development is somewhat complete, some of their engine functions remain inadequate [17]. To the Researcher's best knowledge so far there is no such study that compares these two approaches. The key aim of the current analysis was to evaluate the core permanence and balance exercise in

postural control amid DS. So that in the future we developed a better treatment plan for CP & Stroke patients to develop postural control. And previously most studies focus on functional training rather than core stability

## METHODS

It was a single-blinded randomized control trial, in which the assessor was kept in blindness. The sampling technique applied was non-probability purposive. This research work was approved ethically by an institutional board review committee of the international university Riphah Lahore campus. The study registration number was S18C13G37009. The objective of this research work was to evaluate the core permanence and balance exercise in postural control amid DS. An alternative hypothesis was that balance training and core stability exercises are not equally effective in children with Down syndrome. Data was collected from the Comprehensive rehabilitation center Chakwal and Private physical therapy institute of Lahore while following consort guidelines. The duration of the study was 6 months after approval of synopsis from 15-09-19 to 30-03-20. This study had taken a sample size of 20 participants. Each group has 10 participants. Size  $d = 1.5662217$   $\alpha$  err prob = 0.05, Power  $(1 - \beta$  err prob) = 0.95, Allocation ratio  $N2/N1 = 1$ , Output: Non centrality parameter  $\delta = 3.50$ , Critical  $t = 1.7340636$   $Df = 18$ , Sample size group 1 & 2 = 10 in each group, Total sample size = 20, Actual power = 0.957404. 20 participants were randomly allotted in 2 groups, 10 participants in each group. Randomization was done through the lottery method and concealment was done. Group A ( $n = 10$ ) was managed with trunk balance exercises, while Group B ( $n = 10$ ) was managed with abdomen core stability exercises and conventional treatment was given to both groups. Inclusion Criteria include both female and male, age 5 to 17 years, trisomy 21 by genetic karyotype, low muscle tone, joint Laxity, psychomotor progress deficits, normal visualisation, and audible range. Exclusion Criteria include patients suffering from Seizure, multiple sclerosis, or epilepsy, muscular dystrophy, mental retardation, severe learning disability or sensory deficits, using inhibitory splints or a polyethylene ankle/foot orthosis, severe cognitive and perceptual issues. Once the inclusion and exclusion criteria mentioned above have been taken into account potential participants have been considered. They were asked to take part in the study. Written consent form has been granted. Each participant was requested to draw either the number one or the number two from the box. The number one was assigned to Group A and the number two was allocated to Group B. for data collection. For Down syndrome children Paediatric berg scale Stability is used to measure the core stability and consistency in this study.

Paediatric Berg balance scale is 14 –item parameter referred test which evaluates functional balance in the sense of the daily task in peace population. (a) The scores of the item level vary from 0 to 4, which is calculated by the capacity to carry out the assessed activity. (b) Items scores are then summed up (c) Total score is 56 [18]. Head, upper limbs and trunk rotation from a kneeling position, flexion/extension in upper limb with concurrent movement of head from position of kneeling, Pelvic bridging, elating contrary upper/lower limbs from a position of Quadruped, Heel/toe elevations, substitute escalating are all part of Group A balance exercise. Abdominal bracing with or without heel slide in lying position, or Leg lifts with same position, same abdominal position with bridging, or standing with abdominal bracing are all examples of Group B core stability exercises. Both groups got standard treatment. In conventional treatment isometric muscle contraction (hamstrings, quadriceps, hip extensors, anterior tibial group, and calf muscles). Dosage was 10 Repetitions with 5 seconds hold three times per day. Session was last for 6 weeks and 3 sessions each week. Data were examined by means of SPSS for windows software version 21.0, numerical consequence was set at  $p=0.05$ . Regularity table, pie charts, bar charts were applied to demonstrate conclusions of collection assessment restraint ended period. nonparametric test was used to find change between the group and within groups. Changes between successive visits: Change between successive visits: t test was used to show the progress of two groups between any two successive visits in terms of subjective and objective measurements. Difference between Groups: Independent sample t test was used. This a nonparametric test that is used to compare two populations at different various intervals.

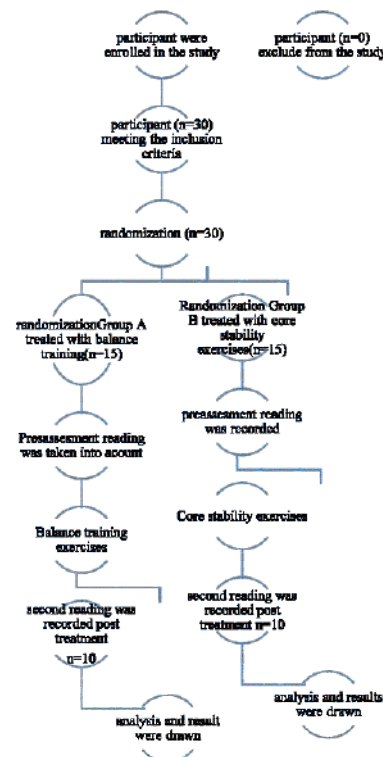


Figure 1: CONSORT diagram

## RESULTS

Baseline values of demographic data of both groups were comparable on basis of to mean± SD. Participants mean age in group A was 8.70±3.23 years compared to 7.30±2.49years in group B. The percentages of female participants were 40.00% whereas male participants were 60.00%. Independent t-test was used for analysing the difference between 2 groups and paired t-test was used for evaluating the data pre and post treatment in the group. Table 1 reveals the comparison of Total Paediatric Berg scale between two groups before and after treatment session. In group 1 (Trunk Balance Exercises) mean±SD before treatment was 10.30±5.77 and after treatment it was 12.40±2.79. While in group B (Truncal Core Stability Exercises) mean & standard deviation formerly treatment was 8.50±3.47 and after treatment it was 20.10±12.09. With  $p<0.04$  which shows that Trunk Core Stability Exercises more significant result as compared to Trunk Balance Exercises

Variable	Outcome measurement	Trunk Balance Exercises n (10) Mean ± SD	Trunk Core Stability Exercises n (10) Mean ± SD
Total Test score	Pre	10.30±5.77	8.50±3.47
	Post	12.40±2.79	20.10±12.09
P		< 0.4	< 0.02

P (Coefficient of alpha,  $P\leq0.05$ ), SD (Standard Deviation), Pre (Pre-treatment), Post (Post treatment)

Table 1: Across the group comparison using Independent Sample Test Total pre and post scoring.

Study Group		Baseline Mean±SD	PostTreatment Mean±SD	p-value
Balance Training	Sitting to standing	1.00±0.94	2.20±1.03	0.00
	Standing to sitting	1.10±0.99	1.80±1.39	0.025
	Transfer	1.50±0.53	2.60±0.52	0.001
	Standing unsupported	1.30±0.67	2.10±0.99	0.003
	Sitting unsupported	1.40±0.96	2.10±0.99	0.000
	Standing unsupported with eye closed	0.90±0.88	2.10±1.19	0.000
	Standing unsupported with feet together	0.60±0.88	1.70±0.94	0.000
	Standing unsupported with one foot in front	0.90±0.57	1.90±0.56	0.000
	Standing on foot	1.00±0.94	2.20±1.13	0.000
	Turning 360 degrees	0.80±0.91	2.00±1.24	0.000
	Turning to look behind left & right shoulders while standing still	0.90±0.74	2.00±1.15	0.001
	Retrieving object from floor	2.10±1.11	2.80±0.91	0.001
	Placing alternating foot on stool	0.90±0.88	2.10±1.10	0.000
	Reaching forward with outstretched arms while standing	1.10±0.881	1.90±0.871	0.000
	Total test score	0.30±5.774	2.4±2.79	0.217
Core Stability Exercises	Sitting to standing	1.30±0.94868	2.30±0.94	0.000
	Standing to sitting	1.70±0.15950	2.70±1.15	0.008
	Transfer	1.30±0.82327	2.40±1.26	0.000
	Standing unsupported	1.30±0.67495	2.40±0.84	0.000
	Sitting unsupported	1.30±0.94868	2.80±0.78	0.000
	Standing unsupported with eye closed	1.10±0.73786	2.30±0.67	0.000
	Standing unsupported with feet together	1.00±0.81650	2.40±0.84	0.000
	Standing unsupported with one foot in front	1.00±0.81650	1.00±0.81	0.000
	Standing on foot	0.90±0.87560	2.00±0.94	0.000
	Turning 360Turning to look behind left & right shoulders while standing still	1.30±0.94868	2.50±0.97	0.000
	Retrieving object from floor	1.20±0.91894	2.40±0.96	0.000
	Placing alternating foot on stool	0.90±0.56765	2.50±0.70	0.000
	Reaching forward with outstretched arms while standing	1.40±.84327	2.30±0.822	0.000
	Total test Score	0.85±3.47211	2.8±10.7	0.003

**Table 2:** Within the group comparison of pre and post treatment mean values in each group using Paired sample t test.

## DISCUSSION

Main purpose of the current study was to associate the result of core stability and balance exercise in postural control amid Down syndromes. Patients aged 5-17 years were randomly allocated including both genders. During the selection analysis for postural influence, statistically separate findings occurred between the two groups, suggesting clear improvement in one group. The aftereffect of current investigation found that there was a critical increment in the examination gatherings anteroposterior, mediolateral and in general dependability lists contrasted with the post treatment bunch as there was a huge impact of centre solidness practices on post strength. These results are similar with Ghaeeni et al. who studied the effect of core stability on the static balance of youngsters with DS assessed by a modified stork stand test, by improving deep muscle strength and endurance of the core stabilization region [6]. The aftereffects of current investigation indicated an improvement in postural control in one gathering when looking at pre and post treatment measurements. This improved might be ascribed with the impact of activity treatment on balance pose control and quality activities. That was predictable with the aftereffect of Gupta et al.

who examined the impacts of opposition, equalization practices on quality and offset in individual with DS. Improvements in strength and balance were observed just after exercise regime [19]. In this investigation it has been indicated that the fundamental effect of centre strength preparing can be ascribed to the way that the centre strength preparing improves the adequacy of NM framework that causes upgraded stumble pelvic - hip chain portability and incredible speeding up and deceleration suitable strong equalization proximal soundness and great capacity. It impacts in the reinforcing of lower extremity muscles which can regulator the development. This is steady with the finding of Kibler et al who contended that fortifying the profound muscles of trunk would settled and set up the lower limit development The transverse abdominal muscle, the inner and outer abdominal muscles and the rectus abdominal muscles stabilize the spine and promote lower extremity movement. Transverse abdominal and multifidus muscles support the spine as well. When the transverse abdominal muscles contract, the internal abdominal pressure and the thoracolumbar fascia are increased to stabilize the region [20]. In the present study, we observed that core stability trainings enhanced the sequence of trunk muscle strength and activity and this agree with the discovery of Hodges and Richardson who recognized muscle activity of trunk before lower extremity activity, assisting the

spine to leading a framework for purposeful movements. They identified that the transverse abdomen is main muscle of becoming active before the definite movement of the limb, this preprogrammed activation of the transverse abdomen was part of the plan used by the central nervous system to control spinal stability [17]. The core is essential because the anatomical place in the body where the center of gravity is situated and the movements generate from it, so the reinforcement of the muscles of the core tends to cause the improved performance of the neuromuscular system and the reduction of the center of gravity displacement and swaying. It is believed that the current study will help to resolve this impairment and will promote further research into the important and growing rapidly specialty of pediatric therapy.

## CONCLUSION

Core stability exercises were more effective in improving postural control among children with Down syndrome.

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## Original Article

## Prevalence of Neck and Back Pain among Gynecologists and Obstetrics in Tertiary Care Hospitals of Lahore

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## ARTICLE INFO

## Key Words:

Neck pain, Back pain, Gynecologist, Musculoskeletal disorders, Obstetrics

## How to Cite:

Afzal, R. ., Akram, S. ., Rehman, H.-U.-. ., Abbas, A. ., Hassan Javed, M. T. ., & Sana Ashraf, H. . (2022). Prevalence Of Neck and Back Pain Among Gynecologists and Obstetrics in Tertiary Care Hospital of Lahore: Neck and Back Pain among Gynecologists and Obstetrics. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.489>

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Received Date: 24th May, 2022

Acceptance Date: 2nd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Neck pain is identified as the ache, irritation and discomfort in the area below your head up to third Thoracic vertebrae. It can radiate to shoulders, arms and fingers also. The presenting complaints of cervical patients include headache, stiff neck, stress, muscle pain, fever, and tenderness, radiating pain, weakness in the arm and difficulty in lifting or gripping activities. Patients may also present with numbness, tingling and weakness of the arm. **Objective:** To determine the prevalence of neck and back pain among gynecologists and obstetrics in different tertiary care hospitals of Lahore. **Methods:** The cross-sectional study included 310 gynecologist and obstetrics that were recruited using non-probability convenience sampling. The cases of the neck pain were recruited from the obstetrics and gynecology department of different hospitals including: Fatima Memorial Hospital, Shalimar Hospital, Services Hospital, Mayo Hospital and Sir Ganga Ram Hospital, Lahore. Research was completed within six months from 23 October 2021 to 30th April 2022. **Results:** Among 310 participants, 196 (63.2%) reported neck pain among which; 153 (44.4%) gynecologists reported pain two times per week. Out of total, 306 (98.7%) reported fatigue especially on long days. Results regarding pain area showed that 196 (63.2%) had neck pain, 64 (24.6%) had back pain and 50 (16.1%) had shoulder pain. Results regarding frequency of pain showed that out of 310 (100%), 153 (49.4%) had pain 2 times per week and 105 (33.9%) had pain 0-2 times per month. **Conclusions:** Prevalence of low back pain was 20.65% whereas prevalence of neck pain in gynecologists was 63.23%. The study suggests that neck pain and fatigue were common in gynecologists and obstetrics. They lack of postural awareness and don't follow ergonomics principles during surgical procedures.

## INTRODUCTION

Pain is a highly uncomfortable physical and emotional experience caused by either disease or some injury [1]. Any injury, problem, abnormality or inflammation in the bones, ligaments and muscles of your neck can lead to neck pain and stiffness. Neck pain is identified as the ache, irritation and discomfort in the area below your head up to third Thoracic vertebrae. It can radiate to your shoulders, arms and fingers also [2]. The presenting complaints of cervical patients include headache, stiff neck, stress, muscle pain, fever, and tenderness, radiating pain, weakness in the arm

and difficulty in lifting or gripping activities. Patients may also present with numbness, tingling and weakness of the arm [3]. Gynecologists and Obstetrics are a special group of healthcare professionals who are at greater risk for developing work related musculoskeletal disorders [4]. One of the most common MSK (musculoskeletal) problems among Gynecologists is cervicogenic pain [5]. Shift in posture can cause a shift in the relationship between the spine and the line of gravity, putting additional strain on muscles and connective tissues [6]. The etiology of neck

pain in them may be incorrect posture, long laparoscopy procedures, awkward vaginal surgeries, prolonged static position, repetitive movements, poor positioning, fatigue and stress etc. As professionals as they perform pelvic and abdominal examination, they experience cervical problems which gets chronic overtime as they are not aware of the correct posture [7]. Lack of ergonomic awareness like height of operation tables and bed is one of the main factors of neck pain among gynecologists [8]. Females are more prone to neck pain than males. So female surgeons experience more musculoskeletal disorders in the neck, upper back and dominant shoulder [9]. Due to continuous flexion of neck during surgical procedures, surgeons develop forward head posture. Adaptation of forward head posture for prolonged periods of time leads to development of chronic neck pain [10]. The initial treatment protocols consist of rest, icing, hot packs and NSAIDs for pain relief [11]. Other options include physical therapy: stretching and strengthening exercises of cervical muscles, manual therapy for muscle stiffness [12,13]. Work related disorders have not only psychological, physical and social impact but also have some economic effects and when it becomes drastic it affects the performance, work capacity, and lead towards early retirements [14]. In surgeons, 90.1 % musculoskeletal disorders were work related. The most frequent and severe MSDs were observed in neck, upper back and shoulders among surgeons. Those who were old and had more work experience took medical opinions [15]. The frequency of MSDs among gynecologists and general surgeon population and concluded that majority of laparoscopic surgeons developed symptoms of pain, stiffness and fatigue. Stationary and exhausting work positions required in techniques of laparoscopy lead towards this prevalence. The area commonly affected were neck, shoulder and low back. Fever, headaches and visual problems are noticed and those who worked for prolonged hours developed MSK signs and symptoms [16]. Gynecologists inquire musculoskeletal symptoms during surgical procedures and women were at double risk of pain in respective region. A high prevalence of LBP (75.6%), neck (72.9%), shoulder (64.4%) upper back (61.6%) and wrist (60.9%) pain [17]. To determine the prevalence of neck and back pain among gynecologists and obstetrics in tertiary care hospitals.

## METHODS

The cross-sectional study carried out including 310 participants selected by non-probability convenience sampling technique. Keeping confidence level 95%, anticipated population proportion 0.72 and Absolute precision 0.05, calculated sample size was 310 or more respondents [18]. The study selection criteria included

female gynecologists and obstetrics from age group 25 to 40 years, those who had to work for more than 6 hours and who were performing surgeries regularly. The cases of the neck pain in gynecologists were selected. An informed consent was obtained from gynecologists for including data in study. The questionnaire used for this study was taken from previous research "Back and Neck Pain in Gynecologist" [5]. A detailed socio-demographic data was obtained inquiring their life style. A history of onset of the problem was obtained to assess the possible etiology. The severity and duration of the condition was measured. Identity of all the patients was not disclosed. The data was entered in SPSS 22.0. Categorical variables were presented in forms of frequencies and percentages in tables and graphically represented as bar charts.

## RESULTS

Results regarding age distribution showed that out of 310, 154 (49.7%) were in the age group of 36-40 years and 123 (39.7%) were in the age group of 30-35 years (Table 1).

Age group	Frequency (%)
30-35	123 (39.7)
36-40	154 (49.7)
41-45	12 (3.9)
46-50	16 (5.2)
51-55	3 (1.0)
56-60	2 (0.6)

**Table 1:** Descriptive statistics of cases according to age group

Results regarding gender distribution showed that out of 310, 305 (98.4%) were females and 5 (1.6%) were males. Out of total, 177 (57.1%) had 0-5 years of practice and 103 (33.2%) had 5-10 years of practice. Procedure performance showed that 230 (74.2%) had performed both laparoscopic and open procedures, 78 (25.2%) had performed open procedures and 2 (0.6%) had performed laparoscopy. About 196 (63.2%) participants had neck pain, 64 (24.6%) had back pain and 50 (16.1%) had shoulder pain (Table 2). Prevalence of low back pain was 20.65% whereas prevalence of neck pain in gynecologists was 63.23%.



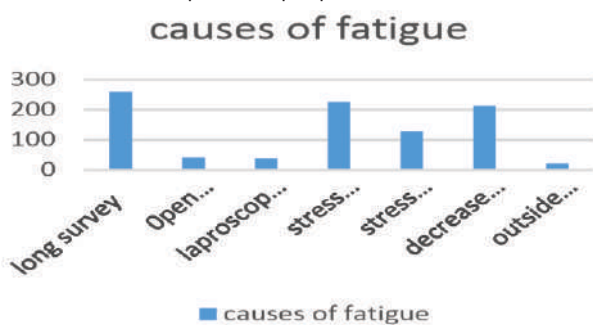
Variables	Construct	Frequency (%)
Gender	Males	5 (1.6)
	females	305 (98.40)
Practice in years	0-5	177 (57.1)
	5-10	103 (33.2)
	10-15	19 (6.1)
	15-20	5 (1.6)
	20-25	6 (1.9)
Performed Procedures	open procedure	78 (25.2)
	laparoscopic	2 (0.6)
	Both	230 (74.2)
Pain region	back pain	64 (20.6)
	neck pains	196 (63.2)
	houlder pain	50 (16.1)

**Table 2:** distribution of cases according to gender

Variables	Construct	Frequency (%)
percentage of laparoscopic to open	100% open	84 (27.1)
	75% open	155 (50.0)
	50% laparoscopic	63 (20.3)
	75% laparoscopic	7 (2.3)
	100% laparoscopic	1 (0.3)
Proper posture taught	Yes	193 (62.3)
	No	117 (37.7)
Prevalence of Low Back Pain	20.65%	
Prevalence of Neck Pain	63.23%	

**Table 3:** distribution according to percentage of laparoscopic to open procedure

Results regarding percentage of laparoscopic to open surgery showed that out of 310 (100%), 155 (50.0%) were performed 75% open procedure, 84 (27.1%) were performed 100% open procedure and 63 (20.3%) were performed 50% laparoscopic procedure (Table 3).



**Figure 1:** distribution of cases according to causes of fatigue

## METHODS

On inquiring about causes of fatigue, like long survey, open procedures, laparoscopic procedures, stress from work and disturbed sleep subjects report multiple causes, out of which long surveys (83.8%), stress from work (72.90) and disturb sleep (69.03%) were the most frequent causes of fatigue reported. Results regarding posture knowledge shows that out of 310 (100%), 193 (62.3%) had posture

knowledge and 117 (37.7%) had no posture knowledge (Figure 1).

## DISCUSSION

Pain is a common complain due to sustain posture, restricted ROM, and decrease head mobility. Increased rate of work-related MSD was reported among surgeons and the most frequently affected area of the body is neck. In this study most of the gynecologists were females. This study showed that almost 63.2% gynecologists and obstetrics were reporting neck pain. The result was more or less same with a previous study conducted in 2018 that reported the frequency of neck pain among vaginal surgeons were 50.3% [9]. The present study reported that 74.2% surgeons suffer from neck pain who perform both open and laparoscopic procedures and 25.2% who only perform open procedure. Laparoscopic surgery is predominantly more stressful as compared to open procedures regarding physical demands. Because laparoscopic surgery requires more static posture than open surgery [19]. Current study portrayed the relationship between fatigue & neck pain and frequency of fatigue among gynecologists and obstetrics. According to research of 2010, surgeons who experience fatigue had more chances to develop neck and back pain than those who do not experience fatigue. And the cause of the fatigue was assumed prolonged procedures and poor posture that surgeons were adopting during surgical procedures [20]. In the present study it was reported that young gynecologists exhibited a high prevalence of neck pain due to lack of work experience and weaker skills in surgical procedures. Inexperienced surgeons had not proper grip on instruments and fine movements. While in contrast one of the previous researches it was found that increased age gradually influences the overall effectiveness and cause pain in different regions of their body including neck and lower back [21]. Total 86 surgeons were participated in this study. And the results shows that 66% participants were reported work related MSK disorders. Low back pain was one of the most common work related MSK disorder among orthopedic surgeons. And prevalence of low back pain is 29.3%. As comparison in my study the most common MSK complain is neck pain among gynecologists and obstetrics [22]. Another systematic and meta-analysis was conducted recently in 2018. The purpose of the study was to calculate the prevalence of work relate MSK disorders among surgeons and interventionists. The most common MSD's and their percentages were following; carpel tunnel syndrome (9%), lumbar spine diseases (19%), shoulder pathologies (18%) and neck problems (17%). The study indicated that the prevalence rate of neck problems was increased 18.3% from last previous years. Current study shows that neck

pain is one the most common MSD among gynecologists and obstetrics. Percentage of neck pain is 63.2% and the frequency of neck pain among them is 2-3 times per week (49.4%) [23]. There was low frequency of male gynecologists as compared to females. There should be self-controlled tables for height adjustments. Proper ergonomics should be followed e.g., maintaining head straight in the middle of shoulders, keeping feet in contact with floor while sitting. General exercises of neck and back should be performed. There should be equal male and female ratio.

## CONCLUSION

Prevalence of low back pain was 20.65% whereas prevalence of neck pain in gynecologists was 63.23%. The study suggests that neck pain and fatigue were common in gynecologists and obstetrics. They have lack of postural awareness and don't follow ergonomics principles during surgical procedures. Female gynecologists and obstetrics had at greater risk of developing neck pain may be because they face ergonomics disadvantage in Operation Theater. They also had shorter stature and less strength than males.

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## Original Article

## Frequency of HRCT Findings and Distribution in Lung Parenchyma in Pneumonia

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## ARTICLE INFO

## Key Words:

HRCT, Bronchopneumonia, Lobular pneumonia, Lymphadenopathy, Ground-glass opacities

## How to Cite:

Rasheed, L. ., Jamil, M., Ali, A. ., Azam, S. ., Akram, H. ., & Kiran, W. . (2022). Frequency Of HRCT Findings and Distribution in Lung Parenchyma in Pneumonia: HRCT Distribution in Lung Parenchyma in Pneumonia. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.556>

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Received Date: 13th June, 2022

Acceptance Date: 9th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Lung's primary role is to allow the diffusion of gases from the surrounding atmosphere into circulation. Pneumonia and associated spread in the lung parenchyma is a very common finding in one or both lungs. **Objective:** To determine the frequency of HRCT findings and distribution in the lung parenchyma in pneumonia patients. **Methods:** It was a cross-sectional study conducted at a Tertiary Hospital in Lahore, Pakistan in the department of Radiology over five months, from January 2022 to May, 2022. A sample size of 90 patients was taken using a convenient sampling approach from previously published articles. Patients with pneumonia were included in the study after informing a consent. All the data were entered and analyzed using SPSS version 22.0. **Results:** Results shows that pneumonia is more common in the age of 56-65years (30.0%). It is more common in the patients having a history of smoking 44(48.9%). One of the most prevalent CT findings was ground-glass opacities 55(17.7%). Lung infection dissemination was found to be unilateral in 16(17.8%) patients and bilateral in 74(82.2%). On categorization and parenchymal distribution, lobular pneumonia was more common 77(85.6%). **Conclusion:** In conclusion, pneumonia is the most prevalent disease among children and older males at the age of 56-65years, having previous history of smoking. The most prevalent observations were lymphadenopathy, ground-glass opacities GGO, and consolidations. Bronchopneumonia findings are more common however, the majority of cases were bilateral than unilateral.

## INTRODUCTION

Pneumonia is a disease in which the airways of either one or both lungs become irritated. Sore throat with sputum or mucus, temperature, cold, and trouble breathing may result from the air sacs filling with mucus (serious waste) [1,2]. Pneumonia can be caused by a variety of organisms, comprising bacteria, and spores [3]. The severity of pneumonia might vary from minor to life-ending [4]. Babies and toddlers, adults over the age of 65, and individuals with chronic conditions or compromised immunity are the most vulnerable [5,6]. The type of germ that develops the illness, the person's maturity level, and their general fitness are all variables that influence how dangerous an incidence of

pneumonia is. It occurs more frequently in adults of higher ages [7,8]. If an immunosuppressed individual presents with indications such as coughing, mucus formation, difficult breathing (with changed respiration and wheezing), or temperature, it must be evaluated in pneumonia [9]. The above clinical signs are non-specific and therefore can occur in people with throat infections, some lung conditions like acute and long-term pneumonia, as well as non-infectious illnesses like responsive lung disorder, lung collapse cardiomyopathy, vasculopathy, and a blood clot in a pulmonary blood vessel, and neoplastic disorder [10,11]. Computed tomography (CT) is substantially

higher efficient in identifying lung nodules, but the clinical implications [12,13]. Even though there are microorganisms that exhibit a radiographic appearance of non-segmental pneumonia, the imaging pattern of non-segmental pneumonia is not limited to any particular causal organism [14]. Non-segmental pneumonia is caused by Pneumococcal bacteria, which is the most prevalent pathogenic microorganism and the nation's fourth-biggest time of mortality [15]. The use of HRCT to indicate the degree of diffused lung disease [16,17]. Since the degree of scarring observed on HRCT corresponds strongly with the fatality rate, HRCT is in the deed effective for evaluating the clinical consequences of idiopathic pulmonary fibrosis (IPF) [18,19]. HRCT findings in Pneumonia include ground-glass opacity, Broncho-vascular opacity [20], reticulation opacities, bronchiectasis, interlobular septal thickening, focal ground-glass opacities [21], consolidation, and their distribution in the lung parenchyma whether it is on left side of right side, whether it is unilateral of bilateral. Findings also includes lobe of lung upper, middle and lower thirds, also with central or peripheral findings [22-25]

## METHODS

It was a cross-sectional study undertaken at a Tertiary Hospital in Lahore, Pakistan's Radiology department over five months, from January 2022 to May, 2022. A sample size of 90 patients was taken by using a convenient sampling approach from previously published articles. After informing a consent patient with pneumonia were included. Patients were having the symptoms of severe cough with or without sputum, shortness of breath, fever, and cyanosis in the study region. Known subjects other than Pneumonia on HRCT were excluded. All data were entered and analyzed using SPSS version 22.0.

## RESULTS

A sample size of 90 patients was taken. There were 40(44.4%)ladies and 50(55.6%)gents among the 90 cases. Patients in the age ranges of (15-25), (26-35), (36-45), (46-55), (56-65), and (66-75) were 4(4.4 %), 9(10.0 %), 16(17.8%), 20(22.2 %), 27(30.0 %), and 14(15.6 %), respectively. Table 1 and Table 2 show people with various medical illnesses including 13(14.4%)patients with chronic kidney disease, 16(17.8%)patients with diabetes, and 24(26.7%)patients with hypertension. However, 37(41.1%) of the patients had no prior medical history.

Clinical history	Frequency	Percent
Cough	64	20.6
Fever	42	13.5
Shortness of breath	75	24.1
Chest pain	13	4.2
Flue	24	7.7
Cyanosis	13	4.2
Crackles	34	10.9
Wheezing sound	46	14.8
Total	311	100.0

**Table 1:** Clinical History of participants

Medical history	Frequency	Percent
Diabetes	16	17.8
Hypertension	24	26.7
Chronic kidney disease	13	14.4
No history	37	41.1
Total	90	100.0

**Table 2:** Medical History of the Patients

Table 3 shows the history of smoking in patients. 44 people (48.9%) had a history of current smoking, 24 (26.7%) were non-smokers, and 22(24.4%) had been prior smokers.

History of smoking	Frequency	Percent
Active smoker	44	48.9
Previous smoker	22	24.4
Non-smoker	24	26.7
Total	90	100.0

**Table 3:** Smoking History of the Patients

Table 4 shows CT findings in patients. One of the most prevalent CT findings were reticular opacities, which were seen in 22 patients (7.1%), bronchiectasis, which was seen in 26 patients (8.4%), septal thickening, which was seen in 22 patients (9.0%), pleural effusion, which was seen in 29 patients (9.3%), osteophytes, which were seen in 46 patients (14.8%), consolidations, which were seen in 49 patients (15.8%), ground-glass opacities, which were seen (18.0%).

CT Findings	Frequency	Percent
Consolidations	49	15.8
Ground glass opacities	55	17.7
Bronchiectasis	26	8.4
Osteophytes	46	14.8
Lymphadenopathy	56	18.0
Pleural effusion	29	9.3
Septal thickening	28	9.0
Reticular opacities	22	7.1
Total	311	100.0

**Table 4:** CT findings in Patients with Pneumonia

Table 5 shows the lungs infected. Lung infection dissemination was found to be unilateral in 16 (17.8%) and bilateral in 74(82.2%)cases

Distribution of Lungs infected	Frequency	Percent
Unilateral	16	17.8
Bilateral	74	82.2
Total	90	100.0

**Table 5:** Distribution of Lungs infected

Table 6 shows the parenchymal distribution in pneumonia. On categorization and parenchymal distribution in pneumonia, there were 13 (14.4%) bronchopneumonia and 77 (85.6%) lobular pneumonia.

Categorization and Parenchymal distribution in Pneumonia	Frequency	Percent
Broncho pneumonia	13	14.4
Lobular pneumonia	77	85.6
Total	90	100.0

**Table 6:** Categorization and Parenchymal distribution in Pneumonia

## DISCUSSION

In the current study, the evaluation of high-resolution computed tomography scans of 90 patients having severe symptoms of pneumonia is included. The minimum age was 15 years and the maximum age was 75 years. The severity of the disease and its parenchymal distribution depends on the immunity of the patient and history of smoking. The current data is approximately similar to literature data showing these tomographic findings in patients with pneumonia. Chen et al, in 2019 concluded the observations of consolidations with ground-glass opacities, reticular opacities with concomitant septal thickening, and bronchiectasis [1]. These results have been reported in a few studies with varying degrees of frequency. In this investigation, reticular opacities, bronchiectasis, septal thickening, ground-glass opacities, and consolidations were seen in 7.1 percent, 8.4 percent, 9.0 percent, 17 percent, and 15 percent of the patients, respectively. These findings have been shown in a few research with varying degrees of frequency. A study done by Lee et al, in 2012 showed that reticular opacities, bronchiectasis, septal thickening, ground-glass opacities, and consolidations were found in 7.1 percent, 8.4 percent, 9.0 percent, 17 percent, and 15% of the patients, respectively [4]. In current study, 9.3% of participants had pleural effusion, which might be unilateral or bilateral, whereas prior studies had only recorded a few cases. Lymphadenopathy was found in 18% of individuals, although there was no evidence of mediastinal lymphadenopathy in the publications. Tibana et al, concluded that a most prevalent HRCT observation was bilateral multifocal infiltration, primarily in the inferior portion, in a prior investigation [8]. In certain investigations, although, the pattern is widespread, with no evidence of regional primacy. In this analysis, HRCT imaging revealed bilateral engagement in the overwhelming majority of instances (82.2%), as well as

segmental pneumonia in 85.6 percent of cases.

## CONCLUSION

Pneumonia is the most prevalent disease among children and older males, who have a previous history of smoking. The most prevalent observations were lymphadenopathy, ground-glass opacities, and consolidations. There were more bronchopneumonia findings than lobular pneumonia. However, the majority of cases were bilateral than unilateral.

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## Original Article

## Role of CT-KUB for Detection of Obstructive and Non-Obstructive Hydronephrosis on The Basis of Frequency of Calculi

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## ARTICLE INFO

## Key Words:

CT KUB, Hydronephrosis, Renal Calculi, Hematuria, Ureteric Stones, Flank Pain

## How to Cite:

Akram, H., John, A., Ali, A., Jamil, M., Rasheed, L., & kiran, W. (2022). Role of CT-KUB for Detection of Obstructive and Non-Obstructive Hydronephrosis on The Basis of Frequency of Calculi: CT-KUB for Detection of Obstructive and Non-Obstructive Hydronephrosis on The Basis of Frequency of Calculi. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.557>

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Received Date: 19th May, 2022

Acceptance Date: 26th May, 2022

Published Date: 31st May, 2022

## ABSTRACT

The kidneys and ureters are the most prevalent sites for stones. The swelling of the kidneys due to renal stones, most often ureteric stones, is known as hydronephrosis. For detecting the position of stones, CT-KUB has a high sensitivity. **Objective:** To determine the frequency of obstructive and non-obstructive hydronephrosis due to calculi in CT-KUB. **Methods:** A cross-sectional study was conducted from January, 2022 to May, 2022 at Tertiary Hospital in Lahore, Pakistan. A sample size of 166 patients was obtained using a non-probability convenient sampling technique based on the previously published articles. All patients with renal calculi were included. 64 Slices Aquilion CT Machine was used. SPSS ver. 22 was used for data entry and analysis. **Results:** 166 Patients were in the age ranges of (15-25), (26-35), (36-45), (46-55), (56-65), and (66-75) were 27(16.3%), 39(16.3%), 32(19.3%), 37(22.3%), 22(13.3%), 9(5.4%) respectively. There were 126(75.9%) males and 40 (24.1%) females. Flank pain was present in 154(94%) and hematuria in 68(41%) patients. Stones were noted in kidneys 102(46.6%), proximal ureter 35(16%), mid ureter 21(9.6%), distal ureter 51(23.3%), urinary bladder 10(4.6%). 96 patients were diagnosed with obstructing hydronephrosis (57.8%). **Conclusion:** Urinary tract stones are most commonly seen in the kidneys and ureters. Obstructive and non-obstructive hydronephrosis is mostly caused by kidney stones. Obstructive hydronephrosis accounted for 57.8% of the total, whereas non-obstructive hydronephrosis accounted for 42.2%. CT-KUB plays a vital role in the diagnosis of hydronephrosis.

## INTRODUCTION

Hydronephrosis is a swelling of the kidney caused by the accumulation of urine in the renal pelvis and calyces [1]. The presence of stones in the urinary tract system is the most common cause of hydronephrosis, although it can also be caused by obstructions in the urinary tract system caused by Renal Calculi, or inflammation [2,3]. Urolithiasis is a condition in which calculus or stones build in various sections of the urinary tract system (kidney, ureter, and bladder) [4,5]. Urolithiasis is the most prevalent cause of renal colic pain and hematuria, or blood in the urine, in patients [6]. Renal tract stones might be detected by chance or develop suddenly, accompanied by symptoms

such as flank discomfort or renal colic [7,8]. Urinary tract blockage causes renal colic. The most common clinical concern is underlying renal, and ureteric stones [9]. Stones in the urinary system are frequent, with a lifetime incidence of up to 12% and recurrent rates of up to 50% [10]. Early diagnosis of Urolithiasis for which non-contrast CT is considered the gold standard, is also useful in the treatment of this disease [11,12]. CT KUB is the preferred examination for evaluation of Urolithiasis because of its availability, ease of performance, and high sensitivity [13]. Because it is a more sensitive and non-invasive approach than IVU and most of the stones noted were radio-opaque



on CT for which plain radiography is not enough to diagnose the stones [14-17]. The size and burden of stones, and also the degree of urinary blockage, may all be detected immediately [16,18]. Two important parameters in detecting the passage of the stones are the size of the stone and its position in the ureters [19,21]. It provides for the accurate detection and quantification of calculus size, as well as the assessment of any related urinary tract blockage [22]. Because it is associated with the spontaneous passage of ureteric stones, accurate assessment of the stone size and position is important for therapeutic therapy [23-25].

## METHODS

The duration from January, 2022 to May, 2022 was considered and patients with renal colic having flank pain and hematuria have been referred to the Department of Radiology for CT-KUB at Tertiary Hospital in Lahore Pakistan. This was a cross-sectional study and the sample size of 166 patients was obtained using a non-probability convenient sampling technique based on the previously published articles. 126 were males and 40 were females. Both Male and Female patients were between the age ranges of 15 to 60 years. All patients with renal calculi who have been referred to the Department of Radiology for CT-KUB were included. While patients other than renal calculi have urinary Tract Infection (UTI), renal failure, and renal tumors were excluded. 64 Slices Aquilion CT Machine was used. Axial slices of 5 mm were obtained through the KUB area without the use of contrast media. SPSS version 22.0 was used for data entry and analysis.

## RESULTS

A sample size of 166 patients was taken in the study. Table 1 shows the age of the patients categorized into different groups. 166 patients were in the age ranges of (15-25), (26-35), (36-45), (46-55), (56-65), and (66-75) were 27(16.3%), 39(16.3%), 32(19.3%), 37(22.3%), 22(13.3%), 9(5.4%) respectively.

Age	Frequency	Percent
15-25	27	16.3
26-35	39	23.5
36-45	32	19.3
46-55	37	22.3
56-65	22	13.3
66-75	9	5.4
Total	166	100.0

**Table 1:** Age of the Patients

Table 2 shows the gender of the patient. There were 126(75.9%) males and 40(24.1%) females among 166 patients.

Gender	Frequency	Percent
Female	40	24.1
Male	126	75.9
Total	166	100.0

**Table 2:** Gender of the Patients

Table 3 shows symptoms of the patients most commonly flank pain and hematuria. Flank pain is present in 154(94%) patients, while hematuria in 68(41%) patients are noted.

Symptoms	Frequency	Percent	
Flank Pain	Yes	156	94.0
	No	10	6.0
	Total	166	100.0
Hematuria	Yes	68	41.0
	No	98	59.0
	Total	166	100.0

**Table 3:** Symptom among patients

Table 4 shows the location of the stones. Frequencies of the location of stones are kidney stones 102(46.6%), Proximal ureter 35(16%), Mid ureter 21(9.6%), distal ureter 51(23.3%), and Urinary Bladder 10(4.6%).

Location of stone in CT KUB	Frequency	Percent
Kidney	102	46.6
Proximal ureter	35	16.0
Mid ureter	21	9.6
Distal ureter	51	23.3
Urinary bladder	10	4.6
Total	219	100.0

**Table 4:** Location of the stone in CT KUB

Table 5 shows the categorization of hydronephrosis in kidney stones. 96 patients were diagnosed with Obstructing hydronephrosis 57.8% and 70 patients with Non-Obstructing hydronephrosis 42.2%

Categorization of hydronephrosis kidney stones	Frequency	Percent
Obstructive hydronephrosis	96	57.8
Non-obstructive hydronephrosis	70	42.2
Total	166	100.0

**Table 5:** Categorization of hydronephrosis kidney stones

## DISCUSSION

In the current study, non-contrast CT KUB (Kidney, Ureter, and Bladder) on 166 patients was performed. Patients came with complaints of flank pain and hematuria. Flank pain was present in 154(94%) patients. Hematuria was in 68(41%) patients. A study by Moawia Gamerddin et.al shows that males are more prone to have kidney stones than females. Another study by Hizbullah Janet also shows male ratio is more than the female ratio [19]. Parisa Fani in 2018 concluded that male patient with stones is more prevalent than females. The current study also shows males are more than females. In the current study, stones are observed more common in males 126(75.9%), and less common in females 40(24.1%) [18]. All of above mentioned previously published studies and the present study concluded that

urinary tract stones are most common in males. The age ranges of (15-25), (26-35), (36-45), (46-55), (56-65), and (66-75). The minimum age was 15 years and the maximum age was 75 years. All patients with urinary tract stones who came with the complaint of flank pain and hematuria were included. While patients other than renal calculi had Urinary Tract Infection, Renal failure, and Renal Tumors were excluded. Calculi can be present in the pelvicalyceal system or other locations (Proximal ureter, Mid ureter, Distal ureter) in ureters that were the majority cause of obstructing hydronephrosis. In literature, Parisa Fani et al. described that majority of the calculi were ureteric. However, the present study also indicates a higher percentage of presence of the ureteric calculi at different locations. In the current study Obstructive hydronephrosis is more prevalent than non-Obstructive hydronephrosis.

## CONCLUSION

Urolithiasis is the most common condition in both men and women. Patients with stones in their urinary system have flank pains and hematuria. Urinary tract stones are most commonly seen in the kidneys and ureters. The presence of stones in the urinary tract system (Urolithiasis) is the most prevalent cause of hydronephrosis. Obstructive and non-obstructive hydronephrosis are caused by kidney stones. For patients with stones in the kidney, various regions of the ureters, and the urinary bladder, non-contrast CT KUB conducted outstanding imaging investigations. The role of CT-KUB in the diagnosis of urinary system calculi was also investigated in this study.

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## Original Article

## Prevalence and Risk Factors of Fear of Fall among Old Age Population of Lahore, Pakistan

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## ARTICLE INFO

## Key Words:

Fear of fall, Old age population, Fall Self efficacy scale<sup>1</sup>

## How to Cite:

Khalid, K. ., Zulfaqar, N. ., Riaz, H. ., & Jabbar, M. . (2022). Prevalence And Risk Factors of Fear of Fall Among Old Age Population of Lahore, Pakistan: Fear of Fall Among Old Age Population. Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.559>

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Received Date: 25th June, 2022

Acceptance Date: 11th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Falls are one of the most common problems that older people face, and they are a major contributor to their higher morbidity and mortality rates. Anxiety over falling, whether actual or perceived, is the most common description of this condition. **Objective:** To assess prevalence and risk factors of fear of falling among old population in Lahore, Pakistan **Methods:** A cross-sectional study was conducted on 139 old age population. The data was collected on the spot from the University of Lahore teaching hospital and doctor hospital. Data was collected using a non-probability convenient sampling technique. Fall efficacy scale 1 and self-administered questionnaire were used for data collection. **Results:** 64% of the 139 participants were female, while 39.6% were male; 19 (13.7%) were over 80 years old, while 36 (24.9%) were 60 to 69 years old; BMI of 71 (51%) was below normal; and 62 (44.6%) had a history of falling. Fear of falling was expressed by 62.6% of the older population, and it was linked to all risk factors. **Conclusion:** Fear of falling is very common in the old population of Lahore, Pakistan Furthermore age, BMI, and past fall experience were all connected to fear of falling.

## INTRODUCTION

Falls are one of the most prevalent issue that aged people face, and they are a major contributor to their higher morbidity and mortality rates. A fall is an accident in which a person falls and comes to a stop on the ground, usually as a result of a combination of internal and external risk factors. Falls and their consequences are the second-leading cause of unintentional injury morbidity. A fall can result in non-traumatic or traumatic injuries, which can range from no injuries, bruises, or lacerations to dislocations, fractures, and brain injuries, as well as death in extreme cases [1-2]. In terms of the number of older adults, Brazil is now placed seventh in the world; by 2025, it is anticipated to be sixth. As falls among older individuals are recurring and complex even [3], caused by many risk factors such as Age, gender, previous falls, fractures, falls other than slips

and trips, recency of a fall, decreased mobility, poor balance test performance, chronic dizziness, higher levels of pain and the use of psychoactive medicines are the most significant risk factors for falls in aged people [4]. In a few retrospective investigations, hypoglycemic medications have been linked as a fall risk factor [5-7]. Another chronic medical condition that increases the chance of falling is osteoarthritis. A person's ability to navigate around things may be impaired by osteoarthritis of the hip or knee. There is also the possibility that postural stability will be compromised if the afflicted leg is tended to be avoided while fully loaded. Falling risk increases with comorbidities, as one may anticipate [5]. Low self-efficacy or low confidence in one's ability to prevent falling is the current definition of fear of falling in current studies. Low

self-efficacy lead people to focus more on the tasks than the obstacles whereas who have high self-efficacy are more likely to develop solutions to overcome their limits [8]. Although the exact causes are unknown, several writers agree on a multifaceted etiology of the fear of falling, which is closely associated to negative aspects such as diminished quality of life, decreased mobility and functionality, increasing frailty, depression, environmental stressors, and institutionalization. Additionally, people with a history of falls and balance disorders are more likely to experience anxiety [9-12]. Some exercises has been shown to reduce the chance of falling such as two approaches to fall prevention have been developed. The first involves exercise, better footwear, and assistive equipment. The second involves adaptations or modifications to the home environment, a review of medication, and greater monitoring by cares. Identifying intrinsic (muscle weakness, neurological impairments, etc.) and extrinsic (bad illumination, unsuitable footwear, etc.) risk factors for falls is an essential and effective preventive strategy [13]. It was shown that older individuals who practiced Tai Chi for 15 weeks had a 47 percent lower relative risk of multiple falls than those who did not [14]. According to researcher's knowledge, there is lack of information regarding prevalence of fear of falling and its risk factors among old population of Lahore. This study would help old people of Pakistan in developing interest in risk factors of fall and decrease its chances by using exercise methods. This study will also encourage further researches on this topic. Therefore, the purpose of the study is to determine the prevalence and risk factors of fear of falling among old population.

## METHODS

This study was conducted from Feb 2022 to May 2022 by selecting sample of old population living in Lahore, Pakistan. After IRB approval, the survey was conducted among 139 old population through convenient sampling technique residing in Lahore. The sample size was determined using the percentage formula of sample size estimation with a margin of error of 5%. Data was collected from old population aged between 50 to 80 years, with those who did not meet the criteria being excluded. People who reported neurological or musculoskeletal illnesses, as well as those who had surgical operations within the previous six months, were eliminated. Participants were thoroughly briefed on the testing method. All individuals agreed to participate, were open to additional research, and completed the survey. In the present study, response of 139 participants were recorded through several observations by visiting & interviewing them. Demographic questions about age, gender, BMI, and for fear of fall Self

efficacy 1 questionnaire were included in this survey. Data were analyzed using SPSS 26.0. The frequency and percentage of qualitative variables were reported. Furthermore, the Chi-square analysis was used to determine the relationship between risk factors such as gender, age, and BMI and the fall self-efficacy 1 among old population.

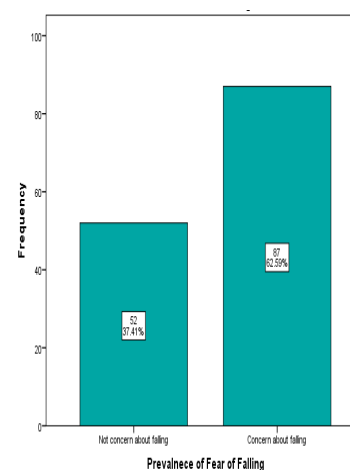
## RESULTS

There were 55(39.6%) men and 84(60.4%) women among the 139 old people. Age of 36(25.9%) was 60-69 years, of 49(35.3%) was 50-59 years. BMI of 71(51%) was below normal weight and normal weight was found in 35 people (25.2%). 82 percent of them they had no prior history of falling and no discomfort (Table 1).

Variables	Frequency (%)
Gender	
Male	55(39.6%)
Female	84(60.4%)
<b>Age</b>	
50-59	49(35.3%)
60-69	36(25.9%)
70-79	35(25.2%)
≥80	19(13.7%)
<b>BMI</b>	
Less weight	71(51%)
Normal Weight	35(25.2%)
Overweight	33(23.27%)
<b>Previous History of Fall</b>	
Yes	62(44.6%)
No	82(59%)
<b>Pain</b>	
Yes	57(41%)
No	82(59%)

**Table 1:** Descriptives of Demographic Data

Out of 139 old people 87(62.59%) had no concern about falling and 87(62.59%) had concern about falling (Figure 1).



**Figure 1:** Prevalence of Fear of falling

Out of 139 people, 72 (51.8%) were very concerned when going out for a social function, 61 (43.9%) were very concerned when bathing or showering, and 57(41.0%) were slightly concerned. 62(44.6%) of 139 participants were concerned about getting dressed or undressed, while 60(43.2%) were highly concerned, 55(39.6%) were anxious about getting in and out of a chair, and 65(46.8%) were highly concerned. And 54(38.8%) were apprehensive about getting up or downstairs, while 67(48.2%) were highly concerned. Reaching for something over your head or on the ground worried 53 (38.1%) of 139 participants, while 66(47.5%) were very concerned (Table 2).

Parameter	Not at all concerned 1	Somewhat concerned 2	Fairly concerned 3	Very concerned 4
Cleaning the house (e.g. sweep, vacuum or dust)	7(5%)	15(10.8%)	60(43.2%)	57(41%)
Getting dressed or undressed	5(3.6%)	12(8.6%)	62(44.6%)	60(43.2%)
Preparing simple meals	5(3.6%)	16(11.5%)	16(11.5%)	66(47.5%)
Taking a bath or shower	5(3.6%)	16(11.5%)	57(41.0%)	61(43.9%)
Going to the shop	7(5%)	15(10.8%)	52(37.4%)	65(46.8%)
Getting in or out of a chair	5(3.6%)	14(10.1%)	55(39.6%)	65(46.8%)
Going up or down stairs	7(5%)	11(7.9%)	54(38.8%)	67(48.2%)
Walking around in the neighborhood	6(4.3%)	10(7.2%)	62(44.6%)	61(43.9%)
Reaching for something above your head or on the ground	6(4.3%)	14(10.1%)	53(38.1%)	66(47.5%)
Going to answer the telephone before it stops ringing	6(4.3%)	13(9.4%)	49(35.3%)	71(51.1%)
Walking on a slippery surface (e.g. wet or icy)	8(5.8%)	9(6.5%)	55(39.6%)	67(48.2%)
Visiting a friend or relative	5(3.6%)	11(7.9%)	54(38.8%)	69(49.6%)
Walking in a place with crowds	5(3.6%)	13(9.4%)	51(36.7%)	70(50.4%)
Walking on an uneven surface (e.g. rocky ground, poorly maintained pavement)	7(5%)	11(7.9%)	50(36%)	71(51.1%)
Walking up or down a slope	6(4.3%)	10(7.2%)	53(38.1%)	70(50.4%)
Going out to a social event (e.g. religious service, family gathering or club meeting)	5(3.6%)	12(8.6%)	50(36%)	72(51.8%)

**Table 2:** Descriptive of Fall Self Efficacy 1

Chi square analysis performed to find out correlation of risk factors with prevalence. According to results previous history of fall, age and BMI had correlation to prevalence of fear of fall among old population as p values were significant .013, .00 .00 respectively. Pain in lumber region and in knee joint on most days during the previous month was categorized as pain had correlation with the prevalence (Table 3).

Variables	p-value
Gender	0.023
Male	
Female	
Age	0.00
50-59	
60-69	
70-79	
≥80	

BMI	
Less weight	.00
Normal Weight	
Overweight	
Previous History of Fall	
Yes	.013
No	
Pain	
Yes	.00
No	

**Table 3:** Association between risk factors and fall self-efficacy 1

## DISCUSSION

The study included 139 old age people with a mean age of 54.32 years. The minimum and maximum ages were 45 and 60, respectively. In the study concern level regarding activities of the daily level was asked by using the fall efficacy scale 1 questionnaire. The result showed that 62.6% (87) had a severe concern of fall while only 37.4% (52) had no major concern of fall. A comparable study performed by Cynthia L. Arken and others concluded that a sample of generally well-resided older people, compared with the reported sample of a pension facility, was common to fear falling. The significant and continuous link between fear and reduced quality of life underlines the importance of public health. This study employed a self-administered and geriatric depression scale questionnaire to evaluate fear of fall among the elderly [15]. Lopes KT and colleagues found in a further investigation that most individuals were afraid of falling irrespective of fall history. Only 54.42 percent had reported an event of fall among those who were afraid to drop (90.48 percent) in at least an FES-I-BRAZIL-scale assignment. This study employed FES-I-BRAZIL to evaluate the fear of falls, in contrast to the current study. Even elderly individuals with no history of falls might be afraid of falling [11]. Other studies indicate that fear of fall fluctuates from 20 percent to 85 percent among the elderly population [12, 16]. The fear of falling was characterized as being independent of prior experience with falling, and the increase in fear of falling after a fall is tied to the fall itself rather than the fall itself. According to Salked et al., falls that result in severe injuries significantly increase anxiety; the history of falls is viewed as a critical risk factor for dread [17]. Most studies identify ageing as a risk factor for falling fear, saying that advanced age is related with a loss of functional reserve and that the perception of these losses can lead to a low sense of self-efficacy and a fear of falling [15, 17-20].

## CONCLUSION

Fear of falling is very common in the old population of Lahore, Pakistan. Furthermore age, BMI, and past fall experience were all correlated to fear of falling.

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## Original Article

## Assessing The Quality of Life Among Older Adults Having Oral Health Problems

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## ARTICLE INFO

## Key Words:

Quality of Life, Older Adults, Oral Health

## How to Cite:

Wajeeha, ., Rizwan, B., Fatima, A. ., Nazia Kausar, H. ., Mujeeb, K. ., Rasheed, M. ., Tanveer, K. ., Gull, F. ., Zaman, S. ., Maqbool, F. ., & Jabeen, H. . (2022). Assessing The Quality of Life Among Older Adults Having Oral Health Problems: Quality of Life among Older Adults with Oral Health Problems. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.609>

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Received Date: 22nd June, 2022

Acceptance Date: 10th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Oral health refers to the health of the oral cavity of an individual. Oral health is the most important part of general healthcare. The oral cavity or mouth make a major part of human body and considered to be the beginning of gastrointestinal and respiratory systems. The concept of Oral Health-Related Quality of Life (OHQoL) is focused on the idea that oral health issues can harm a person's self-esteem and self-image, create other health problems, hinder social contact, and cause pain, stress, and sadness. **Objective:** To assess the Quality of Life (QoL) among older adults having oral health problems. **Methods:** A Cross-sectional study was carried out from 'Heaven Old-Age home', Ferozepur Road, Lahore. Middle age to older adults aged between 45 to 80 years suffering from oral health problems were selected through a non-probability convenient sampling technique, and the sample size of 100 was enrolled. Participants were assessed through a self-constructed questionnaire. The data was analyzed by SPSS version 21.0. **Results:** Out of 100 participants, 45 were males while 55 were females while 96 participants were married. Socioeconomically, 72 participants belonged to the middle class in which 67 participants were educated, while 33 were uneducated. Result showed that 39 felt almost inability of chewing, 51 felt uncomfortable eating, 61 were feeling difficulty in biting hard food, and 54 were feeling difficulty while taking a big bite. Moreover, 77 were feeling difficult or restricted smiling, 74 were feeling difficulty in relaxing while 71 were feeling tense, and 83 were feeling irritable. 75 were embarrassed because of oral issues. However, 65 had pain in the mouth while 35 did not. 68 individuals had history of toothache in the previous 12 months, while 32 had not. **Conclusion:** It was concluded that there is an association between quality of life and oral health. Older adults face problems in chewing and swallowing food, feel pain while chewing or biting the food, and face nutritional deficiencies affecting their quality of life.

## INTRODUCTION

Oral health is vital for good health, that is affected by numerous components that get swapped over time, and the change may be positive or negative. An older adult is a vulnerable group and requires aid in maintaining their daily routine activities [1]. Oral health refers to the health of the oral cavity of the individual and may be termed as it is the beginning point of the concept of general health. The oral cavity and the mouth are the major parts of the human body through which they can communicate with each other. The most important part of digestion is swallowing, and the mouth plays an important role in good physical appearance [2]. Oral health is the most important, as poor oral health leads to diseases which are indigestion, gastrointestinal

disorders, and some other types of cancers of oral cavity, which are interlinked with these due to insufficiency of the person to eat a healthy diet when their oral health is compromised [3]. The majority of older adults don't have the ability to take care of themselves because of economic problems, difficulties in getting access to healthcare and low education levels [4]. The oral health status and general health relationship can be observed from different points, especially from a subjective viewpoint. HRQoL and OHRQoL measurements, which show an individual's level of well-being, are beneficial for observing the possible consequences of oral disorders [5]. Elderly people of age above 65 years, face more difficulties in performing oral



functions like mastication and swallowing, oral motor skills, and existing natural teeth determine the poor status of oral health, which predict loss of muscle mass, also called sarcopenia, frailty, and weakness. The poor status of oral health foretells the severe health issues. For healthy aging, it is important to prevent oral frailty [6]. Between 2015 and 2030, the population aged 60 years or above have increased survival chances by 56%, from 901 million to 1.4 billion [7]. Almost 60% of the Pakistani population have dental caries. The ratio is almost equal in all different regions of the country. Present study reviewed the published material on oral health association with generalized health in elderly population and it has been noticed that most of the included studies were showing high risk of dental issues [8]. The older adults, suffering from dementia-like problems have more risks of caries and many other kinds of oral health problems, which may include gums bleeding, oral soft tissues and periodontal problems, mucosal lesions, and low saliva production [9]. Environmental factors also play an important part in the quality of life of older people who often have problems maintaining physical, psychological, and social functioning [10]. Tooth loss is another major poor oral health problem which can cause hypo salivation leading to chewing problems and swallowing issues. Poor oral health can make the patient unable to take all sorts of foods and diets. Diet can only be restricted to soft diets, which may be nutritionally deficient and can cause malnutrition and aggravate multiple health problems [11]. Although most oral diseases may not pose a life-threatening threat, they do affect overall quality of life by prolonging pain and suffering and causing functional, cosmetic, nutritional, and psychological issues. Health education initiatives with a focus on self-perception, self-protection, and self-care should be investigated [12]. Oral Health-Related Quality of Life (OHRQoL) is a multi-faceted model that affects individuals daily routine functions or general quality of life and health or influence on oral or dental health [13]. The concept of Oral Health-Related Quality of Life (OHQoL) is focused on the idea that oral health issues can harm a person's self-esteem and self-image, create other health problems, hinder social contact, and cause pain, stress, and sadness. It's critical to understand which oral health characteristics contribute to increased quality of life to focus on how to improve the quality of life of an older person [14]. There is a need to prevent older adults from oral health-related problems to maintain a healthy quality of life [15]. Dental decay and gum diseases are among the most common disorders in people of all ages, and if left untreated, they can lead to tooth loss problems, loss of masticatory function, poor nutrition, loss of self-confidence, social issues, and a lower quality of life [16].

Cognitive decline has been linked to poor tooth health and chewing deficits [19]. In a study, some elderly people agreed that their oral health is of great importance for their quality of life, especially concerning their eating habits, comfort level, their appearances and their overall health [17]. It is suggested that the oral health of elderly people can be improved by easy and accessible oral treatments that depend upon their clinical needs and self-perceived needs [18]. Social and demographic components show discrepancies and may also affect the quality of life of older people. Low quality of life is more to be related to poor oral health, loneliness and increasing age [20].

## METHODS

A cross-sectional subjective analysis was carried out from Heaven Old-Age Home, Ferozepur Road, Lahore. Middle age to older adults aged between 45 to 80 years suffering from oral health problems were selected through a non-probability convenient sampling technique, and 100 individuals were enrolled in the study. Adults of age less than 45 years and non-cooperative older adults were excluded from the sample group. Participants were assessed through a self-constructed questionnaire. After collection of data it was analyzed by SPSS version 21.0 and graphs and tables were prepared using Microsoft Excel version 2016. Frequencies and tables were formulated by the qualitative analysis.

## RESULTS

Table 1 shows that out of 100 participants, 66 participants were in the age group of 50 to 60 years, 20 participants were between 61 to 70 years, 6 were between 71 to 80 years, and 8 were between 81 to 90 years. 45 were males while 55 were females. 96 were married, while 4 were unmarried. 18 belonged to the lower socio-economic class, 72 belonged to the middle class, while 10 belonged to the upper class. 67 were educated, while 33 were uneducated.

Age			
Sr.no.	Age categories	Frequency (n)	Percentage (%)
1	50 to 60	66	66.0
2	61 to 70	20	20.0
3	71 to 80	6	6.0
4	81 to 90	8	8.0
5	Total	100	100
Gender			
Sr.no.	Gender categories	Frequency (n)	Percentage (%)
1	Male	45	45.0
2	Female	55	55.0
3	Total	100	100
Marital Status			
Sr.no.	Marital status categories	Frequency (n)	Percentage (%)
1	Married	96	96.0
2	Unmarried	4	4.0
3	Total	100	100

Socio-Economic Status			
Sr.no.	Socio-economic status categories	Frequency (n)	Percentage (%)
1	Lower class	18	18.0
2	Middle class	72	72.0
3	Upper class	10	10.0
4	Total	100	100
Education Level			
Sr.no.	Education level categories	Frequency (n)	Percentage (%)
1	Educated	67	67.0
2	Uneducated	33	33.0
3	Total	100	100

**Table 1:** Frequency and Percentage distribution of demographics.

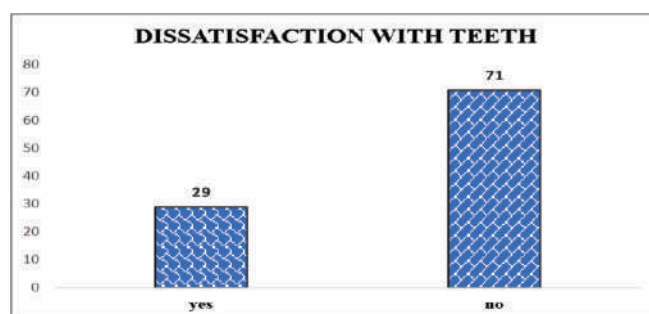
Table 2 reflects that out of 100 participants, 39 were not feeling interrupted in eating food, while 61 were. Although 51 felt uncomfortable eating and 49 were not disturbed. 42 participants think that their diet is unsatisfactory, while 58 do not. 61 were feeling difficulty in biting hard food, while 39 were ok with it. As, 54 were feeling difficulty while taking a big bite, the other 46 were not. 61 think to change types of food while other 39 did not. 76 were experiencing restricted talking, while 24 were not. Moreover, smile of 77 was affected, while for 23 it was not. 25 were not feeling difficulty or restriction in laughing, while 75 were. 74 were feeling difficulty in relaxing while 26 were not. 71 were feeling tense, and 83 were feeling irritable. 18 were not feeling difficulty doing the usual jobs, while 82 were and 75 were embarrassed because of oral issues. However, 65 had aching teeth in the mouth while 35 did not. 68 had toothache in the previous 12 months, while 32 had not. About 57 had denture discomfort currently or in the previous 12 months, while 43 had no discomfort with denture.

Oral Function			
Sr.no.	Questions assessing oral function	Yes(n)	No(n)
1	Do you feel interrupted while eating food?	61	39
2	Do you feel uncomfortable while eating?	51	49
3	Do you think your diet is unsatisfactory?	42	58
4	Do you feel difficulty in biting hard food?	61	39
5	Do you feel difficulty while taking a big bite?	54	46
6	Do you think you have to change the types of food eaten?	61	39
Psychosocial Impact			
Sr.no.	Questions regarding the psychosocial impact	Yes	No
1	Do you feel difficult or restricted talking?	76	24
2	Do you feel difficult or restricted in smiling?	77	23
3	Do you feel difficult or restricted in laughing?	75	25
4	Do you feel difficulty relaxing?	74	26
5	Do you feel tense?	71	29
6	Do you feel irritable with other people?	83	17
7	Do you have difficulty doing your usual jobs?	82	18
8	Do you feel embarrassed because of oral issues?	75	25

Comfort and Well-Being			
Sr.no.	Questions assessing oral function	Yes	No
1	Do you feel painful aching in your mouth?	65	35
2	Do you have toothache or pain currently or in the previous 12 months?	68	32
3	Do you feel denture discomfort currently or in the previous 12 months?	57	43

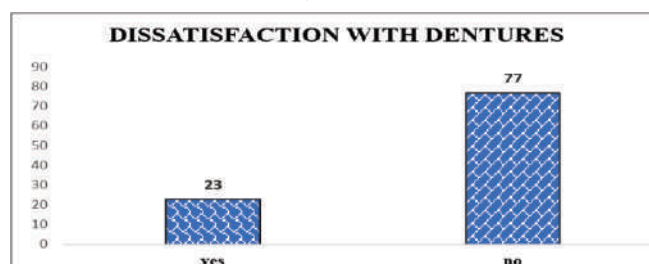
**Table 2:** Frequency distribution of Quality of Life (QoL) scale

Figure 1 shows that out of 100 participants, 29 were dissatisfied with teeth while 71 were not dissatisfied.



**Figure 1:** Distribution of dissatisfaction with teeth (QoL) among older adults

Figure 2 shows that out of 100 participants, 77 were dissatisfied with dentures, while 23 were not.



**Figure 2:** Distribution of dissatisfaction with dentures (QoL) among older adults

According to above table 3 a significant association between embarrassment because of oral issues and dissatisfaction was found with  $p$ -value  $\leq 0.05$ .

Sr.no.	Embarrassed because of oral issues	Dissatisfaction with teeth		Total	P-value
		Yes	No		
1	Yes	14	11	25	0.001
2	No	15	60	75	
3	Total	29	71	100	

**Table 3:** Association between embarrassment because of oral issues and dissatisfaction with teeth

Table 4 shows the association between embarrassment because of oral issues and dissatisfaction with the appearance of dentures with a significant  $p$ -value of  $\leq 0.05$ .

Sr.no.	Embarrassed because of oral issues	Dissatisfaction with the appearance of dentures		Total	P-value
		Yes	No		
1	Yes	12	13	25	0.001
2	No	11	64	75	
3	Total	23	77	100	

**Table 4:** Association between embarrassment because of oral

issues and dissatisfaction with the appearance of dentures

## DISCUSSION

The study was conducted to find out the importance of oral health in older people's quality of life. The respondents were selected through a non-probability convenient sampling technique. In the current study, the results showed that out of 100 participants, 66% participants were in the age group of 50 to 60 years, 20% participants were in between 61 to 70 years, 6% were in between 71 to 80 years, and 8% participants were in between 81 to 90 years. A similar study was performed by Mohd Masood et al., 2017 which showed that 59% of participants were between the 65-75 years of age, while 40.8% of participants were of the age group of above 75. Similarly, findings pertaining to individual marriages were also reported in the that paper which corresponds to our results, i.e. in the present study, the results showed that only 4% of respondents never got married, while 96% were married, whereas, according to Mohd Masood et al., 2017, 7.6% of participants never got married while 57.6% of participants were married [13]. In the current study, the results showed that the gender of respondents taken was 55% females while only 45% were males, and it was the same finding of a research which was performed by Gerhard Schmalz et al., 2021 in which there were 68.9% females while 31.1% males were included [21]. The current research showed that out of 100, 32% of older adults were uncomfortable on eating food due to oral health issues same was seen in a similar study by Reshu Agarwal Sagtani et al., 2020 which concluded that 37.6% of respondents were uncomfortable while eating food. It has also been observed in this study, that 25% of participants were embarrassed because of their poor oral health, again corresponding to Reshu Agarwal Sagtani et al., 2020's findings in which 28% of older adults gave history of embarrassment because of their poor oral health. Additionally, it was found that 8% of participants always have pain while 42% often face this issue, same was reported by those authors as well, with 30% of the participants having oral pain [22]. The absence of natural teeth is another normal occurrence in old age as our study finds out that 95% of people have natural teeth, whereas only 5% do not have them. Even the studies reflect that Yuan studied the phenomenon of natural teeth in his research. Many other studies focused on natural teeth and dentures as a study on Chinese people 90 years of age suggests that 84% of people had less than 20 teeth. The same study reveals the denture pattern even in the different gender, which says that 60% of people had natural teeth in the upper jaw [23]. The studies undertaking gender and multiple age groups as sampling play a pivotal role in getting the key results. Our study reflects a different result

saying 53% of people have no denture in the upper jaw. It might be because most of the population of our study is youth, and more adults have minor problems. In the current study it was also noticed that chewing and swallowing of food of older individuals was associated with different dietary food consistencies, 62% of participants felt difficulty in chewing food, and 38% of participants were not. Same was the observation of the study by Kulvanich S in 2021 showing the 95% participants, ate pudding without any problems, and 49% ate rice crackers without any signs of swallowing difficulty such as coughing or difficulty in chewing [24]. 32% of the participants were uncomfortable with swallowing of food because of under chewed food material secondary to dental issues in our research. Similar associations have been reported between difficulty of eating and mouth mobility problems in the research conducted by Kensuke Nishio in 2021. Our findings additionally showed that self-reported difficulty of eating due to dental problems and difficulty of swallowing was associated with frailty, mouth mobility limitations, and jaw grip strength [25].

## CONCLUSION

It is concluded that the relationship between oral health status and quality of life can be observed from different points, especially from a subjective viewpoint. HRQoL and OHRQoL measurements, which show an individual's level of well-being and the possible consequences of oral disorders. Mostly, individuals between 45 to 80 years, were facing the problems in chewing and swallowing of food due to oral cavity issues, leading to nutritional deficiencies with indirect effects on their quality of life.

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## Original Article

## Impact of Balance Training and Coordination Exercises in Post Hemiplegic Stroke Patients; A Cross Sectional Study

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## ARTICLE INFO

## Key Words:

Hemiplegic stroke, Balance &amp; Coordination

## How to Cite:

 Maqbool, S., Jawa, R., Sattar, T., Awais, M., Uzair Asghar, H. M., Shad, M., Chaudhry, M., & Mushtaq, M. (2022). Impact Of Balance Training and Coordination Exercises in Post Hemiplegic Stroke Patients: Balance Training and Coordination Exercises for Post Hemiplegic Stroke. Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.614>

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Received Date: 27th June, 2022

Acceptance Date: 12th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

A medical condition that occurs due to interrupted blood supply to the brain leading to restricted oxygen supply to the tissues resulting in cell death is known as "stroke". It is considered as a second leading cause of death globally and a major cause of disabilities for the patients surviving from its fatality. Monoplegia, Diplegia, Hemiplegia, Quadriplegia, hemiparesis are all the different gifts of the stroke given to multiple patients suffering from it. **Objective:** The aim of the study was to evaluate the difference between the hemiplegic stroke patients who have undergone physical therapy treatment in contrast to those patients who have not taken any physical therapy treatment. **Methods:** Cross sectional study design was selected for the performance of the research. Research setting was a Government Sector Hospital. Specific balance and coordination exercises were given to the hemiplegic stroke patients and their effect was observed in the term of their recovery speed. Out of sample of 40 individuals, some have taken physical therapy rehabilitation with varying number of sessions and intensity of exercises while in contrast, some have not taken any physical therapy from scratch following stroke. Brunel Balance Assessment (BBA) scale was measured in relation to the effect of exercises given to the patients. **Results:** The data analysis has shown significant improvement in balance and different fine motor movements in post training group as compared to those who have not taken physical therapy rehabilitation. Data analysis has clearly shown that percentage of improvement in the condition of patients is directly related to the frequency of exercise given to them in their post stroke period. The BBA scale was having higher values in the patients undergoing physical therapy rehabilitation as compared to the patients who have not undergone any sort of physical therapy rehabilitation. **Conclusion:** Balance and coordination exercises have impact in the post hemiplegic stroke patients.

## INTRODUCTION

A stroke is a clinical presentation illness of quickly evolving symptoms or signs of focused loss of brain function without any other obvious cause than that of vascular origin, however the loss of function may occasionally be widespread (applied to patients in deep coma and to those with subarachnoid haemorrhage). The symptoms are fatal or persist for more than 24 hours [1]. The following four mechanisms can be used to classify atherothrombotic strokes in major arteries: in situ thrombosis, artery-to-artery embolism, hemodynamic infarct, and branch atheromatous disease. Ischemic strokes can manifest

through two or more complex processes rather than just one [2]. With a worldwide prevalence of 76 – 119 per 100,000 people each year, stroke is a significant health concern for the entire world. Up to 50% of stroke victims still experience lasting symptoms despite recent breakthroughs in stroke treatment. Balance issues in stroke survivors are linked to a higher risk of falling, fracturing, melancholy, anxiety, and even mortality. They are also more prone to experience these conditions after a stroke. In order to enhance balance function in stroke survivors, effective therapies are urgently needed [3]. In

the United States, stroke is the sixth most common cause of death and a major contributor to long-term disability. Any component of post-stroke therapy that strives to lessen disability and encourage involvement in daily activities has been generally characterised as stroke rehabilitation. CVA recovery is a practice with the goals of preventing function from deteriorating, improving function, and achieving the highest level of independence (monetarily, socially, emotionally, and practically) within the confines of the ongoing deficits [4]. Also, balance impairments lead to disturbance in steadiness, symmetry and dynamic stability. Loss of balance and postural asymmetry is going to be the major hurdle in the early rehab care of patients [5]. Because of reduced arm and hand function and poor walking abilities, 20% of sufferers still require institutional care three months following the beginning of the stroke, suggesting dependence on others to complete their daily duties [6]. Sensory and motor deficits derived from neurological injury, such as paralysis, impaired balance or spasticity, are the most common impairments and are the basis of the resulting degree of physical disability [7]. Stroke, which primarily affects older people, is the leading cause of long-term impairment. Patients with strokes may endure cognitive, cognitive, or neurological abnormalities, and recuperation from the disease takes practice and experience since individuals must perform physical therapy sessions often and insistently [8]. After a stroke, sitting is the first position to accomplish because it is necessary for the majority of daily tasks like feeding, transporting, and taking a shower 93% of patients can achieve independent sitting balance for one minute within six days after the start of a stroke [9]. Balance dysfunction is one of the main impairments seen in this population. According to reports 83% of stroke patients have balance issues, which include gait issues such slow movement patterns and changes in distinct gait stages that affect the possibility of falling [10]. Due to the distinctive, intricate combination of systems used to control balance, significant task-specific rehabilitation is necessary. Another factor that has been absent from most research is an examination of the issues surrounding the ideal amount of exercise aimed to maximise balance and reduce falls [11]. Despite the fact that people are frequently sedentary after a stroke, higher levels of physical activity are linked to greater balance, walking ability, and physical fitness even in elevated chronic stroke patients [12]. Spite of the techniques in the management of acute and hyper acute stroke, patients typically still require rehabilitation [13]. The best rehab protocols include different balance and coordination challenges required to attain intact postural reactions [14]. There is a need for more potent interventions following a stroke, according to a meta-

analysis of interventions to enhance standing balance that found no training approach to be superior [15]. Movement is restricted because to muscle weakness on the affected side, which in turn compromises equilibrium and strolling abilities. Therefore, obstacles for the rehabilitation of stroke patients are hampered by muscle strength and postural balance [16]. However, in the chronic recovery stage, the unbalanced postural activity of sufferers during sitting and standing is frequently reinforced, maintained, or very briefly lessened. Poor sensory inputs, such as a reduced awareness of the midline, can also contribute to lopsided posture [17]. Most of the patients suffering from stroke do not undergo physical therapy rehabilitation based on balance and coordination training programs. In contrast, those patients who have undergone physical therapy treatments return more quickly towards the activity of daily livings and their balance and coordination is more enhanced as compared to the other patients. For early recovery, it is necessary to adopt preventive measures and recovery strategies from the stroke. The aim of the research was to study the difference between the hemiplegic stroke patients who have undergone physical therapy treatment in contrast to those patients who have not taken any physical therapy treatment. Moreover, no gender discrimination was made.

## METHODS

We adopted a cross sectional study design in which patients from Pakistan were taken as our research purpose and they were suffering from hemiplegic stroke. Different government hospitals were visited in the premises of Lahore. The patients of hemiplegic stroke were included in study. The patients of two to six months were included with a follow up of four months' physical therapy rehabilitation. During this study, the patients were informed about the research and its purpose with details and they were all independent for their participation in the research whether they wanted to fill the forms or not with their personal data and information. The data of all the participants in this research study were kept highly confidential. Two basic selection methods were used for inclusion and exclusion of the patients. Hemiplegic patients of stroke, patients of age ground ranging from 45 to 65, and both male and female patients were included in the trial, whereas, patients below the age limit of 45 and patients suffering from hemiparesis were excluded from the trial. The population of this study consisted of all hemiplegic stroke patients ranging from 45 to 65 years of age. Brunel Balance Assessment scale was utilised and the results were then analysed by using SPSS version 21.0. Frequencies and percentages of each patient for every question were then recorded and compared with each other. Following balance evaluation strategies were

utilised for patient assessment, including heel raises (not holding on), side stepping (holding on), side stepping (not holding on), heel raises (holding on), heel to toe walking, single leg standing, backwards walking, squats against gym wall, single leg knee extension, seated leg lifts, reaching, weight shifting (side to side), ankle dorsiflexion, bridging, sit to stand, weight shifting (forward to backward), stride length changing (from small to large), and walking sideways

## RESULTS

The total sample size is of 40 individuals. The numbers of patients taking physical therapy at first month are 12. Those who have taken physical therapy at 2nd month are 5 while those who have taken physical therapy at 4th month are 3. In contrast, those patients who have not taken any physical therapy are 20. Table 1 shows the balance factors alternate with grades of improvement. Table 2 and 3 depicts the different balance strategies including static sitting, dynamic sitting, supported standing, static standing balance, dynamic standing, static and dynamic double stance and changing base of support (step-up) test during 1st and 4th month of rehabilitation. More improvement was seen in patients taking more physical therapy rehabilitation as compared to patients who were taking no or less physical therapy rehabilitation. The number of patients who have improved with moderate physical therapy lies between the other two values i.e. "Most frequently" and "Less frequently". It is completely evident that less improvement was seen in the patients taking less or no physical therapy. The Chi square value is independent of the P=0.05.

Balance Strategies	Grades of Improvement frequency (%)			
	Better IMP	Good IMP	Little IMP	No IMP
Effect of balance training on effected limb	12(30%)	2(5%)	3(7.5%)	23(57.5%)
Gait recovery after physical therapy sessions	8(20%)	4(10%)	7(17.5%)	7(17.5%)
Reorganization of sensory and motor system	7(17.5%)	5(12.5%)	6(15%)	6(15%)
Change in the quality of life	8(20%)	4(10%)	9(22.5%)	9(22.5%)
Effect of weight bearing training	7(17.5%)	2(5%)	4(10%)	4(10%)
Effect of conventional gait training	6(15%)	5(12.5%)	5(12.5%)	5(12.5%)
Effect of repetitive passive rehabilitation	7(17.5%)	3(7.5%)	8(20%)	8(20%)

**Table 1:** Rehabilitation Protocols with Timeframe

Balance Strategies	Never Exercise		Normal Exercise		More frequently Exercise		chi-square	Sig V
	Yes	No	Yes	No	Yes	No		
Static sitting-	4(10%)	8(20%)	6(15%)	5(12.5%)	8(20%)	9(22.5%)	1.094	0.579
Dynamic sitting-sitting	7(17.5%)	5(12.5%)	8(20%)	3(7.5%)	16(40%)	1(2.5%)	5.364	0.068
Supported standing-	4(10%)	8(20%)	8(20%)	3(7.5%)	11(27.5%)	6(15%)	4.273	0.118
Static standing balance	7(17.5%)	5(12.5%)	7(17.5%)	4(10%)	13(32.5%)	4(10%)	1.158	0.560
Dynamic standing	9(22.5%)	3(7.5%)	8(20%)	3(7.5%)	16(40%)	1(2.5%)	2.784	0.249
Static double stance	5(12.5%)	7(17.5%)	8(20%)	3(7.5%)	16(40%)	1(2.5%)	9.707	0.008
Dynamic Double stance	7(17.5%)	5(12.5%)	8(20%)	3(7.5%)	16(40%)	1(2.5%)	5.364	0.068
Changing base of support-step up test	10(25%)	2(5.0%)	10(25%)	1(2.5%)	16(40%)	1(2.5%)	0.923	0.630

**Table 2:** Balance strategies with grades of improvement n=40 During 1st Month

Balance Strategies	Never Exercise		Normal Exercise		More frequently Exercise		chi-square	Sig V
	Yes	No	Yes	No	Yes	No		
Static sitting-	2(25%)	10(25%)	4(10%)	7(17.5%)	6(15%)	11(27.5%)	1.455	0.483
Dynamic sitting-sitting	5(12.5%)	7(17.5%)	5(12.5%)	6(15%)	13(32.5%)	4(10%)	4.388	0.111
Supported standing-	3(7.5%)	9(22.5%)	6(15%)	5(12.5%)	11(27.5%)	6(15%)	4.561	0.102
Static standing balance	5(12.5%)	7(17.5%)	6(15%)	5(12.5%)	12(30%)	5(12.5%)	2.462	0.292
Dynamic standing	5(12.5%)	7(17.5%)	5(12.5%)	6(15%)	15(37.5%)	2(5.0%)	8.390	0.015
Static double stance	4(10%)	8(20%)	5(12.5%)	6(15%)	13(32.5%)	4(10%)	5.847	0.054
Dynamic Double stance	5(12.5%)	7(17.5%)	6(15%)	5(12.5%)	15(37.5%)	2(5.0%)	7.435	0.024
Changing base of support-step up test	8(20%)	9(22.5%)	2(5.0%)	2(5.0%)	16(40%)	1(2.5%)	3.767	0.159

**Table 3:** Balance strategies with grades of improvement n=40 During 4th Month

## DISCUSSION

The review has exhibited that after stroke assault, blend of equilibrium preparing and coordination practices gives tremendous number of advantages and re-establish stroke patients more rapidly. Portability improves by doing practices for 30 minutes 3 to multiple times in seven days. While our examination shows that equilibrium and coordination practices in post preparing bunch show huge improvement when contrasted with the people who have not taken any actual restoration. Patients who participate in restoration practices have much better improvement in equilibrium and coordination when contrasted with the people who takes part in these activities less regularly. In this assessment, two gatherings were made in which one gathering did a 6-month practice and the other one did association testing. A half year after the satisfaction of the arrangement program, there was a basic improvement not settled for the limit of the strong balance of the patients in the pre-arranged assembling. On the other hand, at the half year follow-up, there was no immense qualification in standing balance rehearses between the pre-arranged assembling and the benchmark bunch. Si-Nae Jeon, PT, MS1 and his colleagues in their study signifies on the dynamic balance of stroke patients, it was indicated that ankle joint strategy exercises with and without visual feedback were effective. A visual feedback group (VFG) and a visual disuse group (VDG) were randomly and evenly assigned to 26 stroke patients in this study (VDG). For six weeks, they engaged in 30-minute ankle joint therapy activities three times a week. When stroke patients conducted ankle joint strategy exercises to enhance balance, visual feedback training had a positive effect on balance [18]. While our investigation shows that balance and coordination rehearses in post hemiplegic stroke show immense improvement when appeared differently in relation to the people who have not taken any recovery works out. What's more patients who take part in recuperation practice frequently have much better improvement when stood out from the people who

participate in these exercises less routinely. Kyeongjin Lee (2020) in his study examine the effects of postural control using EMG-triggered functional electrical stimulation (FES) on stroke patients' ankle muscle activation, dynamic balance, and static balance. The experimental group (n = 25) and the control group (n = 24) were randomly assigned to 49 patients (>6 months after stroke) [16, 19]. This investigation relied upon the balance getting ready practices in which patients mature enough 40 to 60 years of age were picked. 40 patients were picked who went through works out. We have isolated two social events. One is requested as a survey pack and the other one is organised as a benchmark bunch. One social affair performed one hour out of each day 5 days/week and for a long while. Balance Training was added to the audit get-together's standard program like consistently/5 days/week and 20 minutes of balance getting ready for an extensive time span. Pre-treatment and post-treatment examinations were performed for security using the Biodex Balance System. Twelve weeks right after completing the treatment programs, the survey social event's harmony planning assessments improved essentially. KyoChulSeo et al. (2015) stated that the effectiveness of ramp gait exercise on the dynamic balance of stroke patients with PNF. In altogether, 30 stroke survivors took part in the trial, were evenly divided into the experimental, and control groups by randomisation. The experimental group participated in a 30-minute exercise programme and a 30-minute ramp gait training session with PNF [20]. Our assessment shows that equilibrium and coordination rehearses in post hemiplegic stroke patients show colossal improvement when appeared contrastingly similar to individuals who have not taken any genuine recuperation. Additionally, patients who check out recovery practice as frequently as conceivable have much better improvement when stood separated from individuals who take part in these exercises less.

## CONCLUSION

Mostly patients recover and comes back towards their routine life after getting full therapy sessions from clinical set up. Hence, we conclude that situation of every patient vary according to their severity of lesion. Those who actively participate and perform regular exercises on initial basis, have faster recovery rate. The investigations have showed that the balance and coordination improves with the physical therapy rehabilitation and both are equally important for the recovery of hemiplegic stroke patient.

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## Original Article

## Correlation between Burnout and Meaning in Life in Doctors in Pakistan: A Cross Sectional Study

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## ARTICLE INFO

## Key Words:

Burnout, Emotional Exhaustion, Depersonalization, Meaning in Life, Purpose in Life, Doctors.

## How to Cite:

 Iqbal, S. (2022). Correlation between Burnout and Meaning in Life in Doctors in Pakistan: A Cross Sectional Study: Burnout and Meaning in Life in Doctors in Pakistan. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.612>

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Received Date 29th June, 2022

Acceptance Date: 13th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

According to ICD-11, burnout is a syndrome caused by poorly managed chronic workplace stress that is characterized by feelings of depleted energy or exhaustion, increased mental distance from the job one has, or feeling negative or cynical about it, as well as a sense of ineffectiveness and lack of accomplishment. **Objective:** To assess the correlation between Burnout, its dimensions and Meaning in Life in early career doctors in Pakistan. **Methods:** Online questionnaire containing a demographic survey, Purpose in Life test and Maslach Burnout Inventory, Human Services Survey was circulated among early career doctors. Responses were analyzed using SPSS 26.0. **Results:** 135 doctors (34.6%) reported burnout while 253 (64.9%) did not. Doctors who reported burnout had significantly less meaning in life ( $M = 59.39$ ,  $SD = 12.57$ ) than those who did not ( $M = 74.83$ ,  $SD = 13.68$ );  $t(386) = 10.883$ ,  $p < 0.01$ . A significant negative correlation was found between meaning in life and emotional exhaustion,  $r(386) = -.565$ ,  $p = 0.001$  and between meaning in life and depersonalization,  $r(386) = -.452$ ,  $p = 0.001$ . Meaning in life and personal accomplishment were significantly positively correlated,  $r(386) = .581$ ,  $p = 0.001$ . **Conclusion:** Doctors who have greater meaning in life experience less burnout. Meaning centered interventions can help combat the problem.

## INTRODUCTION

According to ICD-11, burnout is a syndrome caused by poorly managed chronic workplace stress that is characterized by feelings of depleted energy or exhaustion, increased mental distance from the job one has, or feeling negative or cynical about it, as well as a sense of ineffectiveness and lack of accomplishment [1]. Even though there is a large variation in the prevalence estimates of burnout in doctors owing to the myriad definitions and assessment methods [2], it is recognized that doctors are more likely than the general population to experience burnout. Shanafelt et al reported that doctors were at a significantly increased risk for burnout (Odds Ratio 1.39) than other working adults [3]. They suffered from burnout at significantly greater rates in comparison to other doctoral-level professionals, and were less satisfied

with the balance between their personal and professional life. Because of uncertainty, risk of contracting illness at work and social distancing, coronavirus pandemic resulted in a surge in this problem [4]. This has detrimental consequences for both doctors and their patients. Doctors suffering from burnout have a two-fold risk of suicidal ideation, 25% increased risk of alcohol abuse and increased risk of motor vehicle accidents. They are more likely to be depressed, less productive at work, dissatisfied with their jobs and have interpersonal relationship difficulties. The patients treated by burnt-out doctors may be subject to double the hazard of medical errors. They experience longer recovery times, higher mortality risk and more dissatisfaction with the care received. Individual factors like personality traits appear to be substantially

less important in causing physician burnout than the organizational factors which include stressful organizational climate, a lack of autonomy and support, excessive workloads and incentive based payment models, as well as scarce resources and inefficient system leading to a sense of powerlessness and futility in the doctors [5-7]. Pines contends that highly motivated professionals who identify with their job and seek a sense of meaning in life and existential significance from it are vulnerable to burnout when they fail to meet their goals and feel unable to contribute significantly [8]. They begin by considering their lives matter, caring deeply about the people they have chosen to help meeting their emotional demands, and hoping to make a significant difference in their lives and make the world a better place to live but when they believe their efforts have fallen short, they experience emotional exhaustion, depersonalization and lack of a feeling of accomplishment, which together constitute burnout. This idea is supported by empirical evidence from the helping professions. Krok in the research on firefighters, and Tomic et al [9-10]. in their study of principals and teachers discovered that the presence of meaning in life and existential fulfilment predict less burnout across all dimensions. This was also true for social workers, in who higher purpose in life lead to lower rates of burnout [11]. Similar conclusions arise from the research on doctors internationally. Intrinsic motivators, such as a calling for the work, were associated with higher levels of satisfaction and commitment in doctors than extrinsic motivators, such as increased annual salary [12]. Likewise, physicians who believe their profession has a prosocial purpose as well as personal meaning report less fatigue and burnout [13]. A study of family medicine programme directors found that those who expressed a greater sense of meaning in their work experienced significantly less burnout [14]. A similar study of emergency department doctors discovered that burnout was significantly predicted by a lower sense of existential purpose attributable to one's work [15]. This study was designed as there was no published research available that examined the association between burnout and a sense of meaning in life in Pakistani doctors. We anticipate that this will open the door for more in-depth empirical investigation in this field, which may eventually lead to the development of preventive and curative strategies for physician burnout in the organizations they provide services for the people.

## METHODS

This was a cross-sectional study done using a convenience sampling technique. Data were collected from early-career doctors working in Pakistan between July 16 to October 15, 2021. The inclusion criteria were that participants (i) were early career doctors (i.e. those working for 10 years or less

and (ii) were working for a minimum of past 6 months. The exclusion criterion was current diagnosis and treatment for a psychiatric disorder. Participants were asked to fill an online survey after providing informed consent. This was created with Google Forms and distributed through social media networking sites. It included information about the participants' sociodemographic characteristics, including information about age, gender, marital status, education, designation at job, total duration of work and whether they worked in COVID units or not. Psychological variables collected included the Purpose in Life (PIL) test and the Maslach Burnout Inventory, Human Services Survey (MBI-HSS). Crumbaugh and Maholick developed the Purpose in Life (PIL) test in 1964, which is 20-item self-reported psychometric scale measures one's sense of life's meaning. Each question is graded on a scale of 1 to 5, with the higher the score indicating that life is seen as more meaningful. The Maslach Burnout Inventory, Human Services Survey (MBI-HSS) is a psychological assessment tool that includes 22 items about occupational burnout. The MBI-HSS assesses three dimensions of burnout: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Greater scores on the first two and lower scores on the third indicate burnout. As endorsed by Maslach, a high score on both EE and DP or a combination of high EE and low PA was taken as the operational definition of burnout for the purposes of this study [16]. SPSS version 26.0 was used for statistical analysis. Cronbach's alpha was used to assess the internal consistency of all scales, and a value greater than 0.7 was considered acceptable. Frequencies and percentages were used to describe categorical variables. The quantitative variables were described using the mean (M) and standard deviation (SD). Cronbach's alpha was used to assess the internal consistency of each subscale, and a value greater than 0.7 was considered acceptable. Analysis of variance and t test were run to assess the impact of demographic characteristics on burnout subscales and meaning in life. Pearson's correlation test was applied at 5% margin of error and the correlation coefficients were calculated.

## RESULTS

Average age of the participants was  $28.07 \pm 2.87$  years and the average duration they had worked as a doctor was  $3.94 \pm 2.41$  years. As shown in Table 1, greater number of women ( $n=265$ , 68.3%) participated in the study compared to men ( $n=123$ , 31.7%). Higher number of doctors ( $n=225$ , 58%) were single than married ( $n=154$ , 39.7%). Majority of the doctors had MBBS as their highest qualification ( $n=352$ , 90.7%) and were working as postgraduate trainees ( $n=196$ , 50.5%). Over half of the doctors had worked in or were working in COVID units ( $n=203$ , 52.3%).

Baseline characteristic	n	%
<b>Gender</b>		
Female	265	68.3
Male	123	31.7
<b>Marital status</b>		
Single	225	58.0
Married	154	39.7
Separated	1	0.3
Divorced	7	1.8
Widowed	1	0.3
<b>Highest educational level</b>		
MBBS	352	90.7
BDS	6	1.5
Postgraduate qualification	30	7.8
<b>Job designation</b>		
House Officer	98	25.3
Medical Officer	68	17.5
Postgraduate Trainee	196	50.5
Consultant/Specialist	20	5.2
Lecturer/Demonstrator	6	1.5
<b>Specialty</b>		
Medicine & Allied	230	59.3
Surgery & Allied	107	27.6
Non-clinical specialties	21	5.4
General Practice	21	5.4
Dental specialties	9	2.3
<b>Worked/working in COVID Units</b>		
Yes	203	52.3
No	185	47.7

**Table 1:** Sociodemographic Characteristics of Participants at Baseline

The mean scores on Emotional Exhaustion (EE), Depersonalization (DP), Personal Accomplishment (PA) and Purpose in Life test (PIL) were  $24.19 \pm 12.33$ ,  $10.09 \pm 6.36$ ,  $32.84 \pm 8.09$  and  $69.46 \pm 15.19$  respectively. The Cronbach's  $\alpha$  for EE, DP, PA and PIL were 0.91, 0.75, 0.78 and 0.93, which are  $>0.7$  and indicate good reliability. 164 (42.3%) doctors had high emotional exhaustion, 131 (33.8%) had high depersonalization and 154 (39.7%) had low personal achievement. Using the operational definition of burnout chosen, it was found that 135 doctors (34.6%) reported burnout while 253 (64.9%) did not.

Variable	Groups	Burnout		Chi Square
		Yes	No	
Gender	Male	35	88	3.189
	Female	100	165	
Marital Status	Single	80	145	8.839
	Married	48	106	
	Separated	1	0	
	Divorced	5	2	
	Widowed	1	0	
Qualification	MBBS	129	223	6.482
	BDS	1	5	
	FCPS	4	16	
	MCPS	1	4	
	M.Phil	0	2	
Designation	Masters	0	3	11.780*
	House Officer	39	59	
	Medical Officer	29	39	
	Postgraduate Trainee	65	131	
	Consultant/Specialist	2	18	
Specialty	Demonstrator/Lecturer	0	6	6.483
	Medicine & Allied	87	143	
	Surgery & Allied	34	73	
	Non-clinical Specialties	3	18	
	General Practice	9	12	
Working/Worked in COVID units	Dental Specialties	2	7	.869
	Yes	75	128	
	No	60	125	

\* $p < 0.05$

**Table 2:** Burnout according to Demographic Characteristics

Table 2 shows the proportion of participants who reported burnout according to gender, marital status, qualification, designation, specialty and frontline work during COVID-19. An independent samples t-test was run to compare PIL scores between doctors who reported burnout and who did not. There was a significant difference in PIL scores between former ( $M=59.39$ ,  $SD=12.57$ ) and latter group ( $M=74.83$ ,  $SD=13.68$ );  $t(386) = 10.883$ ,  $p < 0.01$ . Independent sample t-tests were also used to compare the mean Purpose in Life (PIL) test and MBI-HSS subscale scores between male and female doctors, as well as frontline and second line doctors. No significant difference was found between frontline and second line doctors. However, there was a significant difference in PIL scores between males ( $M=72.61$ ,  $SD=14.40$ ) and females ( $M=67.99$ ,  $SD=15.35$ );  $t(386) = 2.811$ ,  $p = .005$  as well as Emotional Exhaustion (EE) scores between males ( $M=21.63$ ,  $SD=11.46$ ) and females ( $M=25.37$ ,  $SD=12.56$ );  $t(386) = -2.804$ ,  $p = .005$ . The effect of marital status, highest educational level, job designation, and specialty on PIL and MBI-HSS subscale scores was compared using one-way ANOVA tests. There were no statistically significant differences in any score between the groups with respect to marital status. However, the groups based on educational qualification ( $F(5, 382)$

=2.585,  $p < .05$ ) and specialties ( $F(4, 383) = 2.919$ ,  $p < .05$ ) differed in their Depersonalization (DP) scores. The groups according to job designation differed significantly in their scores on as Emotional Exhaustion (EE) with ( $F(4, 383) = 3.298$ ,  $p = .011$ ), Depersonalization (DP) with ( $F(4, 383) = 4.251$ ,  $p = .002$ ) and Personal Accomplishment (PA) with ( $F(4, 383) = 5.351$ ,  $p = .000$ ). Pearson correlation coefficient was calculated to assess the linear relationship between the scores on Purpose in life (PIL) test and the three subscales of MBI-HSS i.e. EE, DP and PA. There was a negative correlation between the PIL and EE,  $r(386) = -.565^{**}$ ,  $p = 0.001$  and between PIL and DP,  $r(386) = -.452^{**}$ ,  $p = 0.001$ , representing a large and moderate effect size respectively. However, there was a positive correlation between the PIL and PA,  $r(386) = .581^{**}$ ,  $p = 0.001$ , representing a large effect size. Age and the duration of work as a doctor showed a significant positive correlation with PIL scores, although the effect size was small.

	Age	Duration	PIL	EE	DP	PA
Age	1	.854**	.209**	-.157**	-.157**	.166**
Duration	-	1	.173**	-.126*	-.126*	.197**
PIL	-	-	1	-.565**	-.565**	.581**
EE	-	-	-	1	1	-.277**
DP	-	-	-	-	1	-.294**
PA	-	-	-	-	-	1

**Table 3:** Correlations

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

## DISCUSSION

The primary goal of the study was to evaluate the effect of meaning in life on burnout experienced by early career doctors working in Pakistan as well as on its dimensions, namely emotional exhaustion, depersonalization and reduced sense of personal achievement. Doctors who had burnout scored lower on meaning in life than who had no burnout. Moreover, higher sense of meaning in life was found to be associated with lower emotional exhaustion and depersonalization and higher sense of personal achievement. Even though no available study from Pakistan directly studied physician burnout in relation to meaning in life, the reported protective factors against burnout include good interpersonal relationships, a future oriented approach, healthy activities and attitude, all of which indirectly reflect a meaningful life [17]. International literature also supports this notion. Qualitative data from the doctors suggests that they do not attribute burnout to patient bulk or complexity but to an inability to engage well with direct patient care tasks owing to external difficulties which then compromises the intrinsic joy and meaning [18]. According to another study, a sense of calling at work, personally satisfying hours per day, enduring relationships with patients, and dedication to patient care are all

associated with high life meaning. Burnout and meaning were strongly inversely related [12]. Similarly, doctors who were completely burned out were less likely to find their work rewarding, to regard it as one of the most important aspects of their lives, or to believe that their work makes the world a better place than doctors who reported no burnout symptoms, all of which reflect a lack of finding meaning [13]. In the same way, higher levels of meaning salience were also correlated with lower levels of burnout and fatigue in academic program directors, both of which were linked to higher levels of quality of life [14]. According to a study on emergency physicians, even though burnout was also correlated with work-life balance, job satisfaction, social support, depressive symptoms, stress, and preoccupying thoughts, it was discovered that a sense of existential meaning derived from work was the most important factor linked to burnout, in the regression analysis [15]. It may mean that meaning mitigates the effects of everyday stressors and prevent burnout in those who work to help other people as evidenced by the data from social workers, in whom even after taking into account the number of hours worked per week and the years of experience, a higher sense of purpose in life was associated with lower rates of secondary traumatic stress, burnout, and vicarious trauma [11]. Same relationship between burnout and meaning was observed in firefighters and teachers [9,10]. In the current study, 34.6% doctors reported burnout. 42.3% doctors had high emotional exhaustion, 33.8% had high depersonalization and 39.7% had low personal achievement. The percentage of doctors with burnout was comparable to another research from Pakistan where 33.8% doctors reported it but on individual subscales, a wide gap existed from the current study. One possible explanation may be the use of full versus abbreviated MBI [19]. Another study from Pakistan reported a larger percentage of doctors showing the presence of high risk burnout subscale scores. However, fewer doctors from a single hospital participated in the study and the results obtained may reflect the experiences pertaining to the particular organizational climate [20]. Considering the advantages and limitations of this report, it is relevant and timely because there have been few studies on the meaning in life in the local population and therefore, it opens a new direction for research. Moreover, the doctors from both genders and with a diverse range of job titles and specialties were assessed, who are at the forefront of addressing the well-being needs of everyone else, often at the expense of their own. Correlational studies, on the other hand, cannot prove the relationship between variables definitively, and self-reported measures can introduce bias. It is the hope that future research will address these problems. Finally, Bulka considers burnout

as the result of a “well-intentioned but improperly based search for meaning in life”, where one identifies excessively with the work one does, hyperreflects on inadequacy of the rewards received, tends to discount positive everyday experiences and has trouble accepting one's finitude as well as the presence of unavoidable suffering [21]. These may be daily phenomena in a doctor's life. Therefore, the interventions that focus on these aspects can improve the sense of meaning and therefore, reduce the risk of physician burnout. This is in accordance with what the modern experts on burnout recommend [22].

## CONCLUSION

Greater meaning in life leads to lower burnout in doctors from Pakistan. Doctors who have greater meaning in life experience less burnout. Meaning centered interventions can help combat the problem.

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## Original Article

## Comparative Effects of Manual Cervical Traction and Natural Apophyseal Glides on Pain and Disability among Patients with Cervical Radiculopathy

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## ARTICLE INFO

## Key Words:

Cervical Radiculopathy, Manual cervical traction, Natural apophyseal glide, Numeric Pain Rating Scale, Neck disability index

## How to Cite:

Ghazanfar, M., Ahmad, J., Rafiq, S., Iftikhar Hussain, S., Amin, T., Muhammad Rizwan, Kalsoom, U., & Razzaq, A. (2022). Comparative effects of manual cervical traction and natural apophyseal glides on pain and disability among patients with cervical radiculopathy: Comparative Effects of Manual Cervical Traction and Natural Apophyseal Glides on Pain and Disability among Patients with Cervical Radiculopathy. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.389>

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Received Date: 19th April, 2022

Acceptance Date: 20th July, 2022

Published Date: 31th July, 2022

## ABSTRACT

Cervical radiculopathy is a clinical condition that affects the nerve roots and is frequently brought on by inflammatory or compressive disease. Although many alternative techniques have been proposed for reducing patients' pain and disabilities, manual therapy has been proven to be an efficient method. The goal of the current study was to compare how well the Manual Cervical Traction and Natural Apophyseal Glides treated individuals with cervical radiculopathy for pain and impairment. **Methods:** The physiotherapy department of Mayo Hospital Lahore conducted a parallel design, randomized controlled experiment on 72 patients. Following baseline testing, participants were divided into two groups randomly. Natural apophyseal glides and baseline therapy were given to group A, whereas manual cervical traction and baseline treatment were given to group B. Three weeks of treatment were spent receiving three weekly sessions on a rotating basis. A neck disability index and a numeric pain rating scale were used for assessment at the baseline and second and third weeks of therapy. The data was examined using SPSS version 25. **Results:** Data was analyzed for 72 participants. Mean and standard deviation scores for pain in group A were  $3.14 \pm 0.601$  and of group B were  $3.34 \pm 0.482$  before treatment. The post treatment score for group A were  $1.57 \pm 0.502$  and of group B were  $1.63 \pm 0.490$  with P value 0.632. P value for disability was 0.11. **Conclusion:** Natural Apophyseal Glides is equally effective to manual cervical traction for relieving pain but found to be more effective for improving functional mobility.

## INTRODUCTION

Cervical radiculopathy is a neurological marvel where dysfunction of the cervical spinal nerve, the root of the nerve, or of both happens [1]. Radicular pain is only a symptomatic representation of ectopic impulse origin whereas in radiculopathy the neurological signs of both sensory, motor dysfunction are also included [2]. This

radicular pain radiates from neck towards posterior shoulder, into arm, sometimes into the hand. This clinical issue is because of the provocative or the compressive changes brought about by space occupying lesion that can be a disc herniation, spondylitic spur or cervical osteophytes [3]. An examination gave that the prevalence



is 83 for each 100,000 for the populace completely, and an expanding rate in fifth life decade (203 for every 100,000) [4]. Many epidemiological studies report raised incidence of spondylitic changes for cervical radiculopathy [5]. Nerve-root compression does not always produce pain unless the dorsal-root ganglion is also compressed [6]. Certain inflammatory mediators provoked by the disc herniation also provoke the symptoms. These stimuli alters the structure and function and produce hypoxia, edema, ischemia, inflammation, fibrosis, lessened gliding movement and raised mechano-sensitivity of neural tissue [7]. Manual therapy intervention restore these neural alterations to lessen pain, disability originated by cervical radiculopathy [8]. The pattern and location of symptoms depends by the root level influenced, and can be sensory and/or motor by the dorsal and/or additionally ventral root involvement. Presenting complaints of patients are numbness, pain, anesthesia, and weakened upper extremity leading to significant functional limitations and often disability [9]. Yet, broad history, physical examination and explicit tests help to detail a finding. Further neurological examination done by sensation, strength and tendon reflex testing [10]. In 75% cases, treatment is conservative and rehabilitation based [11]. Cervical radiculopathy intervened by different approaches including pharmacological (NSAIDs and Oral steroids), injections (cervical epidurals), surgeries (anterior cervical discectomy with fusion) and rehabilitation [12]. Physical therapy management may include postural education, exercises (cervical retraction, extension, strengthening of neck, scapular muscles), the cervical traction, the manual therapy [13]. In our investigation we assessed the helpfulness of the manual cervical traction, the natural apophyseal glides (NAGS). NAGS are from the Mulligan's treatment techniques of mobilization/manual therapy [14]. Manual treatment is a high speed, low amplitude manipulation or mobilization [15]. The use of hands applied directly with high velocity, and with less amplitude thrust directed at cervical joints appreciated by an audible crack, called as cervical manipulation. (A meta-analysis on manual) There is some risk for injury in manipulation, whereas mobilization is a safer technique [16]. Mulligan's concept stated on Kaltenborn's principle for restoring accessory physiological joint movement [17]. According to this concept spinal mobilization in weight bearing spine position is done by applying a parallel force to facet planes of spine [18]. NAGs Mulligan is expressed as passive oscillatory procedures performing parallel the facet joint planes of the cervical, upper thoracic spine [19]. NAGs is effective in increasing the range of motion, reducing the pain intensity, and improving the neck functional mobility in patients with cervical radiculopathy [20]. Manual cervical

traction is a decompression treatment that diminishes pain through widening and stretching of neural foramina by applying force directly through hands of the clinician. Cervical traction provides instant analgesic effect in cervical radiculopathy [21]. A systematic review and meta-analysis has found that cervical manual traction can decrease pain in cervical radiculopathy patients and have less effects on functional mobility. There comes a lot of techniques under the umbrella of manual therapy. Manual cervical traction and natural apophyseal glides are two of them. The available literature has only identified the effects of cervical manual traction and natural epiphyseal glides alone or in conjunction with conventional treatment but did not compare them with each other. Although different studies have been conducted by adding these intervention with routine physical therapy but there is still need to determine the comparative effectiveness of these approaches along with their right dosage and method [22]. The comparative effectiveness of cervical traction and mobilization has been identified in other cervical diseases (cervicogenic headache [23] and non-specific neck pain [24]) but not in patients with cervical radiculopathy. The treatment techniques applied previously do not satisfactorily address the usefulness of manual therapy in treatment of cervical radiculopathy [21]. So, it demands the need of future researches to be directed on this topic. The goal of this research was to fill the gap of past studies. This study aimed to determine the comparative effects of manual cervical traction and natural apophyseal glides on pain and disability among patients with cervical radiculopathy. This research would be useful for both clinicians, researchers and for community in general.

## METHODS

In 2018, the Mayo Hospital Lahore's Physiotherapy Department conducted a randomised controlled experiment. In this study, 72 patients who met the inclusion criteria were included. The sample size of 72 patients (36 in each group) was calculated using a 5% threshold of significance, 95 percent power of test, and predicted mean values of 1.50 0.877 for Natural Apophyseal Glide and 2.30 1.0177 for Manual cervical traction [25]. Every participant in the research signed a written informed consent form. The study was ethically authorized by the Institution Review Board of King Edward Medical University Lahore. The study comprised both male and female patients between the ages of 20 and 60 who had clinically and radiological confirmed unilateral or bilateral cervical radicular illness. Mechanical cervical discomfort or nonspecific neck pain, cervical myelopathy, any spine surgery or malignancy, and pain due to postural imbalances were all ruled out of the research. Prior to the randomization, the therapist

determined eligibility. Following a baseline examination, eligible patients were randomly allocated to one of two groups (group A or group B) in a 1:1 ratio. The fish bowl approach was used for randomization. The researchers retained the randomization assignments in opaque, sealed envelopes and opened them after baseline testing. For three weeks, Group A got traditional treatment as well as Natural Apophyseal Glides (NAGs) less than 6 repetition (three sets). Manual Cervical Traction (MCT) was used in combination with standard treatment in Group B. Three meetings per week were scheduled for three weeks of treatment. MCT was applied in a way similar to intermittent traction. A 20 to 25 degree angle from horizontal was used to provide a force of 8 to 10 kg. There were five sets of cervical traction. Every set includes 1 minute of traction followed by a 20-second rest break. The session lasted 10 minutes in total. Both groups were given traditional treatment as well as manual approaches. Hot packs, exercises for range of motion, neck strengthening and stability trainings were all part of the traditional treatment. Throughout the trial, the usual or baseline treatment was used. The Numeric Pain Rating Scale was used to determine the severity of the pain (NPRS). The numeric scale spans from 0 to 10 on an 11-point scale. 0 indicates no discomfort and 10 indicates the most severe agony. A higher score implies that the pain is more intense. Neck Disability Index was used to assess functional abilities (NDI). The NDI is divided into ten categories, each having a score of 50. The NDI may also be calculated as a percentage by multiplying the resulting score by 2. The maximum percentage allowed is 100. A higher score suggests that the patient is more disabled. At baseline, post 2nd week, and post 3rd week of intervention, all data was obtained using a standardized NPRS and NDI questionnaire. To avoid bias, all treatments were provided by a single person. The statistical programmed SPSS version 21 was used to analyze the data. The qualitative data was provided in frequency and percentages, whereas the quantitative data was presented in mean and standard deviation. For qualitative data, the chi square test was used to establish baseline similarity. The Shapiro Wilk test was performed to assess the data's normality. Non-parametric tests were used on the NPRS and NDI to establish the significant mean difference because the p value was less than 0.05. Mann Whitney is a character in the film Mann Whitney, The Wilcoxon Signed Rank test was used to evaluate within-group differences and the U test was used to compare two groups at various intervals. Statistical significance was defined as a p-value of less than 0.05.

## RESULTS

Data were analyzed for 70 participants; relevant statistics

were taken out and presented in tabular form. Table 1 shows that the mean  $\pm$ SD age, weight and height of patients was  $40.26 \pm 10.30$ ,  $71.36 \pm 4.83$  and  $172.54 \pm 10.18$  respectively in group A while in group B it was  $41.23 \pm 11.45$ ,  $74.49 \pm 3.02$  and  $170.25 \pm 12.17$  respectively. In group A, 4 (11.4%) participants were male and 31 (88.6%) were female whereas in group B, 5 (14.3%) were male and 30 (85.7%) were female. Thirty-four (97.1%), 4 (11.4%), 16 (45.7%) patients reported numbness, swelling and hypertension in group A, respectively. While in group B 33 (94.3%), 6 (17.1%), 12 (34.3%) patients reported numbness, swelling and hypertension respectively.

Variables	Group A (NAGS) (Mean $\pm$ SD)n (%)	Group B (MCT) (Mean $\pm$ SD)n (%)	p-value
Age (Years)	40.26 $\pm$ 10.30	41.23 $\pm$ 11.45	0.865
Weight (kg)	71.36 $\pm$ 4.83	74.49 $\pm$ 3.02	0.814
Height (cm)	172.54 $\pm$ 10.18	170.25 $\pm$ 12.17	0.913
Gender			
Male	4 (11.4%)	5 (14.3%)	0.721
Female	31 (88.6%)	30 (85.7%)	
Numbness	34 (97.1%)	33 (94.3%)	0.555
Swelling	4 (11.4%)	6 (17.1%)	0.495
Hypertensive	16 (45.7%)	12 (34.3%)	0.329

**Table 1:** Descriptive Statistics

Table 2 shows that in terms of pain the pre-treatment pain mean and standard deviation were  $5.80 \pm 1.828$  in NAGS and post 3rd week pain mean and standard deviation were  $1.1 \pm 1.105$ . After 3 weeks application of MCT the mean and standard deviations were  $1.83 \pm 1.317$  which is less than the mean and standard deviation of pre-treatment that was  $6.26 \pm 1.421$ . In terms of NDI the pre-treatment mean and standard deviation for NAGS group were  $57.54 \pm 22.440$  and post 3 weeks treatment mean and standard deviation were  $6.23 \pm 6.394$ . In MCT group the pre-treatment mean and standard deviation for NDI were  $59.49 \pm 22.209$  and post 3 weeks treatment were  $10.29 \pm 7.262$ . The results showed that both pain and NDI was improved after application of treatment. The p value was statistically significant 0.019 and 0.021 after 3 weeks of treatment for pain and NDI respectively.

Parameter		NAG (Mean $\pm$ SD)	MCT (Mean $\pm$ SD)	P value
Pain	Pre	5.80 $\pm$ 1.828	6.26 $\pm$ 1.421	0.378
	Post 2nd week	2.86 $\pm$ 1.089	3.40 $\pm$ 1.063	0.078
	Post 3rd week	1.11 $\pm$ 1.105	1.83 $\pm$ 1.317	0.019*
	P value	0.000*	0.000*	
Neck Disability Index	Pre	57.54 $\pm$ 22.440	59.49 $\pm$ 22.209	0.663
	Post 2nd week	20.40 $\pm$ 9.503	24.11 $\pm$ 10.209	0.161
	Post 3rd week	6.23 $\pm$ 6.394	10.29 $\pm$ 7.262	0.021*
	P value	0.000*	0.000*	

(\*): p value < 0.05: Significant

**Table 2:** Comparison of Pre and Post Treatment readings for Pain and Disability

## DISCUSSION

The purpose of the research was to compare the effects of natural apophyseal glides and manual cervical traction to relieve pain and decrease or eliminate disability in cervical radiculopathy patient. Results of this study showed that patients' pain and functional mobility improve after application of natural epiphyseal glide and manual cervical traction. But natural epiphyseal glide was superior to manual cervical traction in improving both pain and functional mobility after 3 weeks of treatment. The superior effect of sustained natural epiphyseal on pain and functional mobility can be linked to the neurophysiological effects which includes increased pain pressure threshold and decrease pain rating [26]. Moreover, normal articular surface movement is required to maintain the flexibility of adjacent nerves, and modified biomechanics may impact the nervous outgrowth. As a result, restoring normal joint mechanics may normalise negative neuron-names that appear as a result of limited joint movement [27]. The findings of current research are consistent to previous studies. Similarly, Zhu et al., showed better effects of manual therapy in the treatment of cervical radiculopathy. SNAGs were useful in treating cervical radiculopathy [16]. In comparison to our findings that NAGs are superior to manual cervical traction Farhad et al., found that both intervention were equally effective in improving cervicogenic headache [23]. These inconsistencies can be related to change in population because we focused on cervical radiculopathy patients instead of cervicogenic patients. Moreover, they only enrolled 30 patients while our results were based on 70 patients. Difference in sample size number can also yield to different findings. A study was done to see the comparative effects of Keltenborn segmental traction and mechanical cervical traction for the treatment of cervical spondylosis [25]. This study looks at the use of manual therapy in the treatment of cervical pain, but it doesn't look at the benefits of manual cervical traction; instead, it looks at the effects of mechanical cervical traction on neck pain. Manual traction was shown to be effective in lowering pain and impairment in patients with cervical radiculopathy in this investigation. Another research looked into the usefulness of mechanical traction in the treatment of cervical radiculopathy [28]. There was a high risk of biasness in that study and quality of evidence was low. Another comprehensive review and meta-analysis of randomized controlled trials was conducted to compare the effectiveness of cervical traction combined with traditional physical therapy vs traditional physical therapy alone in patients with cervical radiculopathy in terms of pain and impairment [22]. There was a lack of homogeneity in cervical radiculopathy diagnostic criteria. The present study addressed comparative effects of cervical

mobilization and manual cervical traction which were not studied before in the cervical radiculopathy patients. Moreover, we decrease the chance of selection biasness by randomization and concealed allocation. However, we couldn't blind the patients because of the nature of treatment in both groups as one was receiving NAGs while the other group received the cervical manual traction. Same therapist treated all the patients therefore it also decreased the chance of producing different effects when treated by a different therapist. The chance of producing different effects is actually attributed to the manual nature of the technique as both of the treatments have to be applied through hands. The above mentioned strengths make it a unique study and provide insightful information for the clinicians and general public about the effects of natural epiphyseal glides and manual cervical traction in cervical radiculopathy patients.

## CONCLUSION

Both techniques are helpful in treating cervical radiculopathy. However, a Natural apophyseal glides (NAGS) is more effective than manual cervical traction (MCT) to treat pain and disability in these patients. This study concluded that Natural apophyseal glides depicts more satisfactory results than manual cervical traction in subjects of cervical radiculopathy for decreasing their pain and disability in terms of the NPRS and NDI.

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## Original Article

## Association of Post Vaccination Shoulder Pain with Sinovac and Astrazeneca COVID-19 Vaccines: A Cross-Sectional Study

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## ARTICLE INFO

## Key Words:

Shoulder pain, vaccines, AstraZeneca, Sinovac, COVID-19, Post-vaccination shoulder pain.

## How to Cite:

Sheher Bano, Amjad, F., Haider, M. W., Khalid, M., Jabbar, S., Iftikhar, K. ., Alam, A., &amp; Aslam, S. (2022). Association of Post Vaccination Shoulder Pain with Sinovac and Astrazeneca COVID-19 Vaccines: A Cross-Sectional Study: Post Vaccination Shoulder Pain with Sinovac and AstraZeneca. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.597>

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Received Date: 1st July, 2022

Acceptance Date: 16th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The world is facing severe pandemic due to COVID-19. AstraZeneca and Sinovac both vaccines are being used in many countries to fight against this Fatal Virus. Both AstraZeneca and Sinovac vaccines have some side effects, shoulder pain is one of the most common post vaccination side effect after receiving these vaccines. **Objectives:** Purpose of this study was to determine the association of post-vaccination shoulder pain among individuals who had been administered with AstraZeneca & Sinovac COVID-19 Vaccines. **Methods:** A descriptive study design was chosen to conduct this research. Study duration was six months. Sample selection was based on inclusion and exclusion criteria. Sample size was 143 with 71% response ratio. Snowball sampling (non-probability sampling) technique was adopted. Data were collected from various areas of Lahore using self-administered questionnaire. Responses were collected using questionnaire and data was analyzed by using SPSS version 22.0. Chi-square test and cross tabulations were executed to determine association of the variables. **Results:** 143 individuals were reviewed for this study. Among total respondents, 65% reported shoulder pain after first dose and 50.3% respondents reported shoulder pain after second dose. P-value after chi-square test was <0.001 after both doses and level of significance was adjusted to 0.05. **Conclusion:** This study concluded that there is significant association of post vaccination shoulder pain among those individuals having received Sinovac nad Astrazeneca inoculation for COVID-19.

## INTRODUCTION

COVID-19 was first reported on 31st December, 2019 by World Health Organization (WHO) which entered the global landscape, altering the daily lives of everyone in its path. A fatality rate of coronavirus is approximated from 2-3%. AstraZeneca and Sinovac both vaccines are being used in many countries to fight against this Fatal Virus [1]. Vaccine prepares the body's natural protection which is known as an immune system to fight against the virus [2]. Both AstraZeneca and Sinovac vaccines have some side effects too, shoulder pain is one of the most common post

vaccination side effect after receiving these vaccines. Possible side effects of vaccines related to shoulder are joint pain which limit the range of motion (ROM), injections site pain, myalgia, tenderness, swelling and SIRVA [3]. Shoulder Pain after COVID-19 vaccination can also be a referred pain of some serious disease [4]. Injection site pain and soreness have been noticed as most common side effect reported by 17 to 21 percent of people who received various doses of vaccines [5]. CoronaVac was exhibited to be well tolerated and didn't cause dose-related safety

concerns in Phase 1 and 2 clinical studies involving healthy persons among the age of 18-59 years and those aged 60 years and older. Most common side effect was injection site pain and hypersensitivity reactions were the least common symptoms reported [6]. The European Medicine Agency's (EMA) Pharmacovigilance Risk Assessment Committee (PRAC) discussed about thrombo-embolic disorders associated with COVID-19 vaccine. Aside from Deep Venous Thrombosis (DVT), there have been 8 cases of disseminated intravascular coagulation (DIC) and 18 cases of central vein thrombosis (CVT) reported and record of 9 deaths also found [4]. Most of the candidates were women and their average age reported was <55, which is alarming. Most worrying fact is that these effects are life-threatening [7]. Myalgia and arthralgia are common musculoskeletal problems after vaccination. Shoulder injury related to vaccine administration (SIRVA), explained as shoulder pain and restricted range of motion (ROM) that usually occurs after intramuscular injection in the upper arm, is well known medical problem in medical literature [8]. Millions of COVID-19 vaccine doses have been administered in the whole world and after that, many cases of post-vaccination subacromial-subdeltoid bursitis has been reported due to unintended vaccine administration into bursa [9]. Aims and objectives of this study are to find any association of shoulder pain after receiving AstraZeneca and Sinovac covid-19 vaccines and to find the association of shoulder pain or discomfort and other similar effects after first and second dose of both vaccines. There was no association of shoulder pain in individuals receiving AstraZeneca & Sinovac COVID-19 Vaccines. There was association of shoulder pain in individuals receiving AstraZeneca & Sinovac COVID-19 Vaccines.

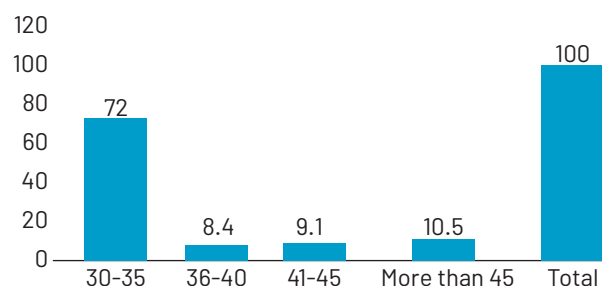
## METHODS

A descriptive cross sectional study design was chosen to investigate the research query. A non-probability sampling technique, snowball sampling was used to collect responses. Study setting was various areas of Lahore where the target population was approached on site and online both (web-based questionnaire) to record their responses. The sample size was estimated around 200 individuals. As per snowball sampling method, the following mathematical operations were performed to calculate the sample size and response ratio [10]. Respondents in researcher contact = 40, Expected person in contact with respondents = 5, Targeted population =  $40 \times 5 = 200$ , Response collected = 143, Response ratio =  $143/200 = 71\%$ . People with age group between 30-60 years. Both male and female participants. Individuals reported shoulder pain after COVID-19 vaccination [11]. Individuals who received COVID-19 vaccination with post-

covid condition [9]. Individuals received vaccination without having COVID-19 disease [12]. Individuals who have been vaccinated with both doses. Exclusion Criteria: People experiencing shoulder pain prior to AstraZeneca or Sinovac COVID-19 vaccination. Individuals vaccinated with only first dose. A self-administered questionnaire was used to collect data. Participants recorded their responses after informed consent via direct on-site and web based online survey. SPSS version 22.0 software was used for data analysis. Results of data were determined according to the Chi-Square test and cross-tabulation for finding association of shoulder pain in individuals receiving AstraZeneca and Sinovac COVID-19 vaccines

## RESULTS

Results obtained from data shows that out 143 candidates almost 70% were from age



**Figure 1:** Age of respondents

group 30-35 years while others fell in age group 36-40, 41-45 and more than 45 (upto  $\geq 60$ ) with percentages 13%, 14.5%, and 15% respectively. The distribution of frequencies and percentages of population vaccinated with AstraZeneca and Sinovac. Among total 143 respondents 22.4% ( $f=32$ ) were vaccinated with AstraZeneca and 77.6% ( $f=111$ ).

	Shoulder Pain	Frequency	Percent
(1 <sup>st</sup> dose)	No	50	35.0
	Yes	93	65.0
	Total	143	100.0
(2 <sup>nd</sup> dose)	No	71	49.7
	Yes	72	50.3
	Total	143	100.0

**Table 1:** Percentage ratio of respondents reported discomfort or shoulder pain after first & second dose

Table:1 shows frequency of subjects receiving second shot of the both the vaccines. 65% reported pain after first dose of both vaccines. While on second dose shows that 50.3% respondents among them shows symptoms of discomfort and pain while 49.7% didn't experience any discomfort or pain in shoulder.

Symptoms	After 1st Dose		After 2nd Dose	
	Frequency	Percent	Frequency	Percent
Little to no swelling	70	49.0	83	58.0
Swelling with pain and difficulty in movement	27	18.9	21	14.7
Swelling with pain but no restriction in movement	34	23.8	27	18.9
Others	12	0.12	12	8.4

**Table 2:** Percentage ratio of symptoms experienced at injection site after first & second dose

Table 2 shows population of individuals who have experienced post vaccination swelling on injection site after first dose. After first dose 49% out of total population experience little to no swelling. Swelling with pain and difficulty in movement was experienced by 18.9% and swelling without reaction was seen in 23.8%. 0.12 % were other symptoms after first dose. While after second dose little to no swelling, swelling with restricted movement and swelling without restricted movement was reported by 58%, 14.7% and 8.4% respectively. 8.2 % were others symptoms after second dose.

Duration	After 1st Dose		After 2nd Dose	
	Frequency	Percent	Frequency	Percent
12-24 hours	56	40	28.0	28.0
3-4 days	40	31	21.7	21.7
6-7 days	10	12	8.4	8.4
No Pain	37	60	4.0	4.0
Total	143	143	100.0	100.0
p-value	<.001		<.001	

**Table 3** Association between duration of pain after first & second dose of both vaccines

Level of significance was adjusted to 0.05 ( $\alpha=0.05$ ). Results from the Chi-Square test (Table 3) were  $<0.001$ , which express that there was statistically significant association between shoulder pain and the administration of vaccines under concern.

## DISCUSSION

This study was conducted to find any association of shoulder pain in individuals receiving Sinovac and AstraZeneca COVID-19 vaccines. 30-35 years while others fell in age group 36-40, 41-45 and more than 45 (upto  $\geq 60$ ) with percentages 13%, 14.5%, and 15% respectively. These results are similar to study of Theodorou et al., and Abbas et al., [12,13]. Among total 143 respondents 22.4% ( $f=32$ ) were vaccinated with AstraZeneca and 77.6% ( $f=111$ ). These results are similar to study of Smerilli et al., 2021 who stated that less people were vaccinated with AstraZeneca vaccine due to vaccine hesitancy [14,15]. 65% reported pain after first dose of both vaccines. While on second dose shows that 50.3% respondents among them shows symptoms of discomfort and pain while 49.7% didn't experience any discomfort or pain in shoulder similar to Andrezejczak-Grazadko et al., [16]. Level of significance was adjusted to

0.05 ( $\alpha=0.05$ ). Results from the Chi-Square test were  $<0.001$  that means alternative hypothesis is accepted, which express that there was statistically significant association between shoulder pain and the administration of vaccines under concern, and null hypothesis is rejected [17]. Results obtained from data shows that there were very few respondents vaccinated with AstraZeneca vaccine as described in the study of Smerilli et al., 202 [14]. 65% reported pain or discomfort in shoulder after first and 50.3% after second dose of both vaccines [18]. According to the current study, that showed similar results to study of Andrezejczak-Grazadko et al., in which 60.3 % Individuals reported these symptoms [16,19]. According to the study of Sah et al., mostly pain was reported after 30 minutes of vaccine administration. Whereas in this study After first dose, in 39.2% participant, pain had been lasted for 12-24 hours post vaccination. 28% and 7% participants reported their pain ended in 3-4 days and 6-7 days, respectively. 25.9% reported no pain, while after second dose, duration of pain in 28% respondents was 12-24 hours while the pain duration in 21.7% and 8.4% respondents was 3-4 days and 6-7 days, respectively and 42% respondents reported no pain, rendering the findings comparable to a study conducted by Singhal et al in 2020 [20,21]. Whereas, in this study 32.2% and 32.9% reported pain after 30 min of first and second dose respectively. Limitations of the study were small sample size due to COVID-19 and due to large number of population. This study included only two vaccines, other vaccines can also be included in further future studies.

## CONCLUSION

From this study, it was concluded that there is an association of shoulder pain in individuals receiving both doses of Sinovac and AstraZeneca COVID-19 vaccines. Immune system response to vaccine, shoulder injury related to inappropriate vaccine administration, tenderness, soreness over the injected area and injection site pain are some common causes of post-vaccination shoulder pain after the administration of these vaccines.

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## Original Article

## Health Status and Academic Progress Among Day Scholars Vs Hostilities in Allied Health Sciences Students

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## ARTICLE INFO

## Key Words:

Academic progress, Allied health sciences students, Dayscholars, Hostilities, Health status

## How to Cite:

Ghulam Rasool, S., Amjad, F., Zuha, A., &amp; Ahmad, A. (2022). Health Status and Academic Progress Among Day Scholars Vs Hostilities in Allied Health Sciences Students: Health Status and Academic Progress Among Day Scholars Vs Hostilities. Pakistan BioMedical Journal, 5(7).

https://doi.org/10.54393/pbmj.v5i7.625

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Received Date: 4th July, 2022

Acceptance Date: 13th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Students are the most important aspect of future in any nation, which depends incredibly on its health and academic quality. Students are either day scholar or hostilities. Students from faraway places for study purposes comes and live in a hostel in which they live in a supervised and secure environment. **Objective:** The purpose of this study was to determine the nutritional status and academic performance of day scholars in comparison with hostilities of allied health science students of Lahore. **Methods:** This was a cross sectional comparative analytic study in which sample of 171 students was included out of which 77 were male and 94 were female. 93 hostel students and 78 where day scholars were selected in this study. Data were collected by using comparative survey design questionnaire which consist of 2 sections of demographic data involving both day scholars and hostel student's data related to nutritional health and over all academic performance. After collecting data, it was analyzed by using SPSS version 22.0. **Results:** After analyzation of data it was found that 36.5% of hostilities have good physical health, 63.5% hostilities have poor physical health, 53.9% day-scholars have good physical health and 46.1% day-scholars have poor physical health. And 65.5% hostilities have good academic performance, 34.5% hostilities have poor academic performance, 56.4%-day scholars have good academic performance and 43.5% day-scholars have poor academic performance. **Conclusion:** On the basis of results, it was concluded that health status of day scholars was better than hostilities and the academic performance of hostel students was slightly better as compared to day scholars.

## INTRODUCTION

A person's character is formed by his or her life experiences which they encounter. Human nature is shaped and altered by their life experience. Family assumes a crucial function in character building and later on society comes to assume its part in conduct change [1]. Along with family education also is important in student's life as it encourages them to create and prosper their character on different part of their life [2]. It is a part of child development process in which an individual learns new skills and information. It starts at birth and lasts till the time of death. The fundamental objective of training is to urge the person to secure errands, realities, information and characteristics [3]. Human culture relied upon this learning cycle, where guardians and different

individuals from our general public encourages this cycle of learning [4]. Schools, colleges and universities are the basic platform for the students to get education. Understudies are considered as the significant possible unit of future health related quality of life (HRQOL) [5]. At college level, understudies feel more work weight and difficulties that create physical, social and enthusiastic challenges among them. In numerous investigations understudies announced uneasiness, stress, despondency and eating issues which place a terrible effect on their scholastic presentation [6]. There are two kinds of student's day scholars and hostel students who live far from their family. Living far away from family for quite a

while is an extreme encounter for hostilities. They need to endeavor to rely upon themselves [7]. The life experience schools or inn life can change all aspects of an understudy's life through socialization[8]. It puts an extraordinary effect on the scholarly exhibition and of student's wellbeing status. They build up the propensity for modifying in new condition and live freely. Then again day researchers live with their folks and don't confront issues, for example, lousy nourishment, lodging ragging and home disorder [9-10]. Both hostilities and day researchers, are encountering diverse ecological and social problems in university life. Mothers in Pakistani do the entirety of the errands for their youngster's future. Guardians need their youngster's getting differentiation and causing them to feel pleased among friends and relatives. Thusly, they make an honest effort to give straightforwardness to their youngsters. Logical writing likewise showed that parental help and family enhance the overall academic performance of students [11-12]. The day researchers can't concentrate appropriately because of their home condition. The long making a trip from home to college is another issue and going in cruel climate conditions can likewise be the contributing variable [13]. Both hostilities and day scholar's students are affected by external factors. These factors can be positive or negative [14]. Negative such as stress, depression, and tension due to ragging, fight, feeling home sick or long traveling which may have a bad impact on student academic performance (AP) as well as can cause psychological health related problem [15-16]. Positive factors include staying alone away from the family and socialization with seniors might have a positive impact on academic performance of a hostilities student and staying with parents and eating healthy homemade food can have a good impact on the health status of day scholar's students [17]. Hostel students are having special needs and issues [18]. Medicinal students not contemplate sleep as topmost concern during academic requirement as students reduce their sleep hours to have more studying time. As a result, they evolve deprived sleep patterns specifically during examination weeks. Sleep has substantial part in cognitive developments and mental and physical health [19]. Deficiency in sleeping hours has major effect on academic performances (AP) of medical students. Researches in United States(US), Canada, Australia, India and some other countries shows students with bad sleep habits got poor marks in results of examinations and more down and depressing than their classmates [20]. They have specific physical, social and passionate attributes. They are away from home unexpectedly and need to learn to deal with their own issues by themselves, and acclimate to new states of living without a family individual from more prominent experience to manage them. on the other hand,

day scholars are dependent upon less parental control that can hinder undesirable conduct. Such students have poor dietary intake, absence of rest and may have bad habits such as smoking or medication use [21-22]. As both day scholars and hostelites have a great deal of impact on academic achievement and health status of the students this research is done to analyze academic performance in university and the health-related problem (HRP) status among day scholars and hostelites of allied health sciences in order to see the difference between these two groups and the factors which effect these two groups for increasing or decreasing their overall status.

## RESULTS

Result regarding age of respondents showed that the mean age was 25.35 and standard deviation was 4.8 with minimum value of 18 and maximum value of 38. Result regarding gender of students showed that 45% participants were male and 55% were female. Result regarding accommodation of participants showed that 54.4% participants were hostilities and 45.6% participants were day scholars.

Statement	Hostelites			Day Scholars		
	Often	Sometimes	Never	Often	Sometimes	Never
I have been diagnosed with urinary tract infection (UTI)	38 (40.9%)	33 (35.5%)	22 (23.7%)	44 (56.4)	21 (29.9)	13 (16.7)
I have complaints of constipation, diarrhea and other GI problems.	50 (53.8%)	28 (30.1%)	15 (16.1%)	26 (33.3%)	32 (41.0%)	20 (25.5%)
I have been going through eye strain due to improper lighting	41 (44.1%)	37 (39.8%)	15 (16.1%)	29 (37.2%)	36 (46.2%)	13 (16.7%)
I can sleep peacefully at least for 8 hours.	38 (40.9%)	45 (48.4%)	10 (10.8%)	27 (34.6%)	34 (43.6%)	17 (21.8%)
I face disturbance during study and sleep.	38 (40.9%)	40 (43.0%)	15 (16.1%)	24 (30.8%)	37 (47.4%)	17 (21.8%)
I suffer from body pain.	32 (34.4%)	46 (49.5%)	15 (16.1%)	18 (23.1%)	46 (59.0%)	14 (17.9%)
I feel depressed	46 (49.5%)	31 (33.3%)	16 (17.2%)	24 (30.8%)	32 (41.0%)	22 (28.2%)
I feel lonely	39 (41.9%)	37 (39.8%)	17 (18.3%)	26 (33.3%)	34 (43.6%)	18 (23.1%)
I exercise and go for walking	42 (45.2%)	34 (36.6%)	17 (18.3%)	29 (37.2%)	32 (41.0%)	17 (21.8%)
I eat junk food	32 (34.4%)	44 (47.3%)	17 (18.3%)	27 (34.6%)	36 (46.2%)	15 (19.2%)

**Table 1:** Frequency and Percentage of Day Scholars related to their Health status

Age (Years)	Total Score of Health Status Questionnaire			
	Frequency	Percent	Frequency	Percent
Good Physical Health	34	36.5	42	53.9
Poor Physical Health	59	63.5	36	46.1
Total	93	100.0	78	100.0

**Table 2:** Descriptive Statistics of Score of Health Status

Statement	Hostilities			Day Scholars		
	Often	Sometimes	Never	Often	Sometimes	Never
I avoid going to class.	32 (34.4%)	38 (40.9%)	23 (24.7%)	33 (42.3%)	30 (38.5%)	15 (19.2%)
I get attendance more than 70%.	34 (36.8%)	39 (41.9%)	20 (21.5%)	25 (32.1%)	36 (46.2%)	17 (21.8%)
I have been scoring above 65% in all subjects	26 (28.0%)	48 (51.6%)	19 (20.4%)	24 (30.8%)	37 (47.4%)	17 (21.8%)
I participate in various cultural activities	27 (29.0%)	45 (48.4%)	21 (22.6%)	21 (26.9%)	37 (47.4%)	20 (25.6%)
I face problems in collecting study material during exams	31 (33.3%)	34 (36.8%)	28 (30.1%)	15 (19.2%)	42 (53.8%)	21 (26.9%)
I am able to concentrate during classes	24 (25.8%)	44 (47.3%)	25 (26.9%)	17 (21.8%)	34 (43.6%)	27 (34.6%)
I am not getting time for self-study	24 (25.8%)	42 (45.2%)	27 (29.0%)	18 (23.1%)	39 (50.0%)	21 (26.9%)
I am able to interact with teachers	22 (23.7%)	43 (46.2%)	28 (30.1%)	22 (28.2%)	38 (48.7%)	18 (23.1%)
I miss important information discussed in the class	24 (25.8%)	45 (48.4%)	24 (25.8%)	22 (28.2%)	39 (50.0%)	17 (21.8%)
I submit my assignments on time.	26 (28.0%)	42 (45.2%)	25 (26.9%)	29 (37.2%)	31 (39.7%)	18 (23.1%)

**Table 3:** Frequency and Percentage of Day Scholars related to their Academic Performance

Score of Academic Progress	Hostilities		Day Scholars	
	Frequency	Percent	Frequency	Percent
Good Academic Performance	61	65.5	44	56.4
Poor Academic Performance	32	34.5	34	43.6
Total	93	100.0	78	100.0

**Table 4:** Descriptive Statistics Of Score Of Academic Progress

Result regarding total score of academic progress status showed that 53.2% gain score less than 75 which means that they had good academic performance and 46.8% gain score for more than 75 which means that they had poor academic performance. Result regarding crosstabulation hostel students and day scholars it was found that 36.5% of hostelites have good physical health, 63.5% hostelites have poor physical health, 53.9% day-scholars have good physical health and 46.1% day-scholars have poor physical health. And 65.5% hostelites have good academic performance, 34.5% hostelites have poor academic performance, 56.4%-day scholars have good academic performance and 43.5% day-scholars have poor academic performance.

## DISCUSSION

The objective of this comparative cross-sectional study research is to evaluate the difference between health condition and academic performance between day scholars and hostel students. Sample of 171 was selected in this study with a sample population of students. Out of these 171, 93 were hostelites and 78 were day scholars with 77 male and 94 female students. Data was collected by comparative survey design questionnaire which consist of 2 sections of demographic data involving both day scholars and hostel student's data related to nutritional health and over all academic performance. Many studies have been done previously in which many factors were stated affecting day scholars and hostelites but some of them showed that the problems which were faced by day scholars were more There were a number of issues looked

by day researcher understudies. The serious issue is that they need to venture out a significant distance to arrive at their school. The good ways from home to class becomes advantage for visitors as they don't have to head out any separation to reach homeroom on regular routine. The subsequent central point found in this examination is nature of the home. Guardians having less instructive foundation can't pay appropriate regard for their kids. The third factor is inappropriate space accessibility and food dispersion for day researchers. Basically, the boarding framework has preferences over the day researcher study framework. Thusly, the boarding framework is favored for the understudies if their folks can bear the cost of the levy without any problem. In the previous studies it was found that health related status of day scholars was better as compare to hostel students but on the other hand academic report of hostel students were better in comparison with day scholars. In contrary to previous study our study showed that the health status of hostilities is slightly better than day scholars and academic performance of day scholars was slightly better than the hostilities [5]. In the previous study it was concluded that day scholars have more adjustable capacity than hostel students. They show significant difference on the basis of social life, home environment, feelings etc. Although some studies also showed no difference in comparison. Study also showed that that there is no significant difference in academic performance between hostel students and day scholars [23]. All the previous studies and this study suggested that day scholar's health status is better as the students' lives at home and eat healthy food and has a good healthy environment and has parents who look after their health in comparison with hostelites who does not have a guardian to look after them, proper diet is not available, meals are skipped as nobody is there to watch over, junks are eaten and other reasons which places a negative impact on hostel students' life. Some previous studies suggested that academic performance of hotel students is better in comparison with day scholars as they get more time to study less travelling time and have friend for guidance or some family drama but some studies on this study also suggests that academic performance of day scholar is better in comparison with hotel students as hostel students feel low after leaving there family they may face depression, tension, stress or other psychological disorders which might effect there academic performance or fall in health status can also be a contributing factor in showing poor or low academic performance in comparison with day scholars[23].

## CONCLUSION

On the basis of results, it was concluded that health status

of day scholars was better than hostilities and the academic performance of hostel students was slightly better as compared to day scholars.

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## Original Article

## Effects of Thoracic Manipulation in Increasing Rom and Pain in Frozen Shoulder Randomized Control Study

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## ARTICLE INFO

## Key Words:

Adhesive capsulitis, ROM, Pain, Musculoskeletal disorder

## How to Cite:

Jahangir, S. ., Naz, H. ., Abid, F. ., Shahid, H. ., Mehmood, M. ., Tariq, M. ., Maqbool, K. ., & Azfar, H. . (2022). Effects Of Thoracic Manipulation in Increasing Rom and Pain in Frozen Shoulder Randomized Control Study: Thoracic Manipulation in Increasing Rom and Pain in Frozen Shoulder. Pakistan BioMedical Journal, 5(7).  
https://doi.org/10.54393/pbmj.v5i7.624

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Received Date: 4th July, 2022

Acceptance Date: 15th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Adhesive capsulitis is a common musculoskeletal condition that can cause discomfort and a limited range of motion (ROM) in the shoulder. Unknown is the precise pathophysiology of frozen shoulder. The tendon fibrosis and capsule contractors that limit mobility at the glenohumeral joint are often to blame. **Objective:** To determine the efficacy of thoracic spine manipulation on shoulder ROM, pain and disability in patients with frozen shoulder. **Methods:** This study was conducted in a randomized control fashion at the HHIRS Rehabilitation Department in Mansehra. Patients experiencing shoulder discomfort between the ages of 40 and 60 were included, both male and female. The analysis was carried out using SPSS version 22.0. For normality, the Shapiro-Walk test was applied. Tests both parametric and non-parametric were used to compare results within and across groups. **Results:** Friedman test presented comparison within group of variables via non parametric test for shoulder pain and ROMs. There is significant improving in variables on VAS scale and range of motions in both groups showed significant improvement  $p < 0.001$ . Both group A and B showed statistically significant improvement in disability  $p < 0.001$  while in B group there was an irrelevant alteration in 3<sup>rd</sup> week. **Conclusions:** In comparison to traditional physical therapy alone, thoracic spine manipulation is more successful in improving shoulder discomfort, disability and ROM.

## INTRODUCTION

Adhesive capsulitis is a common musculoskeletal disorder that can lead to shoulder disability and restricted range of movements (ROMs) with pain [1]. The exact pathophysiology of frozen shoulder is unknown. Usually it is due to capsule contractors and fibrosis of tendon that restricts the movement at glenohumeral joint [2]. Women are most effected as compare to men after the age of 40

[3]. Frozen shoulder or Adhesive capsulitis has 3 stages. It gradually evolves and stage 1 is called freezing stage which is more painful and lasts 2 to 9 months. Stage 2 lasts for 12 months with reduction in pain and restricted ROMs. Stage 3 which is called recovery stage in which ROMs get back to normal [3, 4]. Goal of supervision of frozen shoulder is to get discomfort help and avoid debility through

physiotherapy and in intense cases steroid intra-articular injections. Therapy session include heat therapy, electrotherapy, anti-inflammatory and analgesics, steroids, mobilization and therapeutic exercise. It is observed that following these patient can recover early [5-8]. Thoracic vertebral management is beneficial in patients with frozen shoulder [9]. Hypo mobility is common at thoracic segments of spine with restricted glenohumeral joint [10]. Various studies indicated that manipulation of thoracic spine is beneficial for relieving the pain and decrease the disability of shoulder [11]. In literature thoracic manipulation showed significant improvement in blood flow of upper extremity and signify the relation between thoracic manipulation and functional capabilities of shoulder[12].

**METHODS**

This study was a randomized control carried out at Rehabilitation department of HHIRS, Mansehra. Duration of study among May 2020 to Sep 2020 Patients of both gender with age of 40 to 60 years having shoulder pain were included. Subjects clinically diagnosed with frozen shoulder of stage 2 or 3 with hypermobility of thoracic spine [13, 14]. Subjects with history of trauma or fracture or other thoracic pathologies were not included in the study. Participants were randomly allocated in control group A and Interventional group B. Each group had 16 participants. Subjects underwent 3 sessions per week and measurements for assessment were taken at baseline, 6th visit and last assessment was at 3rd week. Semi-structured questionnaire was used [15]. Control group underwent traditional physical therapy session which include heat therapy 8 min, TENS for 8 to 10 min, stretching and passive ROMs with 5 repetitions [16-18]. Experimental group B received conventional rehabilitation session (TENS, Heat therapy and stretching exercise) along with thoracic manipulation throughout all session. Inclinator was used to measure shoulder range. Visual analogue scale was used for pain, DASH scale. VAS used for discomfort, Inclinator for shoulder range ROM and DASH scale was used to assess the disability of upper extremity. Analysis was done through SPSS version 22.0. Shapiro-walk test was used for normality. Parametric and non-parametric tests were applied to evaluate the outcome between and withing groups.

**RESULTS**

Friedman test presented comparison within group of variables via non parametric test for shoulder pain and ROMs. There is significant improving in variables on VAS scale. And range of motions in both groups showed significant improvement p<0.001 as presented in Table 1.

Variables	Group	Baseline	2 <sup>nd</sup> week	3 <sup>rd</sup> week	p-value
		Median (IQR)			
VAS	A	6 (1)	4.5 (3)	3 (0)	≤0.001***
	B	8 (4)	3 (3)	3 (2.25)	
External rotation ROM	A	39.5 (5)	67.5 (9)	67.5 (9)	≤0.001***
	B	39.5 (7)	83.0 (5)	83.0 (5)	
Internal rotation ROM	A	37.5 (15)	54 (4)	54 (4)	≤0.001***
	B	28 (4)	61.5 (3)	61.5 (3)	
Flexion ROM	A	111.5 (19.5)	160 (5.75)	160 (5.75)	≤0.001***
	B	110 (10.5)	169.50 (4)	169.50 (4)	
Abduction ROM	A	92.0 (10)	154 (19.5)	154 (19.5)	≤0.001***
	B	97 (6.5)	169 (5)	169 (5)	

**Tables 1:** ROMs of shoulder shows significant improvement on DASH scale

Both group A and B showed statistically significant improvement in disability p<0.001 while in B group there was an irrelevant alteration in 3rd week (Table 2).

Variables		Mean ± SD	Mean diff	p-value	F-value	p-value of post hoc test
		Measurements				
DASH Group A	1 <sup>st</sup> week	54.88 ± 9.06	26.12	≤0.001***	110.9	<0.001 <sup>†</sup>
	2 <sup>nd</sup> week	28.75 ± 3.66				<0.001 <sup>†</sup>
	3 <sup>rd</sup> week	26.25 ± 4.40				0.015 <sup>‡</sup>
DASH Group B	1 <sup>st</sup> week	51.63 ± 9.45	28.63	≤0.001***	110.9	<0.001 <sup>†</sup>
	2 <sup>nd</sup> week	23.0 ± 3.14				<0.001 <sup>†</sup>
	3 <sup>rd</sup> week	23.06 ± 2.89				1.00 <sup>†</sup>

**Table 2:** Repeated Measures ANOVA test for DASH scale present SD and mean values

Variables	Groups	Mean ± SD	Mean difference	p-value
Dash score	(Control) Group A	28.63 ± 10.48	0.0625	0.985
	Group B (Experimental)	28.56 ± 8.34		
		Mean Rank	Median (IQR)	p-value
VAS score	Group A	15.50	3 (0)	0.373
	Group B	17.50		
ROM (external rotation)	Group A	9.31	75(18.5)	≤0.001***
	Group B	23.69		
ROM(flexion)	Group A	9.50	166.0(10.50)	≤0.001***
	Group B	23.50		
ROM (abduction)	Group A	9.56	164.5(17.25)	≤0.001***
	Group B	23.44		
ROM(internal rotation)	Group A	8.97	58.5(8.25)	≤0.001***
	Group B	24.03		

**Table 3:** Comparison between groups of pre and post end value 3rd week for VAS, DASH scale and ROMs of shoulder

**DISCUSSION**

A study on thoracic manipulation showed improve in shoulder ROMs and pain [19]. Result of this study overlap the outcomes of current study. Another study indicated the same effect on frozen shoulder regarding variables disability on the scale of DASH score. The result of the study showed improvement in the functional impairment of the study [20]. This project similarly to the result of our current project in relations of shoulder disability. Moreover, a study carried out on frozen shoulder to see the impact of the

different physical therapy techniques along with manipulation techniques. The study showed that effect of conventional therapy along with additional techniques is more effective as compared to conventional therapy alone [21]. While in current study same result have found that there is significant improvement in interventional group as compared to the control group which received only conventional physical therapy. A study in 2012 revealed that there is considerable enhancement in ROMs of patients with adhesive capsulitis with reduction in pain. Similarly, current study showed significant improvement in ROMS of shoulder [22]. In a systematic review by Minkalis et al., thrust manipulation of shoulder was introduced as intervention of shoulder disability and study reported reduction in pain and disability [23]. Same findings were reported in current study in terms of shoulder disability and pain. These findings can be beneficial that manipulation of thoracic spine can be effective with other traditional physical therapies in reducing shoulder ache and disability.

## CONCLUSION

Thoracic spine manipulation combined with conventional physical therapy is effective for improvement in shoulder disability, shoulder pain and ROMs as compared to conventional physical therapy alone.

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## Original Article

Determination of Proximate Composition of *Nigella sativa* L. Seeds and its Effective Role in Improving Lipid Profile Among Hyperlipidemic WomenRida Zanib<sup>1</sup>, Shahnai Basharat<sup>1</sup>, Tara Khursheed<sup>1</sup>, Zarnain Ali Shah<sup>1</sup>, Zainab Gulzar<sup>1</sup>, Muhammad Shaheer<sup>2</sup>, Sakina Fatima<sup>3</sup><sup>1</sup>Amna Inayat medical college, Sheikhpura, Pakistan<sup>2</sup>The University of Lahore, Lahore, Pakistan<sup>3</sup>Department of Physical Therapy, Times Institute Multan, Multan Pakistan<sup>4</sup>University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan

## ARTICLE INFO

## Key Words:

*Nigella sativa* L. seed powder, Black cumin, Blood Lipid profile, Hyperlipidemia, AOAC, Hypolipidemia, Lipid ameliorating effect, Proximate analysis

## How to Cite:

Zanib, R. ., Basharat, S. ., khursheed, T. ., Ali Shah, Z. ., Gulzar, Z. ., Shaheer, M. ., & Fatima, S. . (2022). Determination of Proximate Composition of *Nigella sativa* L. Seeds and its Effective Role in Improving Lipid Profile Among Hyperlipidaemic Women: Proximate composition of *Nigella sativa* L. seeds and role in improvement of lipid profile. *Pakistan BioMedical Journal*, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.626>

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Received Date: 5th July, 2022

Acceptance Date: 18th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Hyperlipidemia is characterized by abnormally elevated levels of body's plasma cholesterol and triacylglycerol. **Objective:** To find out the proximate composition of *Nigella sativa* L. and its hypolipidemic effect on blood lipid profile among hyperlipidemic women. **Methods:** To determine the proximate composition of *Nigella sativa* seed the kjeldhah method, soxhlet extraction using petroleum ether, and AOAC procedure were used. For the identification of hypolipidemic impact, a total of 64 women with mild to moderate hyperlipidemia, aged between 25-35 years were selected for the 8 weeks of study. The sample was selected from the University of Lahore Teaching Hospital, Lahore. After removing physical contaminants like dirt, dust, and other foreign grains black seeds were air dried. After drying, seeds were grounded into fine powder by using commercial blender. Each capsule was prepared with 500mg powder of *N. sativa*, and was transferred in air tight jars. After screening the participants of experimental group, they were advised to use 2 capsules of *N. sativa* supplement before breakfast and two capsules in the afternoon prior to their meal for 8 weeks. Participants were also advised to follow the given 7-day diet plan for 8 weeks. The anthropometric measurements, biochemical evaluation (lipid profile), and dietary intake data were collected. **Results:** The mean age group of Hyperlipidemic patients enrolled in study was  $32.5 \pm 0.34$  years. There was a significant reduction in Low Density Lipoprotein (LDL), total cholesterol level, and triglyceride levels with p-value less than 0.05. High density lipoprotein levels were also improved from  $49.5 \pm 8.38$  mg/dl to  $51.81 \pm 10.21$  mg/dl. **Conclusion:** The study concluded that *Nigella sativa* L. seed powder supplementation showed a significant improvement in lipid profile of hyperlipidemic patients. The study found an increase in high density lipoprotein among patients.

## INTRODUCTION

Hyperlipidemia is a condition in which the body's plasma cholesterol (hypercholesterolemia) and triacylglycerol (hypertriglyceridemia) levels are abnormally high. Hyperlipidemia is also known as hyperlipoproteinemia since the lipoprotein must coexist with elevated levels of cholesterol and triacylglycerol in the plasma. As a result, high triglyceride levels represent increased levels of triglyceride-rich lipoproteins such as chylomicrons and VLDL, as well as their remains. A rise in cholesterol levels

typically indicates an increase in LDL, which may or may not be accompanied by an increase in VLDL [1]. Hyperlipidemia, a significant systemic illness, is a modifiable risk factor for coronary heart disease and extracoronary atherosclerosis, as well as a higher risk of Cardiovascular Disease (CVD), which is the leading cause of death globally [2]. Several prospective studies have found that high-density lipoprotein cholesterol (HDL-C) content is inversely related to coronary heart disease. As a result, a

low HDL-C level is a well-known risk factor for coronary heart disease [3]. BMI is now the most extensively used anthropometric test for predicting health risk connected to weight status, and several research have found a link between BMI and hyperlipidemia [2]. Hyperlipidemia is inherited polygenically in the majority of patients, and the disorder's expression is heavily impacted by factors such as (central) obesity, saturated fat intake, and the cholesterol content of a person's diet. Another process includes high levels of "apo B-100" lipoproteins in the blood, which can lead to atherosclerotic disease even if the patient does not have a family history of the condition. It is common for a person's risk of developing hyperlipidemia and cardiovascular disease to be influenced by a combination of hereditary and environmental variables [4]. Hyperlipidemia is linked to a number of causes, including hereditary, environmental, and lifestyle factors. Excessive alcohol use, smoking, high blood pressure, and other risk factors may all be managed. Secondary hyperlipidemia, also known as acquired hyperlipidemia, is associated to diabetes, renal failure, and alcoholism [5]. Vascular disease, which can be fatal if left untreated, is one of the most common complications of untreated hyperlipidemia. Coronary artery disease, peripheral artery disease, cerebrovascular accidents, aneurysms, type II diabetes, excessive blood pressure, and even mortality are examples of these complications [6]. *Nigella sativa* was used in traditional medicine for millennia, and a wide spectrum of chemical components discovered in *N. sativa* reflect its broad therapeutic properties. The seeds produce various alkaloids (the isoquinoline alkaloids like nigellicin and pyrazole alkaloids) [7]. Unsaturated fatty acids, including eicosadienoic acid (3%), oleic acid (20%), the dihomolinoleic acid (10%), saturated fatty acids palmitic acid linoleic acid, and the saturated fatty acids, for example, stearic acid (3%) are found in black cumin seeds. Crude fibre and vitamins, involving ascorbic acid, pyridoxine, thiamine, folic acid, and minerals like Fe, P, Ca, Zn, Na, and Cu have also been found in the seeds [8]. Furthermore, the seed oil has been used to separate free sterols, steryl glucosides, steryl esters, and acylated steryl glucosides [9]. Black cumin seed oil contains B-carotene (Pro-vitamin A) and tocopherol compounds, as well as phytosterols, such as the beta-sitosterol and, in lower levels, campesterol, stigmasterol, and lanosterol [10]. There are a total of four different reported phospholipid classes, including phosphatidylserine, phosphatidylinositol, phosphatidylcholine, and phosphatidylethanolamine, among others [11].

## METHODS

Two main procedures were used for the assessment, a)

Kjeldhal method and soxhlet extraction procedure using petroleum ether AOAC processes and b) Interventional Non-randomized (Quasi Experiment) with pre-, post-testing. The proximate composition determined by using procedures at labs of University Institute of Diet and Nutrition Science, University of Lahore, Lahore. A total of 32 women, aged between 25-35 years with mild to moderate hyperlipidemia were selected for the 8 weeks of study. The sample was selected from the University of Lahore Teaching Hospital, Lahore. To determine the proximate composition and preparation of *N. sativa* supplementation black cumin seeds were purchased from local market. After removing physical contaminants like dirt, dust, and foreign grains, black seeds were air dried. The protein content of seeds was evaluated by kjeldhal method, fat content was analysed by soxhlet extraction of seed for 24 hrs using petroleum ether, and moisture fibre and ash content was assessed by AOAC procedures [18]. To prepare capsule, the seeds were ground into fine powder by using commercial blender and each capsule was prepared containing 500mg powder of *N. sativa* followed by transferring the product into air tight jars [12]. The participants who meet the study inclusion criteria were enrolled in the study. The baseline data was comprised of blood lipid profile (HDL, LDL, TC, and TG), anthropometric measurements (weight, height, & BMI) and 24-hour dietary recall. After screening the participants of experimental group, they were advised to use two capsules of *N. sativa* supplement before breakfast and two capsules in the afternoon prior to their meal for as long as 8 weeks [12]. Participants were also advised to follow the given 7-day diet plan for 8 weeks. The follow up for patients was conducted twice in a month. The anthropometric measurements of experimental group were collected in each follow up. Participants were asked for facing any constraints and barrier to follow the study procedure. After 8 weeks of study the same protocol of baseline, visitations were concluded for experimental groups. The baseline and post-test study data were compared to test the study hypothesis.

## RESULTS

*N. sativa* seeds contain protein, fat, moisture, ash and carbohydrates with approximate percentage of 22.8%, 36.24%, 5.41%, 3.30%, and 30.95% respectively. The percentage composition of the seeds is demonstrated in Table 1.

Macronutrien	%per 2g
Protein	22.8%
Fat	36.24%
Moisture	5.41%
Ash	3.30%
Carbohydrates	30.95%

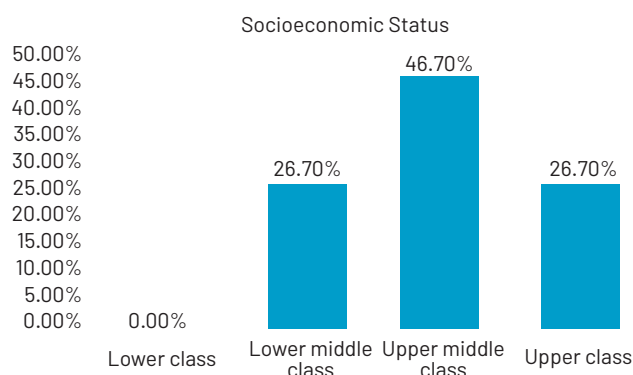
**Table 1:** Proximate composition of *Nigella sativa* L. seed

Table 2 exhibits the average age distribution trends in multiple hyperlipidemic patients that were enrolled to partook in the trial.

Age in Mean± SD	Minimum	Maximum
32.5±0.34	26	35

**Table 2:** Average age distribution of hyperlipidemic patients enrolled in study

Graphical demonstration was formulated for the demonstration of average socioeconomic status among the patients of hyperlipidemia that were selected for the trial. This graphical representation showed that 46.7% of participants belonged to upper middle class and 26.7% belonged to lower middle class, making the remaining patients belong to upper class.



**Figure 1:** Average socioeconomic status among hyperlipidemic patients

The mean HDL of patients was 49.5±8.38mg/dl before the treatment, whereas the mean HDL after treatment was 51.81±10.21mg/dl. Findings showed statistically significant difference in pre- and post- treatment with p-values 0.001. The mean LDL of patients was 162.84±30.20mg/dl before the treatment, whereas the mean LDL after treatment was 158.84±22.56mg/dl. Findings showed statistically significant difference in pre and post treatment with p-values 0.001. The mean TC of patients was 227.81±11.95 mg/dl before the treatment, whereas the mean TC after treatment was 224.93±18.75mg/dl. Findings showed statistically significant difference in pre and post treatment with p-values 0.001. The mean TG of patients was 201.78±27.55mg/dl before the treatment, whereas the mean TG after treatment was 197±27.84mg/dl. Findings showed statistically significant difference in pre and post treatment with p-values 0.001, Table 3.

Macronutrien		Mean ± SD	Paired sample t-test (p-value)
High-Density Lipoprotein (HDL)	Pre	49.5±8.38	0.000
	Post	51.81±10.21	
Low-Density Lipoprotein (LDL)	Pre	162.84±30.20	0.001
	Post	158.84±22.56	
Total cholesterol (TC)	Pre	227.81±11.95	0.001
	Post	224.93±18.75	
Triglycerides (TG)	Pre	201.78±27.55	0.001
	Post	197±27.84	

**Table 3:** Comparison of average HDL, LDL, TC and TG pre- and

post-treatment

## DISCUSSION

It is estimated that more than half of all individuals in the United States have high LDL levels, with only about a third of those patients control their high LDL levels well, implying that the condition is undertreated [4]. In both the developed and developing countries, hyperlipidemia is the major cause of mortality, accounting for 16.7 million deaths each year [13]. Hyperlipidemia affects 63 percent of the Pakistani population. At least one major lipid-fraction, such as Total Cholesterol (TC), Low-Density Lipoprotein Cholesterol (LDL-C), High-Density Lipoprotein Cholesterol (HDL-C), or Triglycerides (TG), was abnormal in the study population. Low HDL-C was the most prevalent kind of isolated dyslipidemia (17.3 percent) [14]. There are many interventions that have done to improve hyperlipidemia and major influence have been given to the dietary interventions. Different plants have been approved to improve lipid ameliorating effects, and *N. sativa* is one of them. Existing analysis shows that active components in *N. sativa* improve many health complications, especially thymoquinone helps in prevention of lipid per oxidation and niacin improve weight management results. In another study Razamposh and his colleagues determine that. *N. sativa* capsules raised serum HDL cholesterol, decreased serum LDL cholesterol, and decreased the TC/HDL-C ratio [15]. In the present study the *N. sativa* seed powder capsule was prepared for the evaluation of proximate composition and its effective role in improvement of lipid profile among hyperlipidemic women visiting University of Lahore Teaching Hospital. The proximate analysis of *N. sativa* shows the presence of protein, fat, moisture, ash, and carbohydrates in percentage of 22.8%, 36.24%, 5, 41%, 3.30%, and 30.95%, respectively determined by extraction method used by Khoddami and his colleagues [18]. The formulation of seed powder capsule was developed by following the similar work performed by Ibrahim RM and his colleagues, on analysing the potential of therapeutic impact of *N. sativa* on different disease it has been evaluated that *N. sativa* helps to improve lipid profile [12]. In current study it has been evaluated that after consuming *N. sativa* seed powder capsules the lipid profile and antioxidants levels improved as compare to initial results. LDL- cholesterol level was reduced from 162.84±30.20 to 158.84±22.56mg/dl with p-value less than 0.05. Total cholesterol levels were also reduced (227.81±11.95 to 224.93±18.75) with p-value less than 0.005. In a randomised, double-blind, controlled study performed in Kerman, Iran, 20 physically inactive overweight females were categorized into two groups and given either 2g *N. sativa* supplementation (*N. sativa* capsules) and a placebo

for eight weeks. During that time, both groups enrolled in an aerobic training programme (3 times per week). At the start of the study and at end of the eight weeks, blood lipids as well as VO<sub>2</sub> max were measured. Supplementing with *N. sativa* reduced Total Cholesterol (TC), triglycerides, Low-Density Lipoprotein (LDL), and the body mass index while increasing HDL and VO<sub>2</sub> max. A high-intensity aerobic training programme reduced TC and LDL while increasing VO<sub>2</sub> max [19]. In another study the impact of crushed *N. sativa* on blood lipids, anthropometric factors and glucose homeostasis, in individuals with Hashimoto's thyroiditis were investigated by MA Farhangi and colleagues. After 8-week administration of *N. sativa* seed powder, blood concentrations of LDL cholesterol and triglyceride (TG) reduced with p value less than 0.05, whereas serum HDL cholesterol rise considerably [20]. In the present study the LDL cholesterol, Total cholesterol and Triglycerides were mitigated with p value less than 0.05 as well as the HDL cholesterol of patient considerably increase from 49.5±8.38 to 51.81±10.21 with p value less than 0.05.

## CONCLUSION

The study concluded that *N. sativa* L. seed powder supplementation showed a significant improvement in hyperlipidemic condition. The study found an increase in high density lipoprotein among patients.

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## Original Article

## Linguistic Reliability &amp; Validity of Urdu Version of Roland-Morris Disability Questionnaire in Patients with Chronic Non-Specific Low Back Pain

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## ARTICLE INFO

## Key Words:

Chronic low back pain, LBP, Validity, Reliability, Roland-Morris Disability Questionnaire (U-RMDQ)

## How to Cite:

Shabbir, A. ., Imran, M. ., Kamran, M. ., Wassi, A. ., Amin, H. ., Balqees, A. ., Ain, Q. ul ., Tariq, H. ., Ahmad, M. . & Ullah, I. . (2022). Linguistic Reliability & Validity of Urdu Version of Roland-Morris Disability Questionnaire in Patients with Chronic Non-Specific Low Back Pain: Roland-Morris Disability Questionnaire in Patients with Chronic Non-Specific Low Back Pain. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.627>

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Received Date: 5th July, 2022

Acceptance Date: 20th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Roland-Morris Disability Questionnaire (RMDQ) is a self-administered tool that produces reliable measurements for drawing implications about disability. Urdu form of the Roland-Morris Disability Questionnaire (U-RMDQ) is considered apprehensive for the population of Pakistan. Furthermore, the Urdu version of this tool is consistent in reliability, validity & content continuity with the English original version. **Objective:** The aims of the current study were to assess the reliability, validity & utility of the Urdu form of the Roland-Morris Disability Questionnaire (RMDQ) in participants with chronic nonspecific low back pain. **Methods:** This study design was qualitative tool validation. The sampling technique employed was non-random convenience sampling with 100 individuals including both females and males within the age of 20 years to 70 years. Out of 100, 25 were healthy & 75 were patients. Measurements were taken at baseline followed by another measurement after 24 hours. The study was completed in three stages; content validity was evaluated through the content validity index in the first stage, a pilot study was run to evaluate reliability & validity in the second stage followed by an evaluation of patients presenting with low back pain using Urdu version of (U-RMDQ) in the third stage. Data were collected through the Urdu version of the (U-RMDQ). Afterward, IBM SPSS version 25.0 was used to analyze the data. **Results:** -retest reliability depicted with Intra-class Correlation Coefficient was 0.684 for healthy individuals while 0.998 for participants with non-specific chronic LBP. The outcomes clearly express the tool reliability for the assessment of disability in patients with nonspecific chronic low back pain. An Independent t-test was employed to check the different validity, results showed the significant differences in means of all variables between both groups thereby producing <.05 two-tailed significance of all variables. After factor analysis of samples of 100 patients, Kaiser-Meyer Olkin (KMO) was 0.872 & p-value <0.05 showed the significance of the test. Five variables in (U-RMDQ) were responsible for variance in data. **Conclusion:** The study concluded the Urdu version of the Roland-Morris Disability Questionnaire is a valid and reliable instrument to evaluate disability associated with chronic non-specific low back pain.

## INTRODUCTION

The low back of the human body is composed of five lumbar vertebrae with the possible inclusion of sacral vertebrae. Fibrocartilaginous discs lie between these vertebrae. These discs absorb shock, prevent rubbing of discs &

protect the spinal cord. Spinal nerves enter & leave through the vertebral foramen to provide innervation to the skin & muscles of the lower back. Moreover, the spine is stabilized through ligaments & strong low back muscles [1]. Due to

increased loads & advancing age, the discs eventually lose their flexibility thereby compromising the ability of the spine to withstand forces. The reduced ability of discs to bear forces is compensated by ligaments & muscles. Consequentially, ligaments grow thicker & bony outgrowths develop on vertebrae making the nerve passage narrower [2]. The low back of the human body is one of the major weights bearing regions & central axis that withstands immense loads throughout the life span., pain in the low back is a predominant illness [3]. The low back pain (LBP) is a prevalent body state among individuals all over the world. The low back pain is neither an illness nor a diagnosis rather it is a pain confined between the rib cage & gluteal folds. Pain may also be felt in the thighs, groin & calf region. It does not necessarily radiate to the leg. Low back pain is frequently described as an ache dull and the duration of the pain varies considerably among individuals. The risk factors associated with LBP are obesity, pregnancy, heavy lifting & prolonged sitting. Other risk factors are population-specific & do not strongly correlate with the progress of low back pain [4]. The causative agents for low back pain are osteoporosis, arthritis, disc bulge & muscular or ligamentous strains are other factors that significantly contribute to the onset of low back pain. Classification of the low back pain is built on numerous ways. Depending on the duration of the pain, acute low back pain is defined as the pain persisting for less than 06 weeks and sub-acute low back pain is defined as the pain having in between 6-12 weeks; chronic low back pain is described as the pain persisting for more than 12 weeks [5]. Among all these pain, the chronic low back pain is the most incapacitating pain leading to reduced performance in activities of daily life for a person. Low back pain is also classified based on clinical manifestations; nonspecific low back pain is diffuse in nature & described as the pain that does not differ in response to movement & is limited to the low back with no radiation [6]. On the other hand, pain that is located unilaterally or bilaterally with radiation below the knee and changes in severity in response to body movements is defined as radicular [7]. Physical examination, medical history, and other radiological tests such as MRI, CT and X-rays are employed to diagnose back pain [8]. Most common and effective strategy for low back pain is the exercise. Moreover, back pain may be managed through medications, heat therapy, massage, acupuncture & spinal manipulation. Aquatic therapy, aerobic exercises, Trans-cutaneous electrical nerve stimulation (TENS) & exercise therapy are some other effective methods to cope with the debilitating the low back pain [9,10]. The pervasiveness of disability is more closely linked with chronic LBP. The disability associated by chronic low back pain needs to be appropriately evaluated. For this purpose,

various data collection tools are administered to patients like Modified Oswestry Disability Index (MODI), Quebec Pain Disability Scale (QPDS) and (RMDQ). Among these, (RMDQ) is considered a valid and reliable instrument to appropriately evaluate the disease in patients with chronic nonspecific low back pain (LBP). There is sufficient strong evidence of the reliability & validity of the (RMDQ). An English Scholars Roland & Morris (1983) construct the Roland-Morris Disability Questionnaire to measure the activity status of patients with chronic low back pain & they derived contents from the sickness impact profile (SIP). Sickness impact profile (SIP) reflects the overall health status of individuals. Roland and Morris chose 24 items from the (SIP) that strongly correlated with low back pain (LBP) to develop (RMDQ). The questionnaire grants a score of 1 if the answer is "yes" & a score of 0 if the answer is "no". All components hold no significant difference in rank, the overall score is considered the entire of the score of all components with a minimum score of 0 7 and maximum score of 24. The Greater the score, the more severity of the disability is considered [11]. In recent years, (RMDQ) has been translated into various languages e.g, Korean, Italian, Chinese, Spanish, Arabic, Gujrati, Portugal and Urdu. Urdu form of the Roland-Morris Disability Questionnaire (URMDQ) is considered apprehensive to the population of Pakistan. In addition, the Urdu form of the Roland-Morris Disability Questionnaire (URMDQ) is consistent in reliability, validity & content continuity with the English original version.

## METHODS

The qualitative study design was adopted for qualitative tool validation. This research was conducted from February to July 2020 in the Out-patient Physiotherapy department of General Hospital, Lahore. The approval of the current research was obtained from research ethical committee of Riphah College of Rehabilitation Sciences (RCRS), informed consent was signed by each participant and get the permission from the hospital administration. Non-random convenience sampling technique was adopted to collect the data, 100 individuals within the age group of 20-70 years were included as a sample. Out of 100 individuals, 25 were healthy whilst 75 were patients with chronic LBP. Patients were included if they have chronic nonspecific LBP of non-mechanical origin with or without radiation. Patients were excluded if they had acute LBP, low back pain of mechanical or neurological origin were pregnant females, had inflammation, infection, or suspected tumor. Patients were informed before their participation. The study was completed in three stages; (RMDQ) was translated into Urdu & content validity was checked through the content validity index (CVI), and a pilot study was run with the Urdu form of the Roland-Morris



Disability Questionnaire (RMDQ) to evaluate reliability & validity in the second stage followed by the evaluation of patients presenting with non-specific chronic low back pain through (RMDQ) in the third stage. RMDQ was first translated into Urdu by 2 experts. Both experts had fluency in English & Urdu. One expert belonged to the Allied health care profession & the second one was a junior life scientist. Another expert compared the Urdu translation to the initial questionnaire & formulated the first draft of the (RMDQ). Afterward, the committee was established to check the content validity of the tool. 5 expert Physical therapists rated the 24 items of the RMDQ on Content Validity Index (CVI) created by Waltz & Bausell. Each item of the (RMDQ) was rated for its simplicity, relevance, ambiguity & clarity on a Four-point Likert ordinal scale. The numerical value of the content validity ratio was measured by the Lawshe table. Measurements were taken at baseline followed by another measurement after 24 hours. A Cronbach's alpha was calculated to assess the reliability of the (RMDQ). Test and retest reliability was calculated through Intra-class Coefficient Correlation. An-independent t-test was applied to determine the discriminant validity of the questionnaire. For different factor analysis, Kaiser-Meyer Olkin (KMO) & Bartlett's test of sphericity was used to check the sampling adequacy of data and to ensure that the correlation matrix is the identity matrix.

## RESULTS

The Table 1 illustrate the Content Validity Index (CVI) of the Urdu form of the (URMDQ). Each item of the questionnaire was rated by 5 Physical therapy experts for its relevance, clarity, simplicity & ambiguity on a 4-point Likert scale to get an average for each item. The averages were calculated for Content Validity Index to assess the content validity (CV) of the tool.

Questions	Relevance	Clarity	Simplicity	Ambiguity	CVI
Q-1	4	4	4	4	1.00
Q-2	4	3	4	4	0.94
Q-3	4	3	3	4	0.88
Q-4	4	4	4	4	1.00
Q-5	4	4	3	3	0.88
Q-6	4	3	3	4	0.88
Q-7	4	3	4	3	0.88
Q-8	4	4	4	3	0.94
Q-9	4	3	3	3	0.81
Q-10	4	4	4	3	0.94
Q-11	4	3	3	3	0.81
Q-12	4	3	3	4	0.88
Q-13	4	3	3	4	0.88
Q-14	4	4	3	4	0.94
Q-15	4	3	4	4	0.94
Q-16	4	3	3	4	0.88
Q-17	4	4	3	3	0.88

Questions	Relevance	Clarity	Simplicity	Ambiguity	CVI
Q-18	4	4	3	3	0.88
Q-19	4	4	3	3	0.88
Q-20	4	3	3	4	0.88
Q-21	4	3	4	3	0.88
Q-22	4	4	4	4	1.00
Q-23	4	4	4	4	1.00
Q-24	4	4	3	3	0.88

**Table 1:** Content Validity Index-(CVI) of Urdu version of Roland-Morris Disability Questionnaire (URMDQ)

Item	Expert-I	Expert-II	Expert-III	Expert-IV	Expert-V	CVR
Q-1	1.0	0.0	1.0	1.0	1.0	0.6
Q-2	1.0	0.0	1.0	1.0	1.0	0.6
Q-3	1.0	0.0	1.0	1.0	1.0	0.6
Q-4	1.0	1.0	1.0	1.0	1.0	1.0
Q-5	1.0	1.0	1.0	1.0	1.0	1.0
Q-6	1.0	1.0	1.0	1.0	1.0	1.0
Q-7	1.0	1.0	0.0	1.0	1.0	0.6
Q-8	1.0	1.0	1.0	1.0	1.0	1.0
Q-9	1.0	1.0	1.0	1.0	1.0	1.0
Q-10	1.0	1.0	0.0	1.0	1.0	0.6
Q-11	1.0	1.0	1.0	1.0	1.0	1.0
Q-12	1.0	1.0	1.0	1.0	0.0	1.0
Q-13	1.0	1.0	1.0	1.0	1.0	1.0
Q-14	1.0	1.0	1.0	1.0	1.0	1.0
Q-15	1.0	1.0	1.0	1.0	1.0	1.0
Q-16	1.0	1.0	1.0	0.0	1.0	1.0
Q-17	1.0	1.0	1.0	0.0	1.0	1.0
Q-18	1.0	1.0	1.0	1.0	1.0	1.0
Q-19	1.0	1.0	1.0	1.0	1.0	1.0
Q-20	0.0	1.0	1.0	1.0	1.0	0.6
Q-21	1.0	1.0	1.0	1.0	1.0	1.0
Q-22	1.0	1.0	1.0	1.0	1.0	1.0
Q-23	1.0	1.0	1.0	1.0	1.0	1.0
Q-24	0.0	1.0	1.0	1.0	1.0	0.6

**Table 2:** Content Validity Ratio of Urdu version of Roland-Morris Disability Questionnaire (URMDQ)

Category	Items	Cronbach Alpha	CI (95%) Lower Bound - Upper bound
Healthy	24	0.942	0.684 (0.690-0.940)
Low Back Pain	24	0.794	0.998 (0.997-0.999)
All Participants	24	0.880	0.856 (0.820 - 0.930)

**Table 3:** Reliability statistics from "Cronbach's alpha" and the test and retest reliability for the Urdu form of the (URMDQ)

Questions	Mean±SD	SE.	Mean±SD	SE.	Mean±SD	SE.	Mean±SD	SE.
Q-1	0.06±0.24	0.06	0.00±0.00	0.00	0.46±0.51	0.08	0.47±0.51	0.08
Q-2	0.76±0.44	0.11	0.63±0.52	0.18	0.81±0.40	0.07	0.74±0.45	0.07
Q-3	0.06±0.24	0.06	0.13±0.35	0.13	0.89±0.31	0.05	0.89±0.31	0.05
Q-4	0.06±0.24	0.06	0.00±0.00	0.00	0.62±0.49	0.08	0.92±1.58	0.26
Q-5	0.06±0.24	0.06	0.00±0.00	0.00	0.62±0.49	0.08	0.66±0.48	0.08
Q-6	0.12±0.33	0.08	0.13±0.35	0.13	0.30±0.46	0.08	0.24±0.43	0.07
Q-7	0.06±0.24	0.06	0.13±0.35	0.13	0.65±0.48	0.08	0.55±0.50	0.08
Q-8	0.06±0.24	0.06	0.13±0.35	0.13	0.70±0.46	0.08	0.66±0.48	0.08
Q-9	0.12±0.33	0.08	0.00±0.00	0.00	0.62±0.49	0.08	0.79±0.41	0.07
Q10	0.24±0.44	0.11	0.00±0.00	0.00	0.81±0.40	0.07	0.89±0.31	0.05

Questions	Mean±SD	SE.	Mean±SD	SE.	Mean±SD	SE.	Mean±SD	SE.
Q11	0.12±0.33	0.08	0.13±0.35	0.13	0.78±0.42	0.07	0.74±0.45	0.07
Q12	0.06±0.24	0.06	0.00±0.00	0.00	0.65±0.48	0.08	0.71±0.46	0.07
Q13	0.06±0.24	0.06	0.00±0.00	0.00	0.46±0.51	0.08	0.61±0.50	0.08
Q14	0.06±0.24	0.06	0.00±0.00	0.00	0.73±0.45	0.07	0.79±1.61	0.26
Q15	0.06±0.24	0.06	0.00±0.00	0.00	0.46±0.51	0.08	0.18±0.39	0.06
Q16	0.06±0.24	0.06	0.00±0.00	0.00	0.51±0.51	0.08	0.68±0.47	0.08
Q17	0.06±0.24	0.06	0.13±0.35	0.13	0.86±0.35	0.06	0.89±0.31	0.05
Q18	0.00±0.00	0.00	0.00±0.00	0.00	1.08±2.34	0.38	0.53±0.51	0.08
Q19	0.06±0.24	0.06	0.00±0.00	0.00	0.32±0.47	0.08	0.24±0.43	0.07
Q20	0.00±0.00	0.00	0.00±0.00	0.00	0.57±0.50	0.08	0.63±0.49	0.08
Q21	0.06±0.24	0.06	0.00±0.00	0.00	0.76±0.43	0.07	0.89±0.31	0.05
Q22	0.00±0.00	0.00	0.00±0.00	0.00	0.46±0.51	0.08	0.32±0.47	0.08
Q23	0.06±0.24	0.06	0.13±0.35	0.13	0.86±0.35	0.06	0.95±0.23	0.04
Q24	0.00±0.00	0.00	0.00±0.00	0.00	0.59±0.50	0.08	0.32±0.47	0.08

**Table 4:** Discriminant validity of Urdu version of (URMDQ)

Table 4 shows the discriminant validity of the Urdu form of the (URMDQ). An Independent t-test was applied to determine discriminant validity for healthy participants and patients with low back pain. The Independent t-test indicated a significant difference in the means of all variables for both groups. Therefore, the results expressed satisfactory discriminant validity for both groups.

## DISCUSSION

The prevalence of the LBP is on the rise around the globe and affecting millions of people. Low back pain over prolonged period of time may lead to disability therefore, it limits the ability of individuals to perform "activities of daily life" (ADL) efficiently [12]. The various tool is available to measure the disability related to the LBP. Among these, (RMDQ) is considered a valid and reliable questioner for drawing inferences about disability linked with chronic non-specific LBP [13,14]. The study design followed for the current study was "qualitative, tool validation". These types of studies are conducted to depict the cultural differences, reliability & validity of version change of some standard tools. The reliability recorded by the current study is 0.888% which is very close to the other studies as the French version recorded a 0.84 value for Cronbach's alpha while the Colombia version recorded a 0.86 value for Cronbach's alpha [15]. Two studies demonstrated high values for Cronbach's alpha in the Moroccan version, Cronbach's alpha was computed to be .092 & in the Yoruba version 0.932 value of Cronbach's alpha was recorded [16]. Gujrati's version demonstrates a 0.72 value for Cronbach's alpha which is quite low. All studies that have translated the Roland-Morris Disability Questionnaire (RMDQ) into their native language have used these variables & our research is closely associated with these studies. The current study found satisfactory internal consistency with "Cronbach's alpha" of 0.88 which is parallel to the Japanese version with "Cronbach's alpha" of 0.85, the Chinese version with "Cronbach's alpha" of 0.87 & Turkish version with "Cronbach's alpha" of 0.85. On other hand, Argentine

version with "Cronbach's alpha" of 0.90, Moroccan version with "Cronbach's alpha" of 0.96 & Korean version with "Cronbach's alpha" of 0.94 had comparatively fewer validations. The current study demonstrated high authentication than the Gujrat version with "Cronbach's alpha" of 0.72, Portugal version with "Cronbach's alpha" of 0.81, Spain version with "Cronbach's alpha" of 0.83 & Iran version with "Cronbach's alpha" of 0.83. Another similarity observed in current research & Yoruba, Chinese, Arabic, Columbia & Gujrati version was that the pilot study was run for validity before reliability & validity was evaluated with the help of a modified version of the (RMDQ). The (RMDQ) is an excellent & useful tool for the valuation of disability associated with LBP [17]. The current study expressed high Intra-class Correlation Coefficient (ICC) than the Iranian version with an Intra-class Coefficient Correlation (ICC) of 0.86, similar values with the Italian version having Intra-class Coefficient Correlation (ICC) of 0.92 & lower values than the Korean & Chinese version with Intra-class Coefficient Correlation (ICC) of 0.98 & 0.95 respectively. A high correlation has been observed in other validation which qualifies the RMDQ as an effective & consistent tool for the valuation of disability associated with LBP. In one study conducted in Korea, Cronbach's alpha was 0.84-0.93 & Intraclass Coefficient Correlation (ICC) after a follow-up of 1 week was 0.88 which is very close to my study [18]. In the current study, 5 items were load factors sharing most of a load of all items similar to the Colombian version with more than one load factor [8]. Houda Ma'aroufi, MD et.al (2007) conducted an observational scheme to evaluate the validity of the Roland-Morris Disability Questionnaire in 76 Moroccan patients suffering from low back pain. Cronbach's alpha & Intraclass Correlation Coefficient (ICC) evaluated reliability whilst Correspondence analysis was used to assess structure validity. The study found a positive correlation between Visual Analogue Scale (VAS) & Roland-Morris Disability Questionnaire (RMDQ) through construct validity but other variables demonstrated no correlation [19]. Ani'Bal Scharovsky PT (2008) conducted research in which 132 patients with lumbar pain were scored from Roland-Morris Disability Questionnaire (RMDQ). Out of 132, 50 patients were given a final questionnaire prior and were retested after 24 hours. He concluded reliability through Intraclass coefficient correlation (ICC) was 0.940 and validity by Pearson correlation coefficient was  $r = 0.544$ . The results show that verification was good enough [20]. Kyoung-Eun Kim et.al (2011) developed a Korean type of the Roland-Morris Disability Questionnaire (RMDQ) & confirmed its usage for evaluating disability in Korean patients presenting with LBP. 231 patients were incorporated in the study and were evaluated using Roland-Morris Disability Questionnaire (RMDQ), Oswestry Disability Index [16], and

Visual Analogue Scale (VAS). Reliability was assessed through internal consistency and correlation between RMDQ with VAS and ODI were the tools used to assess the validity. He concluded that the Korean version of the questionnaire is linked or correlated with ODI and VAS significantly [21]. It is hence evident that the Urdu version of the RMDQ is a reliable and valid tool for the valuation and evaluation of disability linked with chronic low back pain. This questionnaire will give accurate diagnostic outcomes related with the disability of chronic nonspecific low back pain.

## CONCLUSION

The study concludes that the Urdu version of the (URMDQ) is an efficient, valid, and reliable Instrument for assessment of disability associated with chronic nonspecific low back pain.

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## Original Article

## Patient Satisfaction with Manual Physical Therapy Care

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## ARTICLE INFO

## Key Words:

Patient satisfaction, Musculoskeletal care, Manual therapy care.

## How to Cite:

Faizan, S. M. ., Afzal, S. ., Neelam Muneeb, H. ., Sarfraz, K. ., Ali, H. ., Haq, K. ., Faizan Hamid, M. ., & Muhammad Arslan, H. R. . Patient Satisfaction with Manual Physical Therapy Care: Balance Training and Coordination Exercises for Post Hemiplegic Stroke. *Pakistan BioMedical Journal*, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.630>

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Received Date: 7th July, 2022

Acceptance Date: 14th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Patient centered approach is the cornerstone in health care facility. Therefore, patient satisfaction is of utmost importance. Factors related to satisfaction of patient in connection with manual therapy practice are not evaluated. **Objective:** The purpose of this survey was to evaluate satisfaction of patient receiving manual therapy for their musculoskeletal disorders in Ali Hospital Lahore, Pakistan. **Methods:** A retrospective survey of 82 male and female patients in the range of 18 and above years was conducted in 2021 for the patient who had availed the services from Ali Hospital. These patients were recruited through simple random sampling only to refrain from biasness. Patients were enrolled according to inclusion and exclusion criteria. **Results:** In current study, among 82 patients almost 31 will undoubtedly and 31 will most likely suggest manual therapy treatment to people close to them. While the remaining 20 participants did not show any interest of suggesting this therapy. 37.80% participants showed more satisfaction towards manual therapy treatment and close association found between patient satisfaction and experience of physical therapist. Patients showed higher level of satisfaction when treatment was done by experienced skilled Physical Therapist. **Conclusion:** Current study reveals that there is higher customer satisfaction from the skill of Physical Therapist but the follow up exercise plan at home is considered worthless by the recipient. Manual therapy provides more relish. Similarly, the results demonstrate that female recipients are more satisfied from physical therapy in this scenario as compared to males.

## INTRODUCTION

Patient satisfaction survey is a complex, implicit, lively, subjective, and multi-component construct. It is a critical component in evaluating rehabilitation [1]. The most important component of a successful rehabilitation procedure is the ability to assess the quality of health care services. The survey provides purpose-based feedback on services, inspires and connects patients to treatment plans, and improves quality of life by gathering data and a collection of information that is utilised in making decisions by health regulatory bodies and officially

recognised clinical settings [2]. Patient satisfaction refers to the multidisciplinary approach that demonstrates the experiences of patients while receiving healthcare and is closely associated with treatment recovery indicators and patient's response to manual therapy interventions and has been considered a primary health care calculator that evaluates the quality of treatment that was given by therapists. This is strongly influenced by factors such as the patient's age, their presenting complaints, their specific requirements, the therapist's past experiences,

opportunity, socioeconomic background, and personality. As a consequence of cultural differences, the findings of past studies cannot be categorized and extrapolated to the entire world [3, 4]. The degree of satisfaction is a predictive indicator that can aid in assessing health care practitioners and appreciating health care services [5]. Manual therapy care is often provided by physical therapists in one of two health care settings: a) inpatient care, generally as part of an acute care treatment plan, or b) outpatient settings. Prior study literatures identified and compared components that impact patient satisfaction level with musculoskeletal physical therapy treatments in South Korea and Australia. In line with other research that have used the MRPS, the findings of our investigation demonstrated that interpersonal features of patients' treatment, notably effective communication and the value of physical therapist respect, are a key and universal component in determining patient happiness [6]. However, one feature that was unique to Korean culture was the requirement of respect and humility during the therapeutic appointments. The clinical premise of these outcomes is that the evolution of meaningful communication and increased interpersonal expertise connected to therapeutic outcomes is critical for patients to achieve high levels of patient satisfaction, even when treatment results are not regarded as ideal [7, 8]. Patient satisfaction with manual therapy services has not been closely monitored, and only a few studies have been conducted. The measurement of such satisfaction is critical for improving treatment and may add to the little global literature on the subject. Furthermore, these sorts of research would serve as a learning resource by drawing attention to staff training/development needs. The goal of this study was to analyse patient overall satisfaction level, as well as its variables with musculoskeletal physical therapy treatments to recognise connected patient features. The findings of this study might help hospital management enhance service quality and patient satisfaction [9, 10]. Patients' experiences for quality and patient-centred health care have not been thoroughly investigated in the field of physical therapy. Measurements of patient experience should be used in physical therapy to improve clinical effectiveness results and provide good patient-centric treatment [11].

## METHODS

The conducted study was a cross-sectional survey in which data were collected from Ali Hospital, Lahore. The complete duration for the conclusion of the study was over 4 months, after the validation of synopsis. The technique used for the sampling of patients was non-probability consecutive sampling method, which enabled us to include

82 patients from hospital. Specific criteria for the inclusion and exclusion of the patients was adopted to complete the survey. For patient inclusion, individuals pertaining to both the genders were included, as well as patients with 18 years of age or above with any kind of musculoskeletal condition, no psychological trauma, and patients who have taken at least 5 manual therapy treatment sessions between 2020 and 2021, were all included. And for the exclusion criteria; patients with speech disabilities and communication issues, patients with inability to comprehend questionnaire, and patients with fewer than five manual therapy sessions, were all excluded. Moreover, the patient satisfaction form was used for pre- and post-evaluations. The questionnaire was relatively clear and simple for patients, and topics that appeared to undermine cultural norms were eliminated. The sample approach employed in our study was convenient sampling, and data was collected informally after receiving informed consent, with additional assistance offered by the researcher to alleviate ambiguity.

## RESULTS

The mean age of participants is 35.353, with a standard deviation of +7.48, and the mean prior PT experience is 1.6341, with a standard deviation of 0.48463. According to Table 1, 17 participants had an exceptional experience with the therapist's ability to put them at ease throughout the session, 36 had a very good experience, and 21 had a decent experience. The Pearson chi-square value (0.001), indicating a high correlation between past experience and description of what therapy administered to them.

Variables		Frequency	Percentage	P-Value
Valid	Poor	8	9.5%	0.001
	Good	21	25.0%	
	Very Good	36	42.9%	
	Excellent	17	20.2%	
	Total	82	97.6%	
Missing	System	2	2.4%	
Total		84	100%	

**Table 1:** Association between Patients experience regarding manual therapy treatment

3 (30.0%) of the cells had an anticipated count fewer than 5. The estimated minimum count is 2.56. Table 2 summarizes the patients' perspectives on manual therapy treatment and whether they would recommend it to relatives and friends. 31 of 82 patients expressed an interest in and willingness to offer and refer manual therapy treatment to their friends and family members.

Patient perspective on manual therapy		Frequency	Percentage
Valid	Poor	3	3.6%
	Fair	25	29.8%
	Good	26	31.0%
	Very Good	9	10.7%
	Excellent	19	22.6%
	Total	82	97.6%
Missing	System	2	2.4%
Total		84	100%

**Table 2:** Patient perspective on manual therapy

Table 3 reflects the categories of patients who are satisfied and reassured by the therapist, what is going to happen during the session and patients rated their reassurance level as poor, fair, good, very good and, excellent.

Prior experience of PT services	Reassurance about what will be done to the patient					Total
	Poor	Fair	Good	Very Good	Excellent	
Yes	0	6	14	6	4	30
No	10	1	5	23	13	52
Total	10	7	19	29	17	82

**Table 3:** Patient satisfaction

## DISCUSSION

Current study is a cross-sectional survey conducted to find out the satisfaction of patients regarding the manual therapy services provided to them, we took a structured questionnaire from the site of APTA to collect data. The mean age of participants is 35.35 and standard deviation is +7.487. Keramat KU et al, did a study in 2020 and analysed the level of patient satisfaction in several dimensional constructs of O-MSK that a patient was subjected to. More research should be done to determine qualitative and quantitative relationships and to establish a comprehensive knowledge of health professionals' processes [12]. In the current study, 41.46% of 82 participants had very good experiences with the treatment quality they got, 19.51% had good experiences, and 13.41% had exceptional experiences. A study conducted on patient satisfaction factors in student-led physical therapy clinics in 2018. A qualitative examination, the findings emphasise the importance that patients place on effective communication, as well as the relationship that exists between the supervisor and the student in charge of their care. The findings demonstrate the effect of both the student and the supervisor on patient satisfaction and provide insight into the patient's perspective on student supervision [13-15]. In the study, 32.93% of the 82 individuals felt fantastic and secure at all times during the therapy, 39.02% felt very good, and just 1.22% felt somewhat secure. The findings of this study are supported by the findings of this investigation. In 206 a study conducted by Desjardins-Charbonneau in which a total of 513 participants completed the online survey. The majority of respondents were women (74 %) and aged 18 to 24 (39 %

of all respondent). About 90 % of respondents believed that physiotherapists were skilled and competent and 91 % answered that they had trust in physiotherapists for the treatment of musculoskeletal disorders through Manual Therapy. A total of 90 % of respondents supported the idea of introducing Manual Therapy intervention for the treatment of patients with musculoskeletal disorders [16]. According to its relevance, the primary purpose of this qualitative meta-summary and meta-synthesis was to summarize patient satisfaction characteristics in O-MSK. Patient satisfaction in outpatient musculoskeletal physical therapy is a complicated concept influenced by individual patient/provider, clinical, and environmental factors. The present poll found that 24.39% of participants thought manual physical therapy clinics were simple to find. 25.61% said they felt excellent or very good. The findings suggest that physical therapists should be educated at the undergraduate and postgraduate levels in recognizing these determinants and designing and managing them appropriately in order to maximize their effectiveness in increasing patient satisfaction; additionally, managers and health care centres should consider these determinants in order to design quality-improving projects affecting patients' satisfaction [17, 18]. Furthermore, healthcare organizations should see patient satisfaction as a significant indicator of quality care, promoting constant monitoring and critical assessment at all levels, from clinicians to executives [19, 20]. 31 of the 82 participants will absolutely recommend and 31 will most likely recommend this facility to others. 37.80% of people were extremely satisfied with how well their problem was treated, 25.61% felt fantastic, and 29.27% felt good.

## CONCLUSION

Our study discovered that while the physical therapist's skill boosts patient satisfaction, the patient finds the follow-up exercise routine at home to be ineffective. Physical therapy appeals more to middle-aged and younger people than to the elderly. Similarly, female patients are happier than male patients, according to the research. The research landscape indicates that overall patient contentment is at an all-time high.

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## Original Article

## Menstrual Irregularities Post Tubal Ligation

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## ARTICLE INFO

## Key Words:

Sterilization, Menstruation, Contraception, Polymenorrhea, Tubal ligation

## How to Cite:

Yasmeen Abbas, H. ., Liaqat, F. ., Memon, E. ., Qureshi, Z.- un-N. ., Karim, K. ., & Ali, N. . (2022). Menstrual Irregularities Post Tubal Ligation : Menstrual Irregularities Post Tubal Ligation . Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.631>

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Received Date: 7th July, 2022

Acceptance Date: 16th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The most popular form of family planning is tubal ligation. Decades-long debates have surrounded the possibility of the post-tubal ligation syndrome of menstrual irregularities. **Objective:** To study the frequency of menstrual irregularities after tubal ligation in women attending gynecological outpatient department of a tertiary care hospital setting. **Methods:** A cross sectional study was conducted on 126 females who had history of post tubal ligation syndrome. Cases were verified and data were collected. Duration and length of menstrual cycle was noted. Laboratory examination was done. Duration of tubal ligation was also noted. Their age, name and hospital registration number were also noted down. A control group of 50 healthy females was made for the comparison of menstrual disturbance. **Result:** The patients mean age was 39.5±3.4 years. Maximum of the patients 71(56.3%) of the patients had age between 37 to 42 years. The duration of tubal ligation observed in 118(93.7%) of the patients more than or equal to 1 year. Type of menstrual disturbance such as polymenorrhea in 76(60.3%), menorrhagia in 51(40.5%) and intermenstrual bleeding in 9(7.1%) of the patients respectively. Final outcome menstrual irregularity was presented in 74 (58.7%) of the patients. Age group with menstrual irregularity was presented in 40(53.5%) patients versus 31 (43.7%) patients who had absent menstrual irregularity. Similarly, duration of tubal ligation was compared with menstrual irregularity and presented in 69(58.5%) of the patient compared with 49(41.5%) patients who had absent menstrual irregularity. **Conclusion:** The older group of patients has high prevalence of menstrual irregularities.

## INTRODUCTION

The main organs of the female reproductive system are the fallopian tubes, ovaries, vagina and uterus. The uterus is located in the pelvic cavity between the bladder and the rectum. It is about 7.5 cm long, 5 cm wide at the top, and about 2.5 cm thick, and weighs between 30 and 40 grams [1-2]. It has a stopper whose body and cervix protrude through an opening into the vaginal fornix where it opens. Each fallopian tube is 10 cm long. Medially, 1 cm is embedded in the uterine wall (intramural part) [3-4]. The part adjacent to the uterus is called the shedding tube. Next to it is an ampulla which is more than half the length of the tube. The lateral end is called the fimbrial end that meets the ovary [5-6]. The ovary is oval in shape. It is about 3 cm

long, 2 cm wide and 1 cm thick. The size and appearance of the ovary depend on both age and the phase of the menstrual cycle. The two main arteries are the uterus, which originates in the lower abdomen, and the ovary, which originates in the abdominal aorta [7-8]. The lining of uterus (endometrial) responds to hormones made in ovary under the control of hypothalamus and pituitary gland [9]. In first half cycle, estrogen predominates, halts menstrual flow and promotes endometrial proliferation [4]. After ovulation at mid-cycle in response to LH surge, progesterone level increases which stops endometrial growth and promotes differentiation of endometrial. If pregnancy does not occur and estrogen production falls,

the endometrial lining sheds and menstrual cycle begins [10]. Each menstrual cycle represents a complex interaction between the pituitary gland, hypothalamus, endometrium and ovaries [9]. Hypothalamus secretes gonadotrophin-releasing hormone (GnRH) which exerts specific effect on the secretion of pituitary gland. GnRH is accountable for the release and synthesis of FSH and LH from anterior pituitary gland. GnRH is released in palatial fashion during the menstrual cycle. Pituitary gland is situated in the base of brain below the hypothalamus [11-12]. Another gland secretes gonadotrophin, FSH and LH, which plays basic part in regulation of menstruation. FSH, (follicle-stimulating hormone), is responsible for the early maturation of the ovarian follicle as the name indicates [13]. It is also responsible for proliferation of granulosa cells. LH, (luteinizing hormone), necessary for final follicular growth causes the corpus luteum formation and ovulation from the remains of the follicle [14]. Estrogen facilitates the growth of ovarian follicles and increases the motility of uterine tubes. It causes increase in the thickness of endometrial along with lengthening of endometrial gland. Progesterone is secreted by corpus luteum and placenta. It is an important intermediate in steroids synthesis in all tissues that secret steroid. Progesterone predominates in luteal phase. Endometrium becomes more vascularized and edematous in response to progesterone and maintains the secretory activity of endometrium. Feedback effects of it are complex and large doses inhibit LH secretion [15]. Pakistan is an underdeveloped country; contraception is not easily accepted by women due to high rates of illiteracy. Although, researchers have tried to increase a variety of contraceptives to improve acceptance but strictly speaking there is no ideal contraceptive which suits every woman. Various barriers for contraceptive acceptance include illiteracy, poor knowledge about contraception, poor communication by health care provider, non-availability of some contraceptive in the Government health care centers and misconception about the contraceptive [16]. Additionally, some medical problems and side effects may add further in the gravity of unacceptance. Medical contraindication to the contraceptive includes; hypertension, diabetes mellitus, obesity, smoking, scared, valvular heart disease and pelvic infection. Undesired side effects of contraception like nausea, vomiting, menstrual disorders and contraceptive failure are significant barrier to contraceptive acceptance. Tubal ligation is potentially an irreversible method of control of birth in which fallopian tube portion is either tied or cut, cauterized, clipped or removed. It is the method of choice for most of the women [3]. About 30% of all women currently practicing contraception relied on tubal ligation.

Hypermenorrhea is defined as menstrual flow more than 7 days. Menorrhagia is defined as menstrual bleeding more than 7 days and menstrual flow more than 80 ml and it is considered as the most common menstrual disorder. Almost all studies don't confirm menstrual disorder as a consequence of tubal ligation. Theoretically ligation of tubes should not interfere with endocrinological environment, but it has been observed that sooner or later patient undergoing for female sterilization ends up with menstrual disorder. This may be due interference with the utero-ovarian blood supply and subsequent disturbance of ovarian function. However, this was technically rejected because no change in the gonadotrophin level in the blood reaching ovaries was found. This change in menstrual pattern may be co-incident or may be pre-existing one. patient with history of irregular cycles in their reproductive years are increase risk of post ligation irregularities. However, dysmenorrhea may be due to adhesion following tubal ligation. Researcher closely explore menstrual pattern before and after tubal ligation. They found some sort of menstrual disorder antedating tubal ligation. Some were due to improper use of contraception, pelvic infection following IUCD insertion. Numerous investigations has been evaluated the impact of tubal ligation on menstrual cycle. Although the literature on tubal ligation and its effects on menstrual disorders is extensive, it is inconsistent. Some studies have also found that age is related and can be considered a marker of the risk of menstrual bleeding and irregular bleeding. However, some studies show no increase in menstrual disorders in women who have undergone tubal ligation compared to controls [17-18]. Surgical advances have resulted in the safe and less invasive sterilization of women (tube ligation) as a woman replenishes her family. Half of these tubal ligatures are performed in the postpartum period and half are outpatient interval treatments. Changes in the menstrual cycle after tubal ligation have been reported for over 50 years. Therefore, fallopian tube ligation is suspected to alter menstrual patterns and ovarian reserve by disrupting blood flow in the ovaries. Tubal ligation has been charged with causing a luteal phase defect as a result of disturbed ovarian circulation. Bipolar electrocoagulation (diathermy) of the fallopian tube did not change the reserve and function of the ovaries [16-18]. Cattanach and Milne reported that after tubal ligation, women may experience abnormal uterine bleeding and heavy menstrual bleeding, and psychological problems that can lead to decreased ovarian function and reserve [19]. Concerns about early menopause and more menstrual problems following tubal ligation were further explored. The premenopausal age showed that women who had tubal ligation between the ages of 40 and 45 had a significantly higher risk of

developing menopausal symptoms than women who did not have tubal ligation in the same age group.<sup>3</sup>

## METHODS

A cross sectional study was conducted on 126 females in Baqai Medical University, Fatima Hospital from 1st January 2019 to 30th June 2020. All females who had history of post tubal ligation syndrome for almost one year were included in our study. These females had age between 37-42 years. Laboratory examination was also done to check the any damage which happened to the ovary. The cases were verified and detailed history was taken. Females were asked about duration of menstrual cycle, amount of menstrual bleeding and length of cycle. Length of 20-37 days was noted as normal. 3-7 days was considered normal duration of menstrual cycle. Females were asked about heavy or normal menstrual bleeding. Females were also asked about menstrual cramps. A control group of 50 women was made. They were healthy females and did not undergo tubal ligation. It was made for the comparison of menstrual abnormalities. Women of child bearing age who underwent tubal ligation for sterilization, attending the gynecology out patient department of Baqai Medical University, Fatima Hospital for follow up were included. Patient having menstrual irregularities due to organic disorder prior to tubal ligation as polycystic ovarian syndrome, endometriosis, adenomyosis, fibroid uterus, hemolytic and patient with thyroid dysfunction and chronic liver disease were excluded. A total of 126 women, fulfilling the inclusion criteria were included in the study. Informed consent were signed from each patient for their participation in the study and approval of ethical committee of the hospital was sought. All Patients were enquired about the menstrual interval of their last cycle (polymenorrhea); duration of the menstruation (menorrhagia) and any episodes of inter menstrual bleeding (spotting). Information was taken by fourth year post graduate resident, in the gynaecology OPD of Baqai Medical University, counterchecked by consultant. A Performa was used to document findings and demographic information like patient name and age, hospital registration number, duration of tubal ligation (i.e., less than one and more than year), type of menstrual disturbances (i.e., polymenorrhoea, menorrhagia, and spotting) and final outcome (i.e., menstrual irregularity present or absent) were included. All data were incorporated by a fourth year postgraduate resident.

## RESULT

The mean age of the patients was  $39.5 \pm 3.4$  years. Majority of the patients 71 (56.3%) of the patients had age between 37 to 42 years. The duration of tubal ligation observed in 118 (93.7%) of the patients were more than or equal to 1 year.

Type of menstrual disturbance such as polymenorrhea in 76 (60.3%), menorrhagia in 51 (40.5%) and intermenstrual bleeding in 9 (7.1%) of the patients were observed respectively. Final outcome menstrual irregularity was presented in 74 (58.7%) of the patients. When compared by age group, patients who experienced menstrual irregularities were present in 40 (53.5%) patients against 31 (43.7%) patients who had absent menstrual irregularity, Table 1.

Age Group	Present	Absent	Total
32 - 36	19	15	34
	55.9%	44.1%	100.0%
37 - 42	40	31	71
	56.3%	43.7%	100.0%
43+	15	62	21
	71.4%	8.6%	100.0%
Total	45	52	126
	8.7%	41.3%	100.0%

**Table 1:** Comparison of age group by menstrual irregularity

Similarly, duration of tubal ligation compared with menstrual irregularity was presented in 69 (58.5%) of the patient compared with 49 (41.5%) patients who had absent menstrual irregularity, Table 2.

Duration of tubal Ligation		Present	Absent	Total
< years	1	5	3	8
		62.5%	37.5%	100.0%
>= year	1	69	49	118
		58.5%	41.5%	100.0%
Total		74	52	126
		58.7%	41.3%	100.0%

**Table 2:** Comparison of duration of tubal ligation by menstrual irregularity

## DISCUSSION

As we discussed, tubal ligation is used as a birth control technique. Women also undergo tubal ligation if they are having heavy bleeding. After tubal ligation, amount of bleeding decreases. But tubal ligation affects menstrual cycle of females as well. Some researches stated that due to tubal ligation, blood supply of ovaries got disturbed. When blood supply of ovaries got disturbed, follicles were unable to grow properly and growth of corpus luteum got affected too [20]. This disturbance of blood supply causes a decrease in menstrual bleeding. Also, during tubal ligation, some damage can occur to the ovary. This damage to ovary also disturbs menstrual cycle [21]. Women who underwent tubal ligation also had higher level of menstrual hormones (FSH, LH, Estradiol) as compared to the normal women. Menstrual disturbance also showed in females after 2 to 3 years of tubal ligation [22]. Females who have age between 35-40 years shows more symptoms of post tubal ligation syndrome. Some studies also stated that females who underwent tubal ligation also faced

disturbance in duration of menstrual cycle and disturbance in menstrual pain as well [23]. It is necessary that women should study all the advantages and disadvantages of tubal ligation before undergoing this procedure. Surgeons should do this procedure with proper care so that no harm to ovaries occur.

## CONCLUSION

The patients of older group of had high prevalence of menstrual irregularities.

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## Original Article

## Frequency of Hyperandrogenism in Young Women with Polycystic Ovarian Syndrome

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## ARTICLE INFO

## Key Words:

Hyperandrogenism, Testosterone, Sex Hormone Binding Globulin, Free Androgen Index and Polycystic Ovarian Syndrome.

## How to Cite:

Khatoon, R. ., Fakeer Muhammad, S. ., Batool, U. ., Khan, R., Rafiq, S. ., &amp; Bashir Rind, J. . (2022). Frequency of Hyperandrogenism in Young Women with Polycystic Ovarian Syndrome: Frequency of Hyperandrogenism in . Pakistan BioMedical Journal, 5(7). https://doi.org/10.54393/pbmj.v5i7.632

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Received Date: 7th July, 2022

Acceptance Date: 18th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Polycystic ovary syndrome (PCOS) is the communal disorder of endocrinology in females of reproductive age. **Objective:** The purpose of the study was to govern the incidence of hyperandrogenism in young females with polycystic ovarian syndrome. **Methods:** Total 93 women of age 20 to 35 years with any parity and diagnosed patients of PCOS were included. All patients were assessed biochemically. Serum of testosterone and sex hormone binding globulin analysis was done randomly at any phase of menstrual cycle. Participants were followed in OPD. Free androgen index was calculated. Score more than 5 labeled as Hyperandrogenemia. Data were analyzed using SPSS version 21.0. **Results:** The mean age was 27.22±4.58 years, with range of 15(20-35) years. Age of 46(49.5%) patients was ≤27 years and age of 47(50.5%) patients was >27 years. 41 patients were married and 52 patients were unmarried. The mean parity was 1.41±0.94 with range of 4(0-4). Results of free androgen index score (FAI) showed that overall mean FAI was 7.80±5.82 with range of 32.60(0.80-33.40). Total 60 patients were found with hyperandrogenism. Among these patients the mean age was 26.93±4.68 years. Ages of 32(53.3%) patients were ≤27 years. participants it was observed that 18 patients were nulliparous, 3 patients had 1-2 parity, and 2 patients had parity more than 2. Chi square results for association of hyperandrogenism showed no significant association with age, marital status, and parity with p>0.05. **Conclusion:** Hyperandrogenism is an important feature of PCOS. It mainly comes from the ovaries of women diagnosed with PCOS. The best indicator of hyperandrogenism is Serum testosterone levels.

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is the communal disorder of endocrinology in females of reproductive age [1-2]. It is a clinical disorder of heterogeneous type categorized by chronic symptoms of oligo/ovulation and hyperandrogenism. Current variations in criteria of diagnostic methods may have additionally augmented the heterogeneity of the affected females [3-4]. Many females with diagnosis of PCOS in a gynecological department have amenorrhea and seek medical attention mainly for fear that

a menstrual disorder may affect their current or future productiveness. Other medical seeking reasons are overt infertility, anovulatory menometrorrhagia and hair growth. Many females identified later to 18-20 years of age because menstrual disorders and hyperandrogenism are communal signs in regular puberty [5-6]. Though, due to this syndrome heterogeneity, PCOS women may come across in a variety of clinical situations; dermatology, endocrinology and surgery [7]. The PCOS causes various health related

risks and obesity is the utmost common than type II diabetes, insulin resistance, and lipid profile abnormalities. Probable health jeopardies comprise related risk factors and cardiovascular diseases. It is not known that all PCOS affected females have a comparable risk of cardiovascular disease and type 2 diabetes [8-9]. The PCOS prevalence in randomized people using the Rotterdam criteria shows that rates seen in young women in their 20s were 6.3% in Sri Lanka, 217% in southern China, 518% in Thailand and 8% in the UK and the US [10-11]. Two researches from Southern Europe reflect an incidence of around 6.6% in Spain and Greece by means of the criteria of NIH. In Pakistan, Haq found the prevalence of PCOS is 17.6% in women visiting fertility clinics. So, existing data on epidemiology of PCOS support the diversity of ethnicity [12]. Diagnosis is usually grounded on 3 components: (i) ovarian dysfunction as demonstrated by anovulation and oligomenorrhea; (ii) ultrasound shows polycystic ovaries; and (iii) biochemical or clinical indication of hyperandrogenism. One of the most widely used definitions of the NIH from 1990 includes two of them: hyperandrogenemia and anovulatory menstrual cycles. The Rotterdam consensus recommends the exclusion of two of the three components mentioned above, as well as other etiologies. Hyperandrogenemia denotes to elevated androgens levels in the blood. At the consensus working group conference in Rotterdam in 2003, experts reviewed the diagnostic criteria for PCOS and concluded that 2 of the following 3 criteria should be present: [i] anovulation or oligomenorrhea [ii] biochemical factors or clinical signs of hyperandrogenism and [iii] PCOS. These criteria also take into account that other related disorders must be ruled out before making PCOS diagnosis [13]. It has also been reported that insulin resistance or the effects of insulin can lead to hyperandrogenemia in women with PCOS. In addition, there is proposition that the PCOS incidence is advanced in people at higher risk of metabolic diseases and insulin resistance [14]. Many factors associated with PCOS include hyperinsulinism, obesity, diabetes, dyslipidemia, and low birth weight history. In addition, available data on epidemiology of PCOS confirm the diversity of ethnicity on its occurrence [15]. Given the alterations in the prevalence of hyperandrogenism in different ethnic groups, it is important to understand the current extent of hyperandrogenism in our Pakistani population. If my test results show a high prevalence of hyperandrogenism in PCOS patients, these patients will be offered early intervention and future treatment.

## METHODS

This cross-sectional study held at department of Obstetrics & Gynae of teaching hospital affiliated with Dow

University of Health Sciences, Karachi. It was conducted for the duration of one Year from 7th May 2017 to 6th May 2018. Total 93 diagnosed patients of PCOS were enrolled. Patients' ages were ranging between 20 to 35 years. Detailed demographics of all subjects were recorded after attaining informed consent in written form. Pregnant women, lactating, history of miscarriage, women taking oral contraceptive pills, hyperprolactinemia, thyroid disorder (confirmed by history), late onset-CAH, testosterone secreting ovarian tumor or adrenal tumor, Cushing's syndrome and women with no other endocrine disorder e.g. adrenal enzymatic deficiency were excluded. Serum analyses for serum testosterone and sex hormone binding globulin was done randomly at any phase of menstrual cycle. Participants of this study were followed along with the reports of advised investigation by the researcher in OPD under the supervision of consultant who has more than 5 years' clinical experience. The following formula was used to determine the free androgen index by dividing serum testosterone with serum sex hormone binding globulin and was labeled as operational definition. All these information was entered on specified fields in the proforma. All statistical calculations were done by using SPSS version 21. The standard deviation and mean were determined for serum testosterone, age and sex hormone binding globulin. Frequency and percentage were calculated for marital status, parity and hyperandrogenism. Stratification with respect to age, parity and marital status was completed. The chi-square test was pragmatic later to post stratification and p-value <0.05 was deliberated significant.

## RESULTS

The mean age was  $27.22 \pm 4.58$  years, with range of 15(20-35) years. The results showed that among study subjects, 41 were married and 52 were unmarried. The descriptive statistics of parity was also evaluated. Results showed that overall mean parity was  $1.41 \pm 0.94$  with range of 4(0-4). The descriptive statistics of free androgen index score (FAI) was also evaluated. Results showed that overall mean FAI was  $7.80 \pm 5.82$  with range of 32.60(0.80-33.40). The results showed that among all study subjects, 60 women were found with hyperandrogenism, and 33 had no findings of hyperandrogenism. The percentages are presented in Figure 1.



**Figure 1:** Frequency of Hyperandrogenism Post stratification it was observed that among 60 patients

who were found with hyperandrogenism, ages of 32 patients were ≤27 years and age of 28 patients were >27 years, also presented in Table No 2. The chi square test results presented no substantial relation amid hyperandrogenism and age with  $p>0.05$ .

Age (Years)	Hyperandrogenism		Total	P-Value
	Yes (n=60)	No(n=33)		
≤ 27 years (n=46)	32	14	46	0.314*
> 27 years (n=47)	28	19	47	
TOTAL	60	33	93	

**Table 1:** Association and Frequency of Hyperandrogenism Conferring to Age Groups

Marital status showed that among patients who were found with hyperandrogenism, 23 patients were married and 37 patients were unmarried. The chi square test results presented no substantial relation amid hyperandrogenism and marital status with  $p>0.05$  as shown in Table 2.

Marital Status	Hyperandrogenism		Total	P-Value
	Yes (n=60)	No(n=33)		
Married (n=41)	23	18	41	0.132*
Unmarried (n=52)	37	15	52	
TOTAL	60	33	93	

**Table 2:** Frequency and Association of Hyperandrogenism According to Marital Status

As far as parity is concerned, it was observed that among patients who were found with hyperandrogenism, 18 patients had 0 parity, 3 patients had 1-2 parity, 2 patients had parity more than 2 and rest of the 37 patients had no parity because they were unmarried. Chi square results for association of hyperandrogenism with parity showed no significant association with  $p>0.05$ . The results are given in Table 4.

Parity	Hyperandrogenism		Total	P-Value
	Yes (n=43)	No (n=50)		
0 (n=5)	18	12	30	0.346*
1 – 2 (n=30)	3	3	6	
> 2 (n=6)	2	3	5	
NO (n=52)	37	15	52	
TOTAL	60	33	93	

**Table 3:** Association and Frequency of Hyperandrogenism Conferring to Parity

## DISCUSSION

Polycystic ovary syndrome (PCOS) is the communal disorder of endocrinology in females of reproductive age, with a prevalence of 4-12%, reaching 25% in some populations. PCOS is measured to be the leading cause of androgen excess and ovulation disorders. Conferring to the British Medical Journal, a study published the PCOS definition as hyperandrogenism (biochemical and clinical) and the presence of polycystic ovaries or ovarian dysfunction (oligo-anovulation) and related disorders [16]. The cutaneous manifestations of hyperandrogenism in

PCOS include acne, hirsutism, androgenetic alopecia, seborrhea and actinic keratosis (AN). Though insulin resistance and androgen excess play an important role in the advancement of skin lesions, the particular cause of these features is unknown. AN is directly caused by insulin resistance [17-18]. Since insulin increases level of androgens through and direct mechanisms, it also associated with other skin characteristics. Abnormal changes in carbohydrate metabolism in some skin features have also been reported [19]. The incidence of an augmented incidence of hyperandrogenism amongst PCOS in the present study was comparable with the large study series results of females identified with PCOS by Aziz, as there was evidence of clinical hyperandrogenism in approximately 75-85% of PCOS affected women. Females with PCOS exhibited hirsutism, one of the skin symptoms of hyperandrogenism. Markopoulos reported that hyperandrogenism is a vital pathophysiological polycystic ovary syndrome (PCOS) feature, with an incidence of 60-80% [20]. While increased androgen production in the ovaries by the sheath cells is a main sponsor to the excess of androgens in PCOS affected females of childbearing age, 20-65% of females with classic non-ovulatory PCOS have an excess of androgens in their adrenal glands, which is determined by high levels of dehydroepiandrosterone sulfate (DHEAS). The later comes chiefly from the reticular zone of the adrenal cortex [21]. Excessive secretion of adrenal androgens is also observed following adrenal stimulation in women with PCOS of childbearing age. The degree and incidence of hirsutism also be contingent on the patient's ethnicity. Hirsutism is less common in PCOS women of Pacific Island or East Asian descent, but much common in females in the subcontinent [22]. Although age is the vital determinant of fertility in females, Pedersen and Monga found that postponing marriage till age 30 will affect fertility rates as fertility drops sharply after age 35. Polycystic ovary syndrome has been reported to occur more frequently in young women (<35 years old) than in older females [23]. This is likely due to a physiological decline in the follicular cohort result in normalized ultrasound picture of the ovaries with age. In our study, all study participants were 35 years of age or younger. This study results are in line with those of Al-Tae and Alnakash as they found that 88.2% of the PCOS affected females enrolled in our study were under the age of 35 [24]. In one Pakistan study, the women mean age with PCOS was  $27.1 \pm 34.3$  years, which is comparable to this study. Although a female may be predisposed genetically to progress towards PCOS, only in the environmental factor (obesity) interaction with genetic factors results in PCOS clinical expressions. The age and marital status of women were also associated with hyperandrogenism. In determining



hyperandrogenism, the true state of androgens can be measured by calculating the free androgen index (FAI) and gauging free testosterone. Multiple studies have formerly assessed the efficacy of FAI and serum total testosterone in detecting hyperandrogenism. The specific ethnic changes in the PCOS phenotype are recognized well. There are no reports of this characteristic of the PCOS analysis among women of South Asian region. In vitro or in vivo studies by means of cultured capsular cells have dependably shown that in PCOS affected females, the ovarian capsular cells are more effective at converting androgen precursors to testosterone than normal capsular cells. Insulin plays indirect or direct role in the hyperandrogenemia pathogenesis in PCOS. Our results are comparable and in line with previously published studies. The mean age was  $27.22 \pm 4.58$  years, most patients were over 27 years of age, but all were 35 years or younger. Most of the patients were lonely. The mean free androgen index (FAI) score was  $7.80 \pm 5.82$  with a range of 32.60 (0.80-33.40). In our study, 60 (64.5%) patients with hyperandrogenism were observed. The age of these patients was  $26.93 \pm 4.68$  years, 32 of them were  $\leq 27$  years of age, 28 of them were  $> 27$  years of age. 23 patients were married and 37 patients were unmarried. Among patients with hyperandrogenism in terms of the number of deliveries, the delivery was greater than 0 in 81 patients, 1-2 in 3 patients, and greater than 2 in 2 patients [25].

## CONCLUSION

Hyperandrogenism is an important feature of PCOS. It mainly comes from the ovaries of women diagnosed with PCOS. The best indicator of hyperandrogenism are Serum testosterone levels. Hyperinsulinemia seems to be one of the main factors responsible for steroidogenesis deregulation. It was also concluded that in our study hyperandrogenism was mostly prevalent among PCO women which was identified by FAI Score. It also observed in younger aged and unmarried women

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## Original Article

## Impact of Maternal Height on Delivery Outcome: A Cross-Sectional Study

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## ARTICLE INFO

## Key Words:

Cesarean section, Obstetric labor, Pregnancy, Maternal height, Mode of delivery

## How to Cite:

Khan, R. ., Baloch, N. ., Ali, S. ., Jogezi, Z. un N. ., Jan, F. ., & Kakar, S. . (2022). Impact of Maternal Height on Delivery Outcome: A Cross-Sectional Study: Impact of Maternal Height on Delivery Outcome: A Cross-Sectional Study. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.633>

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Received Date: 7th July, 2022

Acceptance Date: 19th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Maternal height influences obstetric effects, especially the delivery outcome. It is crucial to identify and anticipate potential CPD at every birth in order to avoid the detrimental effects of an undiagnosed imbalance. Maternal height is closely associated with women's ease of vaginal delivery. **Objective:** To assess the impact of maternal height on the delivery outcome. **Methods:** The study included nulliparous women aged between 19 to 35 years, with a height between 140-155 cm, and a singleton pregnancy with cephalic presentation. Data were collected through a predesigned questionnaire. The pregnant women were categorized concerning their heights, and the delivery outcomes and complications were compared. The main outcome was the manner of delivery (vaginal delivery or CS). Secondary outcomes were a composite of newborn morbidity, including infant distress, mechanical ventilation, neonatal intensive care unit hospitalization, perineal injury, postpartum hemorrhage, and puerperal fever. **Results:** A total of 383 cases were included in the present study. The range of the patient's height was from 140 to 155 cm. The age of pregnant women was between 19-35 years. Women of  $\leq 145$  cm had a higher cesarean section (CS) rate than the group of 150-155 cm. No significant correlation was observed between maternal and neonatal mortality concerning maternal height. **Conclusion:** Females with short stature have higher chances of Cesarean Section than vaginal delivery. As a result, these women should deliver in a health-care institution where their labor may be thoroughly watched and a prompt choice about delivery mode made. Clinical examinations during prenatal visits should include maternal height.

## INTRODUCTION

Most women in underdeveloped nations give birth at home or in health institutions that lack operative capabilities. Home deliveries to critical cases can increase maternal and fetal mortality rates [1]. Maternal morbidity and mortality continue to be a serious problem for health systems worldwide, particularly in developing countries [2]. Obstructed labor problems such as postpartum hemorrhage, birth canal trauma, and genital infections cause a high number of maternal mortality in underdeveloped nations. In rural hospitals, patients with dystocia may delay deciding to seek treatment or arrive at an appropriate medical facility [3]. One option for reducing maternal and perinatal mortality and morbidity is to identify women at risk of dystocia before labor and refer them to a district hospital for delivery. Maternal and perinatal/morbidity and death rates are therefore higher in

Pakistan [4]. Maternal height influences obstetric effects, especially the delivery outcome. Previous research has found that shorter women have a greater rate of overall and emergency cesarean deliveries [5]. Lower maternal height is linked to shorter gestational length in the newborn [6]. Previous research has revealed that shorter women have a higher prevalence of overall and emergency cesarean delivery (CD) [7]. The possible reason for the link between short females and the incidence of CS is that shorter women have smaller pelvises due to environmental and genetic factors [8-9]. Malnourished women, on average, have small adult height and a high incidence of unfavorable pregnancy outcomes such as perinatal death and prematurity [10]. A cesarean birth for cesarean delivery is best for the woman and her fetus if done at the right time. Timely diagnosis for cesarean delivery can be helpful for

mother and fetus. The repercussions of late diagnosis are particularly severe in developing countries, where the female may go into labor in a situation where cesarean section services are limited [11]. However, there is no agreement on the minimum height when CS is indicated. Most studies have utilized a height cut-off of 150 cm to predict the need of CS [12]. This, however, will not be appropriate for all ethnic groups. To prevent the negative repercussions of an undetected imbalance, it is vital to recognize and predict likely CPD at every birth. The ability of women to deliver vaginally without difficulty is closely linked to maternal height [13]. The main objective of this research was to observe the relationship between maternal height and the mode of delivery in Pakistani women and evaluate the link between maternal height with newborn and maternal morbidity.

## METHODS

Permission was taken from the ethical review committee of the institute. The study included nulliparous women aged 19 to 35 years, 140-155 cm in height, and a singleton pregnancy with cephalic presentation. A questionnaire was used to collect data after informed consent was obtained, and the mode of delivery was noted. Every patient had a thorough medical history recorded to rule out diseases and pregnancy issues. Method of conception, height, age, pregnancy complications (hypertension, glucose intolerance, pregnancy disorders), gestational age (weeks,) body mass index (BMI) at delivery, neonatal birth weight, mode of onset of labor (natural or induced), and spinal analgesia at the time of labor, were all examined. Weight was divided by the square of height to calculate BMI. The main outcome was the manner of delivery (vaginal delivery or CS). Secondary outcomes were a composite of newborn morbidity, including infant distress, mechanical ventilation, neonatal intensive care unit hospitalization, perineal injury, postpartum hemorrhage, and puerperal fever. Mothers with a definitive fetal or maternal disease (e.g., fetal hydrocephalus and maternal skeletal dysplasia with considerable head enlargement) were diagnosed with cephalopelvic disproportion (CPD) before childbirth. Elective cesarean sections were arranged for cases with substantially inadequate pelvic diameters clinically, taking into account the patient's wishes. Patients with a borderline pelvis received a labor trial. A partogram was used to track the progress of labor. Patients who experienced primary or secondary labor arrest in the first stage were delivered via emergency cesarean section. Each case's mode of delivery was recorded. Data were analyzed using SPSS version 22.0.

## RESULTS

During the study, 383 women with a singleton pregnancy

were admitted to the labor ward. The range of the patient's height was from 140 to 155 cm. The age of pregnant women was between 19-35 years. Table 1 shows maternal features and fetal birth weights based on maternal height. Except for BMI at delivery, all maternal variables were identical among the three groups. The mother's height has a substantial impact on neonatal birth weight. Women who were shorter delivered the babies with low weight, and vice versa.

Characteristics	Maternal Height		
	140-145 cm (n= 72)	146- 150 cm (n= 116)	151-155 cm (n= 195)
Maternal Age (Years)	28 ± 3.6	26 ± 8.5	31.2 ± 4.8
BMI at delivery (median)	25.7	24.8	24.3
Gestational age at delivery (median)	39	39	39
Hypertensive disorder of pregnancy	9(12.5)	13(11.2)	23(11.8)
Birth weight grams (median)	2756( 2589-2994)	2835(2644-3084)	2948(2637-3148)
Induction of labor (%)	18	37	71

**Table 1:** Description of characteristics of pregnant women and fetus birth weight

Table 2 compares maternal height with delivery mode, mother outcomes, and neonatal outcomes. Short women had higher rates of CS than taller ones. The rate of CS due to failure to deliver was found to have a stronger relationship with maternal height when CS was stratified by its indication. Short women were more probable to suffer from CS due to their incapacity to progress. There were no maternal and neonatal deaths reported. Regardless of mother height, each determinant for maternal and neonatal outcomes was similar.

Outcome	Maternal Height		
	140-145 cm (n= 72)	146- 150 cm (n= 116)	151-155 cm (n= 195)
Vaginal delivery	27(37.5)	64(55.2)	138(70.7)
Cesarean delivery	45(62.5)	52(44.8)	57(29.2)
Postpartum hemorrhage	2(2.8)	4(3.4)	40(20.5)
Severe perineal injury	2(2.8)	5(4.3)	10(5.1)
Puerperal fever	3(4.1)	3(2.5)	7(3.6)
Neonatal distress	3(4.1)	3(2.5)	29(14.9)
Mechanical ventilation	1(1.4)	4(3.4)	14(7.1)
NICU admission	2(2.8)	5(4.3)	9(4.6)

**Table 2:** Description of the mode of delivery and fetomaternal outcome

Of those given a labor trial, 122 (31.8%) had secondary cervical dilatation arrest (As shown in Table 3). The average cervix dilation when labor was stopped was 6 cm + 1.0SD. In 34 (8.9%) cases, the head did not descend. The average head station where an arrest took place was -1 + 0.2SD. 154 (40.2%) of those given a trial of labor required an emergency cesarean section, whereas 209 (54.6%) were delivered vaginally.

Height Range(cm)	Inadequate n (%)	Borderline n (%)	Adequate n (%)
141-145 cm n= 72	48 (66.7)	14 (19.4)	10 (13.9)
146-150 cm n=116	11 (9.5)	8 (6.9)	97 (83.6)
151-155 cm n= 195	6 (3.07)	10 (5.1)	179 (91.8)
Total n=383	65 (16.9)	32 (8.3)	286 (74.7)

**Table 3:** Description of adequacy of pelvis according to height

## DISCUSSION

Female height is often associated with their pelvic size. In obstetrics, the size of the pelvis is crucial. It's an excellent tool for predicting delivery methods. As a result, the height of pregnant women, which is easily measured in prenatal clinics, is crucial in antenatal evaluation. In the present study, we observed the mode of delivery and complications during delivery in short-statured nulliparous pregnant females from age 19-to 35 years. In all of our cases, we performed a clinical pelvic examination. Patients with questionable clinical pelvimetry findings were offered a labor trial. This strategy saved money and lowered the number of elective cesarean sections. The present study observed different groups of heights with mode and complications of delivery and observed that height was directly linked with CS. CS rates were greater in the lower stature groups compared to the average height group. The link was persistent after controlling for patients' age, maternal labor induction, BMI at delivery, regional analgesia during labor, and neonatal birth weight. Comparable results were observed in other studies as well [14-15]. In recent findings, no significant correlation was observed between maternal height with complications at the time of delivery, including postpartum hemorrhage, severe perineal injury, mechanical ventilation, neonatal distress, etc. Our study also observed that mother height had no significant relationship with maternal or newborn morbidity. However, preterm delivery, low birth weight, small-for-gestational-age babies, and neonatal mortality have all been linked to short mother height in previous research [6, 16]. Obstetric outcomes can be influenced by socioeconomic situations and nutritional status, recognized environmental factors of adult height. These links might be partly explained by factors that cause short stature, including poor socioeconomic situations and malnutrition [17]. The physical restrictions in short women might explain these correlations. Small pelvic size results from genetic and environmental conditions, such as malnutrition in early development, and contributes to CS. Several research studies have shown a favorable association between pelvic size and height [18-19]. As a result, several previous research suggested that the shorter the mother, the higher the risk of CS [20]. We observed clinical pelvimetry of every short female included in the present study to identify pelvic adequacy for further

facilitation in delivery. Shorter females (<145 cm) had the most inadequate pelvis observed than the 150-155 cm. Because labor is the superlative predictor of pelvic adequacy, every pregnant female with short stature was offered a well-monitored labor trial unless the pelvis is significantly constricted clinically. For any indicators of poor labor progression or fetal compromise, a prompt choice about the desired method of birth, either vaginal delivery or cesarean section, was made. Our findings were in line with the bulk of past research. This information will help doctors provide successful prenatal communication to all nulliparous pregnant women, regardless of size.

## CONCLUSION

According to the study, maternal height is a simple measure of pelvic sufficiency. A small pelvis is related to a short height. Short-statured nulliparous women have a greater chance of cesarean section and instrumental vaginal birth. As a result, these women should deliver in a health-care institution where their labor may be thoroughly watched and a prompt choice about delivery mode made. This study will assist our country in minimizing maternal and fetal morbidity and death.

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## Original Article

## Comparison of Fine Needle Aspiration Followed By Histopathology and Sonographic Features of Thyroid Nodule To Formulate A Diagnosis: A Cross-sectional Study

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## ARTICLE INFO

**Key Words:**

Thyroid nodules, FNAC, Sonography, Diagnosis

**How to Cite:**

Jamal, Z. ., Shahid, S. ., Waheed, A. ., Yousuf, M. ., Baloch, M. ., & Allahrasan, . (2022). Comparison of Fine needle aspiration followed by histopathology and sonographic features of thyroid nodule to formulate a diagnosis: A cross-sectional study: Fine needle aspiration followed by histopathology and sonographic features of thyroid nodule in diagnosis. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.634>

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Received Date: 8th July, 2022

Acceptance Date: 19th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Thyroid nodules are solid lumps filled with fluid that develop inside the thyroid gland. Due to their small size, the majority of them go undetected and are asymptomatic. However, some of them are cancerous. **Objectives:** To compare the diagnostic accuracy of Fine needle aspiration followed by histopathology and sonographic features of thyroid nodule **Methods:** In this study, 274 participants were included. All of them were detected with the solitary euthyroid nodule. All the patients considered in the present study had normal values of T4 and TSH as euthyroid nodules were supposed to be studied. All the participants were subjected to undergo a USG as per the TIRADS system and FNAC wherever it was applicable. The biopsy report of the excised sample was considered a gold standard. **Result:** The classification of FNAC was more specific than the TIRADS system, however, the sensitivity of both the classification was the same. Micro-calcification was most specific and sensitive in the individuals that underwent a USG. Irregular margins had a specificity of 88% and nodules taller-than-wider in shape were 91% specificity. A total of 7 patients had shown benign features on cytology, whereas, they were suspiciously malignant on USG (TIRADES 4 and 5) and showed malignancy in final evaluation after the surgery. **Conclusion:** The sensitivity of both FNAC and USG in the diagnosis of malignancy of thyroid nodule is equal, however, the specificity of FNA is more (90%). FNAC is a minimally invasive procedure that can be opted for the differentiation of benign and malignant lesions with an accuracy of 86%. Patients showing high-risk features on sonography are subjected to repeat the FNAC and they should also be referred for a surgical biopsy to make a definitive diagnosis.

## INTRODUCTION

Thyroid nodules are fluid-filled solid lumps that are formed inside a thyroid gland. Most of them are asymptomatic and left unnoticed because of their small size. Whereas, some of them are malignant. Most of them are small in size and are noticed on examination by a surgeon. Some of them are large enough to be visible. The mode of the treatment is dependent on the size and type of the nodule [1]. On the global level, the prevalence of the thyroid nodule is higher in the general population with an estimation of 4 to 8% on

palpation and 19 to 67% through an ultrasound examination [2]. The prevalence of thyroid nodule in the population of US is around 68% [3]. The main challenge of clinicians regarding thyroid nodule is its differentiation from a malignancy [4]. The incidence of occurrence of carcinoma of the thyroid gland is seen to be increasing in the last decade which has made marked improvements in the ultrasonography (USG) guided fine needle aspiration (FNAC) as well as USG surveillance of thyroid nodules [5, 6].

Most of the nodules appeared to be benign, however, 5 to 15% of the cases are found to be malignant. Population with high-risk factors such as advanced age, gender, exposure to radiations in history, and a positive family history of malignancy, need further evaluation of the thyroid nodule [7]. According to various epidemiological studies, it is evident that thyroid nodule is more common in females, whereas, the risk of malignancy in such nodules is higher in the male population [8]. A detailed clinical history, examination, and imaging are required for the evaluation of a thyroid nodule patient. The first line of investigations for Euthyroid nodule patient is USG. A risk stratification system TIRADS is used for risk determination. It is similar to the BIRADs scoring system used for breast lesions [9, 10]. Initially, this system was reported by Horvath et al., [9]. It was subsequently proposed by Park et al., [11] and Kwak et al., [10]. According to the descriptors of the lesions, the thyroid nodules are categorized in categories of TIRADS. The descriptors include the composition, shape, calcification foci, echogenicity, and margins of the lesion. Each descriptor carries on point. All the points are added and TIRADS scores are calculated numerically [12]. The USG findings which are suggestive of a malignant nodule are it being solid, having irregular margins, hypo-echogenic, and presence of micro calcifications view. A rational approach for the management and choosing suitable surgical procedures can be achieved by FNAC. It should provide a higher degree of specificity and sensitivity [13]. Bethesda classification is used as a standard for deciding the mode of treatment, either palliative or surgical. Data regarding TIRAD risk stratification is available abundantly, however, data related to FNAC is scarce. The present study aims the comparison of USG by TIRADS scoring with the cytological diagnosis made by FNAC by Bethesda scoring. At the end of the study, an excisional biopsy was done on all the patients for comparison as excisional biopsy is a gold standard investigation for the evaluation of the presence of malignancy. The specificity, sensitivity, positive predictive value, and negative predictive value of Bethesda scoring and TIRADS scoring are used for the confirmation comparing them to biopsy.

## METHODS

In this cross-sectional study initially, 300 patients were included. However, on examination, 274 patients were found to have thyroid nodules. Informed consent was taken from all of the participants. Permission was taken from the ethical review committee of the institute. Clinical and demographic data were collected from all of the participants. Standard protocols were followed in the collection of the data. All the patients had already

undergone thyroid function tests (TFTs). The chemiluminescence technique (CLIA) was used for the estimation of serum TSH and serum-free T4. The value of analytical sensitivity was 0.01  $\mu$ U/ml and the total precision value was 2.2% for the TSH. Similarly, the value of analytical sensitivity was 0.35  $\mu$ U/ml and the total precision value was 2.7% for the free T4. 12.0  $\mu$ g/dL was reference range of T4, and 0.5-5  $\mu$ U/ml was the reference range of TSH. All the patients considered in the present study had normal values of T4 and TSH as euthyroid nodules were supposed to be studied. All the patients were subjected to undergoing a high-resolution USG as well as USG-guided FNAC. Radiology consulted were involved for expert reporting regarding the thyroid USG. They were trained to perform the USG of the thyroid gland. The reports of the scans were given as per the TIRADS score. In Table 1, the indications of malignancy are given.

TIRAD Score	Chances of malignancy	FNAC needed or not
1	Not suspicious	Not needed
2	Not suspicious	Not needed
3	Mildly suspicious	FNAC is needed ( if more than 2.5 cm, follow-up if more than 1.5 cm)
4	Moderately suspicious	FNAC is needed ( if more than 1.5 cm, follow-up if more than 1 cm)
5	Highly Suspicious	FNAC is needed (if more than 1 cm, follow-up if more than 0.5cm)

**Table 1:** TIRADS scoring

The reports of the cytopathology were prepared as per Bethesda classification. The Bethesda classification, in Type 1 is non-diagnostic, type 2 is benign, type 3 is AUS/FLUS, Type 4 is a follicular neoplasm, Type 5 is considered suspicious for malignancy, and Type 6 is confirmed malignancy. All the slides of FNAC were studied by a single expert pathologist keeping in view the nature of the study and the protocols of cytopathology. Surgical biopsy and histopathology were done on the participants. All slides were seen and evaluated by single pathologist to avoid any kind of bias or human error. Out of those 122 participants, 42 had Bethesda 2 cytology. Hence, the nodules were benign. However, surgery was done on them for either compressive symptoms or cosmetic reasons. For statistical analysis, the Chi-square test and Fischer exact tests were applied. The analysis was done in IBM SPSS version 26.

## RESULTS

A total of 274 participants were added to the study. The Bethesda score, TIRADS score, and results of surgical histopathology of the participants are shown in table 2.



Clinical Features	Frequency	Percent
<b>TIRADS Score</b>		
1 (Benign)	No FNA	
2 (Not suspicious)	No FNA	
3 (Mildly suspicious)	182	66.42
4 (Moderately suspicious)	58	21.4
5 (Highly suspicious)	34	12.4
<b>Bethesda Score</b>		
1 (Non-diagnostic)	8	2.92
2 (Benign)	170	62.04
3 (AUS/FLUS)	40	14.59
4 (Follicular neoplasm)	26	9.49
5 (Suspicious for malignancy)	28	10.22
6 (Malignant)	2	0.73
<b>Surgical Histopathology (n=122)</b>		
Benign	72	59
Malignant	50	41

**Table 2:** Bethesda score, TIRADS score, and surgical histopathology of the patients

The mean age of the participants was  $40.69 \pm 12.96$  years. The age and gender distribution of the participants are given in table 3.

Age range (Years)	Number of participants	Percentage
18-20	10	3.65
21-40	148	54.01
41-50	48	17.52
51-60	68	24.82
<b>Gender Distribution</b>		
Female	212	77.37
Male	62	22.63

**Table 3:** Age and gender distribution

The final diagnosis of histopathology in different categories according to the TIRADS scores are given in table 4.

TIRADS Score	Histopathology		Total	Risk of malignancy (%age)
	Malignant	Benign		
3	10	34	44	23
4	14	34	48	30
5	26	4	30	87
Total	50	72	122	41

**Table 4:** Occurrence of malignancy according to TIRADS Score

The sonographic features of the patients and the occurrence of malignancy is represented in Table 5. According to table 5, ultra-sonographic features are suggestive of lesser observation of taller than wider morphological changes. Micro-calcification was seen more in malignant tumors compared to benign tumors. Hypo-echogenicity was predominant in malignancy. However, more cases of benign tumors were seen with irregular margins compared to malignant ones.

Major Ultrasound Features	Histopathology (n=122)		Total	P-value
	Malignant (n=50)	Benign (n=72)		
<b>Taller than Wider</b>				
Present	18	6	24	0.01
Absent	32	66	98	
<b>Micro-calcification</b>				
Present	40	10	50	<0.0001
Absent	10	62	72	
<b>Hypoechoogenicity</b>				
Present	34	16	50	<0.01
Absent	16	56	72	
<b>Irregular Margin</b>				
Present	14	8	22	0.17
Absent	36	64	100	

**Table 5:** Occurrence of malignancy according to the USG feature Table 6 shows presence of malignancy on fine needle aspiration. There were 28 cases suspicious for malignancy. However, 24 were diagnosed with malignant tumors and 4 were not detected with any malignancy in Bethesda 5,6. Likewise, there were total 42 cases with Bethesda 2 out of which 6 were diagnosed with malignancy and 36 had benign tumors.

Fine-needle aspiration assay	Malignant Frequency (Percentage)	Benign Frequency (Percentage)	Total Frequency (Percentage)
BETHESDA 5,6	24 (86%)	4 (14%)	28 (39%)
BETHESDA 2	6 (14%)	36 (86%)	42 (60%)
Total	30 (43%)	40 (57%)	70 (100%)

**Table 6.** Fine needle aspiration findings according to BETHESDA

## DISCUSSION

The main challenge to the clinician is determination of presence of malignancy in a thyroid nodule. The overall ratio of malignancy is lower in the indeterminate thyroid nodules, whereas, benignancy can be expected more after a surgical procedure [14-15]. In the present study, it has been observed that thyroid nodules are more commonly present in women as compared to men. It suggests a predominance of euthyroid nodules in women and it is as large as 77.37%. Another similar study conducted by Taddesse et al., also shows female predominance. The percentage of female patients in their study was 88% [16]. The present study suggests that thyroid nodules were more predominant in the participants in the age range of 21 years to 40 years. The percentage of participants in this age range was 54%. A total of 24% of the participants were from an age range of 51 years to 60 years. According to the study by Muthu et al., 80% of the participants were from an age group of 21 years to 40 years [17]. The study of Kwak et al., gave TIRADS scores by an analysis of thyroid nodules retrospectively, in FNAC and USG which are in accordance with our study [6]. In the present study, 23% of participants had malignancy for TIRADS 3. For TIRADS 4 was 30% and TIRADS 5 was 87%. According to the study by Barbosa et al.,

23.3% of participants were detected with malignancy in TR 3 [18]. The present study had similar findings. According to the TIRADS criteria, there are four scenarios of TR 3; (1) solid and isoechoic, (2) solid and hyperechoic, (3) mixed solid cystic and hypoechoic, (4) mixed solid cystic and hyperechoic with macro-calcification. Hence, higher chances of malignancy should be expected in TR 3. According to the study by Handa et al., the sensitivity of FNAC was 97% [19]. In a similar study by Mundasad et al., the sensitivity of FNAC was 52.6% [20].

## CONCLUSION

It can be concluded that both TIRADS and FNAC are highly sensitive, however, the specificity of FNAC is higher. The suspicion in the results of either of them can be ruled out by excisional biopsy as that is a gold standard investigation.

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## Original Article

## Association of Decreased Daily Physical Activities, Disturbed Sleep Pattern with Cervical Pain Among Young Adults

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## ARTICLE INFO

## Key Words:

Cervical pain, Neck pain, Sleep disturbance, Physical activities.

## How to Cite:

Hanan Zafar, M. ., Ghafoor, A. ., Athar, I. ., Umer Atif, M. ., Laeeq, M. ., Zafar, S. ., & Faizan Hamid, M. . (2022). Association Of Decreased Daily Physical Activities, Disturbed Sleep Pattern with Cervical Pain Among Young Adults: Disturbed Sleep Pattern with Cervical Pain Among Young Adults. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.638>

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Received Date: 8th July, 2022

Acceptance Date: 20th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

There is broad variety in the manner in which neck pain is defined. While examination when providing details for neck pain there are five key points which apparently represented: 1. the origin of issue and information; 2. the situation or testing outline; 3. the neck pain seriousness, also the outcomes; 4. the neck pain extent; 5. the example after some moments. Other evidence showed there is lacking in amount and quality of sleep results in musculoskeletal displacement by patho-physiologically. The pain occurrence and the progression include many environmental and social causes which is widespread. **Objective:** The purpose of this study was to find the association of decreased daily physical activities, disturbed sleep pattern with cervical pain among young adults. **Methods:** A cross-sectional survey was conducted on 90 persons presenting with cervical pain. Data was collected from students of University of Lahore. Non-probability Convenient Sampling Technique was used. Northwick Park Neck Pain Questionnaire and The Sleep Revolution Sleep Quality Questionnaire by Arianna Huffington were used to collect data. **Results:** The total population was 90, which includes 33 males and 57 females with percentage 36.7% and 63.3% respectively. On pain scale to assess the cervical pain there were 43(47.8%) persons with Mild pain, 37(41.1%) having Moderate pain and 10(11.1%) with severe pain. There were 58 (64.4%) persons are physically active even after cervical pain and 32(35.6%) physically not active. There were 3(3.3%) who have severed sleep problems, 16(17.8%) were with some sleep problems, 43(47.8%) having good sleep and 28(31.1%) sleep is in great shape. In this Study there was no association occurs between daily activities, sleep disturbance with cervical pain in overall results. **Conclusion:** In this study overall, there was no association occurred in persons who were having any sort of cervical pain with daily physical activities and sleep patterns disturbance. As some of the individual activities like daily working, house hold activities, driving is affected in some of the cases with cervical pain.

## INTRODUCTION

There is broad variety in the manner in which neck pain is defined in the writing. The task force was started working in 2000-2010 on different types of pain associated with neck and its related diseases as a result of these surveys they concluded almost more than 300 clinical definitions which describes the neck pain. While examination when providing details for neck pain there are five key points which apparently represented: 1. the origin of issue and information; 2. the situation or testing outline; 3. the neck

pain seriousness, also the outcomes; 4. the neck pain extent; and 5. the example after some moments. The clinical neck pain definitions are further approved by additional investigations which given by them in their study [1]. The pain occurrence and the progression includes many environmental and social causes which is widespread [2, 3]. From these causes some of them are changeable or adjustable while others are not. As from some early studies not all, they showed some connection

between age and onset of pain [4, 5]. but among women the rate of neck pain is higher according to some studies [6]. From the history of neck pain, it is estimated the onset of neck pain is at increased risk [7]. The neck pain onset also associated with many of the risks like smoking, poor hygiene conditions, wrong postures during working, jobs related, lifestyle, headaches, emotional or psychological problems according to some other evidences [8]. Other evidence showed there is lacking in amount and quality of sleep results in musculoskeletal displacement by patho-physiologically. Resulting opening of radiating center individuals by methods for cortisol and cytokine frameworks has been suggested as one of the possible segments in an inevitable report where rest agitating impacts foreseen hospitalization due to back disorder. Inadequate rest is finished up to build the centralization of cytokines and inflammatory mediators [9]. The inflammatory factors concentration is increased by obesity, smoking and chronic stress [9]. With the advancement and the electronic media, e.g., TV, PCs and the Internet have rebuilt the everyday schedules of numerous young people, bringing about sleeping to poor level on average. With the increased incidence of musculoskeletal pain, the nature and amount of rest or sleep is lacking day by day. Some recent examinations propose the laziness, nodding off, awakening around evening time and other rest issues are chance elements for musculoskeletal pains [10]. Health habits and sedentary lifestyle may also contribute in affecting sleep in young population [11]. Decrease recreational activities and sedentary lifestyle with no routine exercise workup may lead towards sleep deprivation. Another significant factor which affects the sleep pattern is smoking which is very common in young population [12]. All these factors cause sleep disturbance which eventually results in cervical pain. Our aim is to assess the association of daily routine activities and sleep disturbance with cervical pain among young adults. Although other psycho-social parameters will also be assessed to determine their effect on sleep pattern of individuals [13]

## METHODS

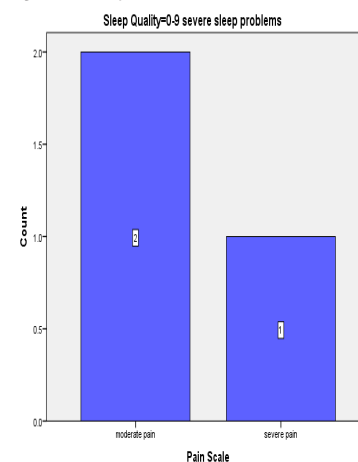
A cross-sectional study was conducted on 90 young adults presenting with some sort of cervical pain. The time duration was 3 months after approval February 2019 to April 2019. Data was collected from students of University of Lahore via non-probability Convenient Sampling Technique. The sample size was calculated through this formula:  $N = Z^2 p(1-p) / D^2$

$Z^2_{1-\alpha/2}$  level of significance which was 95%,  $P$ = expected population which was 63%,  $d$ = margin of error which was 10%,  $n$ = expected sample size which was 90. Both male and

female genders with adult age range 18–30 years were included. Persons with recent injuries (Head Trauma), Any Systemic Infection (R.A, Arrhythmias), Any Cognitive Impairment (Migraine), Psychotic disorders (Depression, Stress, and Anxiety), Any Previous history of Insomnia, Substance Abuse excluded from the study. After taking informed written consent, data was collected through Northwick Park Neck Pain Questionnaire and The Sleep Revolution Sleep Quality Questionnaire by Arianna Huffington. The data was analyzed using SPSS 21.0. For Quantitative Variables Mean and Standard Deviation were calculated and for Qualitative Variables Frequency and Percentage were calculated.

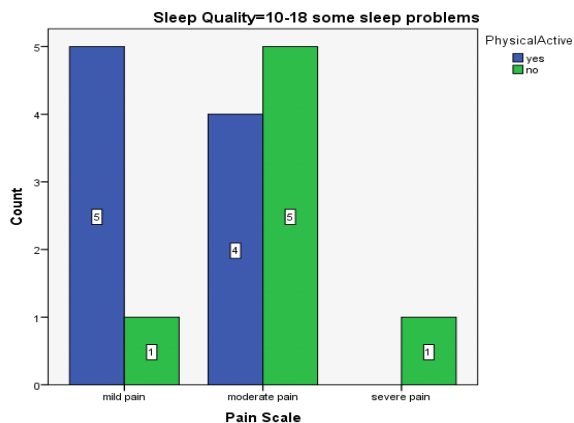
## RESULTS

The total population was 90, which includes 33 males and 57 females with percentage 36.7% and 63.3% respectively. The mean age of the subjects was 21.56 years with the standard deviation of 2.00 ranges between 18 to 27 years. On pain scale to assess the cervical pain there were 43 (47.8%) persons with Mild pain, 37 (41.1%) having Moderate pain and 10 (11.1%) with severe pain. There were 58 (64.4%) persons are physically active even after cervical pain and 32 (35.6%) physically not Active. There were 3 (3.3%) who have severed sleep problems, 16 (17.8%) were with some sleep problems, 43 (47.8%) having good sleep and 28 (31.1%) sleep is in great shape. In this Study there is no Association between daily activities, sleep disturbance with cervical pain in overall results. But there is association of working/housework ( $p$  value=0.03), driving ( $p$  value= 0.05), trouble you in general ( $p$  value=0.05) with cervical pain.

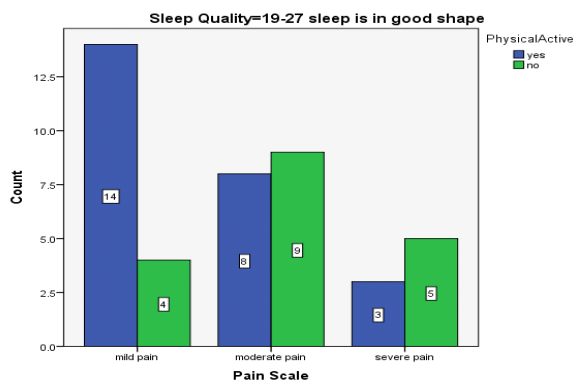


**Figure 1:** Descriptive Statistics for Crosstabs (pain scale, sleep quality, physical Active)(n=90)

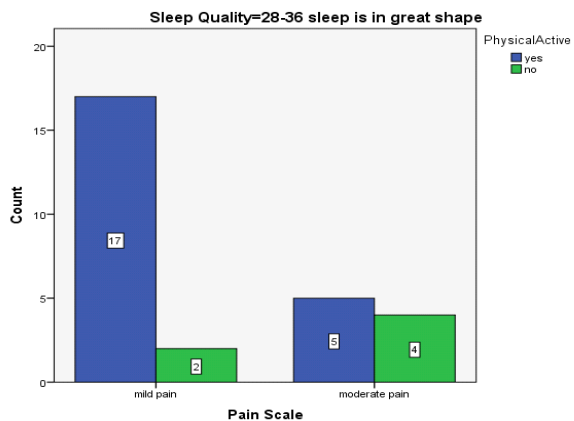
There is no association between pain intensity, sleep quality and physical active. (No significance)



**Figure 2:** Descriptive Statistics for Crosstabs (pain scale, sleep quality, physical Active)(n=90)  
There is no association between pain intensity, sleep quality and physical active.(P-value=0.167)



**Figure 3:** Descriptive Statistics for Crosstabs (pain scale, sleep quality, physical Active)(n=90)  
There is no association between pain intensity, sleep quality and physical active.(P-value=0.078)



**Figure 4:** Descriptive Statistics for Crosstabs (pain scale, sleep quality, physical Active)(n=90)  
There is no association between pain intensity, sleep quality and physical active.(P-value=0.061)

**DISCUSSION**

The results of this cross-sectional study showed that there was no connection occurred in daily physical activities and

sleep disturbance with any type of cervical pain. But somehow some of the physical activities are affected in some population like daily working, house work (p-value=0.03) and driving vehicle (p-value=0.005). As per the population size was not very large, this suggested that no such association occurred with cervical pain. There are numerous risk factors which are associated with cervical pain in young adults like their study timings, living standard, diet plans, social pressure, sporting activities and routine workout [14, 15]. The large population of adults and their greater response showed in Finland that these are the key factors for the purpose of this study. It was also in the study to give description and regulate the numerous risk factors which contributes to the neck pain in young population. Some specific laboratory measures are used to check for the sleep patterns which are much reliable as Electroencephalography (EEG). But there is a drawback for this laboratory measure as this is not possible to apply on larger population [16]. In comparison there are also some studies which conducted few years before on small level with small population size or study designs are either case control or cross-sectional which showed sleep disturbance in general adult groups results from any musculoskeletal pain [17]. Also some of the psychological conditions anxiety, depression, distress, strain all these shows some relation with sleep patterns disturbance. A recent discussion gives some conclusions which recommended the quality of sleep is not dependent on any of the risk factors or possibly associated with cervical pain [18, 19]. Some of the social factors including pressures and some social activities like using laptop, mobile phones, TV, caffeine consumption in excess, drugs usage, all these related to the disturbed sleep quality [20].

**CONCLUSION**

In this study overall there was no association occurred in young persons who are having any sort of cervical pain with daily physical activities and sleep patterns disturbance. As some of the individual activities like daily working, house hold activities, driving is affected in some of the persons with cervical pain. But most commonly the people are with good hygiene, doing routine exercise or any sporting activities having mild cervical pain which did not bother them at all.

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## Original Article

## Comparison of the Effectiveness of Back School Exercises And Mckenzie Exercises in the Treatment of Chronic Low Back Pain; A Randomized Controlled Trial”RCT

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## ARTICLE INFO

## Key Words:

LBP (Low back pain), RCT (randomized controlled trial)

## How to Cite:

Nasreen, A. ., Majeed, Z. ., Hassan Awan, M. A. ., Maqbool, S. ., Uzair Asghar, H. M. ., Tahir, H. ., Butt, K. ., & Zaheer, B. . (2022). Comparison Of The Effectiveness Of Back School Exercises And Mckenzie Exercises In The Treatment Of Chronic Low Back Pain; A Randomized Controlled Trial”RCT: Back School Exercises and Mckenzie Exercises in The Treatment of Chronic Low Back Pain. *Pakistan BioMedical Journal*, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.639>

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Received Date: 8th July, 2022

Acceptance Date: 17th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Low back pain has become the most common critical health problem and it is well known for causing a personal, and community financial burden globally. Low back pain is demarcated as non-specific, non-radiating pain with no accompanying neurological signs and symptoms.

**Objective:** The purpose of this study was to compare the effectiveness between Mckenzie exercises and back school exercises in the treatment of low back pain. **Methods:** This research included 36 patients who met the eligibility criteria. Prior to undertaking any examinations or receiving treatments, each participant in this study gave their ethical approval via filling out informed consent. Patients with nonspecific chronic back pain were divided randomly into 3 groups. In 'group A' only the conventional treatment was provided and in group 2 patients performed back school exercises. Similarly, in group 3 patients performed Mckenzie exercises. The lottery method was used to assign patients to these three randomized groups. All of these aforementioned groups received conventional therapy, which remained identical throughout the study. The conventional treatment included a hot pack for 10 minutes and back isometrics. Additionally, group A received conventional therapy, group B received conventional therapy along with back school exercises, and group 3 received Mckenzie exercises and conventional therapy. Each patient received treatment three times a week for of total 4 weeks. Roland Morris's disability questionnaire was used to measure self-reported physical impairment due to low back pain. Moreover, a numeric pain rating scale was used to measure pain severity. **Results:** This study showed that patients receiving back school and Makenzie exercises showed marked improvement in pain and disability scores. **Conclusion:** This study concluded that Mckenzie exercises are more effective than back school exercises for the management of chronic nonspecific low back pain. That is because Mckenzie's exercises not only decrease pain but equally improve, the flexibility and posture of the spine.

## INTRODUCTION

Low back pain has become the most common critical health problem and it is well known for causing a personal, and community financial burden globally. Low back pain is demarcated as non-specific, non-radiating pain with no accompanying neurological signs and symptoms [1]. This pain is restricted to the spine and Para spinal muscles of

the lumbar spine with no referred pain to the leg [2]. The common type of low back pain is non-specific low back pain. Non-specific LBP is well-defined as the pain of the lower back without any path anatomical cause of the pain [1]. There are numerous causes of low back pain. The most frequently reported type of back pain is simple back pain



which is the problem of every person nowadays. According to the Global Burden of Disease Study, it was stated that musculoskeletal conditions were responsible for 6.8% of entire disability-adjusted life years, in which low back pain is the chief leading problem [3]. It is the foremost cause of long-term disability worldwide [4]. Studies have reported, that years spent with a disability as a result of low back pain elevated up to 54% from 1990 to 2015, primarily due to population upsurge and aging, with the major population affected in middle income and low-income countries [5]. Additionally, back pain is more common among office workers, like computer workers or bankers. In Pakistan, the prevalence of low back pain among the bankers is so high, particularly affecting males than females [6]. And currently, chronic back pain has become the most frequently occurring medical problem, especially affecting the elderly population worldwide, with a significant effect on their health, functional status and general wellbeing [7]. Furthermore, it is recommended that proper evaluation of the patients should be done because there are various presentations of the back pain. Therefore, current studies and as well as clinicians are placing more emphasis of importance of common red flags of back pain in adults and other population so that an appropriate highly effective evaluation and treatment plan can be made. In addition, people with low back pain can be diagnosed through clinical evaluation [8]. This should include a neurological test, physical assessment and thorough history to identify radicular characteristics [9]. Patients with low back pain should be assessed for red flags to rule out major diseases. Additionally, diagnostic procedures (for example, imaging) should be performed if suspicion exists [10]. Currently, there are numerous treatment options are available to treat low back pain. These include patient counseling, pain neuroscience education, mobilization of the spine, trunk coordination, strengthening, endurance, regular walking, lower quarter nerve mobilization procedures, stretching, pain-relieving medications, and surgical treatment [11]. One of the gold standard and most effective technique to treat chronic low back pain is Mckenzie approach [12]. The Mckenzie back exercises are an exercise program developed in the 1950s by physiotherapist Robin Anthony Mckenzie, which gained popularity around 1985 [13]. This Mckenzie approach, is also known as "Mechanical Diagnosis and Therapy" and it is typically recognized as a "classification system" for the accurate diagnosis and to cure a large number of musculoskeletal conditions. These conditions can be lower back pain, neck pain, and extremity pain [14]. The Mckenzie approach for back pain is known for its ability to identify and classify nonspecific spinal pain into homogeneous categories. These categories are based on how a patient's symptoms respond to mechanical forces

in a similar way [13]. Mechanical diagnostic therapy involves three evaluation strategies to categorize pain problems. These are dysfunction syndrome, derangement syndrome and postural syndrome [15]. Previous studies have reported that Mckenzie exercises were highly effective in reducing pain, centralization of symptoms (symptoms migrating into the middle line of the body), flexibility, mobility and strengthening. The patients gained complete recovery of pain as a result of these exercises [16]. The major benefit of Mckenzie exercises is that these exercises can be performed at home by the patient according to the physiotherapist advice [17]. On the other hand, Back School is an educational exercise program that patients receive with the assistance of a therapist with the goal of treating or managing low back pain. These are the non-pharmacological interventions that are frequently known in an occupational health setting [18]. These back school exercises were introduced by Swedish Back school in 1969. Studies suggests that Back-to-School exercises play a vital part in the fortification of the spinal structures during normal activities and also provide protection for the spine in the workplace. It alleviates kinesiophobia, decreases pain, and promotes tissue repair [19]. However, their therapy efficacy for low back pain remains a concern. This study provided an opportunity to share my personal experience with community. This study was conducted purely in clinical setting of Physiotherapy Department Mayo Hospital, Lahore. The outcome of this study is of great value as we know that back pain is a global burden, therefore more quality evidence about the treatment of back pain would be a great contribution to the health care system of Pakistan. Additionally, there is not enough evidence about the efficacy of back school exercises. Therefore, this research was done to compare the efficacy of Mckenzie exercises and back school exercises to treat low back pain.

## METHODS

This research study was carried out in accordance with the inclusion and exclusion criteria for the treatment of chronic low back pain. Prior to undertaking any examinations or receiving treatments, each participant in this study gave their ethical approval via filling out informed consent. The assessment consisted of both objective and subjective data. The data included gender, age, duration of onset, socioeconomic position, location symptoms and severity of pain. There were 3 groups 1st group labelled as control receive conventional physiotherapy exercises. Group 2 labelled as Experimental receive Back school Exercises. Group 3 defined as Mckenzie receive specific exercises related to Mckenzie back care. Group 1 (Control Group). This group received conventional therapy which

include: Hot pack for ten minutes. Back isometrics. Exercises. Bridging: Ask the patient to lie in a crook lying position and raise the pelvis and hold this position. Repetitions: Repeat this exercise for up to 10 times. Arching the back: Ask the patient to lie prone with a pillow under abdomen, while crossing the arm, under the forehead and then raise the head. Repetitions: Repeat this exercise for up to 10 times. The exercise session was of 20-25 minutes with 1 set of 10 repetitions per day. Group 2 (Experimental Group). Back School Exercise Group). This group received conventional therapy and Back School exercises which include: Hot pack for ten minutes: Back isometrics, Back School exercises. Back school exercises: Diaphragmatic breathing, Repetitions: Repeat this procedure up to 10 times. Stretching of erector spine muscles, Repetitions: Hold this position for 30 seconds and repeat this procedure up to ten times. Stretching of the posterior lower limb muscles Repetitions: Hold this position for 30 seconds and repeat this procedure up to 10 times. Stretching of the anterior hip muscle. Repetitions: Hold this position for 30 seconds and repeat this procedure up to 10 times. Kinesthetic training. Repetitions: Repeat this procedure up to 10 times. Strengthening of abdominal muscles. Repetitions: a) Repeat this procedure up to 10 times. The exercise session lasted 20-25 minutes and consisted of one set of 10 repetitions every day. These exercises were performed three times a week for a total of six weeks, with the increase in five repetitions every two weeks. GROUP 3 (Experimental Group) Mckenzie Group. This group will receive conventional therapy and Mckenzie exercises which will include: Hot pack for ten minutes. Back isometrics. Mckenzie exercises: Trunk flexion Lying down: Repetitions were completed sequentially, with a little pause between repetitions, or the patient was asked to perform them at different times of the day based on his or her capability. Trunk extension Lying down: Repetitions: Repetitions were completed sequentially, with a little pause between repetitions, or the patient was asked to perform them at different times of the day based on his or her capability. Lateral shift: Standing with support of the upper arm: Procedure: With the patient's feet situated shoulder-width apart, instruct him or her to bend his or her upper arm to 90 degrees of elbow flexion, with the hand touching the lateral trunk. The patient will then physically transfer the pelvis to the opposite side using his or her hand while supported by an arm. Repetition: Repetitions might be completed sequentially, with a little interval between repetitions, or the patient could be asked to perform them at different times of the day, based on the patient's response. In short, the exercise session lasted 20 to 25 minutes and consisted of one set of 10 repetitions every day. These exercises were repeated three times per week

for a total of six weeks, and exercise intensity was increased by five repetitions after two weeks.

## RESULTS

Table 1 shows the demographics of the participants involved. Total 36 patients were included in this study, 12 in Group A, B and C respectively. The Gender demographics depicts that 7 males, 5 females in Group A, Group 2 were 5 males, 7 females and Group C participants includes 7 males, 5 females. The age was divide in 2 categories 25-35 and 36-45. Rest of factors including occupational status and marital status mentioned below.

	Group A (12)	Group B (12)	Group C (12)
Gender	12(7/5)	12(5/7)	12(7/5)
Age	25-35(3),36-45(9)	25-35(4),36-45(8)	25-35(7),36-45(5)
Occupational Status	22.2%(UnE),11.1%(E)	22.2%(UnE),11.1%(E)	22.2%(UnE),11.1%(E)
Marital Status	33.3% (M)	30.6%(M),2.8%(S)	30.6%(M),2.8%(S)

UnE (unemployed), E (Employed), M (Married), S (Single)

**Table 1:** Descriptive statistical analysis (N=36) between groups

Table 2 depicts the mean values of pre and post treatment comparison of Group A, B and C respectively. Pre and post treatment comparison of pair of numeric pain rating scale in group A had shown that mean NPRS score before treatment was  $7.17 \pm 0.577$ , Group B had  $6.500 \pm 1.883$ , Group C  $11.167 \pm 1.642$  while post treatment values were  $4.25 \pm 0.754$ ,  $3.58 \pm 0.669$  and  $2.75 \pm 0.87$  with the significant value of 0.000 which is less than 0.05 showing that back school exercises and Makenzie treatment is effective in reducing pain in patients with non-specific low back pain. RMQ of group A, B and C has showed that mean RMQ score before treatment was  $14.42 \pm 14.429$ ,  $15 \pm 3.075$ ,  $14.5 \pm 2.06$  which was improved to  $11 \pm 2.55$ ,  $8.5 \pm 3.17$ ,  $3.33 \pm 1.23$  with the significant value of 0.000 which is less than 0.05 shows the improvement in patient with the use of back school and Makenzie exercises. Table 3 depicts the post treatment scores for NPRS and RMQ with the p-value of 0.00 showing the effectiveness. Table 4 shows the post RMQ and NPRS values within and between the groups having sig-2 tail value less than 0.5 depicts that back school and Makenzie exercises were highly effective in the reduction of back pain.

Outcomes	Group A	Group B	Group C	
NPRS	Pre value	$7.17 \pm 0.577$	$7.0 \pm 0.85$	$6.92 \pm 0.79$
	Post value	$4.25 \pm 0.754$	$3.58 \pm 0.66$	$2.75 \pm 0.78$
	P-value	0.000	0.000	0.000
RMQ	Pre value	$14.42 \pm 2.42$	$15.0 \pm 3.07$	$14.5 \pm 2.06$
	Post value	$11.0 \pm 2.55$	$8.5 \pm 3.177$	$3.33 \pm 1.23$
	P-value	0.000	0.000	0.000

**Table 2:** Pre & post Treatment scores (N=36) between groups

Outcomes	Group A	Group B	Group C	P-value
NPRS Post treatment	$4.25 \pm 0.75$	$3.58 \pm 0.66$	$2.75 \pm 0.86$	0.000
RMQ Post treatment	$11.0 \pm 2.55$	$8.50 \pm 3.17$	$3.33 \pm 1.23$	0.000

NPRS (Numeric pain rating scale),RMQ Roland Morris Questionnaire

**Table 3**: Mean values of Post treatment scores

Sum of Squares		Df	Mean Square	F	Sig.	
Post_RMQ	Between Groups	366.889	2	183.444	30.319	0.000
	Within Groups	199.667	33	6.051		
	Total	566.556	35			
POST_NPRS	Between Groups	13.556	2	6.778	11.519	0.000
	Within Groups	19.417	33	.588		
	Total	32.972	35			

**Table 4**: Post RMQ & NPRS values

## DISCUSSION

The present examination was done to check the efficacy of Mckenzie exercises and back school exercises for the treatment of chronic low backpain. This study used lottery method for the allocation of patients to each intervention group. Additionally, in this research, group A received conventional treatment, group B received Back school exercises and group 3 received Mckenzie exercises. The aim of this research was to compare to results of Mckenzie exercises and back school exercises to determine which treatment technique was better. For this purpose, we had used numeric pain rating scale and Rolland Morris questionnaire to measure severity of pain and disability. Furthermore, proper consent was taken from each patient. After four weeks, we noticed that there was quite alleviation of pain and disability in all the three groups. The major improvement that we observed was at approximately after 40 days. The patients that received Mckenzie exercises felt a large improvement in disability and pain at one month follow up compared to the participants assigned to the Back-School intervention group and control group. This finding was supported by any other research in which Mckenzie exercises significantly improved severity of pain and disability in older patients compared to back school exercises [20]. That is because Mckenzie exercise focuses on posture correction and centralization of symptoms which can provide positive results in a few days. This theory was also backed by another study which demonstrated that Mckenzie exercises were far more effective than back school exercises for reducing disability and severity of pain. Additionally, a study suggested clinicians should inform their patients about these therapy alternatives so that they may decide which one to use, taking into account the patient preferences and potential costs of each intervention. This study provided similar findings as Mckenzie exercises were found to be highly effective in the treatment of low back pain. Although back school exercises were also found be effective but their efficacy was less compared to Mckenzie exercises[21]. On the other hand, our study proved that Back school efficacy for the

treatment of low back pain was extremely low. While some evidence suggests that back schools were a bit effective to improve the functional status and for the reduction of pain than other treatment options for patients suffering from typical chronic and recurrent low back pain. Another body of evidence suggests back school exercises are highly effective for the treatment of chronic low back pain in an occupational than the additional pain management techniques [22]. Further future research is needed to check the efficacy of back school exercises as the level of evidence for this back-school exercise is very low.

## CONCLUSION

Mckenzie exercises are more effective in the management of low back pain as compared to Back school exercises. Mckenzie exercises not only decrease pain but it equally improves, flexibility and posture of the spine.

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## Original Article

## Pain Catastrophizing in Adult Females After Bilateral Total Knee Arthroplasty

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## ARTICLE INFO

## Key Words:

Pain catastrophizing, bilateral Total Knee Arthroplasty, Pain Catastrophizing Scale (PCS).

## How to Cite:

Sharif, M. ., Nouman Tabassum, M. ., Maqbool, S. ., Uzair Asghar, H. M. ., Naveed, M. ., Shamshad, E. ., Naeem Atta, M. ., & Niaz, I. . (2022). Pain Catastrophizing in Adult Females After Bilateral Total Knee Arthroplasty: Adult Females After Bilateral Total Knee Arthroplasty. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.640>

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Received Date: 8th July, 2022

Acceptance Date: 16th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Total Knee Arthroplasty is a procedure used to ease the pain and improve functions after degenerative joint diseases e.g. osteoarthritis. One of the complications of TKA is pain catastrophization. Pain catastrophizing is characterized by the tendency to magnify the threat value of pain stimulus. It can be assessed through PCS which is a 13-item standardized tool for assessing pain catastrophizing. Primary objective of the study was to find the pain catastrophizing level in adult females after bilateral Total Knee Replacement. **Objective:** This study aims to highlight the importance of pain catastrophization in females who have undergone TKA so that it will alert the rehabilitation experts to plan the post-operative management keeping in view respective levels of pain catastrophization. **Methods:** This was a descriptive case series study in which 30 patients were included in study according to inclusion and exclusion criteria according to non-probability convenience sampling. All females were included in the study with same baseline characteristics. Literature was reviewed for the given study from EMBASE, MEDLINE AND PsycINFO. Questionnaire included in the study was PCS. **Results:** The statistical result of Rumination with the mean of 11.63, Magnification score with the mean of 1.98 and Helplessness score with the mean of 12.13 was obtained. Total mean score of pain catastrophizing was 29.500 and SD  $\pm 6.273$ . **Conclusion:** Pain catastrophizing after bilateral TKR is one major complications in females. That resulted in score of 40% Rumination, 19% Magnification and 41% Helplessness.

## INTRODUCTION

A high complexity procedure called Total Knee Arthroplasty (TKA) is carried out to ease the pain and improve function at advanced stages of degenerative joint disease, when conservative measures and other possible surgical options with less morbidity become incapable of providing satisfactory treatment. Surgical treatment of knee is a successful treatment for advanced knee osteoarthritis,

with symptom improvement rates over and above 85% and long-term failure rates of less than 1% annually [1]. Only in the United States, there were 220.9 total knee arthroplasty surgeries performed from 2005 to 2008, up from 31.2 procedures per 100,000 person-years during the period from 1971 to 1976 [2]. By the end of year 2030 the incidence of TKA is predicted to increase by approximately 700% [3].

A marked deformity of the knee, such as genu varum or valgum, gross instability or a limitation of motion, failure of non-operative management or a previous surgical procedure are some common indications for TKA. Other common indications include severe joint pain with weight bearing or motion that compromises functional abilities [4]. One of the best treatments for end-stage knee osteoarthritis is total knee arthroplasty, yet 10% of patients still exhibit inadequate function, strength, and mobility. Regular nursing care is crucial to the rehabilitation of patients after complete knee replacements [5]. The incidence of post-operative pain after Total Knee Arthroplasty is approximately 20%. Some preoperative factors are allied with higher chances of developing chronic post op pain which are high pain sensitization, female gender, high inflammation and Pain catastrophization [6]. The tendency to exaggerate the danger value of pain input, the sense of helplessness in this unpleasant environment, and a relative inability to control pain-related thoughts prior to, during, or after a painful encounter are all signs of pain catastrophizing [7]. Pain catastrophization can be assessed through a standardized 13 item instrument known as Pain Catastrophizing Scale (PCS). Using a 5-point scale with the end points (0) not at all and (4) always, participants are asked to reflect on prior painful experiences and rate how often they experienced each of 13 thoughts or feelings related to pain. Chronbach's alpha, which is reported to be 0.87, indicates that PCS has a high degree of consistency [8]. Just one research demonstrates that pain catastrophizing was not a significant predictor of postoperative pain, but this study also revealed that pain catastrophizing contributed significantly distinctive variance to the prediction of knee function one year after arthroplasty [9]. One of the study depicts that low operative mental health and pain catastrophizing have an obvious influence on outcome of TKA as compared to THA [10]. high levels of pain catastrophizing were a significant psychological predictor for more pain at 6 weeks, 3 months, 6 months, 1 or 2 years' post-surgery. Twelve months after the TKR, there was no correlation between pre-operative pain thresholds (PPTs) and pain severity, and there was no interaction between gender and preoperative pain, change in pain intensity, PPTs, and change in the pain severity [11]. According to one study's findings, persistent pain persisting for three months after TKA was significantly predicted by pain catastrophizing in five of the trials examined. They came to the conclusion that there was moderate evidence for the relationship between pain catastrophizing and chronic pain after TKA [12]. In comparison to males, women are more prone to pain and more likely to report chronic musculoskeletal load. Additionally, it's been asserted that

women experienced higher levels of catastrophizing and more distressing symptoms than men [13]. Pain catastrophization and depression have been shown to be associated with persistent pain and functional limitation after surgeries like total knee arthroplasty [14]. One of the best treatments for end-stage knee osteoarthritis is total knee arthroplasty, yet 10% of patients still exhibit inadequate function, strength, and mobility. Regular nursing care is crucial to the rehabilitation of patients after complete knee replacements [15]. Although TKA outcomes are generally positive, post-operative pain and functional status trajectories differ greatly; a sizable proportion of patients experience persistent pain and decreased function after the surgery [16]. In our current practice in Pakistan, it's mostly ignored to assess the post-operative level of Pain catastrophization which may affect the prognosis of recovery. This study aimed to highlight the importance of pain catastrophization in females who have undergone TKA so that it will alert the rehabilitation experts to plan the post-operative management keeping in view respective levels of pain catastrophization.

## METHODS

The study design was Case series which was conducted at Ghurki Trust Teaching Hospital. Study duration was 6 months after the approval of synopsis. A sample size of 30 subjects is calculated by using the formula given below with 4% margin of error (d) and 0.125% anticipated population proportion of 95% level of confidence. Non probability convenience sampling was the technique used. Inclusion criteria: Females with bilateral total knee arthroplasty after six weeks' post operatively. Exclusion criteria: Mental disability, any other condition which can be a cause of pain catastrophization, Patients who refuse to participate in study. The written consent was taken from the patients of Ghurki Trust & Teaching Hospital who fulfilled the eligibility criteria. Total 30 females post-operative bilateral Total Knee Arthroplasty were included in the study. Under the supervision of an orthopedic surgeon, to fill the questionnaire using standardized tool for measuring levels of pain catastrophization called PCS.

## RESULTS

Table 1 shows the demographics of the participants involved. Total 30 patients were included in this study; the gender distribution was 30 females only. The mean scores of age were  $59.33 \pm 6.709$ , 22.2% participants were unemployed and 11.1% were employed. The Mean score of pain catastrophizing of  $29.50 \pm 6.274$  for total of 30 participants which shows that data is normally distributed. Table 2 depicts subscales scores and the minimum and maximum ranges of each subscale separately with the mean and standard deviation also. The table shows a

minimum of 7.00, 2.00 and 4.00 while maximum of 16.00, 11.00 and 19.00 values of rumination, magnification and helplessness respectively. Total mean score of Pain Catastrophizing level in PCS is 29.500 with a SD of 6.27392 in total PCS. Pie charts shows That out of sample size of 30, 41% participants were feeling Helpless, 40% felt Ruminated and Magnification score was 19%.

Parameter	Analysis
Gender	30 (F)
Age	59.33±6.709
Occupational Status	22.2%(Un E),11.1%(E)
PCS scale	29.50±6.274

PCS(Pain catastrophizing scale),Un E(Unemployed), E(Employed)

**Table 1:** Descriptive statistical analysis(N=30)

Subscales Mean scores	Mean+SD	Range	Minimum	Maximum
Rumination Score	11.63+2.5	9.00	7.00	16.00
Magnification Score	5.70+1.9	9.00	2.00	11.00
Helplessness Score	12.13+3.7	15.00	4.00	19.00
Total Score of Pain Catastrophizing Scale	29.50+6.3	28.00	17.00	45.00

**Table 2:** Subscales Mean scores of PCS

## DISCUSSION

Total knee arthroplasty is regarded as a successful treatment to enhance function and lessen discomfort in cases like advanced osteoarthritis of the knee. According to one study, women are more sensitive to pain than men are, and they are also more prone to complain of chronic musculoskeletal load than males. Additionally, there is evidence to support the notion that women experienced higher degrees of catastrophizing and more painful symptoms than men [13]. This may be the result of low pain threshold levels in females. According to our case series we also find out that pain catastrophization was seen in females undergoing TKR. Our findings suggest that most participants reported higher percentage of helplessness rather than magnification and rumination. According to another research published in December 2015, it was shown that people with greater pain catastrophizing had lower odds of having a positive 2-year result for knee OA, while people with greater self-efficacy had higher odds [17]. In a different trial, 117 individuals with a median age of 67.0 years (Q1-Q3: 59.0-72.0) were enrolled. Patients made up 53.3% of the population and were 70.1 percent white. Unadjusted analysis revealed a correlation between resilience and post-operative outcomes, which persisted for physical function even after accounting for PCS. The study reveals that postoperative knee function and general physical health are important in people who get TKA. Examining pretreatment mental health and resilience-focused therapy may improve the outcomes of patients' self-reported physical function following TKA [18]. At baseline, six weeks, three, six, and twelve months following

TKA, participants completed questionnaires on pain catastrophizing and pain severity in another study. A cross-lagged panel study utilising variables for era, gender, race, initial anxiety, and mood disorders was carried out using structural equation modelling. Changes in pain catastrophizing between baseline and six weeks following TKA have been shown to be correlated with the intensity of subsequent pain. Future research is required to evaluate whether pain catastrophizing during the perioperative period can help patients receiving TKA achieve better clinical results [19]. Another study concluded that poor postoperative pain control is a risk factor for preoperative GAD, but when patients receive the right care, this risk factor can be altered. Preoperative GAD with GAD-2 screening and treatment referral may enhance patient outcomes and lower opioid use after TJA [20]. The striking feature of our study was that we separately figured out the pain catastrophizing sub scales levels of the participants who went through bilateral TKA in past 6 months. It would help in planning their rehabilitation protocol likewise. Whether the therapist needs to focus on the helplessness or the rumination or the magnification aspect of a patient.

## CONCLUSION

Women who undergo bilateral TKR and were assessed for their pain catastrophization using PCS after 6 weeks of their operations showed significant level of exaggerated response of pain.

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## Original Article

## Biological Characterization of Colorectal Cancer in Patients Undergoing Surgery and Its Correlation with Gender and Age

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## ARTICLE INFO

## Key Words:

Biological characteristics, colorectal cancers, carcinoma

## How to Cite:

Siddiqui, M. ., Naz, S. ., Masroor Bhatti, A. ., Talpur, S. ., Khan, R. ., & Sangrasi, M. . (2022). Biological Characterization of Colorectal Cancer in Patients Undergoing Surgery and Its Correlation with Gender and Age: Colorectal Cancer in Patients Undergoing Surgery. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.642>

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Received Date: 8th July, 2022

Acceptance Date: 17th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Among cancer patients' colorectal carcinoma abbreviated as CRC is the one of the chief cause of death **Objective:** To study the biological characteristics and types of colorectal cancer, and its correlation with various age groups and gender. **Methods:** It was descriptive study carried out in different surgical units of LUMHS Jamshoro, Sindh for period of 2 years including 115 patients. Biopsy was performed to diagnose colorectal carcinoma after getting consent from patients and the immune histochemical analysis was performed. **Results:** The age range of patients diagnosed with colorectal cancer were above 60 years males. Majority of patients showed per rectal bleeding with positive family history. Patients were also observed to be associated with different types of colorectal carcinomas including rectal, mucinous, well differentiated, moderately differentiated and poorly differentiated. The analysis of TNM classification showed majority at in stage II, also some were in stage IV (8.09%). The biological markers showed P53 and BCL2 the most common and cytokeratin and P53 were found significantly positive in age group of 31-45 years and 46-60 years. Additionally, HER2, P53 VEGF showed significantly ( $p=0.05$ ) higher rates in males. **Conclusion:** Mucinous carcinoma was most common colorectal cancer, and biological markers P53 and BCL2 were frequently common.

## INTRODUCTION

Among cancer patients' colorectal carcinoma abbreviated as CRC is the one of the chief cause of death [1]. Genetic mutations in CRC is the cause of 5% deaths [2] and its prevalence in both developed and developing countries is increasing [3] in age groups of 45 years to 65 years and also in younger population [4]. The chief risk factors of CRC include dietary, nutritional and lifestyle-related factors, higher intakes of alcohol, processed and red meat, limited exercise and physical activity and obesity while the natural protective factors against CRC includes higher intakes of, leafy and green vegetables, dietary fiber, micronutrients like calcium and folate, found in fruits and vegetables [5]. According to [6] the survival rate of colorectal cancer is

58% to 65% if diagnosed early can be treated. Worldwide, colorectal carcinoma is becoming the leading cause of cancer-related so, researchers are focusing the development of biomarkers used to precisely diagnose and predict treatment outcomes. The TNM criteria, which has been used shows substantial over or under treatment of CRC. Therefore, it is the need of the time to develop modern, efficient and precise biomarkers to ensure significant treatment strategies leading toward precise medication [7]. This can and was previously achieved by advancing in molecular genetics of colorectal cancer (CRC) to develop specific biomarkers used as diagnostic, prognostic markers, and markers of treatment responses

[8]. Such biomarkers are: "Epidermal Growth Factor Receptor (EGFR), Human Epidermal Growth Factor Receptor 2 (HER2), bcl-2 proto-oncogene", p53, Ki67 and Vascular endothelial growth factor (VEGF)". "Epidermal Growth Factor Receptor (EGFR)" is a ErbB receptor related and other tyrosine kinases includes "EGFR (ErbB-1), HER2/c-neu (ErbB-2), Her 3 (ErbB-3) and Her 4 (ErbB-4)". The mutations cause altered EGFR activity and expression resulting in cancer [9]. EGFR signaling pathways is responsible for development as well as progression of various tumors including colorectal cancer. Additionally, EGFR pathway and its downstream components also acts as targeted molecules in cancer therapy so modulations in these pathway presents prognostic implications [10]. It has been also reported that patients with "EGFR positive CRC" are resistance to therapy of monoclonal antibodies [11,12,13]. HER2 expression also showed ambiguous outcomes in colorectal cancer as its expression varies from 0 to 84% so targeting HER2 is also a treatment option [14]. The bcl-2 proto-oncogene is the inhibitor of apoptosis allowing propagation and accumulation of cells in genetic modulations [15]. and its over expression is critical in colorectal carcinogenesis [16]. Nuclear p53 accumulation has also been associated with no survival in case of colorectal carcinoma [17]. Moreover, high expression of Ki67 is considered to be prognostic marker showing low nodal status and tumor stage [18]. "Vascular endothelial growth factor (VEGF)" is the most predominant angiogenic factor important in colorectal carcinoma progression. VEGF expression and its quantification provide significant prognostic information in CRC as it contributes toward progression and metastasis [19]. As these biomarkers are significant in CRC so this study was conducted to analyze their role in patients with colorectal cancer using immunohistochemistry technique and analyze their correlate with factors such as age and gender. Additionally, this research also emphasized the controversies and challenges withholding the clinical use of biomarkers to provide evidence based guidelines for implementation in various gastrointestinal malignancies by the personals involved in carcinomas, malignancies management.

## METHODS

The study population was the patients admitted in surgical units of hospital. Inclusion/Exclusion criteria: The patients diagnosed with colorectal carcinoma by biopsy were included in the study and the patients receiving any neo-adjuvant therapy were not included in the research. The sample size was 115 patients, determined by "Openepi, epidemiological scientific calculator", as the anticipated frequency of colorectal cancer was 12%, so 90% confidence interval was used and calculated by following formula.  $n = \lceil \frac{DEFF * Np(1-p)}{[(d2/Z21-\alpha/2*(N-1)+p*(1-p)]} \rceil$

Data were collected by analyzing tumor specimens by immune histochemical analysis. IBM SPSS (statistical packages for social sciences) 16.0 was used to analyze the collected data by applying descriptive statics and correlation.

## RESULTS

The results of age distribution of the patients (Table 1) showed mean range to be 45+10, gender distribution showing 65(56.52%) male while 50(43.47%) female.

Variables	Frequency /%
<b>Age (Years)</b>	
15-30	21(18.26%)
31-45	31(26.95%)
46-60	25(21.73%)
>60	38(33.04%)
<b>Gender</b>	
Male	65(56.52%)
Female	50(43.47%)

**Table 1:** Frequency distribution of age and gender

Table 2 represents implications in CRC showing per rectal bleeding in 70(60.86%), change of bowel habits in 20(17.39%), polyp in 30(26.08%), abdominal pain in 25(21.73%) and mucus discharge in 10(8.69%) patients, risk factors of CRC in study population revealing smoking in 73(63.47%), alcohol in 25(21.73%), low dietary fibers 27(23.47%) and chronic bowel infection in 15(13.04%), positive family history in 33(28.69%), no family history in 65(56.53%).

Variables	Frequency /%
<b>Symptoms</b>	
Per rectal bleed	70(60.86%)
Change of bowel habits	20(17.39%)
Something coming out of anus (polyp)	30(26.08%)
Abdominal pain	25(21.73%)
Mucus discharge	10(8.69%)
<b>Risk Factors</b>	
Smoking	73(63.47%)
Alcohol consumption	25(21.73%)
Low dietary fibers	27(23.47%)
Chronic bowel disease	15(13.04%)
<b>Family History</b>	
Present	33(28.69%)
Absent	65(56.53%)
Not known	17(14.78%)

**Table 2:** Frequency Distribution of symptoms & risk factors

Based on predisposing factors, 17(14.78%) patients showed adenoma, 20(17.39%) revealed synchronous carcinoma, ulcerative colitis was found in 20(17.39%), 08(6.95%) showed crohn disease, 31(26.95%) had pre disposing factors Table 3 also showing the histological type of rectal carcinoma and locality of invasion of tumor.

Variables	Frequency /%
<b>Predisposing factors</b>	
Adenoma	17(14.78%)
Synchronous carcinoma	20(17.39%)
Ulcerative colitis	20(17.39%)
Crohn's disease	08(6.95%)
Others	31(26.95%)
Not known	19(16.52%)
<b>Histological type</b>	
Adenocarcinoma	20(17.39%)
Mucinous carcinoma	50(43.47%)
Medullary carcinoma	15(13.04%)
Signet ring cell carcinoma	06(05.21%)
Anaplastic	05(04.34%)
Not specified	19(16.52%)
<b>Predominant area</b>	
Well differentiated	55(47.82%)
Moderate differentiated	40(34.78%)
Poorly differentiated	20(17.39%)
<b>Local invasion of the tumorp</b>	
To No evidence of primary tumor	00
pTis carcinoma in situ	04(03.47%)
pT1 Limited to sub mucosa	10(08.69%)
pT2 Invasion into muscularis propria	20(17.39%)
pT3 Beyond muscularis propria	22(19.13%)
pT4a Tumor invades adjacent organs	22(19.13%)
pT4b Tumor cells have breached serosa	37(32.17%)
pTx Primary tumor cannot be assessed	00
<b>Lympho-vascular invasion</b>	
Yes	80(69.56%)
No	35(30.43%)

**Table 3:** Frequency distribution of Predisposing factors, Histological type, Predominant area, Local Invasion, Tumor involvement

NM classification and biological markers are represented in table 4 while the correlation of biomarkers expression with age groups and gender is shown in table 5 and 6 respectively.

TNM classification	Frequency /%	
Stage I	31(26.95%)	
Stage II	55(47.82%)	
Stage III	19(16.52%)	
Stage IV	10(08.69%)	
<b>Biological markers</b>		
Name	Positive	Negative
HER2	45(39.13%)	70(60.87%)
EGFR	50(43.47%)	65(56.53%)
BCL2	61(53.04%)	54(29.49%)
Cytokeratin	47(40.86%)	68(59.14%)
P53	60(52.17%)	55(47.83%)
VEGF	50(43.47%)	65(56.53%)

**Table 4:** Frequency distribution of TNM Classification, Biological markers

Bio markers	Age groups				Total	p-Value
	15-30 years	31-45 years	46-60 years	>60 years		
<b>HER2</b>						
Positive	07	11	12	15	45	0.401
Negative	14	20	23	23	70	
<b>EGFR</b>						
Positive	08	15	16	11	50	0.31
Negative	13	16	09	27	65	
<b>BCL2</b>						
Positive	12	15	18	16	61	1
Negative	09	16	07	22	54	
<b>Cytokeratin</b>						
Positive	06	19	17	05	47	0.04
Negative	15	12	08	33	68	
<b>P53</b>						
Positive	10	24	19	07	60	0.02
Negative	11	07	06	31	55	
<b>VEGF</b>						
Positive	12	10	15	13	50	0.822
Negative	09	21	10	25	65	

**Table 5:** Correlation of Biomarkers with age

Bio markers	Gender		Total	p-Value
	Male	Female		
<b>HER2</b>				
Positive	31	14	45	.021
Negative	34	36	70	
<b>EGFR</b>				
Positive	28	22	50	0.211
Negative	37	28	65	
<b>BCL2</b>				
Positive	35	26	61	0.651
Negative	30	24	54	
<b>Cytokeratin</b>				
Positive	27	20	47	0.41
Negative	38	30	68	
<b>P53</b>				
Positive	40	20	60	0.05
Negative	25	30	55	
<b>VEGF</b>				
Positive	32	18	50	0.05
Negative	33	32	65	

**Table 6:** Correlation of Biomarkers with gender

## DISCUSSION

Colorectal carcinoma is ranked to be the third frequently occurring malignancy across the globe [1]. and second in the United States causing cancer related deaths [20]. The prevalence of CRC is higher in males with frequency of 48.3 to 72.5/100,000 people however in females its frequency is 32.3 to 56 per/100,000 per annum [21,22]. The results of this study showed 65(56.52%) of CRC patients were men and 50(43.47%) patients were women in consistent with

the findings of [23], who also reported the higher prevalence in males (2:1). The results of age frequency showed majority cases in older age 38(33.04%) in above 60 years followed by 21(18.26%) patients with age range of 15 years to 30 years, 31(26.95%) with 31 years to 45 years, 25(21.73%) with age of 46 years to 60 years. 10 colorectal carcinoma patients were in 31 years to 40 years and only 2 were below 20 years supported by the findings of [22] demonstrating CRC prevalence higher in older population. The analysis of per rectal bleeding showed frequency of 70(60.86%) while 20(17.39%) patients had altered bowel habits, 30(26.08%) had polyp, 25(21.73%) complained abdominal pain and mucus discharge was observed in 10(8.69%) identical to the study of [23] demonstrating the abdominal pain, weight loss and bleeding per rectum the major implications of CRC. Also [22] reported the bleeding per rectum to be the common symptom of CRC along with altered bowel habits and intestinal obstruction. The common risk factor was found to be the smoking found in 73(63.47%) followed by alcohol use 25(21.73%), low dietary fibers 27(23.47%) and chronic bowel infection 15(13.04%) showing the harmful effects on rectum and colon. [24] also found that smoking cause colorectal cancer deaths in 12% population because it the increase progression of cancer in colon and rectum. [25] found that carcinogens of tobacco increase adenomatous polyps' formation leading to lesions thus resulting in colorectal cancer. The use of alcohol also onset of colorectal cancer [24,26]. and acetaldehyde of alcohol disproportionate tumors in colon [27]. Family history is also the risk factor of CRC, the analysis found that 33(28.69%) patients had positive family history while 50(43.47%) patients had no family history supported by the results of [28], showing 20% population develop CRC due to family history. Moreover, [29] also reported strong association of family history with CRC development. The results of histological evaluation of rectal carcinoma, [32] found 20(17.39%) of adenocarcinoma, 50(43.47%) with mucinous carcinoma, 15(13%) had carcinoma, 6(5.21%) showed signet ring cell carcinoma, 5(4.32%) with anaplastic carcinomas in consistent with the results of [22]. We found that 55(47.82%) patients also had well differentiated carcinoma moderately differentiated carcinoma was found in while 40(34.78%) and poorly differentiated carcinoma in 20(17.39%) patients identical to the results of [23] stating 56% with moderately differentiated carcinoma and 38% with poorly differentiated carcinoma. Likewise, [31] also reported 50% of patients of CRC showed moderately or poorly differentiated tumor. Regarding the TNM classification, stage I accounted for 31(26.95%) patients, stage II = 55(47.82%) patients, stage III = 19(16.52%) and 10(8.69%) were at stage IV similar to results of [33], who reported

71.2% cases at grade II, 19.2% at grade III and 9.6% at grade IV. [34] also reported the identical findings at the time of diagnosis. The determination of biological markers showed BCL2 and P53 to be the most common found in 60(52.17%) and 61(53.04%), supported by the findings of Pity IS et al [29] who reported higher p53 and Bcl2 expression in CRC patients. "HER2, EGFR, Cytokeratin and VEGF" were found in 45(39.13%), 50(43.47%), 47(40.86%) and 50(43.47%) respectively (9.6%) relative to [35] research who found that HER-2/neu in 81.8% of tumors and [36] reported high HER-2/neu expression. Our study also found the significantly higher expression EGFR and VEGF of colorectal cancer tissues and paraneoplastic normal tissue supported by findings of Li [37] reporting their high expression and showing statistically insignificant difference ( $P > 0.05$ ).

## CONCLUSIONS

After all this discussion it can be concluded that prevalence of colorectal cancer is higher in males and older ages and is becoming the major cause of deaths. The major risk factors include smoking inducing the higher expression of biological markers P53 and BCL2. P53 and Cytokeratin showed significantly higher expression in older age in both genders while HER2, P53 VEGF were overexpressed in male. There is still need of appropriate and precise biomarkers in order to diagnose and treat CRC and other types of cancer.

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## Original Article

## Comparison of Thoracic Manipulation and MET (Muscle Energy Technique) on Chronic Mechanical Neck ache: A Randomized Control Trail

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## ARTICLE INFO

## Key Words:

MET, Thoracic manipulation, PNF stretching

## How to Cite:

Salman, M., Naseem, Z., Umar, M., & Badshah, M. (2022). Comparison of Thoracic Manipulation and MET (Muscle Energy Technique) on Chronic Mechanical Neck ache: A Randomized Control Trail: Thoracic Manipulation and MET on Chronic Mechanical Neck ache. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.605>

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Received Date: 8th July, 2022

Acceptance Date: 21st July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Chronic mechanical neck ache is one of the most disabling condition in general population which affects individuals' Activities of Daily Living (ADLs). **Objective:** To compare the effectiveness of thoracic manipulation and MET on chronic mechanical neck ache. **Methods:** It was a single blind randomized clinical trial registered at ClivicalTrial.gov under trial registry no# NCT05138199. Non-probability simple random sampling was used to recruit over 30 patients. This study was conducted at Rawal General and Dental Hospital, Islamabad and at the Physiotherapy Clinic Rawalpindi. Two groups were made, group "A" was termed as control group and received MET (2 sessions/week) and group "B" was termed as experimental group and received thoracic manipulation (1 session/week), for six weeks each. Effect of these interventions were evaluated on frequency of pain, duration of pain and Numeric Pain Rating Scale (NPRS). As data were not normally distributed, we employed Wilcoxon Rank test for intra-group analysis and Man Whitney U test for inter-group analysis. **Results:** Both groups mean  $\pm$ SD of age, gender, and marital status was 26.27 $\pm$ 8.55 and 1.60 $\pm$ 0.49, 1.20 $\pm$ 0.40, respectively. Wilcoxon Rank test showed marked difference within both groups as p-value was <0.05 and "r value >0.05" showed larger effect of interventions. Man-Whitney U test showed no significant difference between groups as p-value was >0.05. **Conclusion:** Both manipulation and MET are effective for management of chronic mechanical neck ache and both have same impact on NPS.

## INTRODUCTION

Neck ache is the second most commonly occurring musculoskeletal condition in general as well as in medical population after backache, roughly with 10 to 12 months of prevalence among the general as well as in occupational populations of 40% to 55% [1]. Therefore, frequent physical therapy visitations are common due to neck ache. In clinical studies general classification of mechanical neck ache includes idiopathic pathoanatomic cause, while the patients with neurological deficits, cervicogenic headache, systemic inflammatory disorders, and osteoporosis as well as pregnancy are excluded [2]. The

ligaments and muscles of body are put into stress due to long term adoption of abnormal posture which leads towards neck ache development. Etiological factors of neck ache due to mechanical causes are typically multifactorial which include anxiety, depression, bad posture, strain in neck ligaments, and sports or occupational activities [3]. Moreover, the mechanical neck ache has following symptoms; limited Range of Motion (ROM), muscle stiffness and tenderness, spasm or muscle's lengthening, cervical region pain aggravated by movement of neck. Due to text neck posture, extensor muscles of

cervical region become tight and deep flexors of neck develop lengthening because of biomechanical changes [4]. Janda reported that postural muscles of cervical region have predisposition to get shorten, in both pathological as well as in normal conditions [5]. Most common among such postural muscles are upper trapezius, scalene, and levator scapulae which have the shortening tendency. In addition, deep neck flexors (e.g. longus colli and longus capitis) have crucial role in postural sustenance and their impaired stimulation put stress into these deep muscles due to which patients develop mechanical neckache [6]. Mechanical restriction between vertebrae, can be due to pain, contracture, cervical vertebrae ankylosis or spasm of cervical muscles lead to ROM reduction. The general clinical definition of mechanical neck ache explains that the neck pain must be aggravated by motion. Also, there is inconsistency among various studies, however, the patients that are classified with mechanical pain in neck have been investigated, there is no consensus treatment as a gold standard within the literature [7]. In literature, one approach used for conservative treatment of neck ache is mobilization of cervical spine and thrust manipulation [8-10]. The probable complications which can arise by High Velocity Low Amplitude (HVLA) thrust manipulation of the cervical spine is Vertebral Basilar Artery (VBA) injury which has greater possibility to occur, is discussed extensively in literature [11, 12]. The reported cases of VBA dissection are rare. Due to this reason, different screening tools have been proposed to recognize the patients who are at greater risk of developing adverse effects from this HVLA thrust manipulation and their use is endorsed, despite some deficiency in supportive evidence for its validity. Besides, in literature, recommendations are present to avoid manual therapies at end of ROM and precautions have briefly explained about the practice of cervical high velocity thrust manipulation due to the apparent risk of serious VBA complications, exclusively in explicit subgroups of the population [13]. On the other hand, thrust manipulation of thoracic spine may effectively target the mechanical neck ache. Recently, there is a growing body of knowledge in regard to the evaluation of the clinical efficacy of thrust manipulation of thoracic spine for patients with mechanical neck ache [14, 15]. The theory about hypomobility in the upper thoracic spine might be the primary cause of mechanical neck ache. Several studies explained that there is a significant relation between hypomobility at junction of cervical & thoracic vertebrae (C7-T2) and the presence of mechanical neck ache. In patients with mechanical neck ache, cervical thrust manipulation or mobilization targeted to the Atlantoaxial (AA) joint (C1-2) and the upper thoracic spine

region (T1-2) are very frequently practiced by certified chiropractors, PT and osteopaths. However, there is no solid evidence about the efficacy of HVLA thrust manipulation in the patients with mechanical neck ache. The HVLA thrust manipulation technique acts as a natural analgesic to the body because it has some neurophysiological as well as mechanical and motor effects. Other approaches which are used for treatment of mechanical neck ache includes Proprioceptive Neuromuscular Facilitation (PNF) [16], stress alleviation techniques, postural advice (i.e. ADLs, IADLs work place and hobbies, pillow, and various techniques like yoga & pilates), among these Alexander techniques (for improving posture, Moist Hot Pack (MHP), KT taping, strengthening exercises, endurance training and, other coordinative exercises), and cervical traction. According to previous studies, muscle energy technique is considered to be more effective for patients suffering from mechanical neck ache. Rationale of this study was to observe which of above mentioned technique is more effective for alleviation of pain on NPRS along with frequency and duration of pain. The purpose of this study is to compare the effectiveness of thoracic manipulation and MET in patients with chronic mechanical neckache.

## METHODS

The patients of chronic mechanical neck ache visiting the Rawal General and Dental Hospital (RGDH), Islamabad and at the Physiotherapy Clinic Rawalpindi. At Clinicaltrial.gov, we registered our study and NCT05138199 was the clinical trial registry number. It was a randomized control trial. A sample of 30 patients was considered for the completion of this study. The duration of study was of six months from 16th August 2021 to 15th March 2022. Two groups were made and individuals were equally divided into both groups. The sampling technique used in the study project was convenience sampling technique. Group "A" was named as control group and group "B" was designated as experimental group. Those individuals included in control group received muscle energy technique as treatment intervention & individuals in experimental group or group "B" received thoracic manipulation as treatment intervention. Total 12 sessions were given in MET group (2 sessions/week) and in experimental group only six sessions (1 session/week) of Thoracic Spine Manipulation (TSM) for six weeks were administered. Pre-test and post-test readings were taken for duration of pain, intensity of pain, and frequency of pain along with Numeric Pain Rating Scale (NPRS). Following individuals were included in this study; a) Male and female patients with mechanical neck pain having age group of 30 to 50 years, b) Mechanical neck pain individuals having activities of daily living, and c) Mechanical neck pain affecting sleep. Those individuals



presented with following complaints were excluded from this study; a) Osteoporosis, b) Radiculopathy, c) Pregnancy, d) Systemic inflammatory condition, e) Neurological deficit, f) Arthritic conditions, and g) Head injuries. Normality of data was checked by Shapiro-Wilk test. As data was not normally distributed, we employed Man Whitney U test for between groups analysis. <0.05 value was set as significant. IBM SPSS version 21.0 was employed along with Microsoft Excel for data analysis and entry respectively. Mean +SD was used for descriptive statistics & median for Man Whitney U test.

## RESULTS

Out of 30 patients, 63.3% ranged between 18-25 years, 20% between 26-30 years, 6.7% between 31-35 years, 3.3% between 36-40 years, 3.3% between 41-45 years, and 3.3% between 56-60 years. Gender distribution out of 30 patients, 40% were male while 60% were female. 20% were single and 80% patients were married. 3.40 +1.95 was the mean +SD of frequency of pain in experimental group before treatment and 3.40+2.05 was of control group. After the intervention, mean +SD of experimental group and control group was 4.53+1.55, 4.93+1.83, respectively. Mean +SD of duration of pain before and after treatment in experiment and control group were 2.27 +1.28, 2.73 +1.33 and 1.53 +0.63, and 1.60+0.91, respectively. Numeric Pain Scale mean +SD of experimental group and control group before intervention were 4.67 +0.97 and 5.50 +0.98 respectively but after intervention mean +SD of experimental group was 2.66 +1.83 & of control group was 2.46+2.55, Table 1.

Variable	Group	Mean+SD
Age	Both	26.27+8.55
Gender	Both	1.60+0.49
Marital status	Both	1.20+0.40
Frequency of pain before intervention	Experimental	3.40+1.95
	Control	3.40+2.05
Frequency of pain after Intervention	Experimental	4.53+1.55
	Control	4.93+1.83
Duration of pain before treatment	Experimental	2.27+1.28
	Control	2.73+1.33
Duration of pain after treatment	Experimental	1.53+0.63
	Control	1.60+0.91
NPS before treatment	Experimental	4.67+0.97
	Control	5.50+0.98
NPS after treatment	Experimental	2.66+1.83
	Control	2.46+2.55

**Table 1:** Mean +SD of variables.

In control group z value of frequency of pain, duration of pain and NPS was 2.05, 2.52, and 2.93 and p-values were 0.04, 0.01, and 0.00\* and R-values were 0.52, 0.61, and 0.75. As p-value of each variable is <0.05 which had shown significant difference in outcomes and also R-value were

also greater than 0.5 in each variable which had also shown larger effects of treatment. In experimental group post treatment frequency of pain, duration of pain & NPS z-values were 2.05, 2.37, and 2.83 and p-values were <0.05 in each variable, and R-values were >0.5 which had shown greater effect of intervention.(Table. 2).

Variable	Z	p	r
<b>Control group</b>			
Post treatment frequency of pain	2.05	0.04	0.52
Post treatment duration of pain	2.52	0.01	0.61
Post treatment NPS	2.93	0.00*	0.75
<b>Experimental Group</b>			
Post treatment frequency of pain	2.05	0.04	0.52
Post treatment duration of pain	2.37	0.01	0.61
Post treatment NPS	2.83	0.00*	0.73

**Table 2:** Wilcoxon rank test in both groups

Man Whitney U test was employed for between groups analysis. Median and U values for frequency of pain, duration of pain, and NPS were 5 (96), 1 (109.5), and 2 (99), respectively. As p-value of each variable was >0.05 which demonstrated that there was insignificant difference between the interventions. This revealed that both interventions were equally effective for chronic mechanical neckache.(Table. 3).

Variable	Groups	Md (IQR)	U	P
Frequency of pain	Exp	4(2)	96.00	0.48
	Control	5(4)		
Duration of pain	Exp	1(1)	109.5	0.88
	Control	1(1)		
NPRS	Exp	2(3)	99.50	0.58
	Control	2(6)		

**Table 3:** Man Whitney U test

## DISCUSSION

This study was conducted to compare the efficacy of thoracic manipulation and MET in patients suffering from chronic mechanical neck ache. NPRS was used to evaluate the effectiveness of both treatments and their effect on frequency & duration of pain. It was concluded from results that both treatments are equally effective for the management of chronic mechanical neck ache. A systemic review and meta-analysis was conducted by Michael Masaracchio et al. to observe the effectiveness of TSM in comparison to cervical manipulation, standard treatment & thoracic mobilization. They searched PubMed, Cochrane library, CINAHL, and PEDro etc. on for this purpose. They included only RCTs in their analysis. Out of 1717 search result only 14 articles met the inclusion criteria. Result of their study showed that TSM is much effective with respect to pain and disability when compared with above mentioned techniques. This study also supports our result that TSM is an effective treatment for MNP (mechanical neck pain) [16]. An RCT conducted by Phadke A et al. to

compare the effects of static stretching and MET on individuals suffering from mechanical neck pain. They randomized 60 subjects into two equal groups. Experimental group was given MET and control group received Static stretching. Neck Disability Index (NDI) and Visual Analogue Scales (VAS) were used to measure the disability and pain of patients respectively. After 6 days of treatment intervention comparison was done between baseline and at 6th day. Results showed improvement in both groups but MET group depicted better results on NDI & VAS as compared to static stretching. Our results are also supported by this study [17]. An RCT was conducted on 33 patients by Yadav H et al. to compare the efficacy of conventional treatment, MET and DNF stretching. Randomization was done by sealed envelope and subjects were divided into 3 equal groups each containing 11 individuals. Group A received conventional treatment such as MHP, static stretching exercises, cervical spine active ROM exercises, mobilization, and other postural exercises. DNF training with conventional treatment was given to group B. Group C received MET in combination with conventional treatment. Functional disability was primary outcome measure at baseline, day 7 and day 14. Repeated measure ANOVA revealed significant difference between group B and C at various intervals. But MET showed better results. As great effect size as compared to other interventions. So, our results that MET is an effective treatment for the management of MNP [18]. A systemic review conducted by Bu-Kyung Son et al. in year 2019 to evaluate the effectiveness of MET for cervicgia in literature as compared to other treatment interventions. They searched different databases for RCTs on cervicgia and MET. Only 6 studies met their inclusion criteria. Biasness was reduced by using Cochrane Risk of Bias tool (RoB). Results of their review depicts that MET has far better effects for the management of neck aches compared to various manual medicines. Our study is also supported by these results that MET is effective for MNP [19]. Ian De Coulter et al. conducted a systemic review & meta-analysis to compare the effects of thoracic manipulation and mobilization for non-specific neck ache. They included 47 studies containing 4460 participants, conducted between year 2000 to 2017 on non-specific neck pain. 37 studies out of 47 were unimodal in which only manipulation or mobilization was used for management of neck ache. 10 other studies were on multimodal approach. Results of multimodal studies demonstrated that neck pain can be managed more effectively when manipulation is used in combination with some other techniques. Our study is also supported by these results that thoracic thrust manipulation is an effective technique for neck pain [20]. Our study is also supported by research conducted by

González-Iglesias J et al. In a double blinded randomized trial 45 patients were assigned into experimental and control groups. Control group was given electrotherapy and experimental group received TSM along with electrotherapy. 100mm VAS was used to assess the pain and disability of patients. Five treatment sessions were administered to both groups but only three TSM was given consecutively to patients for three weeks. Results were assessed at 2nd and 4th week follow-up. Experimental group revealed greater improvement in pain and disability of 26.5mm on VAS as compared to control group which showed only 16.8 mm. So, it was concluded that TSM is more effective as compared to conservative therapy [21].

## CONCLUSION

Hence, it is concluded that both manipulation and MET are effective for management of chronic mechanical neck ache. And both have same impact on Numeric pain rating scale (NPS). A larger Scale study should be conducted and it should be double blinded clinical trial. Results must be taken at more intervals during treatment. Duration of study must be more than 6 months.

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## Original Article

## Incidence of Air Leak in Stapled Versus Hand Sewn Pulmonary Resections

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## ARTICLE INFO

## Key Words:

Pulmonary resection, Surgical intervention, Stapled pulmonary resection

## How to Cite:

 Nasreen, S. ., Ahmad, T. ., Ahmed Shaik, K. ., Sikander, N. ., Ali Wassan, N. ., Thapaliya, P. ., & Asif, A. . (2022). Incidence of Air Leak in Stapled Versus Hand Sewn Pulmonary Resections: Incidence of Air Leak in Stapled Versus Hand Sewn Pulmonary Resections. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.643>

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Received Date: 14th July, 2022

Acceptance Date: 22nd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Postoperative air leak is a frequent complication after pulmonary resection. Different approaches have been used to control the incidence of air leaks after pulmonary resection. **Objectives:** To compare stapled pulmonary resection and hand-sewn, i.e. manual pulmonary resection for the incidence and duration of resolution of air leaks. **Methods:** This was a prospective comparative study, conducted from August 2019 to July 2020 in the Department of Thoracic Surgery Jinnah Postgraduate Medical Centre, Karachi. Patients indicated for pulmonary resection were randomized to either stapled pulmonary resection (Group A) or manually sutured (Group B) pulmonary resection and were followed till their discharge or resolution of air leak. **Results:** The total number of air leaks in group A was 9(30%), out of which 8 (26.6%) resolved conservatively and only one (3.3%) required re-exploration and surgical intervention. The total number of air leaks in group B was 7(25%), out of which 6(21.4%) resolved conservatively and only one (3.5%) required re-exploration and surgical intervention. The difference was not significant in the incidence of air leak of both groups. Persistent air leak (PAL) was present in 5 (16.6%) patients in group A and 3 (10.7%) patients in group B. **Conclusion:** Our study suggests that both stapled pulmonary resection and manually sutured pulmonary resection techniques are comparable in terms of incidence of air leak and its resolution. Hence, the choice of technique should be based on parameters, including the technical aspects and surgeon's preference.

## INTRODUCTION

Postoperative air leak (AL) is a frequent complication after pulmonary resection (PR) [1-2]. It may further lead to other complications, such as prolonged chest tube drainage, empyema, pneumonia, atelectasis and increase duration of hospitalization [3-4]. Hence, while managing air leaks, it is important to rule out if leak originate from lung parenchyma (alveo-pleural) or from bronchial stump (broncho-pleural) [5]. Minor air leaks of parenchymal origin are observed in around 50% of the patients undergoing lung resections and they may resolve spontaneously, taking a few hours up to three days [1, 6]. AL that persists for more than 4 to 10 days after surgery is defined as persistent air leak (PAL). Conservative management of PAL

includes prolonged chest tube drainage, provocative chest tube clamping and permissive chest tube removal, chemical and autologous blood patch pleurodesis, outpatient management with Heimlich valve [6-7]. Female gender, smoking history, steroid use, low preoperative forced expiratory volume in 1 second (FEV1) and pleural adhesions are predictive risk factors for air leak after pulmonary resection [7]. Different approaches have been used to reduce the incidence of ALs after lung resection [8]. PR via manual technique or with the help of stapling devices have been used for decades in various pathologies of lung. Both techniques are reliable and safe, with notable short- and long-term results. Despite routine use of

sutures and stapling devices, AL remain a significant problem in the daily practice of thoracic surgery, occurring in 75% of patients during PR [9]. Locally, very little data is available related to the safety of manual suturing and stapling devices in reducing AL. In this study, we compared the two techniques of pulmonary resection in terms of their safety for reducing air leaks

## METHODS

This was a prospective comparative study, conducted in the Department of Thoracic Surgery, Jinnah Postgraduate Medical Centre (JPMC), Karachi, from August 2019 to July 2020. Informed consent was obtained from patients and the study was approved by the Institutional Review Board (IRB no.:F.2-81/2019-GENL/30036/JPMC, dated July 27, 2019). 58 patients were enrolled who needed pulmonary resection during the study period. Patients were randomized into two groups via online randomization software, Research randomizer (<https://www.randomizer.org/>), i.e. 30 and 28 patients in group A and group B, respectively. Group A patients were scheduled for staple PR while Group B patients were scheduled for manual PR. All patients had preoperative pulmonary function tests. Preoperative exclusion criteria were ipsilateral thoracotomy, chronic obstructive pulmonary disease (COPD), bullous lung disease, chronic steroid therapy and uncontrolled diabetes. All patients had PR in double-lumen endotracheal tube in a standard thoracotomy position. The principal surgical stapler used was the COVIDIEN-GIA Auto Suture Stapler with DST series; 4.8 mm for the main bronchus and 3.8 mm for lobar bronchus and for wedge resection. In group B, the bronchial stump was manually closed in double layers in interrupted fashion with a non-absorbable (Silk 2/0) suture and wedge resection was performed in U-shaped manner with the help of cautery and then suturing lung parenchyma in double layers interrupted fashion with non-absorbable (silk 2/0) suture. AL were checked per-operatively with positive pressure of 30-35 cm of H<sub>2</sub>O under warm saline. All chest tubes were kept on low suction of -15 to -20 cm H<sub>2</sub>O pressure after surgery. ALs were classified as defined by Robert David Cerfolio Classification System for Air Leaks (RDC System). There are four types of AL classified as Continuous (C) AL present throughout respiratory cycle, Inspiratory (I) AL present only during inspiration, Expiratory (E) AL present only during expiration, Forced Expiratory (FE) AL present only with cough (Table 1).

S No.	Description
1	Continuous (C) air leak
2	Inspiratory (I) air leak
3	Expiratory (E) air leak
4	Forced Expiratory (FE) air leak

**Table 1:** RDC System of Air Leaks

Patients were followed till discharge or resolution of AL, whichever came first. Air leaks were diagnosed on the chest drain. AL that persisted for more than 4 days after surgery were defined as persistent air leak (PAL). Expiratory (E) and Forced Expiratory (FE) AL were first managed conservatively with oral and aerosol bronchodilators and incentive spirometry and observe for any clinical and radiological improvement or deterioration, if still leak persisted for more than 4 days after surgery then patient was labelled as PAL and shifted to Heimlich valve and observe for 12 hours for any deterioration; if stable then patient was discharged with Heimlich valve and managed on outpatient basis. Age, gender, presence and grade of air leak, indication and type of resection were noted in the preformed questionnaire. The Statistical Package for Social Sciences® software version 23.0 (SPSS; IBM Corp., Armonk, NY, USA) was used for data analysis. For numerical variables, data was expressed as mean ± standard deviation. Frequencies and percentages were used for categorical variables. Differences were examined using the student's t-test for continuous variables and the chi-square test and ANOVA for categorical variables. A p-value of less than 0.05 meant that there is a significant difference between the two groups and the null hypothesis is not valid.

## RESULTS

This study had 58 patients, out of which group A had 30 patients and group B had 28 patients. There were 21 males and 9 females in group A and 20 males and 8 females in group B. Cough was the most common presentation in both groups. A comparison of demographic and clinical manifestations in group A and group B is given in Table 2.

Characteristics	Group A (n=30)	Group B (n=28)
Age(years)	40 ± 14	37 ± 11
Male	21(70%)	20(71.4%)
Female	9(30%)	8(28.5%)
Cough	19(63%)	15(53.5%)
Dyspnea	11(36%)	10(35.7%)
Chest pain	9(30%)	9(32%)
Hemoptysis	9(30%)	7(25%)
Fever	6(20%)	8(28.5%)

**Table 2:** Comparison of demographics and clinical manifestations of group A and group B

The commonest indication for pulmonary resection was bronchiectasis in both groups i.e. Group A (n=9;30%) and group B (n=7;30.4%), followed by destroyed lung in group A (n=6;20%) and group B (n=6;21.4%)(Table 3).

Indication for pulmonary resection	Group A (n=30)	Group B (n=28)
Bronchiectasis	9(30%)	7(30.4%)
Destroyed lung	6(20%)	6(21.4%)
Pulmonary nodules	5(16.6%)	5(17.8%)
Metastasis	4(13.3%)	2(7.1%)
Chest wall mass	2(6.6%)	3(10.7%)

Indication for pulmonary resection	Group A (n=30)	Group B (n=28)
Aspergilloma	1(3.3%)	3(10.7%)
Lung laceration	1(3.3%)	1(3.5%)
Fibrocystic disease	1(3.3%)	0(0%)
Carcinoid tumor	0(0%)	1(3.5%)
Hydatid cyst	1(3.3%)	0(0%)

**Table 3:** Indication of pulmonary resection in both groups

In group A, nine (30%) patients had AL and twenty one patients did not. Out of nine, eight (26.6%) patients; (two lobectomies, three wedge resections, three segmentectomies) had expiratory (E) AL which resolved conservatively. One lobectomy patient developed inspiratory air leak on the 2nd postoperative day after episode of forceful cough which became continuous AL in few hours with dyspnea, chest pain and decreased oxygen saturation on room air. Patient was re-explored, revealing dehisced bronchial stump. The stump was re-sutured manually and covered with a pericardial fat pad. No air leak was observed on the next day and the patient was discharged after three days with a radiologically expanded lung. One patient underwent lobectomy had PAL till 5th postoperative day with apical pneumothorax, patient was discharged on Heimlich valve and followed on out-patient basis, resolved air leak on 14th day with radiologically expanded lung. Four patients (one lobectomy, three segmentectomies) also had PAL but without radiological evidence of pneumothorax, they were also managed on out-patient basis with Heimlich valve, and showed resolution of AL on 7th, 9th, 10th and 12th postoperative day respectively. In group B, seven (25%) patients had AL and twenty one did not. Out of seven, 6 (21.4%) patients; (two lobectomies, two wedge resections, two segmentectomies) had expiratory (E) AL which resolved conservatively. One patient with pneumonectomy developed continuous air leak on the 2nd postoperative day and was planned to re-explore in emergency. Finding was partially dehisced bronchial stump which was re-sutured manually and covered with a pericardial fat pad. No air leak was observed on the next day and the patient was discharged on 4th postoperative day. Two patients had PAL (one lobectomy, one segmentectomy) without pneumothorax and managed with Heimlich valve and resolution of air leak were observed on 8th and 12th postoperative day respectively (Table 4).

Procedure	Group A (n=30)	Group B (n=28)	p-value
Wedge resection	10 (33.3%)	10 (35.7%)	0.848
Lobectomy	10 (33.3%)	10 (35.7%)	0.848
Pneumonectomy	6 (20%)	6 (21.4%)	0.893
Segmentectomy	4 (13.3%)	2 (7.1%)	0.439

**Table 4:** Comparison of type of pulmonary resection in both groups

The total number of air leaks in group A was 9 (30%), out of

which 8 (26.6%) resolved conservatively and only one (3.3%) required re-exploration and surgical intervention. The total number of air leaks in group B was 7 (25%), out of which 6 (21.4%) resolved conservatively and only one (3.5%) required re-exploration and surgical intervention. However, the difference was not significant in the incidence of air leak of both groups. PAL was present in 5 (16.6%) patients in group A and 3 (10.7%) patients in group B (Table 5).

Outcome	Group A (n=30)	Group B (n=28)	p-value
Total air leak	9 (30%)	7 (25%)	0.67
Air leak resolved spontaneously	8 (26.6%)	6 (21.4%)	0.641
Air leak required intervention	1 (3.3%)	1 (3.5%)	0.96

**Table 5:** Comparison of outcome and grade of air leaks in both groups

## DISCUSSION

In concordance with the results of our study, literature provides evidence that patients who underwent anatomical lung resections reported an air leak in 26-58% [10-11]. This is comparable with our results, being 30% in group A and 25% in group B. Moreover, keeping in mind the extent of lung resection, lobectomies and bilobectomies are also known to impose an increased risk of prolonged air leak [12]. Pneumonectomy or lobectomy may lead to a fatal and morbid complication, i.e. BPF in 1-4% of patients. Management includes placement of large-bore chest drains, and surgical repair in refractory cases. However, researchers believe that the operative technique used for the closure of bronchi holds supreme importance [13]. This is because several techniques have been observed to reduce the incidence of BPF. One of the methods includes using monofilament non-absorbable sutures, including staples [14]. No particular technique has been declared to be superior in terms of efficacy, but the use of non-reactive and non-absorptive suture material has been reported to considerably lessen the chances of inflammation at the closure line [15]. Due to this, the use of prolene for hand suturing and stainless steel and titanium staples are being adopted [16]. Moreover, comparison between manual vs stapled bronchial suturing is an ongoing debate to date. Some studies favor manual suturing as it is a reliable, safe, and cheap technique with beneficial outcomes in all types of situations, being performed by an experienced surgeon; whereas, others suggest mechanical suturing as it is also found to be reliable, safe, and easy to apply [17]. The added benefit of stapling devices is their use by junior surgeons, showing commendable results in the short- and long term. Furthermore, staplers are also believed to play a major role in consuming less time during the operation, secure bronchial sealing, and lesser morbidity and mortality rates [18]. Weissberg et al., found that the time taken with stapling was lesser than suture closure of bronchial stump

(90 seconds versus 5-15 minutes), and no incidence of BPF was reported after stapling as compared to 4.5% cases of BPF after manual closure [19]. In contrast, Al-Kattan et al., reported a 1.3% incidence of BPF after 530 consecutive pneumonectomies using a uniform hand-suturing technique, and concluded that bronchial manual suturing is a cheap and reliable technique with good results in the hands of experienced surgeons [20]. Many theories state that thickened bronchi usually seen in chronic bronchitis and proximal tumors could be labeled as contraindications for staple closures [21]. It is also believed that initial mechanical integrity is significant in maintaining a balance between an airtight and watertight barrier between the area resected and the remaining lung to eliminate the chances of aspiration and mediastinal shifts due to resection [22]. PAL is frequently occurring complication after PR which also increases the chances of prolong hospital stay and morbidity. Management of PAL depends on clinical and radiological stability of patient. If patient is stable clinically and radiologically, can be managed successfully with bronchodilators and breathing exercises under observation [23-24]. If PAL still persists after conservative management, then patient can be shifted to ambulatory device i.e. Heimlich valve, one way valve that allow air to escape from chest and prevent it from entering into chest. If patient tolerates Heimlich valve without clinical or radiological deterioration, then patient can be discharged home safely with follow up on outpatient basis to avoid prolong hospital stay. Heimlich valve has shown successful results in managing PAL. If PAL still persists despite managing on bronchodilators, breathing exercises and one way valve, other options like chemical pleurodesis, autologous blood patch pleurodesis and endobronchial valve (EBV) should be sought as all of these have reported successful results in treating PAL. [7, 25]. The results of our study point towards the fact that the treatment modality does not cause any significant difference in postoperative outcomes and air leak. The total air leak was reported in both the groups; in most cases, resolved spontaneously, and very few required intervention. However, future studies including a larger sample size should be carried out to confirm the findings.

## CONCLUSION

Following pulmonary resection, AL is a very frequent pulmonary complication. However, the methods adopted for resolving air leak i.e. manual suturing and staples, do not show any significant differences. Therefore, surgeons should make sure to keep other parameters in mind, depending on the condition of the patient, making sure to achieve maximum stump integrity.

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## Original Article

## Apolipoprotein B and Lipid Profile among Patients Diagnosed with Acute Myocardial Infarction

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## ARTICLE INFO

## Key Words:

Lipid profile, Atherosclerosis cardiovascular disease, Total cholesterol, Apolipoprotein B, Acute myocardial infarction.

## How to Cite:

Mustafa, B. ., Anwar, M. ., Nazim, M. ., & Khokhar, A. . (2022). Apolipoprotein B and Lipid Profile among Patients Diagnosed with Acute Myocardial Infarction: Apolipoprotein B and Lipid Profile . Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.644>

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Received Date: 14th July, 2022

Acceptance Date: 23rd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Highest mortality rates are associated with acute myocardial infarction. It is recognized as leading cause of deaths globally. It is sequelae to the atherosclerosis cardiovascular disease (ASCVD). There is a close relationship between the Apo lipoprotein B abundance and atherosclerosis. **Objectives:** To estimate the ApoB blood levels and its usefulness and to analyze the total cholesterol TC, non-HDL cholesterol, triglycerides, high density lipoprotein cholesterol (HDL-C), LDL/HDL and low density lipoprotein cholesterol (LDL-C) ratios in AMI patients. **Methods:** It was a comparative cross-sectional study with statistical approach, conducted at Akbar Niazi Teaching Hospital, Islamabad and Khyber Teaching Hospital, Peshawar. The study was conducted on the 53 males and 28 female attended the cardiovascular center of the hospital. The duration of the study was from December 2021 to May 2022. The convenient sampling technique was used for the sampling of the enrolled patients. The healthy patients were included in the control group. The turbidimetric method was laboratory analysis and for lipid profiling the Apolipoprotein B and enzymatic method was used. The SPSS version 21.0 was used for the statistical analysis. **Results:** The ratio of males to females was 1.8:1. The Myocardial infarction range of the patients was selected from more than 31 years to 84 years. The 55± 10 was the average age of the patients included in the study. However, 61 years of age was the median and the interquartile limit was 46 to 61 years for male patients, and for female patients was 49 to 68 years. Of 93 patients (6.5 %) the sufferers were of age lower than 40 years, 46 patients were smokers in the experimental group and in the control group, only 15 people were smokers. The 99 ± 17.8 was the mean level and SD of the experimental group. The moderate correlation was observed in the ApoB, non-HDL cholesterol and HDL-cholesterol. **Conclusions:** The moderate correlation between Apo B and non HDL-C and HDL-C were observed in the AMI patients. It was a complementary marker in the conventional lipid profiling.

## INTRODUCTION

Cardiovascular is one of the most commonly known non-communicable disease among the humans. The highest mortality rates are associated with the myocardial infarction. The disease is effecting a number of people in the developing countries. To determine the risk factors associated with this disease the scientists are conducting extensive research [1, 2]. The notable changes in lipid profiling ultimately leads to the elevated risk of the disease. The protein within the lipoprotein particles are linked with the lipids to form the apolipoproteins. These play role in the metabolism of lipoprotein. The chylomicron has the

Apolipoprotein B and is the best predictor of the acute myocardial infarction [3, 4]. The one of the strongest risk factor associated with the atherosclerotic cardiovascular diseases is high concentrations of LDL-cholesterol. There is a close relationship between the myocardial infarction development risks and Apolipoprotein B. These are the strong predictor of the acute coronary syndrome [5]. Their role is superior to the role played by the traditional lipids in coronary risks estimations. These are the foundation of the pathogenesis of the disease. The apolipoprotein B are showed as atherogenic particles as they play important

role in the risk prediction of coronary artery diseases. Pakistan share the highest burden of the cardiovascular diseases in the world. The reported consequences of the atherosclerosis are the plaque rupture and fissuring. Due to the retention of the apo B lipoprotein the inflammatory process occur within the blood vessel wall [6]. The highly known basic unit of injury to the vascular wall are the Apo B lipoprotein contacting particles. The patients diagnosed with AMI normally have the fluctuating levels of lipid profile [7]. The levels of apolipoproteins are reflective of the anti-atherogenic particles in the blood. The lipid ratios are the determinants of the risk associated with the CAD. The need of the hour is to identify the highly specific and sensitive biomarkers associated with the diagnosis of the AMI. In this study the ApoB levels of the patients included in the control or experimental group were studied [8, 9]. The aim of the study was to evaluate the role of the total cholesterol (TC), low density lipoprotein-cholesterol (LDL-C), high density lipoprotein-cholesterol (HDL-C) and triglycerides (TG) in the diagnosis of the AMI. This study provide with the insight into devising of the disease specific algorithms [10].

## METHODS

This cross-sectional study was conducted on the 81 patients visited the cardiovascular department of the Akbar Niazi Teaching Hospital, Islamabad and Khyber Teaching Hospital, Peshawar. The ethical committee of the hospital approved the study. The patients diagnosed with the AMI were included in the experimental group while the healthy patients who visited the hospital for routine check-up were included in the control group. The duration of the study was from December 2021 to May 2022. The informed consent were given to the participants. The convenient sampling technique was used for the sampling of the enrolled patients. For the comparison of the lipid profile the laboratory specific reference range was used. The tubidimetric method was used for laboratory analysis and for lipid profiling of the HDL-C, TC, TG and Apolipoprotein B enzymatic method was used. LDL-C select FS kit was used for the measurement of the LDL-C present in serum. The SPSS was used for the statistical analysis.

## RESULTS

Demographic studies of the patients predicted that there were 53 male patients (65 %), and 28 female patients (35 %) in the AMI category. The proportion between males to females was 1.8:1. The myocardial infarction range of the patients was selected from more than 31 years to 84 years. The average age of the patients was 55± 10. However, 61 years of age was the median and the interquartile limit was 46 to 61 years for male patients, and for female patients was 49 to 68 years. Of 93 patients (6.5 %) the sufferers were of age lower than 40 years. In the experimental group, 46 of

the patients were smokers and in the control group, only 15 people were smokers. In table 1, the average value of ApoB and its optimum range along with the details of the control group is represented.

Characteristics	AMI Average ± SD limit	Control group Average ± SD limit	p-value
Triglycerides	3.28 ± 1.80	2.51 ± 1.30	0.439
	0.14 to 6.0 millimoles/L	0.12 to 5.00 millimoles/L	
TC (mmole/L)	5.0 ± 1.00	4.87 ± 0.30	< 0.05
	3.0 to 7.1 millimoles/L	2 to 5.1 millimoles/L	
High-density lipids (millimoles/L)	1.06 ± 0.15	1.60 ± 0.27	< 0.001
	0.9 to 1.5 millimoles/L	1.3 to 2.4 millimoles/L	
Low-density lipids (millimoles/L)	2.57 ± 0.7	2.09 ± 0.5	< 0.05
	11.3 to 4.5 millimoles/L	91.2 to 3.3 millimoles/L	
Very low-density lipids (millimoles/L)	1.45 ± 0.88	1.23 ± 0.5	< 0.05
	0.08 to 3.08 millimoles/L	90.08 to 2.38 millimoles/L	
Non-High-Density Lipid Cholesterol	3.98 ± 0.91	3.25 ± 0.39	< 0.001
	2.38 to 5.95 millimoles/L	2.56 to 4.24 millimoles/L	
Low-density lipid/high-density lipid	2.23 ± 0.51	1.35 ± 0.39	< 0.001
	1.35 to 3.34	0.76 to 2.05	
ApoB (milligram/dl)	98.26 ± 18.80	71.72 ± 17.75	< 0.001
	27 to 135 milligram/dl	36.5 to 127 milligram/dl	

**Table 1:** Lipid and ApoB characteristics along with experimental group and control group

In the given table the level of ApoB is comparatively higher in the AMI group than in the control group. The risk ratio was calculated by comparing it with the reference value prescribed on the kit. Then the comparison of the average value of different lipid characteristics was compared with the AMI group as well as the control group. This study predicts that the level of lipids aspects in the experimental group was higher than in the control group, while the level of high-density lipids was higher in the control group. The cutoff value and risk ratio of different lipids are represented in the given table 2.

Characteristics	Required limit ATP III prescription, NCE	Total Cases of lipid profile outside the required range	Control group (lipid profile outside the required range)	Odds ratio 95 % CI	The ratio of risk 95 % CI
The total amount of cholesterol	Lower than 5.18 millimoles/l < 201 milligram/dl	36	7	4.77 [1.85, 12.99]	1.575 [1.32, 2.11]
Low-Density Lipid cholesterol	Lower than 2.61 millimoles/l < 100 milligram/dl	36	9	3.4 [1.44, 8.23]	1.439 [1.132, 1.881]
High-Density Lipid cholesterol	More than 1.24 millimoles/l > 40 milligram/dl	37	1	38 [4.33, 261.80]	1.843 [1.555, 2.433]
TG	Lower than 1.89 mmol/l < 150 mg/dl	58	38	0.27 [0.23, 1.20]	0.7532 [0.48, 0.98]
Non High Density Lipids cholesterol	Lower than 3.2 mmol/l < 130 mg/dl	60	13	6.932 [2.72, 16.5]	2.025 [1.3, 2.6]
Very Low Density Lipids	Lower than 0.78 mmol/l < 30 mg/dl	58	30	1.266 [0.45, 2.96]	1.083 [0.7976, 1.4]

**Table 2:** Lipid profile beyond required range

The relation of ApoB level was predicted by comparing it with the other lipid profile characteristics. The relation between these quantities is represented in table 3.

	Total amount of cholesterol	Low-Density Lipid cholesterol	High-Density Lipid cholesterol	TG	Non High-Density Lipid cholesterol
ApoB	r=0.19, p=0.053	r=0.286, p=0.012	r=-0.480, p<0.012	r=0.158, p=0.129	r=0.388, p<0.011

**Table 3:** Relation between ApoB and lipids.

## DISCUSSION

In our experiment, it was predicted that the males are most affected by AMI as compared to the females. The infection rate is double among males as compared to females. The initiation of AMI is observed in younger patients. Mostly this disease is observed in patients with ages less than 40 [11]. Mostly the disease begins after 20 years of age. Here in this experiment, the average age calculated for men was 34 years and for women was 29 years. It is thus predicted that, lipoprotein metabolism has a link with the AMI initiation. The relationship between different components of lipoprotein metabolism like the total amount of lipoprotein, low density lipids, high density lipids, and non-high density lipid cholesterol was studied with the initiation of different heart diseases like myocardial infarction and other cardiovascular diseases. The ratio of these lipids was also considered for the initiation of different diseases [12, 13]. For the assessment of the different cardio related issues, the biomarker ApoB was selected. In this experiment, 32 patients with AMI has ApoB values above than the normal range (100 mg/ml). The same results were obtained for more than 40 % of the cases. The appropriate range of the ApoB was selected according to the ranges mentioned in the protocols. The three samples of the control group show deviation from the normal results, these samples show false positive results because a high level of ApoB was detected [14]. When the samples of different disease level were tested, then the ApoB marker concentration was measured for AMI and other cardio diseases. The patients in the study had only a normal range of ApoB. The ApoB level was not increased up to the risk level. But there was a significant difference of ApoB level between the control group and diseased persons [15]. ApoB range can also be used for the measurement the number of other risk factors like the components related to the lipid metabolism. The different concentrations of the lipids also play role in the determination of AMI level. By considering all facts, it is clear that the level of ApoB has a strong correlation with cardiovascular diseases and AMI levels. The increase in ApoB level was noted for each of the patients, then the peaks for each of the lipoprotein component was estimated and monitored completely to observe the progression of the disease. In the population under study, the level of ApoB raised in normal patients as well as in AMI patients. Therefore, it is not a good marker for the prediction of different heart diseases like myocardial infarction and AMI [16, 17]. It is particularly not efficient for

the diagnostic of cardiovascular disease in those patients who are already having some therapy for the lowering of blood cholesterol levels. The patients under treatment were not subjected to being diagnosed by ApoB marker test. According to the guidelines of the program of ATP III cholesterol education, the dysregulations of lipids were found in healthy patients as well as in control patients. This dysregulations of lipids was lead to the AMI or sometimes may cause the initiation of AMI. This factor highlights the risk of the development of disease in healthy patients as well. Therefore, there is need to control the lipid proteins, and cholesterol level within blood. In this way, 99 % of heart diseases can be controlled by simply avoiding bad fats. For a healthy person, the High density cholesterol level should be 99 % of the required range [18, 19]. Sometimes lipoprotein also carries ApoB which has a more critical role for the initiation of disease as compared to the cholesterol level. For the assessment of AMI, the cholesterol level measurement along with lipoprotein and TGs is also required. For the initiation of AMI, the non-high density lipids play an equal role as high density lipids do play. Therefore, for the appropriate estimation of AMI and other cardiovascular diseases, there is a need to measure the non-high density lipids as well. The factor ApoB has a strong relation with low density lipids, positive relation with non-high density lipids, and negative relation with high density lipid [20]. So, in the above study after optimization, it can be speculated that ApoB can be used for the measurement of cardiovascular diseases as well as the profile of different lipid components. However, AMI patients show some limitations in the identification due to varying lipid profiles and ApoB [21, 22].

## CONCLUSION

In this study, it was predicted that the level of ApoB has a relation to the AMI level. In the case of AMI the level of ApoB was raised. The ApoB also shows the line between the high-density lipids and non-high-density lipids. Therefore, the level of ApoB can be used as a marker for the prediction of cardiovascular diseases prediction by considering the lipid profiles.

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## Original Article

## Association Of Sleep, Physical Activity, Sedentary Behavior, And Screen Time With Obesity Among Children In The Pediatric-Endocrine Unit

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## ARTICLE INFO

## Key Words:

Obesity, Pediatrics, endocrinology, physical activity, sleeping behaviour

## How to Cite:

Qasim Bham, S. ., Zahra, F. ., Saeed , F. ., Ahmed Sharif, U. H. ., khatoon, A. ., & Ibrahim Bukhari, S. . (2022). Association Of Sleep, Physical Activity, Sedentary Behavior, And Screen Time With Obesity Among Children In The Pediatric/ Endocrine Unit: Association Of Sleep, Physical Activity, Sedentary Behavior, And Screen Time With Obesity Among Children. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.647>

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Received Date: 15th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The frequency of stunting, pallor, zinc, and iron deficiencies serves as evidence that the globe is undergoing a rapid epidemiological and nutritional transition that is characterised by persistent nutritional insufficiencies. **Objectives:** Our study aimed to observe the association of physical activity, sedentary behavior, sleep, and screen time with obesity in children of our community.

**Methods:** A case-control study was conducted at the Department of Pediatrics and Endocrinology from 1st September 2019 to 1st March 2020. Participants were healthy children from 5 to 15 years of age. The participants (overweight or obese) and controls were selected from the same population based on BMI. We divided the sedentary activity into less than 4 hours and more than 4 hours. **Results:** In this study, 53% of children were boys and 47% were girls with a mean age of 7.9 in the non-obese group and 8.9 in the obese group. The majority (75.5%) were age group less than or equal to 10 years. The participants with more sleeping time were 57% less likely to develop obesity (OR: 0.424 with 95% CI of 0.19-0.94, P-value: 0.03) whereas participants with more sedentary activity were 6% more likely to develop obesity (OR: 6.38 with 95% CI of 2.49-16.38, P-value: <0.01). **Conclusion:** This study concluded that sedentary activity is significantly associated with overweight/obesity whereas sleep has negative relation with overweight/obesity making them, a potential risk factor for childhood obesity.

## INTRODUCTION

The world is going through a fast epidemiological and nutritional change described by relentless nutritional insufficiencies, as proven by the prevalence of stunting, pallor, zinc, and iron deficiencies. Correspondingly, there is a continuous increase in the prevalence of diabetes, obesity, and other nutritional-related chronic diseases (NRCs) like cardiac illness, and a few types of malignancies. Childhood obesity is more prevalent in developed countries but in developing countries, its prevalence is also increasing [1]. Most of the world's population lives in countries where overweight and obesity

kill more people than underweight. Around 38 million children under the age of 5 were overweight or obese in 2019. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016 [2]. The study in New Zealand revealed a 17 % prevalence of overweight at the age of 26 years due to watching TV for >2 hours as a contributing factor [3]. Pakistan has an estimated prevalence of childhood obesity between 15% and 20%. The proportion of obese and overweight children in Karachi was found to be 6% and 19% respectively. The combined prevalence is 37.3% of overweight and obesity (15.2%

obese, 22.1% overweight) in school children of Sialkot city [4]. Practices that impact increased weight gain include consumption of a high-calorie diet, low-nutrient value foods, and beverages, sleep routines, and the use of medicines. Lack of physical activity and spending too much time watching television or other screen devices can lead to a gain in weight [5]. Poor sleep is progressively common in children and the relationship between short sleep duration in early childhood and obesity is found consistently. There is internationally growing evidence that decreases in the length of sleep children acquire are conversely connected with obesity and overweight [6]. The adaptive reactions of the numerous childhood obesity phenotypes are affected by social, cultural, ethnic, environmental, behavioral, and parental factors. These elements include dietary consumption, sedentary behavior, physical activity level, family structure (parental weight), perception of overweight, feeding practices, socioeconomic status, and more [7]. Attributable to the increased risk of overweight adolescents becoming obese adults, a key objective of obesity prevention is to engage children and adolescents in physical activity and sport [8]. Few studies have been done so far, and to identify the various burden in different age groups both in children and adults. There is a need for a detailed review and dissemination of the existing knowledge, to determine the extent of the burden of obesity and its distribution among various high-risk groups can result in a better understanding of this important public health issue. This indicates the need for formulating preventive guidelines and policies to prevent childhood obesity. Our study aims to observe the association of physical activity, sedentary behavior, sleep, and screen time with obesity in children of our community. The previous studies have collected data from different primary schools and there was a need to have local community data so that we can correlate it with international data.

## METHODS

A case-control study was conducted at the Department of Pediatrics and Endocrinology at Darul Sehat hospital, Karachi from 1st September 2019 to 1st March 2020. The sample size was calculated by the Raosoft® sample size software. Whereas presumed and estimated prevalence of 15% of childhood obesity in Pakistan. Hereby consider a 95% confidence interval (CI), 5% margin of error, and 80% power to detect such difference. An estimated sample of 200 patients was recruited for the study using Open Epi software. Ethical approval was sought from the ethical review board committee of the Darul Sehat Hospital, Liaquat University of Medicine and Dentistry (reference number: DSH/IRB/2021/0034). The respondents were selected by consecutive sampling and an interview-based

questionnaire was administered. Subjects included from outpatient department visiting their consultant for any illness accompanying their mother along with their sibs. Participants were healthy children from 5 to 15 years of age. Children with chronic illness and comorbidities were excluded from the study. The cases (overweight or obese) and controls were selected from the same population based on BMI. Their BMI was calculated by recording their heights (in cm) with a fixed measuring scale and weight (in Kg) by weighing scale in the triage by trained staff. Overweight and obese were defined by the WHO index of BMI for AGE as having >85th percentile and <95th percentile respectively [9-10]. Written informed consent was taken from parents. Variables such as age, gender, grading of class, duration of physical activity, duration of sleep, sedentary activity, and duration of screen time were asked from the participants and entered on the structured questionnaire. Physical activity was assessed as any activity done in school in the morning and at home in the evening. It is graded as less than 60 min and more than 60 min. Sleep duration was categorized as less than 9 hours and more than 9 hours. We divided the sedentary activity (other than screen time) into less than 4 hours and more than 4 hours with activities being playing indoor games like monopoly, scrabble, board games, doing school work, and taking Islamic lessons at home [11]. Screen time was categorized as less than 2 hours and more and 2 hours spent on the laptop, mobile phones, watching television, playing video games, and using a desktop [12]. Data were stored and analyzed using IBM-SPSS version 23.0, Counts with Percentages reported for qualitative data sets, and Mean and 95% Confidence intervals reported for quantitative parameters. An independent sample t-test was used to compare the mean between obese and non-obese samples. Pearson Chi-Square test was used to test the association of obesity with studied parameters, with an odds ratio of 95%. Confidence intervals were also reported. The binary logistic forward LR method was used to develop the model for obesity after including the parameters with a p-value greater than 0.5 from the Chi-Square test. P-values less than 0.05 were considered statistically significant. Bar diagrams are also used to give a graphical presentation of data.

## RESULTS

The baseline characteristics of the studied sample are shown in Table 1. In the study sample of 200, 75.5% were age group less than or equal to 10 years, 53% of children were male, 60% samples had sleeping time more than 9 hours per day, 42% samples had physical activity more than 60 minutes per day, family history of obesity was present among 54% samples, there were 71.4% samples found with less than four hours sedentary activity per day, 46%

samples found with less than two hours of screen time per day.

Characteristics		N	%
Age Group	<=10 years	151	75.5
	>10 years	49	24.5
Sex	Male	106	53.0
	Female	94	47.0
Sleeping Time (Per day)	< 9 Hours	80	40.0
	>9 Hours	120	60.0
Physical Activity (Per day)	<60 min	116	58.0
	> 60 Min	84	42.0
Family History of Obesity	Positive	108	54.0
	Negative	92	46.0
Sedentary Activity (Per day)	< 4 Hours	95	71.4
	> 4 Hours	38	28.6
Screen Time (Per day)	< 2 Hours	92	46.0
	> 2 Hours	108	54.0

**Table 1:** Baseline Characteristics of Studied Samples (n=200)

Table 2 reports the mean with a 95% confidence interval of quantitative parameters, result showed obese samples have significantly higher mean age, height, weight, and BMI as compared to non-obese samples with  $p < 0.05$ .

Parameters	Total (n=200)	Non Obese (n=100)	Obese (n=100)	P-value
	Mean (95% C.I.)	Mean (95% C.I.)	Mean (95% C.I.)	
Age	8.4 (8.1 – 8.8)	7.9 (7.4 – 8.5)	8.9 (8.4 – 9.4)	<0.01*
Height (cm)	127.6 (125 – 130)	123.8 (120 – 127)	131.4 (127 – 135)	<0.01*
Weight (kg)	31.6 (29.7 – 33.5)	24.2 (22.6 – 25.7)	39.1 (36.2 – 42.0)	<0.01*
BMI	18.7 (18.1 – 19.3)	15.4 (14.9 – 15.8)	22.0 (21.3 – 22.8)	<0.01*

**Table 2:** Mean Comparison of Quantitative Parameters of Study

Table 3 gives the chi-square association of studied parameters with obesity, results showed sedentary activity per day gives a significant association with obesity. All other parameters were found statistically insignificant.

Parameters		Non Obese (n=100)	Obese (n=100)	OR (95% C.I.)	P-Value
Age Group	<=10 years	81.0	70.0	1.8 (0.9 – 3.5)	0.07
	>10 years	19.0	30.0		
Sex	Male	52.0	54.0	0.9 (0.5 – 1.6)	0.77
	Female	48.0	46.0		
Sleeping Time (Per day)	< 9 Hours	35.0	45.0	0.6 (0.3 – 1.1)	0.14
	>9 Hours	65.0	55.0		
Physical Activity (Per day)	<60 min	57.0	59.0	0.9 (0.5 – 1.6)	0.77
	> 60 Min	43.0	41.0		
Family History of Obesity	Positive	53.0	55.0	0.9 (0.5 – 1.6)	0.77
	Negative	47.0	45.0		
Sedentary Activity (Per day)	< 4 Hours	87.9	55.2	5.8 (2.4 – 14.2)	<0.01*
	> 4 Hours	12.1	44.8		
Screen Time \ (Per day)	< 2 Hours	46.0	46.0	0.9 (0.5 – 1.7)	0.99
	> 2 Hours	54.0	54.0		
	> Twice a Week	15.0	14.0		

**Table 3:** Chi-Square Association of Studied Parameters with Obesity

Table 4 reports the results of the developed model for

obesity using binary logistic regression forward LR method, results showed, that sedentary activity was significantly positively associated with obesity whereas sleeping time gives a significantly negative association with obesity, and the p-value was found less than 0.05.

Parameters	OR	95% C.I. for OR		P-value
		Lower	Upper	
Sleeping Time	0.424	0.19	0.94	0.03*
Sedentary Activity	6.387	2.49	16.38	<0.01*

\* $p < 0.05$  was considered statistically significant for the Odds ratio  
**Table 4:** Logistic Regression Model for Obesity using Forward LR Method

## DISCUSSION

The epidemic of obesity is a potential concern in the childhood population as it is becoming a worldwide trend. In our study, we found that sleep and sedentary activity are potential risk factors for overweight and obesity in children. On the other hand, physical activity and screen time did not show any significant effect on obesity and overweight. Variation in sleep duration has been recognized as a dominant risk factor for causing childhood obesity. A firm and thorough association has been linked between sleep duration and obesity through multiple studies [8]. Our study has shown a significant negative association between sleep duration with obesity. Although 55 % of children slept more than 9 hours per day logistic regression analysis showed a negative association with a significant p-value. A local study done on school children showed a positive association between sleep duration and obesity. 52 % of children having slept 8 hours or more was associated with significantly higher odds of obesity [13]. A meta-analysis of 11 studies, reveals participants with a shorter duration of sleep have twice the chances of being obese/overweight as compared to participants with a long duration of sleep [14]. Studies done in school showed an association between the increase in weight gain and going to bed late in children aged 8 to 17 years independent of sleep duration [8, 15]. Several mechanisms have been proposed to show the link between obesity and decrease sleep duration with the most common being a reduced physical activity, low energy expenditure with excessive food intake especially high-calorie food, and late going to bed. Multiple studies have supported this theory that less sleep duration is associated with low levels of leptin [13]. The considerable rise in hunger leads to weight gain as a short-term issue and consequently going towards obesity as a long-term complication [16]. In our study, we explored the positive association between a sedentary lifestyle and obesity/ overweight in our children. Previously such data has been collected from children of different primary schools which concluded that television viewing and working on the computer and video games have a



significant association with being overweight and hence the risk of obesity [17]. Unlike previous studies, we categorized sedentary lifestyles and screen time into two distinct groups. We included homework, playing board games, taking Islamic lessons, and other activities not related to screen as the sedentary activity which revealed a significant independent association with overweight/obesity. It was postulated that television viewing leads to an increase in calorie intake as children enjoy high-calorie food while watching Television [18]. A similar study was done in England also shows the association of obesity with Television viewing with a 42% chance of obesity as compared to non-TV leisure time [19], whereas a study was done in Cameroon showed a significant association between sedentary lifestyle which included homework and listening to music with overweight/obesity. There have been multiple theories explaining this fact. One hypothesis explains that there are more chances of consuming high-energy food and drink while watching Television rather than non-TV sitting where they don't have ample time to eat and drink and need to concentrate more on work thus hampering eating habits [20]. We observed that our children spend a great deal of time doing homework, going to tuition, and taking Islamic lessons. The lack of playgrounds and insecurity of mothers not permitting them to play outside the house, compel them to stay home, and secondly as most of their time is spent on homework and tuition, not much time left for them to indulge in other activities. Although these children were having the habit of eating high-calorie food and drink as their mothers confirmed their eating habits. All these factors explain the sedentary lifestyle as a significant independent risk factor for overweight and obesity. Our study could not conclude any association between screen time and physical activity with obesity as they were equally prevailing in both obese and non-obese children. This is contrary to other studies like Kenney and Gortmaker showed device use of 5 hours or more and less physical activity was associated with an increased risk of obesity [21]. Similar features were disclosed by Tsitsika et al., that social media usage of 2 hours or more accelerates the chances and risk of obesity [22]. The meta-analysis also revealed a positive association of excessive screen time with overweight/obesity in children [23]. A study done in Thailand did not show any significant difference in physical activity in obese and non-obese children [24]. Although many studies are in favor of this notion still further studies are required for a better understanding with proper measurement of screen usage in children. Most studies including the present study, are mainly questionnaire-based relying on the parents to report their screen time and usage where there is a risk for recall bias. We need to have

proper guidelines with initiative for proper assessment and authenticate instruments to measure the correct screen usage and physical activity depending on the resources and support each country can provide. We need to develop a consensus at the National level to validate tools to assess behavior in our children and the mindset of parents towards risk factors associated with childhood obesity like sedentary habits, use of screen time, physical activity, and sleep patterns so that integrated action can be substantiated to halt the progression of childhood obesity in our society. The strength of our study was that it was done in a community setting that caters to a large area of population, and we used multiple variables which were objectively assessed and questionnaire-based. The limitation we faced was it was a cross-sectional study, we use sleep duration to assess the relationship between sleep and obesity which is a broader term. Different sleep aspects may have concluded exact information. The lack of proper instruments to measure the sedentary lifestyle and physical activity was a drawback for us as we relied on parental understanding and estimates which can alter with different age stratification.

## CONCLUSION

This study has shown that sedentary activity is significantly associated with overweight /obesity whereas sleep has negative relation with overweight/obesity making them potential risk factors for childhood obesity. Screen time and physical activity did not show any significant effect on obesity. Parental awareness and timely intervention at all levels should be instituted to reduce the risk factors so that childhood obesity can be controlled at an early age.

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## Original Article

## Patient-Physician Violence in The Hospitals of Pakistan: A Multi-Center Qualitative Study

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## ARTICLE INFO

## Key Words:

Patients, physicians, and violence

## How to Cite:

Khalil Ahmed, F. ., Sukhia, H. R., Shami, A. ., Khan, Q.-ul-A. ., Ejaz Khan, A. ., & Shafiq, M. (2022). Patient-Physician Violence in The Hospitals of Pakistan: A Multi-Center Qualitative Study: Patient-Physician Violence in The Hospitals of Pakistan. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.652>

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Received Date: 16th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Violence against physicians has been considered a significant issue in Pakistan. **Objective:** This study was conducted to explore the need for specific policy-related responses to patient-physician violence in the hospitals of Pakistan. **Methods:** A qualitative study was conducted in the hospitals of Pakistan, by using in-depth interviews. A total of 40 participants were selected out of which ten were in-depth interviews with patients, ten in-depth interviews with their families, ten in-depth interviews with physicians, and ten in-depth interviews with the administrative staff. In-depth interviews were recorded and then transcribed. The responses of the participants were coded with the help of thematic analysis. **Results:** The results of the study revealed that three main themes were derived through thematic analysis. The cause is multifactorial. The employees of the health sector were asked to build revenue without taking care of patients' needs. In the east, no training is provided to physicians regarding how to prevent violence. Patient-physician violence leads to various disputes as a result of which verbal and physical abuse is observed towards physicians. **Conclusion:** The financial stress at hospitals to increase revenue has ruined the patient-physician relationship leading to violence. Certain policies should be developed for the security of physicians. The low literacy rate among patients is also one of the major contributing factors. Communicating strategies should be developed to prevent patient-physician violence.

## INTRODUCTION

The terminology violence is vast while discussing the concept of patient-physician violence most health care providers agreed that there is no definite definition of violence. With time the concept of physician-patient violence has become very common, and the incidence of violence against physicians in Pakistan is at its peak. Physicians working as front liners are more susceptible to violence because of their work and they are more exposed to various medical and socially associated situations in the

health care set-up [1]. International studies have revealed that along with the interaction between physicians and patients, environmental factors, are important leading to violence [2]. Various studies have focused on four main types of violence such as neglect; verbal violence, physical violence, and emotional violence [3]. Approximately 75% of physician's experience violence during their working hours. Physicians of today's world have reported that they are being ill-treated, tortured, and in extreme conditions, they

are even murdered. The devastating situation is not only experienced by Pakistani physicians but in fact, it is happening all around the world [4]. The World Health Organization has extracted a strategic plan to prevent patient-physician violence [5]. Earlier, the noblest profession was medicine. But the situation is quite different now the medical profession has become a business in which the patient is a consumer [1]. Among all health care providers, physicians are the most vulnerable professionals to violence [6]. A survey conducted in Birmingham regarding violence revealed that approximately 63% of physicians experienced violence last year and almost 5% experienced a severe injury. Similarly, another survey was conducted in which 60% of violence experienced by Physicians was done by patients and at times by their relatives [8]. In the UK, to overcome this upcoming issue NHS has introduced guidelines known as "Zero Tolerance" [6]. A study conducted in India also reported that around 87% of violence experienced by physicians is verbal [9]. International studies have shown that violence experienced by physicians is on the rise due to lack of availability of proper medical services, lack of communication between physician and patient, prolonged waiting hours, and poor infrastructure [7]. According to the perception of physicians, patients visit hospitals when their condition of the patient has completely deteriorated and they become intolerant when physicians are not willing to listen or admit the patient to the hospital due to a lack of availability of beds. This situation creates violence in hospitals [8]. Globally, in recent years' physician-patient violence has become a part of every news headline [9]. Increased reporting regarding violence might be due to an actual rise in the number of violent incidents or due to more awareness among the masses. Patient physicians Violence is more common in China as compared to other countries of the world [10]. According to a study conducted in Pakistan by Ali et al, physicians were more vulnerable to violence. Almost 77% of physicians experienced violence such as verbal or physical [11]. Nazish et al, also reported that approximately 74% of the physicians experienced verbal abuse leading to stress in their lives [12]. Patients have become more aggressive in terms of their demands specifically if they are not satisfied with appropriate health care. Many Quantitative studies, have been conducted in Pakistan [11]. More studies need to be conducted to explore the need for specific policy-related responses to patient-physician violence. Hence, this was the most accurate approach for exploring the need for specific policy-related responses to patient-physician violence in various hospitals in Pakistan because of the complexity of the topic.

## METHODS

A qualitative study was conducted in the hospitals of Pakistan from January to April 2022. The participants were selected through the purposive sampling technique. It included young and old physicians, patients; administrative staff, and patients' families who were willing to participate and those who were not willing to participate were excluded from the study. This study included a total of 40 in-depth interviews, out of which 10 in-depth interviews were taken from patients, 10 in-depth interviews were taken from families, 10 in-depth interviews were taken from physicians, and 10 in-depth interviews were taken from administrative staff. In-depth interviews consisted of a semi-structured interview in which the health status of patients was elaborated in detail along with their relation to the health care system which lasted 30–45 minutes. The participant's interview was conducted in the meeting room. Each interview of a participant was recorded through a digital voice recorder. All participants were ensured regarding the confidentiality of their interviews. The perceptions of patients were recorded. The administrative staff of the hospital included various employees which were directly associated with policymaking. Data collection was discontinued as soon as thematic saturation was reached at a certain point. After a thorough reading of transcripts, themes and subthemes were developed. While performing data analysis and interpretation of data all discrepancies were discussed in detail. The study was approved by the ethical committee of the Hospitals of Pakistan and consent forms were filled out by all the participants. After recording the interviews, they were transcribed and analyzed using NVIVO 12.

## RESULTS

Types of participants	Number of participants to be interviewed
Physicians	10
Patients	10
Patients families	10
Administrative staff	10
Total	40

**Table 1:** Number of participants to be interviewed

Causes of Violence	Perceptions of patients regarding unfair dealing in terms of cost of treatment, lack of trained physicians to deal with disputes, Increased security forces
Outcome of violence	Threats, killing, and ultimately murders
Policy responses	Restructure hospital policies, train the doctors on how to treat patients humbly, Reduce security forces

**Table 2:** Main causes, the outcome of violence, and various policy responses

Reasons for unfair dealing in terms of cost of treatment which leads to patient physicians' violence	1- "Nowadays there is no value of Human Life. This occupation has become more business orientated" (Patients IDI) 2- "Whenever a patient visits a hospital, they have so much distrust towards physicians. They believe that doctors are not sincere to patients. (Physicians IDI). 3- "Whoever has money gets good treatment and those who are poor get bad treatment (Patient's IDI). 4- "Medical treatment has become so expensive nowadays that it has become impossible for the poor to get treated in a well-facilitated hospital (Patient IDI). 5- "Patients are not willing to cooperate with the physician at any cost (Physicians IDI).
Lack of trained physicians to deal with disputes	1- "Physicians might be taught how to deal with patients in medical schools but in practical life, they lack communication skills with patients due to which patients get aggressive leading to various form of violence" (Patients IDI). 2- "Physicians are not humble at all and at the same time they are not willing to listen to their patient's issue" (Administrative staff IDI) 3- "Treating a patient's sickness is the job of physicians but if the patient is treated with emotional care it would enhance the treatment of the patient. I have seen many physicians who are perfect at work but when it comes to communication skills they need to improve their skills" (Patients IDI) 4- "Physicians behavior is so rude to patients and their families, although we are paying them we are not getting free treatment from them" (Patients families IDI) 5- "There should be training for physicians on how to deal with patients in such devastating situations when their beloved one is sick" (Patients IDI)
Reduce the Security Forces	1- "The security of hospital is annoying. When our inspection is done while visiting the patients it annoys us a lot as we are already mentally disturbed due to sickness of our beloved ones" (Patients families IDI) 2- "When we enter the hospital it seems we have entered a jail. We have a feeling of being a prisoner" (Patients IDI) 3- "Security guards treat us so badly that we feel like killing the guards at the moment" (Patients Families IDI) 4- "The management of Hospitals should reduce the security forces" (Administrative staff IDI)

**Table 3:** The main themes derived from the study

## DISCUSSION

This qualitative study would help in exploring the need for specific policy-related responses to patient-physician violence. With the help of this qualitative research, patient-physician perceptions could be explored in detail regarding the violence they experienced from patients and their families. The results of the study revealed that unfairness with the patients related to the expense of treatment in the hospital, lack of trained physicians, and various other health system factors are associated with patient-physician violence. This sort of violence was commonly seen in various countries of the world such as the USA [13] and China along with underdeveloped countries [14]. The results of the study are similar to studies conducted in India as well [15]. The results of the study revealed that most hospitals refuse to take unaffordable patients due to which most of the families get devastated as they are already facing the prolonged illness of their families. The profession of medicine has become business orientated. Hence, many studies have revealed that for the poor there are very few options for treatment all around the world [9]. The results of the study also revealed that physicians are not kind to their patients. They are not willing to hear the symptoms of patients. They treat patients as if they are butchers. Hence it seems that physicians are trained in such a way that they lack humanistic characteristics. The medical students should be trained in a such way that in their curriculum professionalism and humbleness should be taught along with patient-physician relationship should be emphasized [16]. Various studies have shown that government does not provide any financial support to the health sector and even the salaries of physicians are less

compared to other professions [17]. During the course work, young physicians should be taught how to deal with patients, and how to negotiate their conflicts of interest by applying ethics [18]. Further the results of the study revealed that increased security in hospitals leads to various disputes as it makes the patient and their family rebellious when they are not allowed to meet their patient which is similar to a study conducted in China [19]. Patient-physician violence can be improved if health policies are restructured along with the provision of incentives. It can help the system to be progressive. These results of the study are consistent with other studies conducted in China [20]. With the help of this study, the masses will have a better understanding of the challenges that a patient and physician experiences. It will also help to develop a specific intervention that has become a necessity for every hospital in Pakistan. The main limitation of this study is that it is a multi-center study of an urban area due to which the perceptions of physicians regarding violence in rural areas cannot be reflected. Most of the physicians were reluctant to discuss this sensitive issue publically.

## CONCLUSION

This study revealed that patient-physician violence is a major issue in today's world. Hence these incidents should be reported regularly. It is essential to implement certain policies and strategies for the security of physicians.

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## Original Article

## Mini-Percutaneous Nephrolithotomy Versus Retrograde Intrarenal Surgery in Patients with Renal Stones

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## ARTICLE INFO

## Key Words:

Mini-PCNL, RIRS, Renal Stones, Adult patients

## How to Cite:

Maqsood Zahid, M. ., Farouk, K. ., Ahmad, K. ., Ali, L. ., Muhammad Javed, H. ., & Mehmood ul Hassan, S. . (2022). Mini-Percutaneous Nephrolithotomy Versus Retrograde Intrarenal Surgery in Patients with Renal Stones: MINI-PCNL Versus RIRS in Patients with Renal Stones. *Pakistan BioMedical Journal*, 5(7), 151-154. <https://doi.org/10.54393/pbmj.v5i7.650>

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Received Date: 16th July, 2022

Acceptance Date: 23rd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Kidney stones, also known as renal calculi, are crystal concretions that primarily occur in the kidney and are referred to as nephrolithiasis. Ideally, calculi should form in the kidneys and pass out of the body through the urethra painlessly. Larger stones are uncomfortable and thus require surgery. Mini-percutaneous nephrolithotomy (mini-PCNL) and retrograde intrarenal surgery (RIRS) are the minimally invasive procedures employed these days to target renal stones. **Objective:** To compare the effectiveness of both mini-PCNL and RIRS in terms of targeting larger stones in adult patients along with other factors including hospital stay, operative time, stone passing rate and associated complications. **Patients and Methods:** In the year 2021, 101 patients undergoing mini-PCNL or RIRS in Doctors Hospital, Gujrat were observed in this study. Effectiveness of both the techniques, exposure time, transfusions required, stone free rates and hospital stay were compared in both groups of patients. **Results:** It was found that mini-PCNL has greater potential than RIRS in terms of stone clearing and operating time. However, RIRS has performed better in terms of reducing the hospital stay with mild complications in both the procedures. **Conclusion:** Both RIRS and mini-PCNL are extremely safe and highly efficient treatments for renal lithiasis with a diameter of 1.5 to 2.5 cm, and either one can be chosen to achieve outstanding stone-free rates.

## INTRODUCTION

Nephrolithiasis is a condition where stones are formed within the kidneys [1]. Poor oral fluid intake, high intake of protein, high oxalate consumption, and high salt intake are all common risk factors for the development of stones [2]. The probability of a patient acquiring further kidney stones is significantly increased by a personal and family history of stones [3]. In the United States, urolithiasis is a common illness that affects roughly 1 in 11 persons. An estimated 1 million people attend emergency departments every year, costing the healthcare system \$5 billion, according to estimates. It increasingly affects people of working age

and is becoming more prevalent. Men appear more frequently than women [4,5]. The area known as the "stone belt" has a persistently high incidence of urolithiasis, and this includes Pakistan [2]. Based on the patient's initial symptoms, urolithiasis is treated with a combination of conservative medicinal medicines and surgical procedures [6]. Surgical treatment was the only strategy to manage renal stones in 1900s, however, its activity was limited due to the major side effects including loss of blood, infection, high fever and damage to surrounding organs. After centuries, Fernstrom and Johansson [7] made a

tremendous achievement in the field in 1976 by conducting the first percutaneous nephrolithotomy (PCNL) on patients diagnosed with renal stones who were unsuited for open surgery. PCNL has gained attention in recent years as it leaves patients stone free in a single setting and is a minimally invasive approach. It has prodigious results and at the same time minimizes morbidity and complications [8]. On the other hand, retrograde intrarenal surgery (RIRS) is another effective technique to target renal stones. The ability to execute RIRS for stones larger than 2 cm has been established by accumulating evidence [9,10]. Today, RIRS is a widely utilised and significant therapy method due to its natural approach to the stone and high success rate with minimal morbidity [9]. A recent study published compared the results of RIRS and mini-PCNL in treating large renal stones (>2 cm) in 38 pediatric patients [11]. The results showed that PCNL possesses higher stone free rate on comparison with RIRS whereas, mean radiation time and hospital stay were comparatively lower in patients undergoing RIRS. Higher complications in PCNL group patients were observed. Also, patients under PCNL therapy received blood transfusions whereas pediatrics in RIRS group did not require blood transfusions, thus demonstrating the better potential of RIRS in pediatric patients with stones larger than 2 cm. This study reported the effectiveness of mini-PCNL and RIRS on adult patients with larger sample size for the first time in Pakistan. Related factors such as hospitalisation time, cost, complications, and outcomes were also evaluated.

## METHODS

**Patients:** In Doctors Hospital Jail Chowk Gujrat, a total of 101 patients underwent either retrograde intrarenal surgery (n=51) or mini-PCNL (n=50) during the year 2021. 101 patients who underwent RIRS or mini-PCNL were observed retrospectively. Before the procedure, patients went through the required lab investigations X-ray, CBC, Urinalysis, intravenous urography, ultrasonography, computerised tomography (CT) and coagulation tests. Stone size was calculated by multiplying the two longest diameters (mm) measured on CT sections. The operation technique chosen was based on patient's anatomy, patient's choice and surgeon's decision.

**RIRS technique:** Patient lies in dorsal lithotomy position and general anesthesia is given. Ureterorenoscopy is then performed with a hydrophilic safety guidewire introduced in body through ureter under the ultrasound and fluoroscopic guidance. A semi rigid ureteroscope (model and size) is introduced to evaluate and dilate ureter which is then removed and flexible ureteroscope (model and size) is introduced through the guidewire or a ureteral access sheath. On advancing the laser fiber (model and type) stone

is broken into small fragments and extracted through suction.

**Mini-PCNL technique:** Patient lies either in prone or supine position and general anesthesia is administered. Under the supervision of fluoroscopic and ultrasound imaging, a puncture is made into the appropriate lower pole calyx (via the flank) with a 22 gauge needle. A safety guidewire (model) is inserted into the bladder through the nephrostomy tract. A 14 Fr peel away sheath is introduced through another guide wire (model), which is then put into the bladder as a functioning guide wire. Additionally, a stiff ureteroscope is introduced to dilate the nephrostomy. Stone is extracted via suction after being broken with a HoYag laser. After the procedure is performed, a 14 Fr nephrostomy catheter is often left to assure outward urine flow and is withdrawn within 48 hours.

**Statistical Analysis:** Data was entered and analyze using SPSS 22.0. All the quantitative variables were presented in the form of mean + SD and qualitative variables with frequency and percentages. Chi square test was used to analyze the two groups of patients. Independent sample t test was applied to find out the significant difference between operative time, hospital stay and stone size among groups. P value < 0.05 was considered as significant.

## RESULTS

Total 101 patients were enrolled in current study. The patients were divided into two groups (MINI PCNL = 50 Vs RIRS = 51). The mean age in groups were not significantly different (MINI PCNL = 42.28+13.06 Vs RIRS = 38.73+13.08). Male patients were more frequent as compared to females. The stone size was significantly different among both groups (MINI PCNL = 1.80+0.51 Vs RIRS = 1.26+0.35). The most affected kidney site was left (n=58). 45 patient have stone in renal pelvis, 29 in lower calyx, 19 in upper calyx and 8 in inter polar calyx. (Table 1)

Variable	MINI PCNL (n=50)	RIRS (n=51)	P-value
Age (Mean+SD)	42.28+13.06	38.73+13.08	0.175
<b>Gender</b>			<b>Total</b>
Male	26(52.0%)	27(52.9%)	53
Female	24(48.0%)	24(47.1%)	48
<b>Stone Characteristics</b>			<b>P-value</b>
Stone Size (Mean+SD)	1.80+0.51	1.26+0.35	0.000
<b>Site of Kidney</b>			<b>Total</b>
Left	30(60.0%)	28(54.9%)	58
Right	20(40.0%)	23(45.1%)	43
<b>Site of Kidney stone</b>			<b>Total</b>
Lower Calyx	21(42.0%)	8(15.7%)	29
Renal Pelvis	24(48.0%)	21(41.2%)	45
Upper Calyx	5(10.0%)	14(27.5%)	19
Inter Polar calyx	0(0.0%)	8(15.7%)	8

**Table 1:** Demographic and stone characteristics of patients



	Procedure	Mean	SD	P-value
Operation time in minutes	MINI PCNL	65.00	15.74	0.006**
	RIRS	74.12	16.73	
Hospital stay in days	MINI PCNL	2.74	0.94	0.000**
	RIRS	1.90	.671	
Procedure		MINI PCNL	RIRS	
Complications	Fever	5(10.0%)	10(19.6%)	
	Hematuria	8(16.0%)	8(15.7%)	
	Obstructive	4(8.0%)	0(0.0%)	
	Pyelonephritis	46(92.0%)	44(86.3)	0.345a

**Table 2:** Comparison of perioperative and postoperative outcomes

\*\* Independent sample t test

<sup>a</sup> Chisquare test

Table 2, showed the comparison between perioperative and postoperative outcomes among groups. There was significant difference between operative time (MINI PCNL = 65.0+15.74 Vs RIRS = 74.12+16.73). The RIRS procedure has longer operative time than MINI PCNL. Both groups also have significant difference in hospital stay (MINI PCNL = 2.74+1.90 Vs RIRS = 0.94+0.671). Over all fewer patients have complications. The stone clearance rate shows that the MINI PCNL has 92% and RIRS 86.3 % rate.

## DISCUSSION

Renal lithiasis affects between 1 and 15% of persons worldwide at some time in their lives [12,13]. There were 22.1 million cases in 2015, and there were around 16,100 fatalities [14, 15]. With the advancements in technology, science has introduced newer procedures which are efficient, result oriented, minimally invasive with faster healing time and lesser complications. Two such methods are mini-percutaneous nephrolithotomy (mini-PCNL) and retrograde intrarenal surgery (RIRS). Mini PCNL complemented the original method and reduced the morbidity rate by use of smaller tracts [16]. In this study, we compared the effectiveness of both the mini-PCNL and RIRS. Few studies have been done before to compare the results of the two procedures. Retrograde intra renal surgery is mentioned in European Association of Urology guidelines for treatment of renal lithiasis [17]. However, the gold standard is still shock wave lithotripsy and percutaneous nephrolithotomy [18]. Mini- PCNL and RIRS have gained popularity as it is an innocuous and effective method. Many urologists have documented the efficiency of both the procedures. Ho et al. [19] reported that the stone free rates were 82 % for patients with stones having sizes between 0.1-1 cm, 71% for patients with stone size of 1.1-2cm and 65% for stones greater than 2 cm using RIRS. Likewise, Mhaske et al. [20] presented 100% and 95.4% stone clearance rates on employing mini-PCNL and RIRS procedures with longer operative time in case of RIRS and lower hemoglobin levels in case of mini-PCNL. In another study, Pelit et al. [21] also compared the efficiency of mini-

PCNL and RIRS in pre-school-aged children and found out that RIRS is superior over mini-PCNL in terms of shorter hospital stay, shorter exposure time in case of fluoroscopy and reduced operative time in terms of treating renal stones, whereas PCNL was found to have higher stone free rate on comparison with RIRS in a single session. In this study we found the efficiency of the two procedures, 1-2 days post-operation with a follow-up for 1 month. We found mini-PCNL group has an efficiency of 93.2% with 90.2% efficiency in RIRS group. Even though both procedures are highly effective but mini-PCNL has a significantly shorter operative time and higher stone clearance rates, whereas in case of RIRS group, shorter hospital stay was observed in adult patients Also, both techniques can be employed as a good choice for stones of larger diameters i.e., 2-3 cm. It is documentable that the management protocols for the two procedures are different.

## CONCLUSION

Both RIRS and mini-PCNL are extremely safe and successful treatments for renal lithiasis and either one can be used to obtain outstanding stone-free rates.

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## Original Article

## Effectiveness of Dietary Supplementation in women with PCOS: A randomized-controlled trial

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## ARTICLE INFO

## Key Words:

PCOS, Vitamin D, Plasma glucose, Insulin

## How to Cite:

Khattak, H. G. ., Ali Bhutto, M. ., Khan Bugti, M. ., Anjum, H. ., Fatima, M. ., Sabeen Ayesha, H. ., Ishtiaq, A. ., Farooq, A. ., & Latif, M. . (2022). Effectiveness of Dietary Supplementation in women with PCOS: A randomized-controlled trial: Effectiveness of Dietary Supplementation in women with PCOS. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.655>

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Received Date: 18th July, 2022

Acceptance Date: 25th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

A well-known endocrine condition in women is polycystic ovarian syndrome. **Objective:** To evaluate the effects of Vitamin D in one hundred eighty girls with PCOS. **Methods:** The investigation is a randomized control trial that is double-blinded. The study took place at the Ali Medical Hospital in Islamabad. The goal of the study was still to determine how adding vitamin D affected the metabolic and endocrine parameter plasma glucose in females with polycystic ovarian syndrome. This experiment had a 24-week base period and a 12-week follow-up period. **Result:** In this trial, no important difference of Vitamin-D addition on main variable AUCgluc and additional secondary variables metabolic and endocrine parameters were observed. There was only exclusion of a substantial reduction in plasma glucose during OGTT after 1 hr. Moreover, no improvement in PCOS or menstrual frequency in experimental group was observed. **Conclusions:** The study found no substantial impact of Vitamin-D supplementation on plasma glucose and on metabolic or endocrine parameters but during OGTT plasma glucose was found to be reduced after 1 hour.

## INTRODUCTION

Polycystic ovarian syndrome is a renowned endocrine disorder in women [1]. PCOS is a very complicated disorder and effects the metabolic and psychological factors [2]. On the other hand, deficiency of vitamin D is also common in population and in PCOS its occurrence rate is great [3-5]. Vitamin D is direct linked with sensitivity of insulin [6-8]. Vitamin D suppress the post inflammatory cytokines and enhance the insulin receptors and its release [5-9]. Insulin confrontation is linked with hazards of metabolic

complications and cardiovascular disorders [10, 11]. Moreover, metabolic complications can lead to PCOS [12]. This is under light by the omnipresent qualities of vitamin D receptor within reproductive system of women [13-15]. The recent treatment choices for polycystic ovarian syndrome specifically depends on hormones and lifestyle [16]. High incidence of deficiency of vitamin D in present in women with PCOS thus, supplementation of vitamin D could be an easy treatment to cure metabolic and endocrine problems

[17]. Various studies including RCTs indicate that vitamin D intake shows positive outcomes in terms of metabolic and endocrine disorders. However the sample size in previous studies was not as large so the result may vary in large number of participants [18, 19]. The goal of the current research is to identify the effects of vitamin D in one hundred eight polycystic ovarian syndrome females. The principal purpose of the this project is to determine the outcome of vitamin D supplement as associated to dummy treatment on plasma glucose factor below the curvature AUCgluc as amount score of glucose. The goal of the present research was to evaluate the effects of Vitamin D in one hundred eighty girls with PCOS. This is to judge if Vit-D treatment as related to palliative has a control on plasma aldohexose space below the curvature(AUCgluc)as a live of aldohexose group. The study also tend to investigate the effect of Vitamin D supplement on many different metabolic and endocrine parameters, embody androgenic hormone humor levels and frequency of discharge amount.

## METHODS

The study is double blinded and randomized control study. Study setting was Ali Medical Hospital, Islamabad. The study remained intended to identify the outcomes of Vitamin-D addition on metabolic and endocrine parameter, plasma glucose in polycystic ovarian syndrome female. This trial was based on 24 weeks with follow up interval of 12 weeks. Inclusion criteria was based on >18 year old females with PCOS and deficiency of Vitamin D 25(oh) d] serum levels < 75 nmol/l). PCOS diagnosis criteria was according to the Rotterdam criteria while Exclusion criteria was hormonal contraception within 3 months, hypercalcemia. Patients having symptom such as plasma metallic element concentrations, medicine effecting the sensitivity of internal secretion, regular cholecalciferol supplements over three months and different pathologies apart from PCOS, were excluded. All participants were informed about study and consent form was take. Subjects were allocated randomly. Sample size was conducted on base of pilot study. About 500 participant underwent the investigation and screening. And 180 patients fullfill the inclusion criteria for PCOS. Participants enrolled was increased from 150-180 to make sure to identify the difference of min outcome measure. Analysis for assessment was done through SPSS version 22.0.

## RESULTS

In this trial, no important difference of vit-D addition on main variable AUCgluc and additional secondary variables metabolic and endocrine parameters were observed. There was only exclusion of a substantial reduction in plasma glucose during OGTT after 1 hr. Moreover, no improvement in PCOS or menstrual frequency in

experimental group was observed. Out of 180, 123 subjects ended the trial and their mean age was  $25.9 \pm 4.7$  years; Body mass index  $27.5 \pm 7.3$  kg/m<sup>2</sup>; initial 25(oh)d  $48.8 \pm 16.9$  nmol/L, and baseline abstinence aldohexose was  $84 \pm 8$  mg/dL. Viosterol supplementation resulted in a major increase in 25(OH)D. However no noteworthy outcome on Aucgluc was observed. Subjects within the Vtamin-D cluster showed greater level blood serum aldohexose by sixty min throughout OGTT as associated to the palliative cluster. Every different parameters failed to show any vital improvement between the teams. There was no vital distinction of vitamin D supplement on plasma aldohexose at the top of 24 weeks path. The subdivision evaluated amongst members by initial 25(oh)d levels < fifty nmol/L (n= 60), vitamin D addition considerably lessened AUCgluc once twenty four weeks with an average management impact (95% CI) of 19.20 (- 35.45 to - 2.95, p = 0.021). Concerning subordinate result back factors, the study showed a major reduction in plasma glucose once sixty min throughout OGTT, Table 1.

Study Variables	Baseline	24th Week	p-value
fasting glucose meaur (mg/dl) Vit-D(n=81)84±8 Control(n=42)84±8 Glucose 30 minute OGTT(mg/dl)	82 ± 8 83 ± 7	- 1.2 (- 3.6 to 1.3)	0.353
Vit-D (n=80)133±24 Control(n=42)128±25 Glucose 60 minutes OGTT(mg/dl).	130 ± 23 129 ± 26	- 1.6 (-10.0 to 6.8)	0.711
Vit-D (n = 80) 123 ± 39 Control (n = 42) 107 ± 31 glucose 120 min OGTT (mg/dL)	105 ± 31 107 ± 34	- 10.2 (- 20.2 to - 0.3)	0.045
Vit-D(n=81)98±24 control(n=42)93±24 hbA1c(mmol/mol)2	88 ± 24 85 ± 24	0.5 (- 7.6 to 8.6)	0.903
Vit-D (n = 74) 33 (31-35) Control (n = 38) 34 (32-35)	33 (32-35) 33 (32-35)	- 0.4 (- 0.9 to 0.2)	0.192
Vit-D (n=79)48.8±16.8 control(n=41)48.8±17.5 pth (pg/ml)*	90.2 ± 20.1 56.8 ± 29.5	33.4 (24.5 to 42.2)	<0.001
Vit-D (n = 81)41.9 (34.4-53.8) Control (n = 42)40.2 (33.0-51.4) 1,25(oh)2d	40.6 (32.4-51.1) 45.7 (37.6-55.5)	- 6.6 (- 11.3 to - 1.9)	0.004
(pmol/l)114 ± 48 Vit-D (n=75) control (n=41)110±43 calc(mmol/l)	141 ± 52 113 ± 48	27 (8 to 46)	0.006
Vit D(n=79)2.35±0.08 control(n=41)2.36±0.07	2.32 ± 0.07 2.32 ± 0.07	0.02 (- 0.00 3 to 0.05)	0.081

**Table 1:** Outcomes variables at baseline and end of 24 weeks

## DISCUSSION

This study figured no noteworthy difference of Vitamin-D on main variable AUCgluc and added secondary variables metabolic and endocrine factors. There is only exemption of an important reduction in plasma glucose during OGTT after 1 hr. Moreover, we did not observe any improvement in PCOS or menstrual frequency in experimental group. Co-relation among Vitamin-D deficit and insulin resistance was not due to overweight. In some studies it is indicated to

improve endometrial environment through cell Latinization [20]. In previous RCT researches, the part of Vitamin-D supplement remain unclear in the management of PCOS, whereas several researchers found noteworthy improvement in main features of polycystic ovarian syndrome. Jamilian et al., determined the impact of 100 IU of calciferol on daily basis vs control in 3 months trail of ninety female with polycystic ovarian syndrome [21]. They found significant reduction in serum insulin and fasting plasma glucose and noteworthy improvement in entire antioxidant capability [22]. Likewise, in another study, Maktabi et al., found significant reduction in fasting plasma glucose and plasma malondialdehyde in 70 females with PCOS [23]. On the other hand in another report did not reject the outcome of Vitamin-D supplement in a cohort study of polycystic ovarian syndrome females with insulin resistance [24]. Hence, in literature review many studies outcome overlap with the results of current study. Anyhow, our study still has many limitations. Major drop out can be the reason of interruption of result but still our study's sample size is large as compare to previous studies. As we did multiple testing to analyzed different measures of glucose metabolism. Thus the outcome of Vitamin-D supplement in females with polycystic ovarian syndrome having insulin resistance cannot be figured out.

## CONCLUSION

The study did not found any substantial impact of Vitamin-D supplementation on plasma glucose and on metabolic or endocrine parameters but during OGTT plasma glucose was found to be reduced after 1 hour.

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## Original Article

## Outcomes of Retrograde Intrarenal Surgery in Renal Calculi of Varying Size

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## ARTICLE INFO

**Key Words:**

Retrograde intrarenal surgery (RIRS), postoperative complications, Intraoperative complication.

**How to Cite:**Khan, A. ., Saleem, A. ., Siraj, S. ., Hassan, R. U. ., Ahmad, I. ., & Naeem, R. . (2022). Outcomes of Retrograde Intrarenal Surgery in Renal Calculi of Varying Size: Outcomes of Retrograde Intrarenal Surgery in Renal Calculi of Varying Size. *Pakistan BioMedical Journal*, 5(7).<https://doi.org/10.54393/pbmj.v5i7.660>**\*Corresponding Author:**

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Received Date: 17th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The patient with the large renal calculi is recommended with retrograde intrarenal surgery by the physicians. It is minimally invasive approach for the treatment. **Objective:** The study was conducted for evaluation of the intraoperative and postoperative complications associated with the retrograde intrarenal surgery RIRS. The stone free rate rates were also compared. **Methods:** The 231 patients who visited the Urology department of our teaching hospital were included in the study. The duration of this study was from January 2021 to June 2021. The patients were divided into six groups. The calculi of dimension 1-9 mm were included in the group 1, while 10-19 mm were included in the group 2, 20-29 mm were included in group 3. The calculi of dimension 30-39 mm were included in group 4, the calculi of dimension 40-49 mm in group 5, while calculi greater than 50mm dimension were included in the group 6. The post-operative complications were reported while six-month follow months. **Results:** Out of the 231 patients included in the study. According to the study smallest size of calculi observed to be 3 mm and the largest size of calculi was found to be 60 mm. The average size of the calculi came out to be  $22.9 \pm 11.2$  mm. The adverse events were observed in different groups. 11% of the patients reported some intraoperative negative effects. There were 31 patients that showed post procedure complications but these complications were later on found to be gone leaving no adverse side effect. 10% patients that undergo repetitive RIRS to clear the stones and were later-on confirmed stone free. **Conclusion:** For the treatment and management of the renal stones that are more than 20 mm in size RIRS is an encouraging option. There was a size dependent enhancement in the complications that take place after the procedure. There was no case of stone related events reported in patients that took care of follow up sessions to get rid of residual stones.

## INTRODUCTION

The urolithiasis incidence are rising globally. The physicians focused on choosing the process that remove the stones completely with least morbidity rates. The ureterorenoscopic management of the renal calculi has been advanced by the ureterorenoscope miniaturization [1]. Further advancement in the surgical and laser techniques have added to the adverts in the medical instrumentation. Stone size highly effect the choice of treatment. For the removal of the renal stone greater than 20 mm in size the retrograde intrarenal surgery is considered as second line of treatment. Therefore RIRS is being effectively used for the treatment of the large and varying size calculi. It is safe option for removal of kidney stone [2-3]. The number are people are suffering from the urinary tract stone. In the recent years the minimally

invasive procedure like RIRS have replaced the open surgery approaches. The RIRS are widely accepted by the physicians as compare to the other approaches. It is alternative to the percutaneous nephrolithotomy PCNL [2]. For the treatment of the lower pole stones, the European Association of Urology (EAU) has labelled the RIRS and PCNL as the first-line and effective treatment. The role RIRS play in treatment of the calyces and renal pelvis is still under investigation. The RIRS is seldom used for the management of the renal calculi with the renal stone of size greater than 40 mm [4-5]. The limited visualization, reduced size of fragment removal are the drawbacks associated with the RIRS. It is very expensive procedure and a major deterrent to the RIRS [6]. It is not only prove as an effective treatment for adults, but also different studies

have showed that it is reasonable treatment for the children also. The minimum complications are observed in the children after RIRS treatment. The better stone free rates are observed after the RIRS treatment. Some studies have showed that if RIRS is performed as outpatients procedure it can reduced the risk associated with the PCNL [7-8]. The study provide with the deep insights into the adverse effects and complication associated with the intraoperative and postoperative events[9-10].

## METHODS

The patients who underwent RIRS at the Urology department of our teaching hospital were included in the study. The ethical committee of the hospital approved the study. The informed consent was taken from all the patients included in the study. According to the exclusion criteria the patients who underwent the bilateral RIRS, having age under 18 years and other who underwent through PCNL surgery were excluded from the study. The patients who underwent RIRS for ureteral or impacted pelviureteric junction calculi were also excluded from the study. The patients with incomplete data were also excluded. The experienced endourologist performed the all surgeries. The frequency of the laser was set between 20-50 Hz. The dusted calculi was preferred rather than their fragmentation. The completion of the procedure depends upon the removal of DJ stent. The calculi of dimension 1-9 mm were included in the group 1, while 10-19 mm were included in the group 2, 20-29 mm were included in group 3. The calculi of dimension 30-39 mm were included in group 4, the calculi of dimension 40-49 mm in group 5, while calculi greater than 50 mm dimension were included in the group 6. The post-operative complications were reported while six-month follow months. The demographic details location and side of calculi, total operative time of each patient was recorded. The intraoperative and postoperative adverse event and complication were recorded respectively. The follow up also noted the stone related events. SPSS version 21.0 was used for the statistical analysis. Receiver operative curves were plotted.

## RESULTS

231 patients were selected for the study. The size of calculi was calculated and the smallest size of calculi came to be 3 mm and the largest size of calculi was found to be 60 mm. The average size of the calculi came out to be  $22.9 \pm 11.2$  mm, the demographic characteristics were studied for all the patients, the features that were studied included size of the stone, its location and position in the body. Two hundred and thirty-one patients reported to have primary RIRS, and they reported that there was no prior need of the DJ stent replacement. Almost 57% patients had carried out

two staged operations. Out of all the patients that were taken for study some of them were at the first step of procedure and the remaining were at the starting stage of the multifunctional procedure. It was also reported that some of the patients 27% were on the later stages of the complex procedure. 11% of the patients reported some intraoperative negative effects. There were 31 patients that showed post procedure complications but these complications were later on found to be gone leaving no adverse side effect. There were almost 90% of the patients that refused to undergo re-surgery or any observation. There were only 10% patients that undergo repetitive RIRS to clear the stones and were later-on confirmed stone free Table 1.

Features	Group # 1 (n=25)	Group # 2 (n=82)	Group # 3 (n=65)	Group # 4 (n=36)	Group # 5 (n=18)	Group # 6 (n=9)	P-value
Primary RIRS without the urge for DJ stent	20 (86.5)	70 (85.0)	55 (85.7)	32 (88.9)	18 (100.0)	9 (100.0)	0.1
No. of procedure	1.13±0.4	1.38±0.5	1.75±0.48	2.04±0.32	2.08±0.46	2.30±0.49	
1	19(82.0)	52(63.4)	19(28.9)	1(2.7)	1(5.5)	0	.0.0
2	6(24.0)	32(39.3)	46(70)	32(88.9)	1(83.0)	5(44.4)	
3	0	0	1(1.5)	2(5.5)	2(11.3)	2(22.6)	
Total duration of operation (min)	4.0±14.11	72.4±30.7	118.7±47.8	188±44.5	232±36.4	257.1±47.9	0.0
Intraoperative negative events	3(12)	7(8)	12(17.9)	4(9.1)	1(5.7)	2(22.6)	0.05
Ureteral sheath related ureteral wall wound - Grade 1	1(40.0)	4(48.3)	3(60.0)	0	0	0	
Incompetence to reach a part of calculus and left alone	0	0	2(30.0)	1(27.3)	0	0	
Inability to access the calculus fully and left alone	1(40.0)	0	0	0	0	0	
Infundibular	0	3(36.0)	1(15.0)	2(55.7)	0	1(11.0)	
Pelvic tear	0	1(12.7)	2(30.0)	0	0	0	
Injury that require Replacement of the flexible ureterorenoscope	0	0	1(15.0)	0	1(55.0)	1(11.0)	
Broken and fixed basket	0	0	1(15.0)	0	0	0(0.0)	

**Table 1:** Demographic features and the characteristics of the stone

Anatomical problems	No. of patients	Size of stone (mm)	Intraoperative negative events, n (%)	Postoperative issues, n (%)	Remaining stones, n (%)
Infundibular stenosis	9	24.7±9.15	1(11.7)	3(33.0)	2(22.3)
Mild pelviureteric junction blockage, postpyeloplasty	6	17.0±5.56	1(16.3)	0	0
Calyceal diverticulum					
Duplicated collecting complex	8	13.9±6.72	1(12.0)	0	1(20.0)
Impacted	9	24.8±16.7	1(11.0)	1(11.0)	0
infundibular calculus	5	28.8±12.3	2(40.7)	1(20.3)	0
Pelvic kidney (ectopic)	3	40.0±0.00	0	0	



**Table 2:** The problems during the retrograde intra renal surgery and the outcomes

## DISCUSSION

This study included a total of 231 patients, all the patients were well aware of the study and written consent is taken from the patients. This study depicts the enhancement in multiple procedures like postoperative problems, duration of total operation, residual size of stone and all these issues are dependent on the size of stone [11]. Instead of making a group that contained all types of stones we tried to make sub categories and the groups or cohorts were made according to the size of stone to study that how incremental variation occur in the size of the stone and the post-operative outcomes were also studied. And then one more task was to estimate the size of stone and the point at which there was a prominent change noted [12-13]. There were only 12% patients that carried out the pre-procedural stent procedure and this ratio is less than that of the ratio reported in the previous studies. It is reported that the elevated rates of RIRS in primary form are attributed to the routine ureteral dilation up to 12 Fr and condition in case of small size was up to 9.5 Fr UAS [14]. In order to get higher SFR the pop dusting was combined with the conventional stone dusting. The procedure always starts at the dusting settings and later on it leads to lithotripsy. At the end of the procedure even though there was no change in the settings of laser, the procedure was altered to non-contact form of lithotripsy. Here the technique was performed uniformly all around the stone s that a very fine dust of stone can be made without producing any larger fragment [15]. There are strong evidences that support taking ureteroscopy as an important day care activity. A large number of patients in this study also opt for the RIRS as a day care procedure and it is becoming a very strong accepted procedure recently. In this study it was found that the number of patients that were at the first stage of procedure or at the next stage greater than the number of patients that are at the later stages of multistage procedure [16-17]. It was observed that may be the majority of the patients are at the primary stages because of high stone size and the duration of treatment as well. As it is known that the duration for single staged procedure is longer. But the data of the patients at the later on stages can also prove to be helpful for subsequent analysis. In this study it was not observed that the stone size was rising as a result of intraoperative negative effect. However, there was occurrence of 19 patients that had grade 1 ureteral wall infection. The inflammation in the ureteral wall was may be due to sequential dilation of the ureter and also smaller UAS was used in some cases [18]. There was renal pelvic tear and tear in the infundibular region that was reported in this study and the reason behind its presence is pressure of

high irrigation or may be because of direct usage of the laser beam. There was irreversible damage reported in the three patients it was because of the high strain on the region of scope and one patient reported the firing of the laser beam in an inadvertent manner inside the machine that caused irreversible problems [19]. The complication that was observed most frequently in our study was hematuria and the occurrence of clots because of the longer catheterization. But such complications were taken care of later on without causing any serious damage. Hematuria was most commonly observed in patients after the operative procedure. It was observed that there were 5 patients that had stone size greater than 6 mm they underwent RIRS and the stone was removed successfully. The SFR was very encouraging as it has patients with size of stone as big as 20 mm. the stone bulk was dusted in the initial stage almost 70-80%. And then the remaining calculi was dealt with later on [20-21]. This study noted enhancement in size of renal stones in the patients included in the fourth group as compared to other groups. The complexity of the stone results in the complications that are observed later on. This retrospective study therefore states that the follow up with proper series of ultrasonography can prove to be great for the residual stones that are produced after RIRS [22].

## CONCLUSION

RIRS can prove to be an encouraging option for the treatment and management of the renal stones that are more than 20 mm in size. There was a size dependent enhancement in the complications that take place after the procedure. There was no case of stone reported in patients that took care of follow up sessions to get rid of residual stones.

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## Original Article

## Comparative Study of Hearing Status After Modified Radical Mastoidectomy with and without Reconstruction

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## ARTICLE INFO

## Key Words:

Modified radical mastoidectomy, Hearing Status, Reconstruction

## How to Cite:

Zada, B. ., Mujtaba Ghouri, S. ., Habib, M. ., Iqbal, J. ., Khan, A. ., &amp; Nadeem, M. . (2022). Comparative Study of Hearing Status After Modified Radical Mastoidectomy with And Without Reconstruction: Hearing Status After Modified Radical Mastoidectomy with and Without Reconstruction. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.661>

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Received Date: 17th July, 2022

Acceptance Date: 23rd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Chronic suppurative otitis media (CSOM) is a communal ailment of the middle ear. **Objective:** To compare hearing status with and without reconstruction after a modified radical mastoidectomy. **Methods:** 40 total patients with Chronic suppurative otitis media (the Atico-antral variety) who endured a modified radical mastoidectomy (MRM) with reconstruction or without reconstruction were enrolled in the study. The subjects were alienated into 2 groups depending on the surgical procedure. Patients done with modified radical mastoidectomy but reconstruction was not accomplished were added in the group I (n = 20), and patients done with reconstruction after MRM (n = 20) added to the group II. The patients were thoroughly examined one week before the operation, and their hearing levels were assessed using pure tone audiometry. The general anesthesia was given to the patients of both groups and operated under a microscope with post auricular approach. Temporal fascia and cartilage were collected as a material for grafting after modified radical mastoidectomy in group II. After surgery, patients were monitored at regular intervals. After 8 weeks, pure tone audiometry was performed and the closure of the air-bone gap was compared with the hearing assessment. **Results:** Many of the patients in this analysis were amongst 11 and 20 years of age and the majority of patients were male. Bone-air gap closure was more common in patients undergoing reconstructive MRM. **Conclusion:** Reconstruction after MRM results in improved hearing amplification and similarly results in greater improvement of life quality.

## INTRODUCTION

Chronic suppurative otitis media (CSOM) is a communal ailment of the middle ear [1-2]. The greater frequency of CSOM with cholesteatoma in developing countries has been accredited to underprivileged conditions of living, poor personal hygiene, overpopulation, passive smoking, lack of breastfeeding, reduced infection resistance, poor overall health, absence of awareness regarding health and available facilities, ignorance and illiteracy [3-4]. The atticoantral variability of CSOM is frequently related with cholesteatoma. Surgery is the preferred management

option for cholesteatoma, the aim of which is to completely cure the disease, keep the ear dry and safe and, if possible, restore or maintain functional capacity [5-6]. Depending on the extent and degree of destruction of cholesteatoma, there are different surgical treatment methods, like intact canal wall surgery (cortical mastoidectomy and joint tympanoplasty approach) and canal wall down methods (radical mastoidectomy, attico-anrostomy, MRM and atticotomy). In the late 20th century, simple or radical mastoidectomy surgery was prosecuted to manage

chronic disease of middle ear with no effort to preserve hearing pre-operatively [7-8]. Contemporary concepts of middle ear reconstructive surgery entered the market when Zollner, Wullstein and Moritz introduced tympanoplasty in Germany [9-10]. MRM can be performed with or deprived of reconstruction such as posterior canal wall reconstruction, ossicular chain and tympanic membrane reconstruction will prevent recurrence, discharge and improve hearing [11]. Currently, modern development in otology is the canal wall down modified radical mastoidectomy with augmented reconstruction under magnification [10-11]. In MRM, hearing outcomes depend on the condition of the ossicles and the restoration of sound conduction through the tympano-ossicular system. In this analysis, we evaluated pre-operative hearing among subjects planned for MRM in both the reconstruction and non-reconstruction groups [12].

## METHODS

This cross-sectional observational study was held in the ENT Head & Neck Surgery Department, Lady Reading Hospital Peshawar and ENT Department SIMS, Lahore for six-months duration from August 2021 to January 2022. A total of 40 patients with Chronic suppurative otitis media (the Atico-antral variety) who endured a MRM with reconstruction or without reconstruction were registered in the analysis. The subjects were alienated into 2 groups contingent on the surgical procedure. Patients done with modified radical mastoidectomy but reconstruction was not accomplished were added in the group I (n = 20), and patients done with reconstruction after MRM (n = 20) added to the group II. The patients were thoroughly examined one week before the operation, and their hearing levels were assessed using pure tone audiometry. The general anesthesia was given to the patients of both groups and operated under a microscope with post auricular approach. Temporal fascia and cartilage were collected as a material for grafting after modified radical mastoidectomy in group II. After surgery, patients were monitored at regular intervals. After 8 weeks, pure tone audiometry was performed and the closure of the air-bone gap was compared with the hearing assessment. After the interview was completed, the subjects were carefully evaluated under a microscope and otoscope. A facial nerve integrity test, tuning fork test, and a fistula test were accomplished in all cases. Radiographs of the mastoid process were performed, and in few patients computed tomography of the petro-mastoid region was accomplished. All statistics were statistically analyzed using the SPSS 21.0.

## RESULTS

Most of the patients were 11-20 years of age (45%). The ratio

of M:F patients is 1.8: 1. Most of the patients had an attic perforation of 77.5%. The dry cavity (75%) in the reconstructed MRM group was higher than in the non-reconstructed MRM group (55%).

Sex	No of Patients	Percentage (%)
Women	14	35
Men	26	65
Total	40	100

**Table 1:** Gender distribution of patients

Age Groups (Years)	No of Patients	Percentage (%)
11-20	18	42
21-30	11	27.5
31-40	07	17.5
41-50	04	10
Total	40	100

**Table 2:** shows the distribution of patients according to the age

Age Groups (Years)	No of Patients	Percentage (%)
Postero-Superior marginal	9	22.5
Attic	31	77.5
Total	40	100

**Table 3:** exhibits the perforation type in tympanic membrane in surgically managed ears

Cavity wetness	Group I (n=20)	Group II (n=20)	Total
Wet	9 (45%)	05 (25%)	14 (35%)
Dry	11 (55%)	15 (75%)	26 (65%)
Total	20 (50%)	20 (50%)	40 (100%)

**Table 4:** The mastoid cavity Condition of afterwards the eight weeks post operatively (n=40)

Hearing improved 80% of the cases in MRM with reconstruction. Hearing damage occurred in most (80%) cases after MRM without reconstruction. (Here, it is assumed that the variability of hearing <10 dB remains unchanged. The air gap (AB) was narrower in group II.

Age Groups (Years)	No of Patients	Percentage (%)
Improvement in hearing	16	80%
(10-20 dB)	09	45%
(21-30 dB)	04	20%
(>30 dB)	03	15%
Deteriorate	01	5%
Unchanged	03	15%
Total	20	100%

**Table 5:** The hearing status improvement post-operatively afterwards the eight weeks in MRM with Reconstruction (n=20)

Age Groups (Years)	No of Patients	Percentage (%)
Improvement in hearing	Nil	Nil
Not changed	04	20%
Worsened	16	80%
(10-20 dB)	10	50%
(21-30 dB)	04	20.00%
(>30 dB)	02	10%
Total	20	100%

**Table 5:** The hearing status improvement post-operatively afterwards the eight weeks in MRM without Reconstruction (n=20)

## DISCUSSION

This cross-sectional analysis was conducted to compare hearing status with and without reconstruction after modified radical mastoidectomy [10-11]. Research results are equated with formerly published related analysis. In this research, the age range was 11-50 years with mean age of twenty-one years. The maximum numeral of cases (42%) was in the 12-21 group of age. Younger age groups suffer much from the horizontal location of the Eustachian tube, cellular mastoid, and recurrent URTIs and enlarged adenoids, reinforced by various analyses [12-13]. In our study, males (65%) were much affected than females (35%), with a M: F of 1.8: 1, which has also been shown in other researches. In this analysis, attic perforation was noted in 77.5% and posterior-superior marginal perforation was noticed in 22.5%. These results are less or more comparable to various studies in which the attic perforation is larger than the posterior-upper marginal perforation [14-15]. The study showed 75% effectiveness of dry ear treatment with MRM and reconstruction after 8 weeks and 55% with MRM without reconstruction, which is comparable to additional analyses. The AB gap was 35.65 dB preoperatively in group-I and 38.15 dB post-operatively. After the operation, the AB increased in size and there was no development in hearing in group I, which was well-known in one other analysis [16-17]. In group II, 37.55 dB was the average preoperative AB interval, and 24.17 dB was the postoperative mean AB interval. This means that the average gain in hearing was 13.40 Db [18]. This outcome was less or more comparable to another analysis. During MRM, both groups had partially diseased incus and ossicle removed, thereby disrupting the ossicles chain by cholesteatoma, thus allowing further hearing. However, once the diseases were eliminated, the ossicular chain was bridged and the hearing was deteriorated [19]. Also, in the case of MRM with tympanoplasty, the graft medialization occasionally occurs, so that the middle ear cavity is not preserved and probably function of Eustachian tube is not properly established. As a consequence, the hearing was deteriorated [20-21].

## CONCLUSION

Early treatment and detection of CSOM with cholesteatoma must be our aim to avoid complications, and follow-up along with postoperative care are essential to relapse prevention and life support. This study functional results support the significance of reconstruction with MRM. In fact, post-MRM reconstruction not only amended hearing amplification but also resulted in dry ears and prevention of complications, thus improving quality of life.

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## Original Article

## Measuring The Burden of Covid-19 In A Tertiary Care Hospital, Swat, Pakistan

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## ARTICLE INFO

## Key Words:

Covid-19, Epidemiology, Swat, Pakistan, Morbidity

## How to Cite:

Imran, T. ., Hanan, F. ., Khan, W. ., Ullah, N. ., Imran, N. ., Lal, A. ., Ahmad, I. ., & Ullah, I. . (2022). Measuring The Burden of Covid-19 In A Tertiary Care Hospital, Swat, Pakistan: Measuring the Burden of Covid-19 In A Tertiary Care Hospital. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.664>

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Received Date: 16th July, 2022

Acceptance Date: 23rd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

An unknown pathogen that caused an unknown respiratory disease in humans was discovered in China city of Wuhan, where it was given the name "new coronavirus." or COVID-19. COVID-19 epidemiology and clinical features in Pakistan is the focus of this study. **Objective:** This study aims to evaluate the burden of COVID-19 in Swat, which might be helpful in preventing viral transmission in Pakistan. **Methods:** The current Retrospective study was carried out in a tertiary care hospital in district Swat Pakistan from April 2020 to June 2021. For the study, data were collected from local population who were suspicious or merely for screening reasons they visit to hospital at Swat Teaching Hospital, Swat, Pakistan. To find out the association between age group and COVID -19, a Chi-square test was used with a p-value less than 0.05. **Results:** A total of 11610 samples were analyzed in this study. The average patient's age was 40 years. Among total, there were 2230 (19%) cases were positive. The gender distributions of Covid-19, females were more affected 1128 (50.60%) than males 1102 (49.40%), but no significant difference in incidence rate. Adults accounted for COVID-19 active cases, 886(40%) patients in the age range of 21-40 years, 686(31%) in the age range of 41-60 years, 391(17.5%), and 155(7%), 45(2%), and 40(1.7%) patients in the age range of 61-80, 11-20, and 80-100 and 1-10 years, respectively. The research comprised a total of 27 older patients who met the locally recognized threshold of being elderly. A total of 40 (1.7%) of the juvenile patients were also infected. **Conclusion:** In this study patients in the age range of 21-40 years and compared to men females were more likely to be affected.

## INTRODUCTION

Symptoms of pneumonia-like respiratory illness were found in a Chinese patient in December 2019 owing to an unknown reason [1]. From then on, the WHO recognized it as the sixth public health emergency globally on the 30th of January, 2020 [2]. and proclaimed it as a pandemic disease in March of that year [3,4]. According to the WHO in 2020, this viral pneumonia was renamed COVID on February 11, 2020 [5]. Six individuals infected with the 2019 novel coronavirus (2019-nCoV) had bronchoalveolar lavage samples analyzed for metagenomics, and the newly discovered pathogen was renamed 2019-nCoV by the CDC

[6]. Nearly 88% of the COVID-19's DNA matched that of a patient with the severe acute respiratory syndrome. Bat-derived coronaviruses bat-SL-CoVZXC21 and bat-SL-CoVZC45 were two of the SARS viruses [7]. ACE-2 receptor for this novel virus is the same as for SARS-CoV [8]. The seventh member of the coronavirus family: The new coronavirus [9]. Several epidemiological investigations indicated that on December 8, 2019, the COVID-19 was found in Wuhan (China) [10]. Later, it expanded to other countries, including Iran, Europe, India, the UK, and Pakistan, and later in March 11, 2020, was declared a



pandemic [11]. This illness was initially discovered in Pakistan at the end of February back in 2020 [12]. The human-to-human transmission of COVID-19 is exceedingly infectious and occurs usually through aerosols from the infected person [13]. According to statistics given by the WHO on February 15, 2021, Pakistan has 564,077 cases reported, 12,333 fatalities, and 525,277 cases recovered as of that date. As mistakes in the coronavirus' RNA genome occur, the virus's RNA is prone to mutation genome quickly mutates. This disease is very infectious due to the fact that it is constantly evolving [14]. Analysis in India predicted that COVID-19 cases will continue to rise as transmission rates increased and seasonal occurrences occurred [15]. Several mathematical models imply that implementing preventative measures such as social distancing, isolation, and contact tracking may slow the transmission of the virus [16]. Humans may be asymptomatic or have the illness if they are not showing symptoms [17]. Not adequately managing asymptomatic individuals, as some have been found to be in Pakistan, might leave them serving as a carrier for others [18]. This was the first study in Swat, Pakistan's in which COVID-19 epidemiological and clinical features were examined. This research will help prevent the spread of the virus in Swat, Pakistan by showing how epidemiology and clinical characteristics are linked.

## METHODS

The research was carried out at tertiary care hospital Swat, Pakistan from April 2020 to June 2021. This study was done in conformity with the Declaration of Helsinki and submitted to the medical ethics review board of the Swat Teaching Hospital, Swat, Pakistan, which was evaluated and approved by the ethical review board. The research participants were divided into three age groups: children aged up to 9 years; teenagers aged 10–19 years; and adults aged >19 years (WHO, 2014). Data collection was carried out from April 2020 to June 2021 from local population who were suspicious or merely for screening reasons they visit to hospital. All the cases were screened for Covid-19 by Nasopharyngeal swab method. RNA extraction was done using a modified Charge Switch Forensic DNA Purification Kit (Invitrogen Life Technologies). Modification done were deactivation step (deactivate of SARS-COV-19 in the sample) for 30 minutes at 25 degrees centigrade (nasopharyngeal swabs in transport medium) with 800 µL L13 buffer adjusted to pH 7, 100% ethanol, dithiothreitol (DTT) at a final concentration of 2.5 mM (for preserving RNA integrity), β-mercaptoethanol (to preserve RNA integrity) and proteinase K (for cell and virus envelopes lysis). After the viral inactivation step the plate was loaded on the Hamilton Automation system for the automated RNA extraction. SPSS version 22.0 was used for statistical

analysis of the data. Interquartile ranges, ranges, percentages, median, and Frequency, were utilized to present data. U-test was employed for comparison across the groups. For association between different categorical groups chi-square test was performed.

## RESULTS

A total of 11610 samples were analyzed in the current study, all participants belonging to Swat. These patients had a median age of 40 yrs, with 21–40 yrs an interquartile range. Six-month-old is the youngest, while the oldest was one hundred years old. Table 1 and shows the gender distribution of Covid-19, with females 1128 (50.60%) being more afflicted than males 1102 (49.40%), but no significant difference in incidence rate. The relationship between gender and covid-19 distribution is seen in Table 1.

Gender	Covid_19		Total	p-value
	Detected	Not Detected		
Male	1102	5094	6196	0.001
Female	1128	4286	5414	
Total	2230	9380	11610	

**Table 1:** Gender wise Distribution of Covid-19

Adults accounted for most COVID-19 active cases, with 886 (40%) patients in the age range of 21–40 years, 686 (31%) in the age range of 41–60 years, 391 (17.5%), and 155 (7%), 45 (2%), and 40 (1.7%) patients in the age range of 61–80, 11–20, and 80–100 and 1–10 years, respectively (Table 2). The research comprised a total of 27 older patients who met the locally recognised threshold of being elderly. A total of 40 (1.7%) of the juvenile patients were also infected (Table 03). The association between age group and novel corona virus, a Chi-square test was used with a p-value less than 0.05. (Table 2)

Gender	Covid_19		Total	p-value
	Detected	Not Detected		
1-10	40	788	828	0.001
11-20	155	1546	1701	
21-40	886	3882	4768	
41-60	686	1980	2666	
61-80	391	892	1283	
81-100	45	130	175	
Total	2203	9218	11421	

**Table 2:** Age wise detected cases of covid-19

## DISCUSSION

According to the WHO, the COVID-19 has accumulated over 1.6 million cases as of April 11, 2020, killing approximately a hundred thousand fatalities [19]. According to recent statistics, the number of COVID-19 cases has surged and will reach more than eighty million worldwide in early 2021, by the WHO. This pandemic also affects Pakistan badly, with an expected total of approximately 0.5 million cases in first quarter of 2021 and a fatality rate of 1.7 per cent, according to the WHO [20]. It was found that the average

age of affected persons was 34 years. The illness had the greatest impact on those in the adult age range (19–59 years). It is estimated that almost 40% of the country's population is made up of adults, while 53% of the population is under the age of 19 according to the results of the country's 1998 census. 5.54 per cent of the overall population is above the age of 60, which amounts to 5.54 million people [21]. When compared to the male population (80.9 per cent), females (19.1 per cent) had a lower incidence of the illness than men (80.9 per cent). Our findings disagree with those of previous research conducted in China, which found that although the proportion of infected females was lower than that of infected males, the difference in the incidence level was not statistically significant [22]. When comparing male and female mice, recent research found that male rats were highly vulnerable to the CoV viruses than their female counterparts. However, there is no credible data to support the notion that sex has an impact on the susceptibility of an infection to occur. As a result, further research is needed to fully understand this behaviour. The original cause of the virus's dissemination may have been Westerners entering Pakistan from Iran, according to some speculation. However, the first instances of COVID-19 were discovered by 20th of February 2020, rather than late January 2020, when the illness epidemic in Iran was initially announced [23]. Consequently, the spread of the virus in Pakistan may be traced back to Iran in the first instance. It was the tourists from Spain who were responsible for the greatest number of infected cases. There is already compelling evidence that the sickness may be transmitted from person to person. In addition, our research reveals that persons who have had greater social contacts are at a peak of risk of contracting illness. Additionally, religious gatherings that were conducted in March contributed to a rise in the spread of infection. Consequently, social distance must be fostered in order to prevent the illness from spreading exponentially further [24]. An unusually large number of healthcare professionals contracted the coronavirus illness during the current coronavirus epidemic in China. The condition was found to impact 3.8 percent of healthcare professionals in China, according to a research conducted in that country [25]. Another article detailed the deaths of twenty-three healthcare professionals and two doctors in China, calling to light the dangers that these health professionals face on a regular basis in the course of their employment. However, when compared to previously published research, the percentage in our study is much greater. Health care personnel' inability to shield themselves from disease transmission, as well as their extended exposure to patients and insufficient awareness of disease

transmission, may have contributed to the rise in such instances [26]. Increased knowledge of self-protection, appropriate supply of personal protective equipment, and a fast reaction may all contribute to a reduction in the vulnerability of healthcare workers to infection [27]. Patient reports revealed that fever, weariness, and abdominal pain were the most commonly reported signs and symptoms by participants. 4.12 percent of the whole patient group, on the other hand, remained asymptomatic throughout. This pattern is similar to that seen in the previous research [28]. It was surprising to find out that 6.70 percent of the patients had had a reduction in their sense of smell and taste. Flu, nausea, cold, sore throat, anorexia, disorientation, myalgia, were also recorded, among other symptoms of the virus [29]. When the COVID-19 epidemic first began in Pakistan, paracetamol, chloroquine, and cetirizine were the most often given medications. Paracetamol, chloroquine, and cetirizine were the next most frequently recommended medications. However, the available evidence is inadequate to determine whether or not drugs have an impact on the outcome of the illness. Paracetamol was the most often recommended medication because it is the safest therapy for controlling COVID-19 symptoms in the absence of ibuprofen, and it was followed by chloroquine, which is being hailed as a "wonder drug" [30]. It is possible that COVID-19 has a connection to the human population as well as animals. There have also been reports of positive SARS-CoV-2 tests in zoo animals. Under experimental settings, chicken and duck eggs were not impacted by COVID-19 in chicken and ducks [31]. The interspecies transmission of COVID-19 was discovered very recently and will need to be handled when several research projects are completed. Various experimental studies have shown that pets may also be vulnerable to SARS-CoV-2 transmitted from humans [32]. The current research has several limitations, including the fact that 53.61 percent of the sample patients were still in the hospital, and it was not possible to determine whether or not they had recovered.

## CONCLUSION

the information gathered was not equally spread around the nation. Furthermore, because of the restricted number of tests done by the hospitals, it was not possible to explore other clinical markers or indicators such as CBC, chest X-rays, CT scans. It had been impossible for us to evaluate further criteria, such as the virus's incubation time, due to the lack of available information, such as the date of commencement of symptoms. The present research is one of the first to provide an epidemiological picture of COVID-19 in Pakistan, and it is one of the most comprehensive. Given its low-middle-income status, Pakistan faces a wide

range of issues, ranging from insufficient healthcare infrastructure to terrible socioeconomic situations. Our research may aid in the identification and development of a response that may assist to mitigate the fast onset of illness.

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## Original Article

## Comparative Effects of Comprehensive Corrective Exercises Versus Muscle Energy Techniques in Patients with Upper Cross Syndrome: A Randomized Controlled Trial

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## ARTICLE INFO

**Key Words:**

Comprehensive corrective exercises, Muscle energy techniques, Upper cross syndrome.

**How to Cite:**

Azam, H., Fatima, N., Asjad, A., Ashraf, I., Asif, T., & Rehman, F. . . (2022). Comparative Effects of Comprehensive Corrective Exercises Versus Muscle Energy Techniques in Patients with Upper Cross Syndrome: A Randomized Controlled Trial: Corrective Exercises Vs Muscle Energy Techniques in Patients with Upper Cross Syndrome. *Pakistan BioMedical Journal*, 5(7).  
https://doi.org/10.54393/pbmj.v5i7.671

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Received Date: 6th July, 2022

Acceptance Date: 14th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Upper crossed Syndrome is one of the most prominent anomalous alignments currently. Janda defines 4 Upper Crossed Syndrome as the involvement of several skeletal system muscles that results in shortness and tightness of the anterior and upper trunk or weakening of the posterior section of the skeletal muscles. Objective: To compare the effects of Comprehensive corrective exercises versus muscle energy techniques in patients with upper cross syndrome. Methods: Randomized controlled trial with non-probability convenient sampling was conducted. Fifty-two patients were randomly allocated into 2 groups. The exercise duration period was of eight weeks and three sessions were conducted in one week. Group A was given muscle energy techniques and Group B was given comprehensive corrective exercises. The study was single (assessor)blinded. NDI and VAS were used as an outcome measure to quantify pain and disability in patients with upper cross syndrome. Measurements were taken at baseline (pretest), 8th week (posttest) and 12th week (follow up). Results: There were 52 diagnosed patients having upper cross syndrome with the mean age of 26.03 in group A (METS) in which 46.2% male and 53.8% females. The mean age of 28.76 in group B (CCEP) in which 65.4% males and 34.6% females. It was resulted that there was significant improvement at each level assessment. Statistically, comparison showed no significant difference were found between comprehensive corrective exercises and muscle energy techniques. However, both VAS and NDI showed better improvement in the CCEP group as compared to the MET group. Conclusion: Both techniques relieved the pain and lowered the disability in upper cross syndrome patients; Whereas, Comprehensive corretive exercises are convinient and easy approach. Furthermore, these set of exercises maintained the effectiveness till 4 weeks post intervention.

## INTRODUCTION

Currently one of most focus abnormal alignment is Upper crossed Syndrome [1]. Upper Crossed Syndrome is defined by Janda as the involvement of different muscles of skeletal system which leads to shortness and tightness of anterior and upper trunk or weakness of posterior part of skeletal muscles. Alteration of muscles activity such as facilitation of different muscles as levator scapula, sternocleidomastoid, pectoralis muscles and inhibition of cervical flexors, serratus anterior etc [2]. The muscular imbalance occurs because of weak/tight and tonic

muscles [3]. The muscle imbalance causes rounded shoulder, forward head posture, scapular deviation and increased thoracic kyphosis. This postural deviation also causes joint degeneration. Joint degeneration also causes pain in some patients but the main cause of pain is due to altered muscle activation [4]. Musculoskeletal disorders basically occurs due to repeated work while handling constant loading in intact posture and this repeated motion causes pain in neck and shoulders which is the primary symptom of upper cross syndrome [5]. The main

cause of the Upper cross syndrome is abnormal posture like the people who work repeatedly in that abnormal posture and this abnormal posture lead to musculoskeletal disorder like UCS [6]. Forward head posture and rounded shoulders are red flags of UCS and these symptoms occurs due to incorrect posture [7]. Muscle energy technique also involves the participation of the person so it is active technique. It is compromised on two features as Reciprocal inhibition and Autogenic inhibition. Limited researches have been done in past which compared these techniques [3]. Many researches showed that MET helps in stretching of several muscles like upper trapezius and strengthening of levator scapulae and lower trapezius [8]. Muscle energy technique and ischemic compression are effective in reducing pain associated with upper cross syndrome [9-10]. The Comprehensive Corrective Exercise Program is advanced approach and consist of corrective exercises. CCEP is designed on the basis of advantages and disadvantages of previous exercises. CCEP not only reduces the pain of specific body parts but also focus on correction of muscle imbalance and altered activation of muscle, healthy posture of the whole body [11-12]. MET is basically a technique in which person use voluntary contraction in precise controlled manner against operation countered force. MET used to decrease pain, muscle spasm, tone, improve blood circulation and strengthen the weakened structures [13-14]. It is important to involve patient's own participation, as muscle energy technique is an active technique. In static stretching all the work done is by therapist. Muscle energy technique compromised of two stages reciprocal inhibition and autogenic inhibition. Autogenic inhibition is defined as relaxation of the muscle is followed by the contraction and tension of that muscle as compared to reciprocal inhibition is known for relaxation of a muscle followed by stretch or tension [15]. CCEP is latest approach and effective because these corrective exercises are essential worldwide for the correction of malalignments but despite knowing its popularity and effectiveness, very few researches have been done on this approach [11]. In addition researcher focused to assess one of affected areas such as spine, shoulder, head, neck individually and describe other malalignments, altered muscle dysfunction and other movement patterns deformities [16-18]. Furthermore the plan of care is designed in such a way that strengthening of weak muscles and stretching of short muscles are prescribed at the region of affected areas [18]. In regards CCEP are best to correct alignment, movement dysfunction and posture correction [19].

## METHODS

It was a Randomized Controlled trial. Data were collected

from Physiotherapy department, Federal Medical and Rehabilitation Centre Lahore. Study was completed within 9 months after the approval of synopsis. The calculated sample size using pain as outcome measure was 26 in each group and after adding 20% dropout the sample size was  $26+5=31$  in each group. Non-probability convenient sampling technique was used to collect data. Inclusion criteria was: (1) Both gender, (2) Neck pain history of 4-12 weeks, (3) Aged between 20 to 35 years and (4) Patients diagnosed with upper cross syndrome. Exclusion Criteria was: (1) Any other impairment or disability (history of joint disease, pelvis/spine fracture or surgery), (2) History of cervical spine surgery with vascular syndrome, (3) Those with infection or history of trauma of spine, (4) Other neurological disorders. The rules and regulations set by the ethical committee of university of Lahore were followed while conducting the research and the rights of the research participants were respected. Written informed consent (attached) was taken from all the participants. Research Ethical Committee approval was taken (REC: IRB-UOL-FAHS/890-III/2021). Authors had prospectively registered the trial in Iranian Registry of Clinical Trials on 2021-10-08 (IRCT20210730052025N1). After approval, diagnosed patients of UCS were screened and 52 patients were randomly allocated in 2 groups (26 patients in each group). The demographic data was obtained by interview. The study was single blinded. The assessor was unaware of which treatment given to both groups. The exercise duration period was of eight weeks and three sessions were conducted in one week. Each session was of 45 minutes. Group A: This group received Muscle energy technique (METs) with routine physical therapy (hot pack for 15 minutes, mobilization, AROM). Reciprocal inhibition of METs was used for upper trapezius, levator scapulae and pectoralis major muscles. It involved patient's own muscle relaxation which is minimum to maximum therapist's force, 5-7 repetitions per session, 3 days a week for eight weeks. Muscle length is changed from shortened position to lengthened ones. Autogenic inhibition (Concentric inhibition): Target muscles which involve levator scapulae, pectoralis major, upper trapezius causing relaxation. Muscle is lengthened to shortened position. Patient's force is greater than therapist's. 5-7 repetitions per session, 3 days a week for eight weeks. Group-B: They received Comprehensive Corrective Exercises with routine physical therapy. CCEP consisted of three stages such as initial, improvement and maintenance Exercise technique involved in Upper cross syndrome ranges from frequency, intensity and duration as the muscles are strengthened enough. The initial phase consists of internal focus of attention. Participants are advised to contract hypoactive and relax hyperactive muscles for the correction of

scapular muscles. Initial phase involves restoration of muscle balance. Initial phase includes series of exercises such as in figure lying in supine position with support of foam roll in various abducted arm positions as external rotation, diagonal positions and military press. Improvement phase involves upper extremity motion in various training positions. Exercise progression with the help of dumbbell, thera band or exercise gym ball. Exercises in sitting and prone position on gym ball and standing on balance board. This phase helps to improve uncorrected static posture. The exercises in Maintenance phase are same as in improvement phase but without any increase in frequency and intensity and participants have to maintain exercise adaptations for two weeks. Pain was measured by Visual Analogue Scale (VAS) whereas, functional disability was measured by Neck Disability Index (NDI). The outcome measures were assessed by assessor at baseline, 8th week and 12th week. Data were analyzed using SPSS version 24.0. The quantitative variables like age were presented in the form of mean  $\pm$  SD and qualitative variables like pain and disability were presented in the form of frequency and percentage. Normality of the data was assessed with Kolmogorov Smirnov test. Difference between groups was assessed with the help of independent sample t- test/ Mann Whitney U test. However, within group differences were measured by repeated measures Anova for NDI and Friedman test for VAS. P-value  $\leq$  0.05 was considered significant.

## RESULTS

There were 52 diagnosed patients having upper cross syndrome with the mean age of 26.03 in group A (METS) in which 46.2% male and 53.8% females. The mean age of 28.76 in group B (CCEP) in which 65.4% males and 34.6% females. The tests of normality showed that the data was normally distributed for NDI ( $p > 0.05$ ), therefore parametric test; Repeated Measure ANOVA was used to assess functional disability. Whereas, for VAS, data was not normally distributed therefore nonparametric test of Repeated Measures ANOVA was used for VAS (Table 1).

Variables	Type of intervention	Kolmogorov-Smirnova	
		Statistics	p-value
NDI_ Baseline	METS	0.098	0.200*
	CCEP	0.175	0.050
NDI_4 weeks	METS	0.119	0.200
	CCEP	0.180	0.063
NDI_12 weeks	METS	0.178	0.054
	CCEP	0.204	0.077
VAS baseline	METS	0.204	0.007
	CCEP	0.213	0.004
VAS (8th weeks)	METS	0.222	0.002
	CCEP	0.234	0.001
VAS (12th weeks)	METS	0.227	0.001
	CCEP	0.214	0.003

**Table 1:** Normality Testing

Repeated measures ANOVA used for the comparison within the group from baseline to 12 weeks. ANOVA shows that there was statistically significant improvement in pain intensity at each level of assessment i.e., Assessment at baseline, 8 weeks and after the treatment (Table 2).

Treatment Groups	Statistics	Within Group Comparison				p-value
		NDI Baseline	NDI 4th Week	NDI 8th Week	NDI 12th Week	
METS	Mean $\pm$ SD	37.34 $\pm$ 3.01	24.04 $\pm$ 3.91	15.27 $\pm$ 3.75	37.34 $\pm$ 3.01	0.001
	Minimum	32.00	18.00	7.00	32.00	
	Maximum	45.00	32.00	21.00	45.00	
CCEP	Mean $\pm$ SD	35.31 $\pm$ 3.96	17.92 $\pm$ 4.12	9.61 $\pm$ 3.05	35.31 $\pm$ 3.96	0.001
	Minimum	27.00	10.00	1.00	27.00	
	Maximum	42	26.00	15.00	42	

**Table 2:** Comparison within group using Repeated Measure ANOVA

The results regarding pain intensity using VAS at baseline showed the that mean and standard deviation of pain score were found to be  $6.9 \pm 7.5$  and  $1.16 \pm 1.10$ , minimum  $5.0 \pm 5.0$ , maximum  $10.0 \pm 9.00$  and in Group A (METS) and Group B (CCEP). The results regarding pain intensity using VAS at 4 weeks showed the that mean and standard deviation of pain score were found to be  $3.7 \pm 7.50$  and  $1.25 \pm 1.03$ , minimum  $2.0 \pm 1.0$ , maximum  $6.0 \pm 5.0$  and in Group A (METS) and Group B (CCEP). The results regarding pain intensity using VAS at 12 weeks or after treatment showed the that mean and standard deviation of pain score were found to be  $1.7 \pm 1.0$  and  $1.2 \pm .89$ , minimum  $.0 \pm .0$ , maximum  $4.0 \pm 3.0$  and in Group A (METS) and Group B (CCEP) (Table 3, 4).

Groups	Outcome Measures	Mean $\pm$ SD	Minimum	Maximum
METS	VAS at baseline	6.92 $\pm$ 1.16	5.00	10.00
	VAS at 4th week	3.73 $\pm$ 1.25	2.00	6.00
	VAS at 12th week	1.77 $\pm$ 1.24	0	4.00
CCEP	VAS at baseline	7.50 $\pm$ 1.10	5.00	9.00
	VAS at 4th week	3.23 $\pm$ 1.03	1.00	5.00
	VAS at 12th week	1.00 $\pm$ 0.89	0	3.00

**Table 3:** Within Group Comparison for VAS through Friedman Test

Mann-Whitney U Test- Between Group Comparison for VAS				
Outcome Measures	Treatment Groups	Mean Rank	p-value	
VAS (baseline)	METS	0.00	0.053	
	CCEP	13.50		
VAS (8th weeks)	METS	0.00	0.237	
	CCEP	13.50		
VAS (12th weeks)	METS	0.00	0.018	
	CCEP	13.50		

**Table 4:** Inferential Statistics for both treatment groups using VAS

## DISCUSSION

The study aimed to determine the effects of muscle energy techniques and comprehensive corrective exercises in patients with upper cross syndrome. The study also shows that CCEP is more effective as its effects are maintained after four weeks of detraining period. The study aimed to evaluate the effectiveness of muscle energy techniques

and comprehensive corrective exercises on pain and functional disability in patients of upper cross syndrome using neck disability and Visual Analogue scale and comparing the effects of both exercises on baseline, 8 weeks and at 12 weeks the detraining period [20]. In this study research, Comprehensive Corrective exercises had positive effects in patients with upper cross syndrome in reducing pain and functional disability after implementation of these exercises. Exercise intervention will be beneficial in reducing pain and musculoskeletal injuries due to posture in patients of upper cross syndrome. Stretching and strengthening exercises are essential in upper cross syndrome [2]. We propose to evaluate the effectiveness of CCEP and METS in patients aged between 20-35 years with UCS in terms of posture correction, reducing pain and functional disability. According to different studies, researchers believed that it is important for UCS patients to correct their posture, alignment as they may contributed many musculoskeletal injuries and motor control issues [21]. The results of this study showed that the decline of pain and improves by comprehensive corrective exercises and muscle energy techniques in upper cross syndrome. Statistically, no significant differences were found between comprehensive corrective exercises and muscle energy techniques with a p-value ( $p > 0.05$ ). Another study also conducted in 2020 which showed the effectiveness of CCEP in patients of Upper cross syndrome. The results of the study showed that these exercises are effective in improvement of posture, alignment and activation of movement patterns. The results showed that corrective exercises effectively improves disability and reduce pain in Upper cross syndrome [12]. Another literature conducted in 2020, on the comparison of muscle energy technique and conventional therapy. The results of the study of showed that pain and disability in upper cross syndrome is improved by conventional therapy and muscle energy techniques. However MET is superior to conventional therapy to reduce pain and functional disability. Therefore MET is feasible and more effective as compared to conventional therapy in patients of upper cross syndrome [22]. The research is started in pandemic so people are avoiding to visit hospitals. Due to Covid-19, we have to wait for too long for the completion of data. Sample size in this research is small. More age groups are invited for the research study. There should be multicenter studies as the study is conducted in only three centers. Further studies can be conducted to see the effects of CCEP on other muscle groups. This study suggests future researchers to increase the sample size as this size of data is smaller to investigate the effects of techniques. Future investigators should add more age groups to get clearer picture.

## CONCLUSION

The present study shows that comprehensive corrective exercises are convenient and easy approach to improve disability and pain in patients with upper crossed syndrome. As the improvements in patients maintained 4 weeks after treatment. The results of this study showed that the decline of pain and disability improves by comprehensive corrective exercises in upper cross syndrome.

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## Original Article

## Immuno-histochemical Expression of Cyclin D1 in Oral Squamous Cell Carcinoma, Oral Potentially Malignant Disorders, and Normal Oral Mucosa

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## ARTICLE INFO

**Key Words:**

Oral Potentially Malignant Disorders, Oral Squamous Cell Carcinoma, Cyclin D1 Immuno-histochemistry

**How to Cite:**

Bakhtiar, S. ., Nasir, S. ., Zia, S. ., Maryam, H. ., Kamran, N. ., & Ali, K. . (2022). Immuno-histochemical Expression of Cyclin D1 in Oral Squamous Cell Carcinoma, Oral Potentially Malignant Disorders, and Normal Oral Mucosa: Cyclin D1 in Oral Squamous Cell Carcinoma. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.674>

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Received Date: 19th May, 2022

Acceptance Date: 26th May, 2022

Published Date: 31st May, 2022

## ABSTRACT

Due to a high risk and tendency of OPMDs towards OSCC, its early detection is essential for better survival rate. Several molecular markers are available for diagnosis and prognostic assessments of OPMDs, also evaluating aggressiveness of OSCC. **Objectives:** To assess the immuno-histochemical expression of Cyclin D1 in OSCC, OPMDs, and normal healthy oral mucosa. Cyclin D1 has a significant role in cell cycle control and also strongly linked with the metastatic and poorly differentiated tumour cells. **Methods:** The study comprised of already diagnosed 20 cases of OSCC, 20 cases of OPMDs, and 20 normal oral mucosa cells, as a control. **Results:** Cyclin D1 immuno-reactivity was found positive in 100% cases of OPMDs, and 100% in OSCC but not in normal oral mucosa cells. **Conclusion:** A statistically significant expression of Cyclin D1 was observed in OPMDs which may indicate the probability of their transformation to OSCC.

## INTRODUCTION

Oral cancer predominantly arises from epithelium cells in which 90 to 95% are diagnosed as Oral Squamous Cell Carcinoma (OSCC) [1]. OSCC is one of the 10th most prevalent malignancies worldwide, responsible for approximately 300,000 new cases and about 145,000 deaths on annual basis [2]. It is the most frequent reasons of death consisting about 50% of the entire cancers [3]. In the United States, 63000 new cases of head and neck cancers are likely to occur in 2017 accounting approximately 4% of newly diagnosed cancers [4]. OSCC is among the most leading malignancies in South and Southeast Asian countries where, it is the second common malignancy in Pakistan (both in male and female) but first

among males with 15.9% new cases and second after breast cancer in females [5,6]. The commonly affected sites of OSCC are tongue, floor of the mouth, and buccal mucosa [7]. The well-established risk factors involved in its development are tobacco use and aggressive intake of alcoholic beverages [8]. Other possible risk factors can be Human Papilloma Virus (HPV) infections and nutritional deficiencies, among others [9]. Tobacco can be consumed in chewable and non-chewable forms. In South Asia Chewable tobacco is more common in form of naswar, paan, and gutka, among others. In Pakistan, common habits of taking excess amount of areca nut or any sort of smokeless tobacco betel quid, gutka, pan masala, naswar,

tobacco, main puri, and mawa promotes higher incidence of oral cancer [10]. OSCC is usually preceded by changes in the mucosa for years or as a result of already existing oral lesions commonly known as oral potentially malignant disorders (OPMDs) [11]. These are clinical presentations that carry an increased risk of cancer development in the oral cavity in a clinically definable precursor lesion or in clinically normal healthy mucosa [12]. Oral leukoplakia, erythroplakia, actinic cheilitis, oral lichen planus, and oral sub-mucous fibrosis are generally categorized as oral potentially malignant disorders [13]. Incidence of oral potentially malignant disorders ranges between 1-5% world-wide [1] and about 4.32% cases of OPMDs have chance of converting into malignancy [14]. Different diagnostic markers have been identified which are helpful in detection of the lesions that are at risk of malignant transformation. Out of these diagnostic markers, Cyclin D1 is one of the vital protein that plays major role in cell cycle regulation [15]. The CCND1 gene on chromosome band 11q13, encodes CyclinD1 protein and promotes development of cell cycle throughout the G1-S phase. High expression of Cyclin D1 accelerates the G1 phase alteration, leading to the abnormal cell proliferation. Thus it was proposed that cyclin D1 is strongly linked with the metastatic and poorly differentiated tumour cells [16]. Due to high risk and tendency of OPMDs towards malignancy, its early detection is essential for better survival rate. Thus several molecular markers are available for diagnosis of OPMDs however the development of additional, new reliable markers may aid in the precise prognostic assessment of OPMDs and aggressiveness of OSCC. Immuno-histochemical analysis of Cyclin D1 could be helpful in assessing OPMDs prognosis and potential for malignancy. Our study aims to evaluate and assess the expression of Cyclin D1 in OSCC and OPMDs, in addition to analyse the prognostic role of OPMDs.

## METHODS

This descriptive cross-sectional research study was conducted in Pathology Department of Peshawar Medical College, which consisted of histologically diagnosed 20 cases of OSCC and 20 cases of OPMDs. The samples were collected through the non-probability convenient sampling technique. Already diagnosed Formalin-Fixed Paraffin Embedded (FFPE) blocks were obtained from the Pakistan Institute of Medical Sciences (PIMS), Histopathology Department's archives. Patients with recurrent tumours and those undergoing chemotherapy or radiation were excluded. 20 normal healthy supra oral mucosa cases from the alveolar ridge were obtained from the patients coming to Peshawar Dental College for tooth extraction or other dental procedures, after taking informed consent from

them. Before starting the study, Ethical approval was taken from the institutional review board under the approval No. Prime /IRB/2019-178 of Prime foundation. Cyclin D1 immunohistochemistry was done on sections with the maximum epithelial content after histopathological examination of various kinds of OPMDs and OSCC. The immunohistochemistry (IHC) slides were subdivided into five groups. Each batch contained one slide of Mantle cell lymphoma as a positive control. Antigen retrieval was accomplished using a microwave oven, during the procedure. For immuno-histochemical labelling of selected sections, a primary antibody (monoclonal mouse antihuman Cyclin D1) and a secondary antibody (Dako EnVision™ detection system) were applied. During procedure antigen retrieval was carried out using microwave oven. (Monoclonal Rabbit anti human CyclinD1) as primary antibody and (Dako EnVision™ detection system) as secondary antibody were used for immuno-histochemical staining of selected sections. Cyclin D1 immuno-positivity was assessed by the presence of brown colour immunostaining in the nucleus. Scoring criteria for Cyclin D1 immuno-positivity was categorized using scoring method prescribed by Dhingra, 2017 [17]. At 400X magnification, the expression of positive cells was assessed in at least five areas and then was graded as (1) 1-25%, (2) 26-50%, (3) 51-75%, and (4) >75%. Immunostaining intensity of Cyclin D1 was scored as (1) Mild (2) Moderate, and (3) Strong staining. Total Scoring (TS) of CyclinD1 was calculated by multiplying Expression Score (ES) with Intensity Score (IS) to produce an Immuno-Reactivity Score (IRS), which was then graded as (1-4) mild, (5-8) moderate, and (9-12) strong. For the statistical analysis, statistical package for social sciences (SPSS) version 20.0 was used. P-value  $\leq 0.05$  was considered as statistically significant.

## RESULTS

Most of the patients age in OSCC and OPMDs were above 60 years, presenting with mean ages of 56.7 and 57.85 years, respectively. MF in OSCC was 1:1.2 while in OPMDs it was 2:3. Cyclin D1 expression was found positive in all layers of squamous epithelium in OSCC. In (80%) cases of OPMDs, Cyclin D1 staining was restricted to basal layer only while (20%) cases showed staining both in basal and supra-basal layers of squamous epithelium, Table 1.

Staining	OSCC			Total	Oral Leukoplakia	Oral Lichen Planus	Total (n%)
	WDSCC	MDSCC	PDSCC				
Basal Layer Only	-	-	-	20 (100%)	8	8	16 (80%)
Basal and Supra-basal Layers	-	-	-		2	2	4 (20%)
All Layers	6	7	7		-	-	20 (100%)

**Table 1:** Allocation of the cases according to groups and pattern of staining for Cyclin D1 immuno-reactivity

The statistical comparison made among the 3 study groups (OSCC, OPMDs, and Normal Oral Mucosa) for Cyclin D1 immuno-reactivity showed significant results p value (<0.05), Table 2.

CyclinD1 immune-reactivity	OSCC n (%)	OPMDs n (%)	Normal oral mucosa n (%)	Total	P-Value
Positive	20	20	-	40	<0.05
Negative	-	-	20(100%)	20	
Total	20	20	20	60	

**Table 2:** Comparison of Cyclin D1 immuno-reactivity status between OSCC and OPMDs normal oral mucosa (\*p value by Chi Square test)

Table 3 shows that in OSCC, all the 20 cases (100%) showed strong intensity. All 6 cases (100%) of Well Differentiated Squamous Cell Carcinoma (WDSCC) had strong Cyclin D1 staining intensity. All the 7 cases (100%) of Moderately Differentiated Squamous Cell Carcinoma (MDSCC) expressed strong Cyclin D1 staining. In the cases of Poorly Differentiated Squamous Cell Carcinoma (PDSCC), in all 7 cases (100%) the intensity of staining of Cyclin D1 was strong.

Cyclin D1 staining Intensity	OSCC			Total (n %)
	WDSCC (n %)	MDSCC (n %)	PDSCC (n %)	
Mild (1)	-	-	-	-
Moderate (2)	-	-	-	-
Strong (3)	6(100%)	7(100%)	7(100%)	20(100%)
Total	6(30%)	7(35%)	7(35%)	20

**Table 3:** Cyclin D1 staining intensity among the cases of OSCC

Table 4 explains that in all 20 cases of OPMDs, staining intensity of Cyclin D1 was weak in 7 cases (35%), and moderate in 13 cases. Mild staining intensity of Cyclin D1 was found in 4 (40%) cases, and moderate in 6 (60%) cases, out of 10 cases of Oral Leukoplakia. Out of 10 cases of Oral Lichen Planus the staining intensity of Cyclin D1 was observed to be weak in 3 (30%) and moderate in 7 (70%) cases.

Cyclin D1 staining Intensity	OPMDs		Total (n %)
	Oral Leukoplakia	Oral Lichen planus	
Mild (1)	4 (40%)	3 (30%)	7 (35%)
Moderate (2)	6 (60%)	7 (70%)	13 (65%)
Strong (3)	-	-	-
Total	10 (50%)	10 (50%)	20

**Table 4:** Cyclin D1 staining intensity among the cases of OPMDs

## DISCUSSION

In the current study, the most common age group of patients diagnosed with OSCC and OPMDs were over 60 years, with mean age in OSCC was 56.76 years. One such study in Pakistan found similar findings, with the average age of the sample population being 53.13 with a range of 25 to 80 years [18]. But contrary to our cross sectional study results (where the age group for OSCC cases was not limited), mean age of 48.35 years was reported with the age

range of 20-85 years in a study conducted in India [19]. In our study, the observed mean age was 57.85 years in case of OPMDs, our results are supported by a research study, done in Brazil who reported that average age for OPMDs had been 60 years [20]. In contrast, a study conducted in Saudi Arabia, found the younger age range of (30-40 years) in case of OPMDs [21]. The differences in age groups can be due to small sample size of our study. Males are generally more affected from OSCC and OPMDs as compared to females. But in the present study, female showed predominancy than males. In this study, M & F in OSCC was 1:1.2, comparable to our findings, studies done in Lebanon, Singapore and Sweden also found similar results in Bulgaria, Austria, Denmark, Ireland, and England [22]. In contrast to our findings, males constituted almost 75% of the study to determine the clinic-pathological significance of cyclin D1 in oral cancers [23]. In case of OPMDs, the male to female ratio in our study was 2:3, similar with Iranian research studies which showed female pre-dominancy [24]. A study done in Brazil in which (males constituted 78% while female constituted 59% of the study population) showing contrast to our findings [25]. In the present study, a statistically significant ( $p < 0.05$ ) (Table 1) relation was found between the immune-reactivity score of OSCC, OPMDs and Normal healthy oral mucosa. Similar strong relation of the cancer cells for expression of Cyclin D1 using immune-histochemical methods (to determine its expression in tumour specimens) was reported in a research study conducted in Tokyo, Japan [26]. In present study all the 20 cases of OSCC showed strong staining intensity for Cyclin D1 (Table 2). A study done in India almost showed similar results to our findings, demonstrated that most of the WDSCC cases (80%) showed strong Cyclin D1 staining intensity [27]. However, in contrast to our findings, an another study from India demonstrated that 60% cases of OSCC showed mild to moderate intensity for Cyclin D1. In OPMDs, out of all 10 positive cases of leukoplakia, 40% cases showed mild while 60% cases showed moderate Cyclin D1 staining intensity. Contrary to our results, a study done in India found that 52.38% cases of oral leukoplakia showed mild while 33.33% showed moderate staining intensity for Cyclin D1 expression which showed that intensity of Cyclin D1 increases with decrease in severity of the lesion [28]. The discrepancy in staining intensity of Cyclin D1 can be due to large sample size of the Indian study. After extensive literature research no study could be found of Cyclin D1 expression in oral lichen planus. Similar to our study where the normal oral mucosa showed negative Cyclin D1 expression, a study conducted in India considered the expression of Cyclin D1 to be negative in normal cells i.e. <10% [29]. But in contrast to an another study done in India in which 60% cases of normal oral mucosa showed mild

staining of Cyclin D1 in basal and para-basal layers of squamous epithelium [27]. A larger sample size for research study in order to establish the effectiveness of Cyclin D1 is recommended. The study should also have follow up to assess role of Cyclin D1 in progression of OPMDs to OSCC as expression of Cyclin D1 was seen both in basal and supra-basal layers of OPMDs but was observed in all layers of OSCC. Thus Cyclin D1 expression significantly changed ROM oral epithelial dysplasia to OSCC. As oral cancer is mostly preceded by oral pre cancer so it specifies that increased expression level of Cyclin D1 could be an early event in Oral cancer progression. Thus, Cyclin D1 marker might be valuable in assessing their prognosis and potential for malignancy.

## CONCLUSION

Early detection of the transformation of OPMDs towards OSCC is necessary for the improvement of survival rate. Upon assessment of immune-histochemical expression of Cyclin D1 in OSCC, OPMDs, and normal oral mucosal cells, we were able to find positive expression of Cyclin D1 in OPMDs and OSCC but it didn't show any expression in normal oral mucosal cells. The results thus, indicate the probability of OPMD transformation into OSCC.

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## Original Article

## Prevalence of Carpal Tunnel Syndrome among Butchers in Pakistan

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## ARTICLE INFO

## Key Words:

CTS (Carpal Tunnel Syndrome), VAS (Visual Analogue Scale)

## How to Cite:

Hayder, A. ., Fatimah, A. ., Uzair Asghar, H. M., Maqbool, S. ., Shad, M. ., Zaheer, B. ., Siddiqui, O. . & Hussain, A. . (2022). Prevalence Of Carpal Tunnel Syndrome Among Butchers In Pakistan: Carpel Tunnel Syndrome among Butchers. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.676>

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Received Date: 12th July, 2022

Acceptance Date: 20th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Carpal Tunnel Syndrome (CTS) is an ailment in which median nerve is trapped in carpal tunnel and as a result a person feels tingling, numbness, and weakness in the wrist joint. It is most caused when excessive pressure is applied on the wrist joint. Most of the professionals go through this condition because of the nature of their work. Hairdresser, dentists, and labourers are commonly affected by this condition. **Objective:** This study determines the prevalence of CTS among butchers in Pakistan. **Methods:** Butchers from different cities of Pakistan were selected to check out the prevalence of CTS. 400 butchers from different cities of Pakistan were selected. Observational study design was carried out and convenient sampling was used to collect the data. The butchers having the age of 20 to 40 years were included with having an experience of 3 years or more. All the butchers should use the manual instruments during the processing of meat. They were told about the purpose of our research and a consent form, personally designed CTS diagnosis questionnaire, Visual Analog Scale (VAS) and Boston Carpal Tunnel Syndrome Questionnaire (BCTSQ) were filled by them. Functional limitations and symptoms severity of butchers with CTS were also assessed. **Results:** The prevalence of CTS among butchers in Pakistan was 10.3%. The butchers having age between 26-30 years had 46% cases of CTS among them. 21-25 years old butchers had 17% of affected butchers among them. According to experience, butchers having 3-5 years' experience was the most affected among them. 34% butchers of 3-5 years' experience were involved. There was moderate level of functional limitation in CTS affected butchers according to BCTSQ. Next thing was the symptom severity with moderate level of symptoms severity was present in butchers suffering from CTS. **Conclusion:** The prevalence of CTS among butchers in Pakistan was 10.3%. All the butchers suffering from CTS had moderate level of intensity of pain. There was a moderate level of functional limitation and symptoms severity related to CTS affected butchers.

## INTRODUCTION

Wrist joint is a synovial joint of the upper extremity. It is an important joint in performing the activities of daily life. Wrist joint is made proximally by the distal end of radius and the articulating disk and distally by the proximal row of carpal bones excluding pisiform. Muscles that work on wrist joint are as Extensor Carpi Radialis Longus, Extensor Carpi Radialis Brevis, Flexor Carpi Radialis, Flexor Carpi

Ulnaris, and Palmaris Longus [1]. CTS is common among many professions because of the constant usage of wrist joint in the movement. If heavy force is applied on the wrist joint during the performance of activity, it can lead to CTS. Those professionals who suffer from CTS include hairdressers, cashiers, boat drivers, car drivers, household workers and dentists [2]. CTS is a condition in which there

is tingling, numbness and weakness in the hand. All this caused due to pressure on median nerve. Median nerve goes through the arm and passes through a passage called carpal tunnel. When pressure is applied on the nerve at this junction then the patient feels numbness and tingling in the hand. Median nerve is responsible for the movement and feeling of thumb and is also responsible for movement of hand except little finger [3]. In order to carry out diagnosis of CTS first of all doctor takes history of the patient. Through that he gets the idea what can be the possible disease. The next step is the performance of physical exams to check out the location and the position in which pain is present. In this way the physician removes the chances of arthritis and other conditions [4]. High BMI can be a reason due to which there can be CTS among people. Railway Workshop Kalka workers went through a complete examination in which they were assessed for CTS on the basis of their BMI [5]. Among those female dentists are at greater risk factor as compared to males. According to that study obese dentists are most commonly affected by CTS [6]. Ultrasound therapy is also useful in this case. If the main is not relieved by conservative and physical therapy treatment in 6 months, then the patient had to undergo surgical treatment. There are two methods used. First one is open surgery; surgeon makes a 2-inch opening that extends from wrist to palm. The second procedure is endoscopic surgery, two small cuts are made and camera is guided inside. After the process of surgery, ligament come backs together. Now there is more space available for median nerve to easily go through carpal tunnel [7]. As they daily face conditions which can lead to CTS like vibration, heat pressure and working period. So, after the study it was concluded that 82.2% prevalence of CTS among boat drivers [8]. It is thought that cashiers also perform such activity which can lead them to CTS. In order to find out, a study was conducted to evaluate thing but the results were surprising. Only 2% cashiers were affected by CTS [9]. Hairdressing is an occupation in which there is a great risk for the occurrence of CTS. In order to look into the issue, a research was conducted on 109 hair dressers. 22 were suffering from CTS. 10 had mild CTS, 7 had moderate, and 5 were severely affected by it. Those suffering from severe CTS had numbness and pain in both of their hands [10]. Certain study was conducted in which hairdressers were asked about musculoskeletal changes in their wrist joint. Other factors like condition of skin and respiratory issues were also looked into. The results showed that hairdressers are facing many health issues including skin disease, musculoskeletal complications, and other respiratory complexities [11]. Many personnel from hair dressing profession face pain in different body parts due to the nature of their work. Hair dressers complained pain in their

spine, shoulder, hands, wrists, and lower limb [12]. For the treatment of CTS, there are three methods; a) conservative, b) physical therapy, and c) surgical technique. Conservative method consists of usage of ice pad, heat pads, wrist bands, sensory gloves, and medication. In conservative management braces and gloves are also used in order to reduce movement on joint. For this purpose, we use wrist band and sensory gloves. They reduce the flexion and extension on the wrist joint [13]. Conservative management was conducted on 37 patients for one year. After one year there was great improvement in the patients. There were symptoms of pain reduction, symptoms reduction, and better electronurography score. A conservative management helped many patients to get them fit without the application of surgery or other processes [14]. There were some studies that corticosteroid injections can be used to treat CTS conservatively. In order to verify this further study was carried out and the results showed that corticosteroid injections are also used in conservative treatment but the results are inconclusive [15]. Physical therapy treatment is also beneficial for the treatment of CTS. The patient is advised stretching and strengthening exercises so that there is reduction in the pain as well increase in movement. Recent studies show that if conservative management is carried out with physiotherapy intervention it will be more beneficial for the treatment of CTS and patient will be safe from surgery [16]. Surgical procedure is performed if the symptoms persist for more than 6 months. Before starting the surgery, the patient should be prepared pre operatively so that the process of healing takes place smoothly [17].

## METHODS

This research was to contemplate the prevalence of CTS Amongst Butchers in Pakistan by Students from University of Management and Technology (UMT), Lahore. Survey method was adopted in this research. A survey was conducted amongst Butchers to gather the information regarding CTS. This is a quantitative study comprising of local Butcher population. Sample size was 400 local Butchers using manually operating instruments. For inclusion and exclusion criteria, all butchers working in meat shops between the age of 20 to 40 years, utilizing manual instruments to process meat were included and Butchers with age less than 20 years and more than 40 years with at least 3 years of experience, using automatic meat processing instruments, along with individuals suffering from congenital abnormalities, systemic diseases, and rheumatoid arthritis were all excluded. The data collection tool was a survey. A Personally Designed CTS Diagnosis Questionnaire was used to collect data for the prevalence of CTS amongst Butchers in Pakistan. To



access the severity of pain, VAS was used. In butchers suffering from CTS, BCTSQ was used to find symptoms severity and functional limitations among affected Butchers. The questionnaire collected demographic data and helped to diagnose CTS. The Study was completed one month after the synopsis's approval.

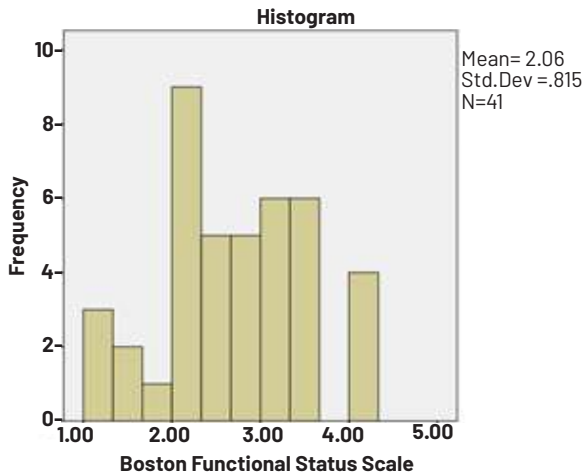
**RESULTS**

Table 1 shows the demographics of the participants involved. Total 400 patients were included in this study. The gender distribution was 400 (100%), males only. 80.2% of butchers were married while only 20.0% butchers were single. 79% of butchers were right handed and only 21% were left handed. The results showed that only 10.3% butchers had CTS in Pakistan.

<b>Gender</b>	400 (100%)
<b>Age</b>	M21-25 (81), 26-30 (203), 31-35 (55), 36-40 (61)
<b>Marital Status</b>	20.0% (S),80.2% (M)
<b>Working Hand</b>	79% (R),21% (L)
<b>CTS</b>	41 (Y),359 (N)

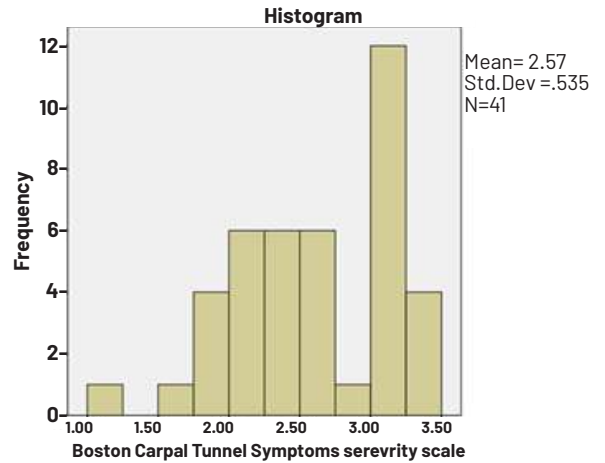
**Table 1:** Descriptive statistical analysis (N=400); M (Males), S (Single), M (Married), R (Right), L (Left), CTS (Carpal Tunnel Syndrome), Y(Yes), N(No)

Figure 1 depicts the butchers suffering from CTS as assessed for functional limitation using BCTSQ. According to the results most of the butchers suffering from CTS had moderate functional limitations. 31 butchers had a moderate functional limitation, 6 butchers had mild functional limitations, and 4 of them were suffering from severe functional limitations.



**Figure 1:** Boston Functional Status Scale

Figure 2 shows Boston CTS severity scale. The next part of BCTSQ was to check out the level of severity of symptoms of CTS. The results showed that 24 butchers were having moderate severity of symptoms, 16 butchers showed the severe symptoms, and 1 had mild severity of symptoms.



**Figure 2:** Boston CTS Severity Scale

Table 2 shows the VAS, assisting us to identify that 31 out of 41 butchers suffering from CTS had moderate pain. Only 8 butchers had severe pain and 2 butchers had mild pain.

VAS scale	Frequency (%)	Valid Percent	Cumulative Percent
Mild	2 (0.5%)	4.9	4.9
Moderate	31 (7.8%)	75.6	80.5
Severe	8 (2.0%)	19.5	100.0
Total	41 (10.3%)	100.0	

**Table 2:** Visual Analogue scale VAS related to CTS

**DISCUSSION**

Carpal Tunnel Syndrome (CTS) is a disease which is related to wrist. There is a nerve entrapment in this condition. Median nerve is entrapped near carpal tunnel and it is caused due to repetitive movement of wrist. This disease is caused when excessive pressure is applied on the wrist. This condition leads to numbness, tingling and weakness in the wrist. Person is unable to perform their daily activities. Mostly people suffering from CTS belong to different profession. They perform such work during their duties due to which there is excessive pressure on the wrist and they get symptoms of CTS. Most commonly effected professionals are hair dressers, boat drivers, car drivers, and dentists. The positioning of their hand is such that it causes pressure on the wrist and as a result median nerve is affected. There is constant usage of hand in these professions [7]. So, according to our research 10% population of butchers in Pakistan is suffering from CTS. Hair dressers are such professionals who had to daily perform same routine all day. During their work they hold a pair of scissors and machines in such pattern in which there is a constant pressure on their wrist. They suffer from CTS and many leads towards chronic state. As a result, they have to leave this profession. We looked in butchers and there were cases of CTS among them. This disease is also affecting butchers at some level as well [17]. A study was conducted in King Fahad Hospital, Saudi Arabia in which

laboratory workers were studied. They use to perform repetitive movements in there working conditions. The prevalence among them was only 9.7%. We looked in butchers for the prevalence of CTS. The results showed that only 10.3% prevalence was present among butchers [18]. A study was conducted in turkey to check the prevalence of CTS among female hair dressers. They checked the prevalence as well as functional limitation and severity of symptoms among them. They compared the functional limitation and symptoms severity with unemployed CTS people. The rate was much higher in female hair dresser in both functional limitations and symptoms severity. We differentiated our study by checking the level of functional limitations and severity of symptoms only in butchers. We looked the intensity of both these things. They showed moderate functional limitations as well as symptoms severity [19]. Another study reveals the prevalence of CTS was high among using electro diagnostic tests. The prevalence was high up to 51%. In order to support electro diagnostic tests, Durkan's CCT was also conducted. Their results were considerably correlated with electro diagnostic tests results [20]. This study also looked at the perspective that how age is affecting the butchers suffering from CTS. The most affected butchers were from 26- to 30-year age group. Then we looked relation of working hours with CTS among butchers. The most affected category was the butchers who daily work for 10 hours straight. They have high prevalence of CTS among them.

## CONCLUSION

The purpose of this research was to find out the prevalence of CTS among butchers. As previous studies showed us that this disease is very common among different professionals so our aim was to look out its prevalence among butchers. 10.3% butchers from our sample size was suffering from carpal tunnel syndrome. This was the number of butchers suffering from CTS. 41 out of 400 butchers were facing this disease.

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## Original Article

## Two Point Discrimination Threshold Among Different Aged Populations of People with Diabetes

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## ARTICLE INFO

## Key Words:

Two Point Discrimination, TPD, Age, Gender, Diabetes

## How to Cite:

Ur Rehman, H. ., Andaleeb, H. ., Saeed, I. ., Asif, T. ., Sharif, Z. ., Haq, K. ., & Faizan Hamid, M. . (2022). Two Point Discrimination Threshold Among Different Aged Populations of People with Diabetes: Discrimination Threshold Among Diabetics of Varying Age. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.677>

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Received Date: 11<sup>th</sup> July, 2022Acceptance Date: 21<sup>st</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Two-point discrimination is the distinction of two points put to skin at the same time (TPD). **Objective:** The main objective of this study is to determine the variation in two-point discrimination sense with increasing age among diabetic population. **Methods:** Cross Sectional conducted among 309 Diabetic Participants from age 21-60 years. Data Collected from University of South Asia, Lahore. Study completed within 6 months (from 5<sup>th</sup> September 2019 to 28<sup>th</sup> February 2020) by Non-Probability Convenient Sampling. The ability to distinguish the two-point was estimated in millimeters by using TPD tool. Results were analyzed by SPSS-25. **Result:** Average TPD value is 2.4888±.75428 (male 2.57±.73124 and female 2.40±.76946). There is a significant difference between the mean value of TPD for Gender (male and female [P=0.04]) and Different Age Group (20-30 age (m=1.6462±.300), 31-40 age (m=2.1609±.341), 41-50 age (m=2.7224±.342) and 51-60 age (m=3.4678±.346), [P = 0.000]. **Conclusion:** There was a significant difference in Two Point Discrimination (TPD) values among different age groups and gender. Females have more sensitivity than males. TPD value increase with increase of age.

## INTRODUCTION

Two-point discrimination is the distinction of two points put to skin at the same time (TPD)[1]. The minimal distance between two equal pressure and simultaneous stimuli delivered to the skin is the measure of TPD [2]. Weber initially defined two-point discrimination in 1853. [3,4]. TPD can be classed as static, blunt-tipped (the most common), or sharp-tipped (the most uncommon). An Aesthesiometer with a sharp tip is used to measure static TPD in the first two categories [5]. The nervous system is composed of the peripheral nervous system as well as the central nervous system. Through the network of peripheral nerves, the

central nervous system is supplied with sensory and motor input from the body's periphery (CNS). Somatosensory modalities can include things like pressure, light touch, pain, temperature, and proprioception, amongst other things [6]. These sensations play a crucial part in consciousness, the initiation and regulation of movement, and the information received from the surrounding environment [7]. The examination of these senses reveals information regarding the CNS and PNS's ability to function [8]. According to Moberg (1990), accurate and reliable TPD findings are feasible with the correct approach and

instrument. TPD is the simplest and most often used test for determining peripheral nerve damage and the result or return of feeling following nerve injury [9]. This test assesses the distance between two locations felt by a person under the same pressure. It is a tactile discriminating approach that provides precise data on space and is frequently used as a reliable tool to examine such aesthetic sensibility [10]. The test spacing varies from one millimeter on the tongue to two to six millimeters on the fingers to 400-600 millimeters on the lower back, depending on the predicted body part [9]. TPD tends to the affectability of covering sensitive areas of the body surface by producing regularising values. It is important to record these regulating values (in millimetres) in each limit since the patient may be able to sense these jolts [12]. TPD is commonly used in neurological examinations to evaluate and assess hand injuries. To determine how much damage has occurred to the peripheral nerve of the hand, previously present DPT data are employed. informed that utilising an Aesthesiometer to assess TPD in the upper extremities is the most appropriate and useful approach [10]. TPD levels change according on the area of the body. Various previous TPD studies examined the sense of stress for fixed and movable segregation, TPD observation methodologies of ordinary people, and TPD evaluation models based on ages [11]. There has been several research on TPD, however the data is insufficient. Many studies on TPD have been conducted in the West, but nothing has been discovered in Pakistan. Normal values are extremely useful in sensory testing for evaluating results, diagnosing nerve damage in the hand, and in post-surgical patients. A sensory exam is used to determine the loss of sensory patterns. Any somatic condition is indicated by a change in discriminative capacity [12]. The current study examined TPD values in healthy people ranging in age from 21 to 60 years old in order to get baseline statistics for sensory system goal evaluation. In most local circumstances, typical TPD values in relation to age and gender are scarce. The findings of this study will assist others in comparing aberrant TPD readings to normal values. The findings will also aid in understanding the influence of ageing on sensory functions in male and female populations, which is an important aspect of neuro physiotherapy [13].

## METHODS

Rao software was used to perform a cross-sectional study among participants. The ratio of males and females in each of the four-age group (21-30 years old, 31-40 years old, 41-50 years old, and 51-60 years old) was equal. All the data was obtained through interviews with people who were either readily available or consented to offer accurate or enough information, such as the Lahore Railway Headquarter and

University of South Asia. A self-designed questionnaire based on demographic information was completed. Static two-point discrimination test using an Aesthesiometer and the Two Point Discriminator tool. Hand intra-rater reliability is 0.82. Two PD values on the right index finger of the right hand were assessed with shut eyes after a cotton wisp was used to examine touch sensation. Results were provided in millimetres when participants couldn't tell the difference between two places (mm). Nonprobability Data were collected using the Convenient Sampling Technique. After the summary was authorised by the University South Asia's ethical committee and the authorization of all involved departments, subjects were questioned to ensure that they met the criteria for participation in the research. Participants were explained thoroughly about the testing procedure. All individuals agreed to participate, were willing to be studied further, and completed the survey form. The independent variables were age and gender, while the dependent variable was two-point discrimination. The survey questionnaire was named after the study's inclusion criteria. This research included participants who were otherwise healthy. Both sexes are included, 21-60 years old. Neurological impairment, peripheral neuropathy, upper limb injuries within the previous six months; burns, scars and dermal hypersensitivity; skin illnesses; stroke, multiple sclerosis; and cognitive issues were all excluded from the study. After the summary was accepted, the study was completed in 6 months (from September 5th, 2019, to February 28th, 2020). Responses from participants were collected, and all data were recorded into an SPSS file. The frequency table, graph, and charts were used to quantify descriptive data (e.g., gender, socioeconomic status, dominant hand). The mean and standard deviation were used to calculate quantitative data (including age and two-point discrimination values). In an independent sample t-test, the Two Point Discrimination values of male and female participants were compared. The P-value cutoff was set at 0.05 or below to ensure statistical significance. ANOVA was used to compare the average 2PD values between age groups.

## RESULTS

There are nearly equal numbers of male and female (50 percent in each group) among 309 diabetic participants ranging in age from 21 to 60 years (21-30, 31-40, 41-50, and 51-60). (25 percent in each group). Sixty-four percent are employed, while 35.9 percent are jobless. 97.7% are right-handed, whereas 2.3 percent are left-handed. 8.1 percent (n=25) are upper class, 83.5 percent (n=258) are middle class, and 8.4 percent (n=26) are lower class. At the right index fingertip, the average TPD was 2.4888.75428 across

309 subjects. The smallest and largest values are 1.15mm and 3.95mm, respectively. Males average 2.57.73124, while females average 2.40.76946.

Age Group	N	TPD Mean±SD	Minimum	Maximum
21-30	79	1.646±.3004	1.15	2.60
31-40	78	2.160±.3413	1.45	3.05
41-50	76	2.722±.3422	1.85	3.65
51-60	76	3.467±.3460	2.45	3.95
Total	309	2.488±.7542	1.15	3.95

**Table 1:** Descriptive Statistics of Value of Two Point Discrimination according to Age Groups

The mean TPD for the 21-30 age group across 309 participants is 1.6462.30040. TPD for the 31-40 age group is 2.1609.34137, for the 41-50 age group is 2.7224.34229, and for the 51-60 age group is 3.4678.34600. Table 2: One Way ANOVA For difference between Age Groups and Within Age Groups

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	141.45	3	47.15	425.76	.001
Within Groups	33.77	305	0.112		
Total	175.23	308			

**Table 2:** Sum of squares

Age Group	(J) Age	Mean Difference (I-J)	Sig.
21-30	31-40	-0.514*	.001
	41-50	-1.076*	.001
	51-60	-1.821*	.001
31-40	21-30	0.514*	.001
	41-50	-0.561*	.001
	51-60	-1.306*	.001
41-50	21-30	1.076*	.001
	31-40	0.561*	.001
	51-60	-0.745*	.001
51-60	21-30	1.821*	.001
	31-40	1.306*	.001
	41-50	0.745*	.001

**Table 3:** Post Hoc Test

There were four age groups (21-60 years) compared using One-way ANOVA for the average TPD value. Age groupings 21-30, 31-40, 41-50, and 51-60 are very different from one other. (P = 0.00) Groups 31-40 and groups 21-30, 41-50, and 51-60 are very different from each other. This study has no significance (P Value 0.00). Comparing groups 41-50 to 21-30, 31-40, and 51-60 reveals significant differences. (P = 0.00). It is clear that group 51-60 is distinct from the other three groups. (P = 0.00) A statistical significance level of 0.05 has been found across all age groups. Two-Point Discrimination ratings were significantly different among age groups [F(3, 305)= 425.767 p=0.000].

	Gender	Mean±SD	Independent Samples Test
Value of Two Point Discrimination at Right Index Finger Tip (mm)	Male	2.574±.73	t(307)=1.996, P=0.047
	Female	2.404±.77	

**Table 4:** Independent Sample t test Two Point Discrimination

Difference among Gender

The male TPD is 2.57.73124 and the female TPD is 2.40.76946, according to the table. Compared to females, males have a greater TPD average. The TPD result was p0.05, t(307)=1.996, p=.047 for the independent sample t-test, which shows a significant difference between men and women.

DISCUSSION

Among 309 participants, there are nearly equal numbers of male and female (50 percent in each group) in four age groups ranging from 21 to 60 years old (21-30, 31-40, 41-50, and 51-60)." (25 percent in each group). In contrast, just 35.9 percent of the population is out of work. Most people are right-handed, with only 2.3 percent being left-handed. 97.7 percent More than 83% are in the middle class, whereas less than 8% are in the top class. At the right index fingertip, the mean TPD value is 2.4888.75428 across 309 people. The minimum and maximum values are 1.15mm and 3.95mm, respectively. 2.57.73124 for men and 2.40.76946 for women [14,15]. According to a 2014 study conducted by Asir and Kannathu, finger tips contain more free endings of nerves than the rest of the body, which explains why fingertips are more sensitive to TPD than the rest of the body. This study also discovered that the human body's fingertips are extremely fragile [16]. The interosseous muscle has a TPD value of 21.0 mm, as found by Michael F.'s investigation of two-point separation affectability in the hand. The hand was chosen to get TPD values in our study because it is an exceptionally remarkable organ with specific capabilities and flexibility in the human body. Skin around the tip-off pointers' volar surface on the right hand measured 2.4 mm, according to this study. When compared to older persons, younger people had greater TPD values [17]. The disk-discriminator, aesthesiometer, and drawing compass have all been used in previous studies for two-point discrimination. Because it requires the least amount of attention in use, aesthesiometer's key benefit is its ability to break even with weight transfer. The device is designed such that the pointer has a regular sharp tip. It is one of the simplest ways to accurately measure TPD [18]. It was revealed in a 2017 study by Cashin et al. that age had a significant impact on two-point segregation esteems. Changes in the senses occur as we age, according to this study. Our research shows that as people become older, their TPD sensitivity declines. It has been revealed that the 2-point segregation capacity of an individual is affected by their age [19]. Ja-Pung Koo, Soon-Hee Kim, and colleagues conducted a research. In 2016. They measured TPD in the upper limb and found that females had lower TPD distance values than men, while females have higher TPD. According to current studies, males are less sensitive than females, while females have greater 2PD levels [20].

## CONCLUSION

There was a substantial variation in Two Point Discrimination (TPD) scores across age and gender categories. Males are less sensitive than females. The TPD value increases with age.

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## Original Article

## Anthropometric Characteristics of Pakistan Rugby Union Players and Differences in Anthropometric Characteristics of Forwards and Backs

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## ARTICLE INFO

## Key Words:

Anthropometric Characteristics, Physical Characteristics, Rugby Union Players, Pakistan

## How to Cite:

Hussain, T., Malia, ., Alam, A., Liaquat, M., Ali, M., &amp; Anwer Javed, H. . (2022). Anthropometric Characteristics of Pakistan Rugby Union Players and Differences in Anthropometric Characteristics of Forwards and Backs: Anthropometric Characteristics of Pakistan Rugby Union Players. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.683>

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Received Date: 17th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Rugby is a contact sport played in Pakistan and worldwide at domestic, national and international level. Rugby union forwards and backs bear differences in anthropometric characteristics which are important while the assortment of players in the team. **Objective:** To describe anthropometric characteristics of Pakistan rugby union players and differences in anthropometric characteristics of forwards and backs. **Methods:** It was an observational study / cross sectional survey. Study was compiled at RCRS after data collection from players. Convenient sampling technique was used and 52 players were enrolled. Stadiometer, Digital weight scale, Skinfold caliper and retractable steel tape was used for data collection. Data were analyzed using SPSS 18.0. **Results:** Mean weight of forwards was  $94.3 \pm 12.1$  kg while that of backs was  $71.2 \pm 12.0$  kg. The mean of the sum of the eight skinfold measurements of forwards was  $150.9 \pm 24.9$  mm, and that of backs was  $93.5 \pm 33.9$  mm. Mean body fat percentage of forwards was  $19.2 \pm 2.9$  %, while backs have  $12.4 \pm 4.5$  %. Mean fat mass of forwards was  $18.2 \pm 4.4$  kg, and of backs was  $9.1 \pm 4.94$  kg. **Conclusions:** Rugby union forwards and backs have significant differences in anthropometric characteristics with respect to body weight, skinfold thickness, girth measurement, and body fat percentage, all higher among forwards. No difference was observed in age and stretch stature.

## INTRODUCTION

Rugby is a contact sport played worldwide. World's first rugby football union (RFU) was established in England in 1871. Later the game was introduced to other countries as well. The first rugby union was founded in Ceylon in 1879. Rugby was introduced in Karachi in 1925 by gymkhana club members. Asian Rugby Football Union (ARFU) was founded on 15 December, 1968 with eight member unions [1]. The Pakistan Rugby Union was founded in 2000 as the representative of the Rugby in Pakistan. From November 2003 Pakistan has become a regular member of

International Rugby Board. Now it has membership of the World Rugby, The Asia Rugby, and The Pakistan Olympic Association. It is also the Governing body of the rugby by the Pakistan Sports Board [2]. Now the game is growing at domestic level in Pakistan due to efforts of rugby union. World Rugby has started its Mass Participation Program "Get into Rugby" and Pakistan is most active member of it. At domestic level, multiple competitions are arranged at senior and junior level for both men and women. Opportunities are also available for women rugby players.



Time to time training and development courses are arranged by the Pakistan rugby union for training of professional players to improve their skills and competencies. Pakistan rugby has four Provincial Associations (Punjab, Sind, KPK and Baluchistan) and two regional units (Islamabad and FATA), five departments at government level (Army, Police, HEC, Railways and WAPDA) [2, 3]. Now days, Rugby is being played globally at elite as well as sub-elite levels. A standard game lasts for 80 minutes, consists of two halves with 10 minutes break or rest time. Fifteen players participate from each team and all of them have specific playing positions. Of these fifteen players eight forwards are in the scrum and seven backs spread throughout the field [4]. Anthropometry is the branch of human sciences dealing with the measurement of the human body in terms of the dimensions of muscle and bone, body shape, size, body fats, mobility, strength and working capacity [5, 6]. It is essential to identify the important key factors which determine a productive performance during a match while choosing elite players. To determine which position is most suitable for a given athlete it is commonly done by assessing anthropometric characteristics. Body mass, standing height, sum of skinfolds and circumference (girth) measurements are often most commonly measured anthropometric measures. Physical abilities that a player possesses depict his ability levels to cope up high in rugby sport. Sevens rugby players are required to have greater sprinting ability and aerobic power and less recovery time required for repetitive sprints. A fewer total players and smaller duration of match in rugby sevens is considered a running dominant game with higher sprinting abilities [7, 8]. Previous researches in rugby union have revealed greater differences in the anthropometric characteristics of forwards and backs, revealing forwards usually being heavier and bigger and retain greater total upper and lower body strength and power, whereas backs are usually faster and leaner having more aerobic power [9]. Anthropometric profile of rugby players is required to meet the increasing training and game demands at succeeding levels [10]. Studies have revealed that anthropometric characteristics increase with each playing level [11]. Disparities in the physiological and anthropometric characteristics of sub-elite rugby league forwards and backward lines is noticeably lighter in backs and displaying greater muscle power, speed, and gauged maximal aerobic power as compared to forwards [12]. 85-95% of the Rugby League game consists of low intensity physical activity like walking with normal pace or standing still. Rugby Union consists 85% of low intensity activity while Soccer consists of 88% [13]. Sprints and tackles hike the overall intensity of the game which are described under the category of high-

intensity physical activity. The global ratio of high to low-intensity physical activity has been gauged as 1:6 for forwards and 1:8 for backs because forwards spend more time carrying out tackles while backs spend more time in carrying out high-intensity physical activity such as running [14]. Descriptive studies on the physical attributes of female rugby players have shown that forwards gravitate to be heavier and larger than backs. Rigg and Reilly correlated the players on the bases of different tests. In terms of body size, body weight and height have most consistent anthropometric differences between forwards and backs. US female college rugby players showed that in terms of aerobic power the performance of forwards was significantly better than backs. Whereas no such difference or change was noted on agility run [15]. Considering the anthropometric and physiological attributes and game-specific competences that show prejudice between players in rugby sport will direct coaches, trainers and researchers to develop highly compelling training plans and provide specific tests to screen players' dexterities [16]. It is now well documented that physical limitations can constrain skilled performance. The importance of development of these physical characteristics is reduced if a physical parameter does not lead to improved skilled performance. Tackling ability and high physical fitness indicate the performance during a competition. An equally important factor is the procurement of such game specific skills [17]. Even with the potential value of anthropometric, physiological and skills potential to playing performance, and regular assessment of these qualities, there is presently limited evidence to accurately assess their input to rugby playing performance [18].

## METHODS

It was an observational study / cross sectional survey. Data was collected from different places including UMT, UOL and DHA H-Block stadium. Study was compiled at Riphah College of Rehabilitation Sciences Lahore. Study was completed in 6 months after the approval of synopsis. Convenient sampling technique was used for data collection. 52 players of Pakistan rugby Union were enrolled in this study. Since the total population of rugby players was less than 100 so instead of sample whole population of rugby players present at that time were selected. Only male players with 18 years of age or above and who have played at least 1 match at domestic level with proper health and free from any injury were included while players who were physically or mentally unfit, who never played at domestic level and who were not involved in their regular conditioning programs were excluded from the study. All the players who met the selection criteria were

enrolled for the study. All of them were explained the purpose of the study, including the risks and benefits of participation, and written consent was taken. They were free to withdraw from the study at any time. All the procedures were safe and approved by the ethical review board and written permission was granted from the ethical review board of the university. Demographic data were gathered on a pre-designed questionnaire. Information regarding the years of playing rugby, number of national and international matches played and positional sub groups were also recorded on the same questionnaire. Anthropometric measurements were taken according to the protocols provided by ISAK [19]. ISAK provides internationally accepted standardized guidelines and protocols for the measurement of anthropometric characteristics. All measurements were taken and data was recorded by two trained physiotherapists following the guidelines of ISAK, along with one official physiotherapist of Pakistan rugby union. Body mass was measured using a portable digital weight scale measuring up to 0.01 kg. Weight scale was placed on a firm and even surface and calibrated to reading zero. Weight was taken with shoes off and minimal dressing in football shorts. Stretch stature was measured using a portable stadiometer measuring up to 0.1 cm. participant stands with shoes off, feet together, heels, hips and upper back touching the scale of the stadiometer and head was positioned in Frankfort horizontal plane. Before taking measurement player was asked to take a deep breath and hold it. Stretch stature and body mass measurements were used to compute BMI of the players. Skinfold thickness was measured using a skinfold caliper and measurements were taken from eight sites including biceps, triceps, subscapular, iliac crest, supraspinale, abdominal, front thigh and medial calf. Following the ISAK instructions skin folds were grasped between thumb and index finger of left hand and measurement was taken with skinfold caliper in right hand. Caliper was held at 90 degree to the skin at a distance of 1 cm away from index finger and thumb. Surface land marking and Girth (circumference) measurements were taken using a retractable steel tape. Girths measurements recorded were arm relaxed, arm flexed and tensed, waist, gluteal, and calf. All measurements were taken twice on the right side of the body and a mean of the two was used for further computation to produce results. Utilizing skinfold measurements and girth measurements, body fat percentage and lean body mass were calculated with the help of Jackson and Pollock equation [20]. Data were entered and analyzed by using computer software SPSS 25.0.

It was an observational study / cross sectional survey. Data was collected from different places including UMT, UOL

## RESULTS

27 backs and 25 forwards were among the 52 players that took part in the study. Rugby union forwards and backs had a mean age of 24.3 and 23.7 years, respectively. The age difference between the forwards and the backs was non-significant. Mean weight of forwards was  $94.3 \pm 12.1$  kg while that of backs was  $71.2 \pm 12.0$  kg. Forwards' mean stretch height was 174.6 cm with a 4.3 cm SD, while backs' stretch stature was 173.1 cm with a 5.5 cm SD. In terms of stretch stature, there was no discernible difference between forwards and backs as presented in Table 1.

Demographics	Position of player	Mean $\pm$ SD	Sig. (2-tailed)
Age	Forwards	24.36 $\pm$ 3.29	0.522
	Backs	23.78 $\pm$ 3.23	
Weight	Forwards	94.32 $\pm$ 12.14	0.000
	Backs	71.27 $\pm$ 12.05	
Stretch Stature	Forwards	174.696 $\pm$ 4.38	0.276
	Backs	173.17 $\pm$ 5.52	
BMI	Forwards	31.27 $\pm$ 4.42	0.000
	Backs	23.59 $\pm$ 3.53	

**Table 1:** Summary Table of Demographics

The mean of the sum of the eight skinfold measurements of forwards was  $150.9 \pm 24.9$  mm, and that of backs was  $93.5 \pm 33.9$  mm as shown in Table 2.

Skinfold Measurement	Position of player	Mean $\pm$ SD	Sig.(2-tailed)
Triceps	Forwards	16.04 $\pm$ 2.98	0.000
	backs	10.074 $\pm$ 3.46	
Sub-scapularis	Forwards	22.28 $\pm$ 4.41	0.000
	backs	13.85 $\pm$ 5.18	
Bicep	Forwards	8.32 $\pm$ 1.93	0.000
	backs	4.74 $\pm$ 1.81	
Iliac Crest	Forwards	24.88 $\pm$ 4.17	0.000
	backs	15.89 $\pm$ 6.56	
Supra-spinal	Forwards	18.76 $\pm$ 5.38	0.000
	backs	10.52 $\pm$ 6.09	
Abdominal	Forwards	29.56 $\pm$ 5.42	0.000
	backs	18.07 $\pm$ 6.63	
Front Thigh	Forwards	15.96 $\pm$ 3.61	0.000
	backs	11.26 $\pm$ 3.39	
Medial Calf	Forwards	15.1200 $\pm$ 3.28278	0.000
	backs	9.2222 $\pm$ 4.34417	
Sum of 8 Skinfolds	Forwards	150.9200 $\pm$ 24.98653	0.000
	backs	93.5556 $\pm$ 33.97661	

**Table 2:** Group Statistics of Skinfold Measurement of Forwards and Backs

Mean body fat percentage of forwards was  $19.2 \pm 2.9$  %, while backs have  $12.4 \pm 4.5$  %. Mean fat mass of forwards was  $18.2 \pm 4.4$  kg, and of backs was  $9.1 \pm 4.94$  kg as depicted in Table 3.

Girth Measurements	Position of player	Mean $\pm$ SD	Sig.(2-tailed)
Arm Relaxed	Forwards	34.44 $\pm$ 2.68	0.000
	backs	28.94 $\pm$ 3.133	
Arm Flexed and Tensed	Forwards	37.14 $\pm$ 3.08	0.000
	backs	32.00 $\pm$ 3.43	
Calf	Forwards	41.37 $\pm$ 2.68	0.000
	backs	35.97 $\pm$ 3.09	
Waist	Forwards	99.94 $\pm$ 8.67	0.000
	backs	83.05 $\pm$ 8.10	
Gluteal	Forwards	107.41 $\pm$ 6.03	0.000
	backs	95.92 $\pm$ 7.13	
Body Fat Percentage	Forwards	19.28 $\pm$ 2.99	0.000
	backs	12.41 $\pm$ 4.55	

Girth Measurements	Position of player	Mean $\pm$ SD	Sig.(2-tailed)
Fat Mass	Forwards	18.28 $\pm$ 4.4	0.000
	backs	49.11 $\pm$ 4.48	
Lean Body Mass	Forwards	76.20 $\pm$ 8.59	0.000
	backs	61.96 $\pm$ 8.54	

**Table 3:** Girth Measurements and Body Composition of Forwards and Backs

## DISCUSSION

This study is first of its nature in Pakistan to explore the anthropometric characteristics of Pakistan rugby union players and positional differences of these anthropometric characteristics in rugby. Results of the study provided valuable information about anthropometric characteristics of Pakistan rugby union players and reveals that there are differences in the anthropometric characteristics of rugby union forwards and backs. These results are similar to previous studies conducted on rugby players in Asian and other countries. However, there was no significance difference in anthropometric characteristics of forwards and backs with respect to age and stretch stature. Of the 52 players who participated in the study there were 25 forwards and 27 backs. Mean age of rugby union forwards and backs was 24.3 years and 23.7 years respectively. There was no significant difference of age in forwards and backs. In another study conducted by Gabbett et al., mean age of forwards (28.6) was found to be greater than backs (24.2) [21]. Current study reveals that mean weight of forwards was 94.3 kg, while that of backs was 71.2 kg. There was significant difference ( $P=0.05$ ) in the weights of forwards and backs. According to their activities forwards were heavier in weight as compared to the backs. As forwards are frequently involved in collisions and tackles, having an advantage of greater weight to produce greater momentum and are able to easily tolerate high impact forces. While low body weight in backs favors them in running and sprinting activities while carrying the ball. These results of body weight closely resembles with the results of a study conducted on Malaysian rugby players with mean weight for forwards  $91.3 \pm 10.4$  kg and backs  $73.8 \pm 4.3$  kg respectively. The mean stretch stature of forwards was 174.6 cm with a SD of 4.3 cm, while backs have stretch stature of 173.1 cm with a SD of 5.5 cm. No significant difference was found in stretch stature of forwards and backs [22]. Mean BMI of forwards was  $31.2 \text{ kg/m}^2$  (SD  $4.4 \text{ kg/m}^2$ ), while mean BMI of backs was  $23.5 \text{ kg/m}^2$  (SD  $3.5 \text{ kg/m}^2$ ). Forwards possess considerably ( $P=0.05$ ) higher BMI as compared to the backs. This finding was in agreement with the study of Marwaha et al., who conducted his study on rugby players in India and found similar results [23]. Similar results were also found in Malaysian rugby players [22].

## CONCLUSION

Rugby union forwards and backs have significant

differences in anthropometric characteristics with respect to body weight, skinfold thickness, girth measurement, and body fat percentage, all higher among forwards. No difference was observed in age and stretch stature.

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## Original Article

## Effects of Sensorimotor Stimulation Program with and Without Routine Physical Therapy on Balance and Cognitive Performance in Patients with Mild Traumatic Brain Injury: A randomized Controlled Trial

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## ARTICLE INFO

**Key Words:**

Berg Balance Scale, Cognition, Numeric Pain Rating Scale, Sensorimotor, Traumatic Brain Injury

**How to Cite:**

Waqar, H. ., Tanveer, F. ., Asadullah Arslan, S. ., Ahmad, A. ., Sarfraz, S. ., & Fatima, K. .(2022). Effects of Sensorimotor Stimulation Program with and Without Routine Physical Therapy on Balance and Cognitive Performance in Patients with Mild Traumatic Brain Injury: A randomized Controlled Trial: Effects of Sensorimotor Stimulation Program on Balance and Cognitive Performance . Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.684>

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Received Date: 13th July, 2022

Acceptance Date: 20th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The term "Traumatic brain injury (TBI)" has replaced the phrase "head injury." A disturbance in neuronal activity caused by the application of a quick, abrupt, and unbearable mechanical force is classified as traumatic brain injury. Every year, around 1.7 billion new cases of TBI are recorded worldwide. **Objectives:** To compare the effects of Routine physical therapy and Routine physical therapy along with Sensorimotor stimulation program on balance and cognitive performance in patients with mild traumatic brain injury. **Methods:** A total of 64 patients were divided into two groups, each including 32 people. Those in Group A got routine physiotherapy, whereas patients in Group B also received sensorimotor stimulation. Patients were randomized to groups at random using a lottery system. The study was intended as a single RCT with blinding. The duration of the intervention was sixteen weeks. Data was gathered on the first day prior to the implementation of treatments, then again after eight weeks, and finally after sixteen weeks. The obtained data was evaluated using the Berg balance scale and the Rancho loss amigos scale. **Results:** In group A, balance before treatment was  $21.90 \pm 5.43$  and after treatment of 8th and 16th weeks it was  $25.93 \pm 4.977$  and  $39.62 \pm 5.68$ . Mean of cognition before treatment was  $5.15 \pm 0.94$  and after treatment of 8th and 16th weeks it was  $5.468 \pm 0.802$  and  $5.90 \pm 0.85$  with  $p$ -value  $< 0.05$ . In group B balance before treatment was  $21.43 \pm 5.17$  and after treatment of 8th and 16th weeks it was  $27.12 \pm 6.59$  or  $52.78 \pm 2.70$ , mean of cognition before treatment was  $5.12 \pm 1.00$  and after treatment of 8th and 16th weeks it was  $6.250 \pm 0.87$  and  $7.70 \pm 0.4$  with  $p$ -value  $< 0.05$ . **Conclusions:** The study concluded that both treatment plans were effective for balance and cognitive performance but sensorimotor along with physical therapy significantly better outcomes as compared to conventional physical therapy treatment.

## INTRODUCTION

In major accidents, brain damage is the leading cause of death and disability. "Traumatic brain injury" has replaced "head injuries." Traumatic brain damage is defined as a disruption in neuronal activity induced by the sudden, unexpected, and intolerable application of mechanical stress [1]. A traumatic brain injury may be caused by a head hit, blow, or whiplash, an abrupt change in calvarium direction, or a penetrating head wound. It may also be caused by falls, sporting events, adolescent drinking, leisure activities, and car accidents [2, 3]. In Pakistan, a 220 million country, TBI is the primary cause of death and disability. A study of road traffic incidents in Pakistan

revealed that one in four individuals had a head injury, with 10 percent sustaining moderate to severe traumatic brain damage. Children aged 0-4 years, adolescents aged 15-19 years, and elderly individuals aged >75 years had the highest prevalence of TBI-related hospitalization and death. In all age categories, males outnumber women in terms of TBI-related visits. Asia has the greatest incidence of traumatic head injuries caused by falls (about 70%), unintentional injuries (57%), motor vehicle accidents (50%) and conflict (approximately 15%) [4-6]. Headaches, disorientation, vertigo, sight loss, hearing impairments, and exhaustion are other symptoms of mild TBI. Symptoms

of dizziness include disorientation, instability, vertigo, and lightheadedness. Mild traumatic brain injury is often accompanied with post-traumatic stress disorder, which manifests as irritability, memory loss, and sleep disturbance. Because of the long periods of bed rest and severe sedation that are often necessary, physiotherapy is a common and well-recognized component of TBI recovery. During the acute inpatient phase of treatment, the objective of improving mobility and upright posture is to restore neurological and physical function while preventing or resolving prospective difficulties. ICU stays are often accompanied by neuromuscular weakness, reduced aerobic capacity, and persistent participation limitations [7-9]. Routine emergency functional neuroimaging assessments, such as CT scans of the cranium, do not detect bleeding or other obvious aberrant development in individuals with mild traumatic brain injury. Even in the absence of abnormalities on highly specialized imaging modalities, mild TBI cannot be ruled out. This is because it is believed that mild TBI neurological symptoms are caused by a temporary disturbance of brain activity, such as reduced synaptic activity, changes in glucose absorption, changes in cerebral blood flow, and changed axonal function. The Glasgow Outcome Scale, Disability Rating Scale, Functional Independence Measure, Functional Status Examination, Evaluation Measure, Timeframe of Loss of Consciousness, and Post Traumatic Amnesia are used to evaluate the quality of life after a TBI [10-12]. Mild traumatic brain injury, the major cause of cognitive performance deficits and balance issues, has received little research attention. These obstacles complicate their everyday life and activities. Sensorimotor activation, which has been demonstrated to be the most effective option for those with moderate traumatic brain injury, is required to overcome these issues.

**RESULTS**

Descriptive results of group A and group B is represented in Table 1. In group A, balance before treatment was 21.90±5.43 and after treatment of 8th and 16th weeks it was 25.93±4.977 and 39.62±5.68. Mean of cognition before treatment was 5.15±0.94 and after treatment of 8th and 16th weeks it was 5.468±0.802 and 5.90±0.85 with p-value < 0.05. In group B balance before treatment was 21.43±5.17 and after treatment of 8th and 16th weeks it was 27.12±6.59 or 52.78±2.70, mean of cognition before treatment was 5.12±1.00 and after treatment of 8th and 16th weeks it was 6.250±0.87 and 7.70±0.4 with p-value < 0.05 (Table 2).

Descriptive Results	Control (Group A)	Experimental (Group B)	p-value
<b>Group</b>	<b>Mean ± SD</b>	<b>Mean ± SD</b>	<b>0.220</b>
Age	28.43±5.52	28.71±6.0	0.303
Height	5.51±0.33	85.40±0.367	0.285
Weight	70.62±13.57	73.25±11.19	0.404
Body Mass Index	25.23±4.72	26.47±3.91	
	<b>N (%)</b>	<b>N (%)</b>	
Modes of Injury	13 (40.6%)	16 (50%)	
	9 (28.1%)	9 (28.1%)	
	6 (18.8%)	5 (15.6%)	
	4 (12.5%)	2 (6.3%)	

**Table 1:** Descriptive statistics

Outcomes	Assessment	Control Group	Experimental Group	f	p-Value
Berg Balance Scale	Baseline	21.09± 5.44	21.44± 5.17	0.350	0.853
	After 8 weeks	25.94± 4.98	27.12± 6.59	3.684	0.050
	After 16 weeks	39.62± 5.68	52.78± 2.71	9.812	0.000
RLAS	Baseline	5.16 ± 0.95	5.125 1.01	0.470	0.829
	After 8 weeks	5.47± 0.80	6.25± 0.88	0.252	0.617
	After 16 weeks	5.91± 0.86	7.71± 0.44	5.911	0.010

**Table 2:** Comparison of Mean Scores of Balance RLAS Scores

**DISCUSSION**

Traumatic brain injury is one of the leading causes of mortality and disability globally, particularly among children and adolescents, and it may affect mobility, cognition, and balance. Early rehabilitation seems to be critical for an individual's functional recovery after catastrophic brain damage. It may even improve long-term survival chances. Physical therapy is essential for the recovery of impaired functions since it assesses the patient's cognitive level and tailors the proper method and techniques to each unique patient. The BBS and RLAS were employed in this research to assess people with moderate TBI who showed balance, coordination, and sensory impairments. Many of these illnesses impair mobility and quality of life. According to the study's findings, sensorimotor stimulation increased gait agility and balance the most of all motor functions. In 2022, Kreter et al., discovered that walking handicap is a common patient concern. As a result, several writers have called for physical therapy focusing on walking, balance, and stair climbing to enhance mobility in TBI patients [13, 14]. After a 7-year physical treatment programme with sensory stimulation, a patient with a traumatic brain injury recovered the ability to walk, talk, execute daily responsibilities, and participate in a range of leisure activities independently. This demonstrates that motor functions may be restored even after a long length of time, and that every interval is critical for recovery. Gagne et al., did research in 2021 in which they compared 40 TBI patients (20 athletes and 20 non-athletes). They were instructed to do four different motor

exercises, including binding onto a leg, walking on their toes, going backward up a step, and balancing on one leg. All four activities had an impact on running ability, although coma length had no effect on either athletes or non-athletes' running ability [15, 16]. Because we only included participants with mild TBI and a decent GCS in our research, we couldn't make any conclusions concerning the severity of TBI and physical function recovery based on the available data. Snir et al., examined physical awareness and rotation, visual attention and exploration, and limb movement and coordination in TBI patients in 2020 and found that those with a Glasgow Coma Scale (GCS) of 10-15 performed much better. The BBS balance test demonstrated that moderate TBI patients with a GCS of 13 to 15 exhibited the least improvement after the eighth week of physical treatment with sensorimotor stimulation. Individuals with mild TBI showed substantially superior balance recovery results after just 16 weeks of therapy, but individuals who did not get sensorimotor stimulation in addition to PT did not [17]. According to the current research, those with traumatic brain injuries improved the most in their balance and walking, while cognitive function improved the least. Trainee of hand movements is a useful physiotherapy treatment for TBI patients to recover impaired hand motions. According to the findings of this study, the mechanism of traumatic brain damage was connected with orientation to time and location, attention, identification of a pencil and a watch, and tactile contact during cognitive and balance recovery. However, Subramanian et al., do not recommend making prognosis judgments on balance and cognitive recovery in 2020 based purely on damage modalities. These findings point to the need for greater research into the latter phases of recovery. The findings show that when a person's balance improves, so does their gait. Walking and sitting to standing, as well as walking and balanced sitting, were shown to have a strong positive association in this research [18]. Individuals with a TBI should undergo gait training, according to our research, and different gait training strategies, such as treadmill walking with subconscious use of the upper limbs, improve the success of rehabilitation. Sharma et al., did a research in 2020 to investigate whether training in attention and cognitive function influenced balance training in those who had had head trauma. A 16-year-old boy with a brain injury received therapy to enhance his balance first in a calm, nonstimulating setting, and then in a nonlinear way. The frequency of loss of balance in distracting situations rose when a patient's attention was directed to a distraction. The physical treatment regimen included balance training and cognitive function enhancement. The patient was able to resume school activities with no loss of balance after 11

weeks of personalised therapy. According to the author, people with brain injuries need sensory and cognitive function training in addition to balance therapy [19]. Agitation and reduced cognitive functioning may impair the efficacy of practising certain talents, according to the findings of Joubran et al., in 2021. Furthermore, numerous writers observed that contractures, stiffness, and decreased balance, as well as challenges with attention and behaviour, a lack of excitement, and sadness, hampered the efficacy of physical treatment [20, 21]. Our research discovered that improving walking ability required considerably more than increasing leg strength, and that attention and spatial awareness were strongly connected to gait. Consistent with the previous study's findings, this investigation discovered a minor link between attention and walking in both persons with moderate TBI. Linnestad et al., study found that cognitive abilities recovered more slowly than motor functions in TBI patients getting physical treatment [22]. However, Morelli et al., observed that cognitive and motor recovery might be substantially separated [23]. Furthermore, the researchers did not examine the influence of these variables on recovery; hence, additional research is needed. Because of the large number of persons with moderate trauma receiving post-acute rehab, this constraint prevented the formation of cohesive groups and the execution of a full statistical analysis. Despite the difficulties in acquiring these treatments, experts in the area think that comprehensive multidisciplinary post-acute rehabilitation is the best strategy for addressing deficits from all stages of TBI [24]. In conclusion, individuals with traumatic brain injury had much improved motor and cognitive status restored during acute rehabilitation; however, this study did not disclose any relationships between kinds of damage and recovery during post-acute rehabilitation.

## CONCLUSION

The study concluded that both treatment plan was effective for balance and cognitive performance but sensorimotor along with physical therapy significantly better outcomes as compared to conventional physical therapy treatment.

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## Original Article

Recent Sensitivity Pattern of *Salmonella typhi* in a Tertiary Care HospitalBushra Gohar Shah<sup>1</sup>, Tariq Tahir Butt<sup>2\*</sup>, Sara Najeeb<sup>3</sup>, Hafsa Ibrahim<sup>4</sup><sup>1</sup>Sahara Medical College, Narowal, Pakistan.<sup>2</sup>Sialkot Medical College, Sialkot, Pakistan.<sup>3</sup>Mohi-ud-Din Islamic Medical College, Mirpur Azad Kashmir, Pakistan.<sup>4</sup>Rawalpindi Medical University, Rawalpindi, Pakistan

## ARTICLE INFO

## Key Words:

Salmonella paratyphi, Salmonella typhi, co-trimoxazole, ampicillin, and sensitivity and susceptibility.

## How to Cite:

Gohar Shah, B. ., Tahir Butt, T. ., Najeeb, S. ., & Ibrahim, H. . (2022). Recent Sensitivity Pattern of Salmonella Typhi in a tertiary care Hospital: Sensitivity Pattern of Salmonella typhi. Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.686>

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Received Date: 10th July, 2022

Acceptance Date: 19th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

*Salmonella typhi* is the main cause of the enteric fever in Homo sapiens. The topic of the concern now a day is the emerging multidrug resistance. It causes the disease of intestinal tract known as enteric fever, while *Salmonella paratyphi* cause the paratyphoid fever. This infection is waterborne and foodborne. Approximately 12 – 33 million people suffered from the typhoid fever annually around the globe. **Objective:** The aim of the study was to evaluate the sensitivity patterns of *Salmonella typhi* and *Salmonella paratyphi*. It is a retrospective study, conducted at the Medicine Department of Sahara Medical College, Narowal and Rawalpindi Medical University, Rawalpindi. **Methods:** The blood sample of 306 patients visiting the teaching hospital of our institute were collected. The samples were tested to evaluate the antimicrobial sensitivity. The Kirby-Bauer disc diffusion method was used. The E-test was leveraged for obtaining MIC of ciprofloxacin, while agar dilution method was utilized for obtaining MIC of azithromycin. **Results:** The samples were collected from patients. Out of the 306 sample, 177 samples were of *S. paratyphi* and other 127 were of *S. typhi*. 56% sample showed the sensitivity to ciprofloxacin antibiotic, while 281 samples showed sensitivity to nalidixic antibody. According to the MIC criteria 94% sample isolate were susceptible to ciprofloxacin and 46% to azithromycin. While 31% sample were resistant to it. 90% of the samples were susceptible to ampicillin while other 95% to trimoxazole. **Conclusion:** The co-trimoxazole and ampicillin care highly suggested for the management of the enteric fever. Ciprofloxacin resistance cannot be accurately measured by Nalidixic acid resistance screening. The samples also showcased emerging resistance against azithromycin.

## INTRODUCTION

The *Salmonella typhi* cause the disease of intestinal tract known as enteric fever, while *Salmonella paratyphi* causes the paratyphoid fever. This infection is waterborne and foodborne. The major risk factor associated with enteric fever is the consumption of the street food [1, 2]. The approximately 12 – 33 million people effected from the typhoid fever globally. It is most commonly observed in the adults of age 18 – 35 years. It is commonly transmitted through contaminated food and impure water. The usage of the untreated sewage for crop fertilization is another source promoting the transmission of typhoid. The low vaccination rates with excessive use of antibiotics in

Pakistani people is adding to the increasing resistance of Salmonella. The excessive use of antibiotics in the farm animals is also an associated factor. This eventually results in development of the antibiotic resistance genes. Annually, around 250,000 deaths are reported because of typhoid fever. While the 5.4 million cases of paratyphoid are reported around the globe. The higher incidence of enteric fever is observed in the summer season. It most commonly affects the male candidate [3, 4]. As the male candidate has the more exposure to outdoor and street food rather than the female candidate in Pakistan. The highest cases of *S. typhi* are observed in the cities like Hyderabad and

Karachi. Out of all the reported cases the 80% of the death cases are observed in the Asia region. Due to poor sanitations and impure drinking water, this disease is a huge burden for the developing countries. It is a major health issue in Pakistan also. Moreover, it has led to an increased number of mortality and morbidity cases in Pakistan, decreasing the quality of life. 30% mortality rates are associated with typhoid fever. Intestinal perforation has also been observed in many cases. The extensive cases of drug resistance are observed in different regions of Pakistan [5, 6]. Chloramphenicol remained the treatment of first choice for many physicians. But the *Salmonella enterica* have evolved multidrug resistance to chloramphenicol, ampicillin, and co-trimoxazole. It is used as standard for comparison to the other antimicrobials. The first line of treatment for the enteric fever are chloramphenicol, ampicillin, and co-trimoxazole. The multidrug resistance against *Salmonella* was first time reported in 1980. The use of foloroquinolone has increased the resistance of *Salmonella* against nalidixic acid. The extensive drug resistance outbreak was observed in Pakistan from 2016 – 2017. This has eventually increased the treatment cost and physicians are running out of treatment options [7, 8]. Different outbreaks because of evolving multi-drug resistance have been reported in the literature. This evolving drug resistance is posing major problems to clinicians and microbiologists. In Pakistan the *S. enterica* isolates with reduced susceptibility to fluoroquinolone has also observed [9]. The sensitivity of the ampicillin, chloramphenicol, and co-trimoxazole for *S. typhi* range between 90-100%. The limited and inadequate knowledge about the *S. typhi* sensitivity and susceptibility patterns in Pakistan is available. A number of bacteria develop resistance against various antibiotics, consecutive monitoring of the effect of these antibiotics is needed. Therefore, the effects of different antimicrobial are continuously studied for *S. typhi*. For the management of the enteric fever the knowledge of the *Salmonella* antibiotics and anti-biogram is required. The aim of this study is to evaluate the antibiotic sensitivity of *S. typhi* and *S. paratyphi* [10]. The main purpose of this research work was to evaluate the sensitivity of *Salmonella* to various antibiotics so that the treatment of the patients can be made possible with the more effective antibiotics with greater sensitivity and those antibiotics should avoid against which the bacteria developing resistance.

## METHODS

The blood sample isolate of 306 patients who visited the Teaching Hospital of our institute, were collected. The duration of the study was from December 2021 to May 2022. The ethical and review committee of the hospital approved

the study. BACTEC 9240 automated system was used for the processing of the blood sample. The commercial antimicrobial disks were used to determine the susceptibility pattern of antimicrobials. 30µg of nalidixic acid, ceftriaxone and chloramphenicol while 15µg of azithromycin was used. 10µg of ampicillin, 1.35/23.75µg of co-trimoxazole, and 5µg of ciprofloxacin was used. The Clinical and Laboratory Standard Institute (CLSI) provided with the guidelines. The guidelines of Kirby-Bauer disc diffusion method were used to perform the tests. According to inclusion criteria, the patients who were diagnosed with any other disease other than enteric fever were excluded from the study. For determining MIC quantity of ciprofloxacin, its concentration was reduced from 0.5µg/ml to 0.0625µg/ml. The transitional reaction of the antibiotics with isolates were observed. The E-test was used to determine the Minimum Inhibitory Concentration (MIC) of ciprofloxacin. It is most preferable method with better results. For quality control the *Escherichia coli* strain was used. The agar dilution method was used for obtaining MIC of azithromycin.

## RESULTS

In the given experiment 306 samples were studied, among them, *S. typhi* samples were 177 and *S. paratyphi* samples were 127. Of all the isolated specimens, 56% of the samples show sensitivity to the antibiotic ciprofloxacin with a minimum concentration of about 0.26mg/ml. while on the other hand, 281 of the isolated samples were sensitive to the antibiotic nalidixic acid. From the nalidixic acid sensitive samples, some of the sample specimens (about 264) were vulnerable to the ciprofloxacin with a concentration of less than 0.6mg/ml. Some of the samples like 249 samples were tested against the antibiotic azithromycin, and 114 of them were vulnerable to the antibiotic while 77 of the specimens show resistance to the given antibiotic by showing proliferation. In this test, 52 samples show the transitional reaction to the antibiotic test. The total of 306 samples show sensitivity to the antibiotic chloramphenicol, and ceftriaxone while 275 samples were sensitive to the ampicillin antibiotic. For the drug co-trimoxazole, 94 % sensitivity was observed. Here in the given table sensitivity patterns of all the available antibiotics are mentioned for the proper understanding of antibiotic vulnerability and sensitivity.

Antibiotics	Sample specimens	Sensitivity of the isolates	Percentage
Chloramphenicol	306	306	95%
Cotrimoxazole	306	291	100%
Ciprofloxacin	306	166	8%
Ampicillin	306	275	54%
Nalidixic acid	306	25	90%
Ceftriaxone	306	306	100%

**Table 1:** Sensitivity of antibiotics against samples

## DISCUSSION

In our population, enteric fever is a major health issue. Several studies have been done for the isolation and treatment of *S. typhi*. In our study, the effect of various antibiotics was studied against *S. typhi*. In this study, samples were collected, among these samples, 57% of the samples were of *S. typhi*, and 43% samples were of *S. paratyphi* [11]. In the previous years, various studies have been done for the antibiotic ciprofloxacin against *S. typhi*. For the ciprofloxacin, nalidixic acid is considered an effective marker, which highlights the resistance of the ciprofloxacin. For the validation of this fact, different studies have been reported, to find out the resistance of nalidixic acid against various strains and the usage of ciprofloxacin in those cases [12, 13]. The sample specimens used in our study showed a reduced vulnerability to the ciprofloxacin, about 13 % of the population showed such behaviour when less than 0.6mg/ml of the concentration was used. When further testing has been done, it was predicted that 93% of the population show resistance to the nalidixic acid as well as to the ciprofloxacin. The prescribed method to the ciprofloxacin is Kirby Bauer disc, but it is not a much more efficient method. For the estimation of MIC of ciprofloxacin, E test is the most recommended method [14, 15]. However, a number of bacteria may develop resistance against various antibiotics, therefore there is a need for the consecutive monitoring of the effect of these antibiotics. Therefore, azithromycin and ciprofloxacin effects are continuously studied for the *S. typhi*. The invasion of the bacterial specie increase, when microbes develop resistance against various antibiotics [16]. From the very start of this disease, the gold standard method for the treatment of typhoid was the use of chloramphenicol. This antibiotic drug was used for a number of many other diseases at this time. This antibiotic was used against those diseases, which were caused by some bacteria. When such patients were treated with chloramphenicol, the death rate was very much reduced from 21% to 1.0%. The time limit of the infection was also reduced from 13 – 26 days to 4 – 6 days. However, by the consecutive use of these antibiotics, different microbes start to develop resistance against various diseases like microbes as well as the severity of the disease was also affected due to the development of resistance [17, 18]. Different kinds of issues emerge with the development of resistance to antibiotics like a high rate of relapse, the toxicity of bone marrow, and an increased death rate. The issues due to antibiotic resistance were mostly developed in developing countries. Then other effective drugs were introduced like ampicillin and co-trimoxazole. At this time, three antibiotics were used for the treatment of typhoid i.e. ampicillin,

chloramphenicol, and co-trimoxazole. All of these three antibiotics show a different level of sensitivity against salmonella specie. About 100% to 95% sensitivity was shown by these three antibiotics. These effective antibiotic drugs are used for the treatment of enteric fever in our population [19]. Further studies were conducted on the other antibiotics to find out the more available options of treatment. Then new antibiotic azithromycin was tested in animal models and then it was further studied in clinical trials. The spores of the *S. Typhi* show resistance against these antibiotics, then all the sample specimens were tested for the ceftriaxone antibiotic. The results were quite controversial as some of the specimens showcased resistance against *S. Typhi*, but some show sensitivity against these antibiotics. Multiple other studies groups were also doing the same experimentation. Their all samples showed sensitivity against ceftriaxone. Therefore, a proper conclusion cannot be drawn about the effects of this antibiotic drug because of the varying results of the two research groups. The possible reason for the different results may be due to the handling issues or the other contaminations [20, 21]. Due to the difference in results, our research also shows some limitations or may give the chances of false results, because in this study testing of various antibiotics was not completely analysed at clinical level trials. In our population quinolone is an effective drug although it develops resistance under in vitro conditions. The ceftriaxone was also linked with the resolution of long lasting fever, but under in vitro conditions, it shows sensitivity [22].

## CONCLUSION

From the above research, it is concluded that for the proper clarification of the vulnerability of various drugs like quinolone which is required in the enteric fever case, while on the other hand, another antibiotic nalidixic acids show resistance against *S. Typhi*. The resistance to azithromycin is originating. But the antibiotics, co trimoxazole, ampicillin, and chloramphenicol are useful for oral treatment of this disease. For the effective treatment of typhoid, ceftriaxone is the most effective drug available.

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## Original Article

## Practitioner's Perspective of Personal Protection against COVID-19 during Prosthodontics Rehabilitation

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## ARTICLE INFO

## Key Words:

COVID-19, Personal Protective Equipment, Aerosol Generating Procedures

## How to Cite:

Khan, H. ., Sartaj khan, M. ., Raza, M. ., Tahir, M. ., Afridi, S. ., & Manzar, S. . (2022). Practitioner's Perspective of Personal Protection Against COVID-19 During Prosthodontics Rehabilitation: Personal Protection against COVID-19 during Prosthodontics Rehabilitation. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.601>

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Received Date: 5th July, 2022

Acceptance Date: 16th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The corona virus pandemic has impacted almost all kinds of public health care professions, including dentistry. **Objectives:** In the present study, we aimed to evaluate the practitioner's perspective of personal protection against COVID-19 and evaluating the practicing protective protocols adopted by local practitioners. **Methods:** This cross-sectional study included 150 practitioners from two different private dental hospitals. Data was collected by pre-structured questionnaire, which composed of 20 questions. These questions assessed infection control measures and their perspective and knowledge regarding spread of Corona virus. Data were analyzed using (SPSS version 20.0) **Results:** A total of 150 practitioners participated in the study (70 house officers and 80 post graduate residents and above). The most commonly practiced procedure was wearing mask (81.3%) and washing hands (76%) after gloves removal. A small amount of practitioners preferred rinsing mouth with mouth wash (2.7%), use of water-resistant gowns (4.7%), wearing goggles (8%), use of N95 mask and rubber dam application (9.3%) each during procedure. **Conclusion:** Prosthodontists are at highest risk of contracting the virus owing to aerosol generating procedures. Current study observed an inadequate use of PPEs as depicted from various responses from practitioners such as limited use of mouth rinses before start of procedures, goggles, water resistant gowns and N95 masks.

## INTRODUCTION

The COVID-19 corona virus has affected all forms of public health care management, and dentistry is not an exception to it. The health care professionals around the globe being on the forefront, has largely been affected by COVID-19 virus. Oral and dental health care providers, including prosthodontists, are most vulnerable to this disease, because of increased viral load and aerosol generating procedures. The emergence of this virus has forced the health care professionals to re-consider the protective and preventive measures to curtail the cross-infection [1, 2]. The required preventive measures must be effective to limit and stop the spread of this highly infectious disease. The various forms of viral spread are aerosols generating procedures like tooth preparation and non-aerosol generating processes like exposure to saliva during

impression taking, contact with contaminated acrylic particles from dentures, or from finishing/polishing of different restorations. Indirect contact with dental laboratories and dental technicians may include impression, dental casts, and fixed and removable appliances [3, 4]. Dental practitioners and related dental care providers can reduce or limit the spread of COVID-19 by adapting preventive measures at various levels, for example, at triage filtration clinic (monitoring temperature, and oxygen level), waiting area (seating arrangement at recommended distance), and at dental operational rooms (proper ventilation and use of mouth rinses) along with the utilization of personal protective equipment [5]. The Centre for Disease Control (CDC) has emphasized the use of personal protective equipment (PPEs) as compulsory, not

only for practitioners but for dental assistants as well [6]. Various forms of PPEs consist of goggles, head cover, face-shields, triple layer surgical mask, surgical gloves, disposable gown, water resistant gowns, and N95 respirator during dental procedures. Filtering facepiece-3 (FFP3) should be used in COVID-19 positive patients and if respirator is not accessible combination of mask and full face shield should be used [7, 8]. Since the reporting of first COVID-19 case, almost 2 and half years ago, a rapid surge in research started around the world in terms of prevention, diagnosis, management, and treatment, among others. Several studies have been conducted on the knowledge and perception of different dental practitioners regarding COVID-19 infection control in prosthodontics care facility centres. According to the study done by Sa Y et al, clinical care was provided for patients with dental emergencies by using enhanced grade 2 and grade 3 personal protective equipment (PPE). Tele-dentistry was used and advised where required to provide care for patients with non-emergency needs [9]. Another study done by Aldhuwayhi S et al, around 78.7% of dentists believe that use of N95 mask can prevent the transmission of COVID-19, 91.5% practitioners conclude that repeated hand washing with soap and sanitizers can help prevent transmission of infection, 77.3% of dentists believed that vaccine would prevent the transmission, 92.13% believed that usage of standard guidelines suggested by health authorities can reduce transmission risk [10]. According to study done by Dwivedi H et al, hand hygiene must be strictly followed before and after all patient contact, contact with potentially infectious material, and donning and doffing PPE. Hand hygiene should include the use of an alcohol-based hand rub containing 60-95 percent alcohol or washing hands for at least 20 seconds with soap and water can reduce the chances of transmission of infection. Application of rubber dam during aerosol-generating procedure can minimize spread of infection [7]. According to a study done by Halawani R et al, [11] wearing a mask was the most widely used method (99.8%) to control the spread of infection. Another study done by Banaee S et al, believed that while treating COVID-19 positive patients N95 (59%) is the best fit rather than surgical masks (16.2%) [2]. To follow and comply with the recommended protective protocols against any disease, it has been found to be variable among the health care providers. This depending upon many factors, for example, cost of the personnel protective equipment (PPEs), accessibility, time consuming procedures to disinfect the operatory, availability of protective equipment, difficult and time consuming donning and doffing, among others. The present study was started with having an objective in mind to assess the perspective and current practicing inclination of

practitioners towards the predominant type of protection against COVID-19. Therefore, the rationale of the study was to evaluate the knowledge and perspective of different dental practitioners regarding personal protection against COVID-19 during prosthodontics rehabilitation in local circumstances. This would be of valuable information to dental care professionals in providing proper protection against COVID-19 patients and helps to reduce the spread of infection.

## METHODS

This cross-sectional study was conducted in Prosthodontics Department of Peshawar Dental College, from January to March; 2022. The study was carried out after obtaining an ethical approval from institution review board. For the purpose of this study the practitioners working in various prosthodontics departments were divided into two groups based on their experience. The first group included house officers and the second group post graduate residents and above. A total of 150 participants were approached in personal to invite them to participate in the study. These participants were selected from two different private dental teaching hospitals namely; Peshawar Dental College (PDC) and Sardar Begum Dental College (SBDC). A consecutive non-probability sampling technique was used for this study. Data was collected using self-structured questionnaire. The participants were informed about the purpose of the study. The prepared questions or responses were self-explanatory, and were deemed necessary to be explained to the participants. An informed verbal consent was taken from the practitioners before starting and recording the responses on prepared questionnaire, and then only wilful participants were recruited in the study. The questionnaire had two parts. The first part was about practitioners' demographic data and second part related to collection of information regarding practitioners' perspective of personal protection against COVID-19 during prosthodontics rehabilitation during various treatment modalities. The collected data were analysed using Statistical Package for Social Sciences (SPSS version 20.0). Descriptive statistics was computed for both qualitative and quantitative variables. Mean and standard deviation was calculated for quantitative variables like age of practitioners. Qualitative variables like gender, affiliation with institution and qualification were presented as frequency and percentage. Association between study variables and perception queries were analysed via Chi-Square test with a 95% confidence level with  $p < 0.05$ .

## RESULTS

A total of 150 practitioners participated in the study from two different teaching hospitals, making a response rate of

100%. Overall, all practitioners filled the questionnaire and opted for the option of their choice. Out of 150 participants 92 (61.3%) were female and 58 (38.7%) were male practitioners as shown in Table 1. The mean age of the patients in study was 26, with a standard deviation (SD) of 3.5. A total of 83 (55.3%) practitioners were from Peshawar Dental College (PDC) and 67 (44.7%) were from Sardar Begum Dental College (SBDC). A total of 80 (53.3%) were post graduate residents or more while 70 (46.7%) were house officers, as shown in Table 1.

Minimum 19	Maximum 46	Male (n=58)	Female (n=92)	House Officers (n=70)	Postgraduate and above (n=80)
Mean+SD	26+3.5	39%	61%	47%	53%
Affiliation with Institution					
PDC	n=83(55%)		SBDC		n=67(45%)

**Table 1:** Statistics for participant's gender, age, qualification, and affiliation with institution. PDC- Peshawar 3 Dental College, SBDC- Sardar Begum Dental College

Table 2 and Table 3 shows practitioner's occupational practices regarding use of PPE compliance during prosthodontic procedures. According to the data collected from different practitioners, 59% practitioners sometimes use face shield during procedure. More than half of participants that is almost 59.3% practitioners never used N-95 mask during procedure. A quite significant number of practitioners (81.3%) always used surgical mask. Almost 49% practitioners were found to be engaged in aerosol generating procedures in prosthodontic departments. Regarding the use of mouth rinse, almost 61% practitioners never asked their patient to rinse with mouthwash or any antiseptic solution, before starting any procedure. Disinfection of impression is necessary, and 39.3% practitioners never disinfected impression before sending to laboratory. Almost one third of practitioners (36%) used the facility of extra-oral suction technology. A total of 51% practitioners sometimes availed functional efficient ventilation facility. Regarding wearing of gloves and gowns, 63% practitioners sometimes used gowns during procedure, 60% never used water resistant gowns during dental procedure, and 55% practitioners responded that they used sometimes double gloves during procedure. Almost half of practitioners (49%) responded that they sometimes used goggles during procedure. Washing hands before and after any dental procedure is necessary and 76% of practitioners responded that they always washed hands after gloves removal. The recorded responses of different variables like use of hand sanitizers, rubber dam application and use of PPEs by assistant respectively were 49%, 51%, and 49%. Astonishingly 57% of practitioners' assistant never used PPEs and 43% practitioners sometimes asked their patients to reproduce on paper COVID-19 test before the start of procedure. Similarly, 42% practitioners sometimes asked verbally about Covid-19

test before the procedure and 40% practitioners asked vaccination status from the patients before the procedure.

Variables [n=150   n (%)]				p-value
Do you use face shield during procedure?	Always 16 (10.7)	Sometimes 89 (89.3)	Never 45 (30)	0.15
Are you using N95 mask during procedure?	Always 14 (9.3)	Sometimes 47 (31.3)	Never 89 (59.3)	0.21
Do you use surgical mask?	Always 122 (81.3)	Sometimes 17 (11.3)	Never 11 (7.3)	0.1
How often you are doing aerosol procedures?	Always 74 (49.3)	Sometimes 65 (43.3)	Never 11 (7.3)	0.4
Do you ask patient to rinse mouth with mouthwash?	Always 4 (2.7)	Sometimes 54 (36.0)	Never 92 (61.3)	0.15
How many times you disinfect impression before sending to laboratory?	Always 45 (30.0)	Sometimes 46 (30.7)	Never 59 (39.3)	0.001
Do you use the facility of using extra-oral suction technology?	Always 54 (36.0)	Sometimes 47 (31.3)	Never 49 (32.7)	0.8
Do you avail functional efficient ventilation facility in your environment?	Always 30 (20.0)	Sometimes 76 (50.7)	Never 44 (29.3)	0.38
How much often you are using gown using during dental procedure?	Always 29 (19.3)	Sometimes 95 (63.3)	Never 26 (17.3)	0.11
How much often you are using water resistant gown during procedure?	Always 7 (4.7)	Sometimes 53 (35.3)	Never 90 (60.0)	0.08

**Table 2:** Practitioner's responses regarding use of PPE of first ten questions(1-10) given in questionnaire.

Variables [n=150   n (%)]				p-value
Do you wear double gloves during procedure?	Always 25 (16.7)	Sometimes 83 (55.3)	Never 42 (28)	0.02
Do you wear goggle during procedure?	Always 12 (8.0)	Sometimes 74 (49.3)	Never 64 (42.7)	0.89
How frequently do you wash hands after gloves removal?	Always 114 (76.0)	Sometimes 33 (22.0)	Never 3 (2.0)	0.05
Do you use hand sanitizer after gloves removal?	Always 73 (48.7)	Sometimes 67 (44.7)	Never 10 (6.6)	0.005
Do you wash hands with soap after each procedure?	Always 77 (51.3)	Sometimes 62 (41.3)	Never 11 (7.3)	0.41
Do you use rubber dam during procedure?	Always 14 (9.3)	Sometimes 62 (41.3)	Never 74 (49.3)	0
Does your assistant use PPE?	Always 13 (8.7)	Sometimes 52 (34.7)	Never 85 (56.7)	0.37
Do you ask for on paper COVID-19 test before the procedure?	Always 38 (25.3)	Sometimes 54 (42.7)	Never 48 (32.0)	0.68
Do you ask verbally about COVID-19 test before the procedure?	Always 61 (40.7)	Sometimes 63 (42.0)	Never 26 (17.3)	0.13
Do you ask about vaccination status from the patients?	Always 58 (38.7)	Sometimes 60 (40.0)	Never 31 (20.7)	0.19

**Table 3:** Practitioner's responses regarding use of PPE of last ten questions(11-20) given in questionnaire.

## DISCUSSION

The present study was carried out among the participants (having basic qualification of BDS, post graduate training and above) working in prosthodontics department of two different teaching hospitals with a sample size of 150 (58



males and 92 females). This study investigated various parameters of prevailing practicing scenario of practitioners' perspective of protection against COVID-19 during prosthodontic rehabilitation of patients presenting with various forms of replacement therapies. Appropriate type and recommended usage of protective mask is a prime requisite for limiting the spread of COVID-19 and other infectious diseases. However, at times, practitioners fall short of adapting these protective measures due to various reasons, including but not limited to the availability, cost of PPEs, along with donning/doffing time consuming procedures and increase surge of patients. A previous study has observed that only 37% of practitioners working in various hospitals in Pakistan, have access to N95 masks, however in contrast to this, our current study observed 9.3% practitioners using N95 mask during procedure. The greater part of this difference may be due to the low sample size of current study [12]. The low score achieved in our study may be due to shortage of N95 mask for usage or it might be due to its high cost when compared to routinely use surgical masks. In our study 81.3% of practitioners used surgical mask, which are also available over the counters these days, to prevent transmission of infection which are in agreement with a study done by Cagetti and co-workers from Italy who reported a score of 74.5% with a surgical mask [13]. To prevent spread of infection, disinfection of contaminated instruments and materials is obligatory to protect clinical and laboratory personnel. Our study observed a statistically significant deference ( $p=0.001$ ) for disinfecting impressions. It was noted in our current study that around 30% of practitioners disinfect impression before sending to laboratory as compared to a study done in India and Saudi Arabia earlier where they observed that 14 to 17% dentists disinfect impression before sending to laboratory [14, 15]. A slight high scores obtained in our study might be due to the corona virus pandemic situations, where people are more aware and believe more in disinfection and using sanitizers. It is worth commendable that practitioners had adequate knowledge about the importance of disinfection and its role in reducing the spread of infection. Application of rubber dam during aerosol generating procedure can minimize the spread of infection. Ramsha et al, reported in their study that 28% were using rubber dam during procedure [16], while another study observed that about 13.84% of participants were using rubber dam according to the study done by Duruk G et al [17]. A low score of 9% achieved in current study might be due to the practitioners could find it difficult and time-consuming using rubber dam on every patient or it may be due to unavailability of rubber dam in hospitals or it may be due lack of practitioners' skills. This might be investigated in another study of such a kind. In

prosthodontics aerosol generating procedures are unavoidable like tooth preparation in crown/fixed partial dentures and for removable partial dentures. Our study observed that more than 80% of practitioners were doing most of the time aerosol generating procedures in their clinical practices. This is quite interesting that despite COVID-19 pandemic, apprehension of practitioners by avoiding aerosol generating procedures around the globe is quite is high. According to study done by Ramsha K et al, 68% of dentists were avoiding aerosol generating procedures [16]. It suggests that practitioners and their clinical environment are more prone to be affected by the spread of viral load during aerosol generating procedures. There is an abundance of research evidence that mouth rinse with an antiseptic solution can reduce the number of oral micro-organisms [18]. Ahmad and co-workers reported that 24% of practitioners were advising their patients for a pre-procedural mouth rinse [19]. Contrary to this our study observed a quite low score (2.7%) for using a mouth rinse before starting any aerosol generating procedure. This situation is quite startling and measures should be taken to encourage dental practitioners to comply with the recommendations of health care guidelines. A possible explanation for this might be the unawareness or lack of interest on behalf of practitioners regarding use of mouth rinses. Duruk and co-workers reported that 63.79% practitioners were using high volume suction during procedure [17]. It is noted in our current study that around 36% were using high volume suction. Low percentage may be due unavailability of suction system in dental unit or it may be due to patient experienced fear, frustration during suctioning. Trauma to airway or other oral soft tissues might another reason of not using suction during procedure. Protective equipment in the form of goggles, gowns and gloves is essential for every aerosol generating procedures. A study conducted earlier by Narjees et al, reported that 39.4% dentists used goggles during aerosol generating procedures [20]. The present study observed that almost 8% of practitioners used goggles while doing dental procedures. Low score obtained may be due the practitioners are unaware of the substantial risk of viral transmission by aerosol. According to study done by Narjees A et al, around 14.2% used gowns during procedure and these finding are somewhat in agreement with our current study i.e., 19.3%. After gloves, it is the second most often used item of PPE. They're used to keep practitioners and patients safe from microorganisms and bodily fluids [20].

## CONCLUSION

Within the limitation of this study, it can be concluded that prosthodontists are most vulnerable to this disease,

because of abundance of virus in oral secretions. By following the guidelines suggested by the centre for disease control in the form of using of PPE, we can substantially minimize the spread of infection includes masks, goggles, gowns, face-shields and gloves etc. It was observed that PPEs used by practitioners were inadequate especially regarding the use N95 masks, aerosol generating pre-procedural mouth wash rinse, use of rubber dam and etc. The use of PPE during procedure was minimal. The most commonly practiced procedure was wearing mask and washing hands after gloves removal other than that their response towards the use of other equipment's were found to be not up to the required standard to achieve protection against the spread of this deadly disease.

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## Original Article

## Comparative effects of Myofascial Technique Alone and In Combination with Isometrics on Myofascial pain Syndrome Due to Excessive Smartfone Usage

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## ARTICLE INFO

## Key Words:

Isometrics, Myofascial release technique, Myofascial pain syndrome, trigger points.

## How to Cite:

Khalid, A. ., Ahmad, J. ., Michelle, A. ., Nazir, S. ., Khalid, N. ., &amp; Jabbar, F. . (2022). Comparative effects of Myofascial Technique Alone and In Combination with Isometrics on Myofascial pain Syndrome Due to Excessive Smartfone Usage: Effect of Isometrics, Myofascial and Isolated Myofascial Release Technique on Myofascial Pain Syndrome. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.654>

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Received Date: 18th July, 2022

Acceptance Date: 25th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Myofascial Pain Syndrome (MPS) is a regional musculoskeletal pain disorder which is caused by the formation of myofascial trigger points. Myofascial trigger point pain is typical and frequently so debilitating that it is vital to receive quick and efficient treatment. This pain is commonly seen in people that are in their teenage or in adults effecting both men and women. Many interventions have been used to treat this condition by physiotherapists and respective health care providers such as trigger point release, massage therapies, acupuncture techniques, and other heat and cold therapies, among others. **Objective:** This study compares the efficiency of myofascial release techniques along with isometrics exercises and isolated myofascial release for the upper trapezius muscles' myofascial trigger points. **Methods:** It was a Randomized clinical trial carried out in the city of Faisalabad. Two groups of the patients were made and randomly assigned by lottery method. Both the groups received myofascial release techniques baseline treatment. Group A received the isometrics with myofascial release technique and group B received the isolated myofascial release technique. The Trapezius muscle's trigger points were assessed using Simon's trigger point criteria. Outcome measures were VAS and Neck pain assessment form. **Results:** Upon completion of the trial, NDI and VAS scores were assessed prior to and after the treatment; before treatment group A of NDI demonstrated average score of 10.7333 and group B showed 14.5333, while after treatment the score was transformed to group A; 3.4000 and group B; 4.8667. For VAS, group A and B before treatment scored 5.7333 and 5.8667, respectively, whereas, after treatment they scored 2.4667 and 2.5333, respectively. **Conclusion:** MFR along with isometrics was slightly more effective as compared to isolated MFR in pain alleviation and improvements of ROM but statistically both of interventions given were effective.

## INTRODUCTION

The area between the base of the skull and the clavicles is known as the neck. Despite its modest size, it comprises a number of significant anatomical features. The cervical fascia divides the neck into layers and possible areas. The trachea, oesophagus, thyroid gland, cervical fascia, as well as the muscles, nerves, and blood vessels, are all enveloped inside this fibrous connective tissue. The cervical fascia has two layers: the superficial layer and the deep layer. The superficial layer is deep in the dermis but shallow in the platysma muscle. It is connected with the superficial musculoaponeurotic system and unsheathes the platysma (SMAS). The facial motor neurons, adipose tissue, external and anterior jugular veins, and sensory nerves are all found in the gap between the superficial and

deep cervical fascia. The deep cervical fascia is separated into three layers: superficial, medium, and deep. The "rule of twos" might be used to remember the superficial layer of this fascia. It encircles two muscles (trapezius and SCM), two glands (submandibular and parotid), and two neck gaps (parotid and submandibular) (space of posterior triangle and the suprasternal space of Burns in the anterior midline). The deep cervical fascia has an intermediary layer called the peritracheal fascia. The strap muscles, thyroid gland, trachea, and oesophagus are all enclosed in it. The deepest layer of the deep cervical fascia is the posterior prevertebral layer, which encloses the scalene muscles and the spine [1-3]. Pain in the shoulder region and shoulder joint as a result of myofascial trigger points is very

common in people now a day. This also shows that the chances of occurrence of trigger points is common in the shoulder region as compared to other parts or regions of the body where it is less likely that trigger points will be present [4]. The neck is the body part that joins the head to the rest of the body. It connects the head to the thorax and holds a range of vital organs which is located between the clavicle and the jaw. It has some of the most complex and complicated anatomy in the body and comprises of a variety of organs and tissues that have important structures and functions for normal physiology. Structures in the neck regulate breathing, speaking, swallowing, metabolism regulation, support, and connection of the brain and cervical spine, and also circulatory and lymphatic influx and outflow from the head. The midway of the muscle's upper border is where the trapezius myofascial trigger point is quite often seen [5]. Myofascial trigger points are a common and prevailing condition affecting many people and their daily activities of life but when it comes to clinical based evidence it has been seen that there is less evidence to show how to manage this condition in a successful manner [6]. Myofascial trigger points have a very drastic and negative affect on the life of a person who suffer by such problems once in a while in his or her life. This condition constitutes a very devastating impact on the person affecting the daily work, not only at home but also at a workplace. According to a local survey done in America it has been seen that approximately 15 percent of American population is affected by this problem in their daily life while the numbers increase, each passing day. Hence, there is an elevated number of medical visitations with most of the cases being of myofascial trigger points [7]. Myofascial trigger points are most often mixed by researchers and authors with other problems that are more or less similar to this condition due to the presence of very minor differences. For instance, myofascial pain syndrome is mixed with fibromyalgia because the pattern of pain, character of pain, and radiation of pain is quite similar in characterized with trigger points whereas fibromyalgia consists of tender points. Nevertheless, there is an overall acceptance of the problem among researchers and authors but still ambiguity is present to some extent. Moreover, there is also an overall agreement upon the methods of diagnosis that are used to identify this common problem among people [8]. Most of the times in clinical practice the common method used for the identification for presence of myofascial trigger points in the shoulder region whether they are active or latent, requiring palpation of the taut band of muscle fibre of the affected region. This method has also been validated by the clinicians and researchers to be performed upon the trigger points of not just shoulder region but also of the

other regions of the body [6]. For the proper diagnosis of the presence of myofascial trigger points physical examination of the trigger points is the very first step used in physical therapy to confirm the existence of myofascial trigger points and to confirm the intensity of muscular shortness involved. This physical examination is also used to see how much area has been covered by these trigger points so that the extent of disability and limited functional activities by the affected person can also be confirmed [9]. The physical examination of myofascial trigger points involves a method which is referred to as palpation of the whole area where trigger points have been developed, inert involves palpation of the whole taut band of muscle fibre by using thumbs and fingers followed by application of pressure upon the area so that the trigger points can easily and efficiently be located. This method of palpation provides information to the physical therapist about the structure of the bone. The tone of the affected muscle also gives an idea about the texture, turgidity, and temperature of the involved area of the skin. Specific palpation techniques are frequently used to elicit pain by applying pressure to the affected anatomical structures. These manoeuvres are crucial for diagnosing and treating patients with manual therapy and not just involve the manual palpation of the patient but also involves interviewing the patient by asking him question related to pain and functional disabilities as a result of trigger points [10]. In order to prevent the occurrence of trigger points the most important thing to know is the underlying mechanism of development of trigger points as well as potential risk factors and causes that can lead towards the development of this problem. Once these causes are known it becomes too easier to stop this problem and to reduce the intensity and progression of this problem. Most commonly it is believed by clinicians and researchers that overuse of a muscle for a long period of time of direct injury to the muscle can disturb the overall structure of a muscle and hence lead towards the development of trigger points along the whole length of the muscle fibre. This muscle damage usually occurs as result of various type of forces of different intensities acting upon the muscle directly for a long period of time. These forces can be of low intensity and can also be of medium and high intensity leading towards concentric as well as eccentric contraction and shortening of the muscle fibre [11]. Among various regions of the body, it has been seen that the most commonly affected areas by trigger points in most of the cases are shoulder, neck, upper back, and scapular region. The most commonly affected muscle as shown by literature is the trapezius muscle which is more prone to the development of trigger points and loss muscle function especially in those people that are involved in many types of badminton, swimming, or

basketball, among others [12]. There are many different types of treatment options that can be utilised to treat myofascial trigger points in the field of physical therapy. Usual care includes the utilization of multiple therapeutic modalities, such as TENS, Ultrasound (US), and short wave diathermy. In addition to these modalities various techniques of myofascial release technique are also used to release the trigger points by applying pressure on them and moving their place. Stretching techniques along with various types of coolant sprays are also used in the treatment of the trigger points. Along with these therapeutic methods of treatment many other complementary treatments are also used such as lifestyle modification, psychological counselling, and patient encouragement. Commonly, it has been reported that various patients suffering from trigger points, if not diagnosed at earliest of stages, it can lead to more chronic complications. In such cases, the pain can also spread from a smaller area to a larger part of the body, increasing the incidence of disability and other functional complexities [13]. In clinical practice among various modalities the commonly used modalities to treat trigger points include hot packs and ultrasound. Moreover, these modalities have been used in different sequences in order to get better therapeutic results regarding trigger points of trapezius muscle. The effect of hot pack and ultra sound upon various tissues of the body is different from one another. Hot pack causes vasodilation of the superficial tissues and increases the blood circulation in the area to which it is applied by releasing a vasodilator known as histamine [14].

## METHODS

A private institution's outpatient department participants were screened and recruited for the study. The subjects were female only, between both the ages of 18 to 28, with pain lasting more than one month, constraining neck movements related to pain, distributing pain, and the jump signs, which would be defined by patient voice/withdrawal palpable tender spots on neck and upper back. Participants were excluded from the study who had the history of shoulder and spine surgery, congenital problems, fibromyalgia, myopathy, radiculopathy, trigger point injections, and any recent accidents. A number of 30 participants (n=30) aged between 18-28 years were enrolled after taking a thorough clinical history and fully informed written consents. Two groups of the patients were made and randomly assigned by lottery method. Both the groups received myofascial release techniques baseline treatment. Group A received the isometrics with myofascial release technique and group B received the isolated myofascial release technique. Trigger points of the trapezius muscle were assessed by using Simon's

criteria. A quantitative study was conducted which follows the research design of randomized clinical trial. Inclusion and exclusion criteria were used to screen participants that fulfilled the inclusion criteria when further screened by using neck pain assessment form and then the treatment was carried out on these participants. A signed informed consent was obtained from the participants before recruitment into the study. Each subject was permitted to ask the examiner questions about the study. Participants who fulfilled the inclusion criteria were enrolled in the study. The primary outcome measures were Visual Analogue Scale (VAS) graded from 0 to 10, which shows no pain and 10 shows maximum bearable pain and neck pain assessment form to assess the level of pain. The secondary outcome measures were neck disability index to analyse the level of functional limitation as a result of trigger points. The participants were divided into two groups A and B. Group A received isometrics plus myofascial release technique. At first, release was given as baseline, followed by application of pressure upon the trigger points to release them and finally isometrics were applied. Group B received isolated myofascial release technique. First of all, myofascial release technique was applied and then pressure was applied upon the trigger points to release them. The Institutional Review Board granted ethical approval to the study. All 30 participants were randomly assigned with disguised allocation to 1 of 2 treatment groups using a realistic sample technique: Solo MFR; Group-B (n=15); Group-A (n=15) MFR + isometrics (described below in detail). Block randomization was being used to divide the participants into two groups, in which they chose one of two labelled envelopes at random. Participants selected on the basis of neck pain assessment form were divided in to different groups as discussed above. One measurement was taken before treatment by utilization of VAS and NDI. After follow up on the first measurement, last evaluation was conducted at the end of 6 sessions. Neither the treatment nor the subjects' desire to speak with one another during the trial was revealed to the participants. Following a 10-minute period of deep transverse friction, the upper trapezius muscle underwent three sets of 90-second myofascial stretches. The principle trigger point was gently rubbed with the right thumb while the left thumb reinforced it from the top, all while the patient was comfortably seated in an armless chair with both feet firmly planted on the floor. The upper trapezius was then handled with myofascial release using the ulnar border of the therapist's both palms. At that moment, the patient's cervical spine was flexed towards the opposite side. On one of the groups after receiving myofascial release technique were subjected to isometric exercises of neck, including side flexion, cervical

extension, right and left rotation, and flexion at the neck joint. Every exercise is performed for 10 repetitions with a 5-second hold [15]. A software called SPSS version 20.0 for Windows was used to enter and analyse the data. Utilizing Windows software, the Shapiro-Wilk method was conducted to test the data's normality. The mean and standard deviation were determined for quantitative variables. The independent t-test was used to compare the efficacy. P value of 0.05 or less was recognized as statistically significant. Data analysis was done by using SPSS 20.0 version and Independent T-test was also applied.

## RESULTS

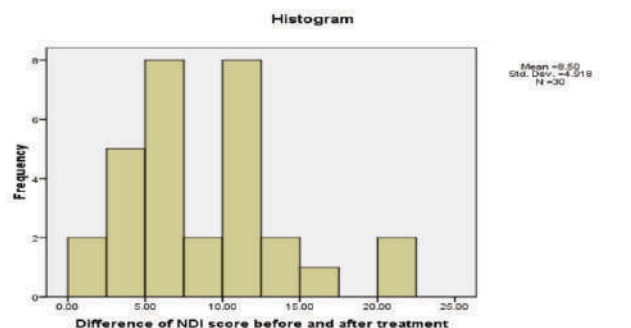
Descriptive statistics of neck disability index in table 1 shows that after applying independent t-test, the mean value for group A before treatment was 10.73 and +SD for group A was 4.13. Mean value for group B before treatment was 14.53 and +SD for group B was 6.76. This table also shows that mean value for group A after treatment was 3.40 and +SD for group A after treatment was 1.5 whereas mean value for NDI for group B after treatment was 4.87 and +SD for group B after treatment was +1.81. Statistically, the mean NDI score before applying treatment for group-A and group-B is equal as indicated by the p-value (0.074) using 5% level of significance, whereas the mean NDI score after applying treatment for group-A and group-B is not equal as indicated by the p-value (0.022). Descriptive statistics of visual analogue scale in table 1 shows that after applying independent t-test mean value for group A before treatment was 5.73 and +SD for group A was 1.34. Mean value for group B before treatment was 5.87 and +SD for group B was 1.25. This table also shows that mean value for group A after treatment was 2.47 and +SD for group A after treatment was 0.91 whereas mean value for VAS for group B after treatment was 2.53 and +SD for group B after treatment was 0.99. Statistically, the mean VAS score before applying treatment for group-A and group-B is equal as indicated by the p-value (0.779) using 5% level of significance, whereas the mean VAS score after applying treatment for group-A and group-B is not equal as indicated by the p-value (0.850).

Parameter	Groups	N	Mean + SD	p-value
Score of NDI before treatment	Group A	15	10.73+4.13	0.074
	Group B	15	14.53+6.76	
Score of NDI after treatment	Group A	15	3.40+1.5	0.022
	Group B	15	4.87+1.81	
Score of VAS before treatment	Group A	15	5.73+1.34	0.779
	Group B	15	5.87+1.25	
Score of VAS after treatment	Group A	15	2.47+0.91	0.850
	Group B	15	2.53+0.99	

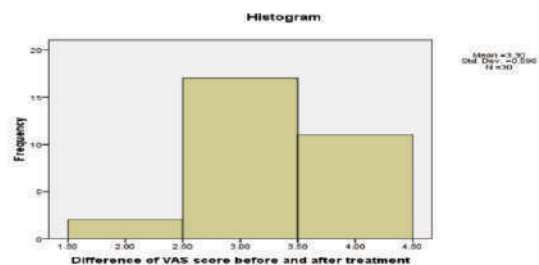
**Table 1:** Scores of NDI and VAS before and after treatment

	No. of groups	N	Mean + SD	Std. error mean	p-value
Difference of NDI score before and after treatment	A = control group	15	7.3333+3.30944	0.85449	0.199
	B= case group	15	9.6667+6.01981	1.55431	
Difference of VAS score before and after treatment	A = control group	15	3.2667+0.70373	0.18170	0.765
	B= case group	15	3.3333+0.48795	0.12599	

**Table 2:** Average mean difference of scores before and after treatment



**Figure 1:** Difference between NDI score before and after treatment



**Figure 2:** Difference between VAS score before and after treatment

Descriptive statistics of average mean difference of group A and B before and after treatment in table 2 shows that the difference of NDI score before and after treatment for group A has mean value 7.3333 and +SD value was 3.30944 and the difference of NDI score before and after treatment for group B has mean value 9.6667 and +SD value was 6.01981. Table 2 also shows that difference of VAS score before and after treatment for group A has mean value 3.2667 and +SD value was 0.70373 and the difference of VAS score before and after treatment for group B has mean value 3.3333 and +SD value was 0.48795. Statistically, the mean difference of NDI score before and after treatment for group A and B is equal as indicated by p-value (0.199) using 5% level of significance whereas the mean difference of VAS score before and after treatment for group A and B is also equal as indicated by p-value (0.765).

## DISCUSSION

To determine the comparative effectiveness of isometrics and myofascial release versus isolated myofascial releases, this interventional study was carried out in a time period of 3 months. Neck disability index demonstrated for

group A mean +SD decreased from 10.7333 + 4.13118 to 3.4000 + 1.50238 whereas for group B neck disability showed that mean +SD decreased from 14.5333 + 6.75983 to 4.8667 + 1.80739. Visual analogue scale showed for group A that mean +SD decreased from 5.7333 + 1.33452 to 2.4667 + 0.91548 whereas for group B neck disability showed that mean +SD decreased from 5.8667 + 1.24595 to 2.5333 + 0.99043. The average mean difference of group A and B before and after treatment shows that the difference of NDI score before and after treatment for group A has mean value 7.3333 and +SD value was 3.30944 and the difference of NDI score before and after treatment for group B has mean value 9.6667 and +SD value was 6.01981. This table also shows that difference of VAS score before and after treatment for group A with mean value 3.2667 and +SD value 0.70373 and the difference of VAS score before and after treatment for group B has mean value 3.3333 and +SD value was 0.48795. The average mean difference of NDI score before and after treatment for group A and B is equal as indicated by p-value >0.05 whereas the mean difference of VAS score before and after treatment for group A and B is also equal as indicated by p-value >0.05 so there is no statistically significant difference between group A and group B. The results of this study revealed that treating myofascial trigger points with MFR or MFR paired with isometric exercises was successful. When myofascial release is applied to TrPs, the local chemistry changes as a result of the nodules blanching and then producing hyperaemia. This breaks down scar tissue, desensitises the nerve terminals, washes out the inflammatory exudates and pain metabolites from the muscles, and lessens muscle tone [16]. Thus myofascial release has essentially the same mechanism of action on the trigger point as the injection therapy. However myofascial release is a non-invasive technique that does not produce post treatment soreness or haemorrhage [20]. According to literature interpretation, extending the muscle after treating the trigger point will result in longer-lasting pain alleviation [17-19]. The results of the study may be advantageous to the population with a clinical diagnosis of myofascial pain syndrome with insidious start. One cannot conclude that the good benefits of MFR and isometrics plus MFR exhibited at the sixth session of treatment would end in long-lasting changes because to the brief intervention and monitoring periods. To observe for long-term symptom relief, additional controlled studies with extended observation are needed.

## CONCLUSION

According to this study it was concluded that both isometrics plus myofascial release versus isolated myofascial release are useful for treating myofascial pain syndrome in the short term. In terms of pain relief and ROM

improvements, MFR combined with isometrics was marginally more effective than isolated MFR, although statistically both therapies were successful.

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## Original Article

## Impact of Mobile Phone Use on Health, Behavior and Social Interactions among Children Aged 2 – 12 Years

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## ARTICLE INFO

## Key Words:

Pediatrics, Mental Health, Health, Social Behavior, MobilePhone

## How to Cite:

Iqbal, M. ., Saeed, F. ., Qassim Bham, S. ., Athar Khan, M. ., & Ahmed Sharif, U. H. . (2022). Impact of mobile phone use on health, behavior and social interactions among children aged 2 – 12 years: Impact of mobile phone use on health, behavior and social interactions. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.646>

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Received Date: 14th July, 2022

Acceptance Date: 21st July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Children and teenagers are becoming increasingly dependent on their mobile devices, which they use for entertainment, education, and self-expression in addition to keeping in touch with friends and family. The prolonged use of mobile phones can have deleterious effects on children. **Objectives:** This study was conducted to evaluate these effects on specific areas of the children. **Methods:** It was a cross-sectional study conducted at the outpatient department during the study period from September 2019 to February 2020. Children below the age of 2 years or mentally challenged children were excluded. Informed consent was taken from parents who participated in the activity. The child and the parents are explained the research purpose and data collected in the pre-designed and pre-tested questionnaire. SPSS version 21.0 was used to enter and analyses the data. **Results:** A total of 399 participants of age 2 to 12 years were included in the study. In 50.3% of children who were using mobile for more than 2 hours, 55.1% of children slept less than 6 hours a day with 68.9% of children having a disturbance in sleep pattern. 33.9% of children reported having been wearing glasses and 34.8% of children showed an increase in weight. Regarding social interaction and behavior, 39.9% of children showed rude behavior towards their parents. 53.2% of children using mobiles were associated with behavioral issues like isolation thus avoiding gathering while 77.3% were addicted to mobiles and showed anger and frustration when mobiles were taken away from them. **Conclusion:** The use of the mobile phone negatively impacts the various aspects of a child's life.

## INTRODUCTION

The 21st century is undoubtedly an era of mobile phone communications with billions of subscribers worldwide [1]. The increased dependency on mobile phones in children and adolescents is not only a source to keep in touch with friends and relatives but also for entertainment, educational purposes, and expressing one's identity [2]. Despite its advantages, it is still hazardous for the human being in the sense of physical & mental well-being with negative effects on social relationships, working capabilities, and day-to-day activities. The major health risk is associated with radiofrequency electromagnetic fields, as the main source of mobile phone communication

is linked through the emission of radio signals [3]. The brain is the main target organ for radiofrequency (RF) radiation emitted during its use [4]. Brain tumors have been a major concern as it absorbs most of the radio frequency energy when the handset is held near to the head during talking and listening [5]. In students, physical fitness [6] and poor academic performance [7] have been related to excessive use of mobile phones. Due to its dependency, interpersonal relationships are being affected which can have an immense impact on our physical and psychological health [8]. By the definition of psychology, factors contributing to the poor-quality relationship are social anxiety and

loneliness [9-10]. Many studies have shown the association between the behaviors of mobile phone users with psychological features like low personality, low self-esteem, impulsivity, and feeling unwell [11-12]. Studies have also shown a significant association between headache, tiredness, low energy, and insomnia in late-night cell phone users. Insomnia later will be affecting the learning process of an individual [13]. The sleep quality and deprivation is another factor affecting the normal activity of a healthy individual that raises significant health concerns [14]. The aim of this study was (a) to study the effects of mobile phones on the health of children (b) to study the impact of mobile phones on the physical and social behavior of children and (c) to study the association of mobile phones used with poor social interactions and disturbed relationship among peers and family. There was a dire need to identify the factors associated with psychological and behavioral issues that are amenable to timely intervention in our population.

## METHODS

A cross-sectional study was conducted at Pediatric OPD of tertiary care teaching hospital of Karachi. All children with their parents attending the pediatric OPD between 2 to 12 years were included during the study period from September 2019 to February 2020. A total of 399 children using mobile phones for any purpose participated in the study. Children below the age of 2 years or mentally challenged children were excluded. Informed consent was taken from parents who participated in the activity. The child and the parents are explained the research purpose and data collected in the pre-designed and pre-tested questionnaire. The institutional review board of the Darul Sehat Hospital, Liaquat College of Medicine and Dentistry approved the study with reference number DSH/IRB/2021/0031. It was estimated using an online sample size calculator open epi version 3.0 after inserting the frequency of outcome factor in population [2] as 38.1% with a 5% margin of error and 95% confidence interval we required at least n = 363 samples for this study. Data were stored and analyzed using IBM SPSS version 23.0, and counts with percentages were given for qualitative data. Pearson Chi-Square test of independence was used to check the association of mobile users with studied factors, p-values less than 0.05 were considered significant. A pie diagram is also used to give a graphical presentation of data.

## RESULTS

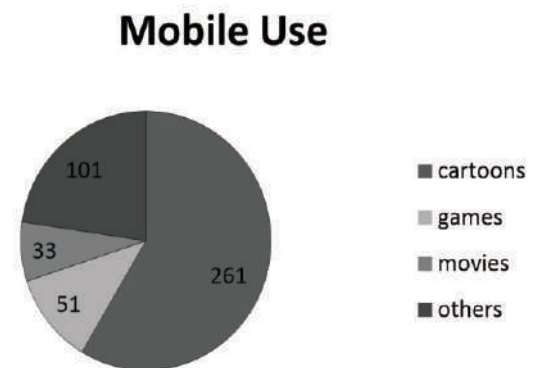
Table 1 shows that 214 (53.6%) participants were male and 185 (46.4%) were females. While the children were <5 years 138 (34.5%) and 261 (65.4%) belonged to >5 years age group. 196 (49.1%) children used their mobile for less than 2 hours

while 203 (50.3%) were using their mobile for more than 2 hours.

Gender (n=399)	n (%)
Male	214 (53.6)
Female	185 (46.3)
Age Groups (n=399)	n (%)
<5 years	138 (34.5)
>5 years	261 (65.4)
Amount of mobile use hours/day (n=399)	n (%)
<2 hours	196 (49.1)
>2 hours	203 (50.8)

**Table 1:** Baseline Characteristics of studied sample (n=399)

The majority of 261 (65.4%) of the children were using their mobiles for cartoons, followed by 51 (12.8%) playing games, and 33 (8.3%) children were watching movies as shown in Figure 1.



**Figure 1:** Purpose of mobile use n=399

Table 2 shows the amount of use of mobile phones in relation to health and education problems. In children with mobile usage of more than 2 hours, 55.1% of children had less than 6 hours of sleep as compared to children with less than 2 hours of usage of a mobile phone where 27.0% had less than 6 hours of sleep with a P-value of 0.0001. In response to Abnormal sleep timings, 75 (36.5%) parents identified a decrease in nighttime sleep with 66 (32.5%) children showed an increase in daytime sleep with a p-value of 0.0001.

Amount of use per day (hours)	Duration of sleep n (%)			Total 399	p-value
	<3 hours	3-6 hour	>6 hours		
<2 hours	07(3.5)	46(23.5)	143(72.9)	196	0.0001
>2 hours	37(18.2)	75(36.9)	91(44.8)	203	
Amount of use per day (hours)	Effects on Vision after Mobile use n (%)		Total 399	p-value	
	Normal vision	Wearing glass			
<2 hours	164(83.6)	32(16.3)	196	0.0001	
>2 hours	134(66.0)	69(33.9)	203		
Amount of use per day (hours)	Sleep Disturbance/Abnormal sleep timings n (%)			Total 399	p-value
	Increase day time	decrease night time	Normal		
<2 hours	22(11.2)	37(18.8)	137(69.8)	196	0.0001
>2 hours	66(32.5)	74(36.5)	63(31.0)	203	

Amount of use per day (hours)	Weight for age/ Gain /Loss of weight n (%)					Total 399	p-value
	Increase waist 105(26.3)	Decrease waist 95(23.8)	Bangle tightening 34(8.5)	No change 165(41.3)			
<2 hours	53(27.0)	31(15.8)	14(7.1)	98(50.0)	196	0.0001	
>2 hours	52(25.6)	64(31.5)	20(9.8)	67(33.0)	203		
	Impact on Education n(%)					Total 399	p-value
	Excellent 134(33.5)	Good 162(40.6)	Bad 19(4.7)	Very bad 22(5.5)	Not attended 62(1.5)		
<2 hours	61(31.1)	76(39.3)	4(2.0)	6(3.1)	49(25.4)	196	0.0001
>2 hours	73(35.9)	86(42.3)	15(7.3)	16(7.8)	13(6.4)	203	

**Table 2:** Chi-Square association of Mobile phone use with health and education n=399

The various behavioral and social problems observed in the present study are shown in Table 3. More hours with mobile phones were associated with social problems like rude behavior with parents in 81 (39.9%) children, unfriendly behavior with friends in 70 (34.4%) children, disobedience with teachers in 43 (21.1%), unfriendly with siblings in 91 (44.8%) children, rude relationship with other family members in 65 (32.0%) children and prefer isolation and avoid gatherings in 108(53.2%) children with a significant p-value. One thing that did not differ was whether more or fewer hours with a mobile phone was addictive nature which was seen in 77.3% of children with a p-value of 0.943.

Time of mobile use per day (hours)	Relationship with parents n (%)				Total 399	p-value	
	Obedience 147 (36.8)	Friendly 128(32.0)	Rude 124(31.1)				
<2 hours	90(45.9)	63(32.1)	43(21.9)	196	0.0001		
>2 hours	57(28.1)	65(32.0)	81(39.9)	203			
Time of mobile use per day (hours)	Relationship with teachers n (%)			Total 399	p-value		
	Obedient 335(83.9)	Disobedient 64(16.0)					
<2 hours	175(89.2)	21(10.7)	196	0.005			
>2 hours	160(78.8)	43(21.1)	203				
Time of mobile use per day (hours)	Relationship with Friends n (%)					Total 399	p-value
	Friendly 194 (48.6)	Cooperative 92(23.1)	Quarrel Some 44(11.0)	Bullying 20(5.1)	Fighting 49		
<2 hours	117(59.6)	36(18.3)	15(7.6)	5(2.5)	23(11.7)	196	0.0001
>2 hours	77(37.9)	56(27.6)	29(14.3)	15(7.3)	26(12.8)	203	
	Relationship with Siblings n (%)					Total 399	p-value
	Friendly 194 (48.6)	Cooperative 92(23.1)	Quarrel Some 44(11.0)	Bullying 20(5.1)	Fighting 49		
<2 hours	121(61.7)	25(12.7)	16(8.1)	8(4.0)	26(13.2)	196	0.0001
>2 hours	68(33.4)	44(21.6)	29(14.3)	14(6.8)	48(23.6)	203	
	Relationship with other family members n (%)				Total 399	p-value	
	Obedient 335(83.9)	Friendly 143(35.8)	Rude 112(28.0)				
<2 hours	85(43.3)	64(32.6)	47(23.9)	196	0.011		
>2 hours	49(24.1)	79(38.9)	65(32.0)	203			
Amount of use per day (hours)	Social Isolation - prefer to be alone and avoid gatherings n (%)			Total 399	p-value		
	Yes 180	No 219					
<2 hours	85(43.3)	64(32.6)	196	0.011			
>2 hours	49(24.1)	79(38.9)	203				

**Table 3:** Chi-square association of Mobile phone use with behavioral and social problems n=399

## DISCUSSION

Our study describes the significant and increasing use of mobile devices in children between the age of 2 to 12 years, raising apprehension about the harmful impact on the health, wellbeing, behavior, and social interactions of children. Our study shows that 50 % of children use mobile phones for more than 2 hours which is against the recommendation of AAP which says screen time should be limited to not more than 2 hours [15]. This shows that the parents are not restricting the use of mobile phones which is also seen in the study done by Shaiza et al., where children have given the view that their parents allow them to use mobile phones for longer hours [16]. This highlights that parents are less attentive and vigilant. The reason could be being busy in their life makes it difficult to control their children's activities at home. The commonest use of the mobile phone was watching cartoons in our study which is a non-educational tool that might be the reason for distraction from their studies and less interaction with parents and friends. These findings were also shared in the study from Lahore which describes mobile usage causing interference with face-to-face communication and interaction with family members at home [17]. Constant visualization of cartoons and other non-educational stuff also makes them prone to develop eyesight issues later in life. Being busy with their mobile, these children have chances of developing behavioral disorders and inattention as described in the study that children under 5 years of age are more prone to develop behavioral problems when using screen time for more than 2 hours. Interacting less time with family members and decreasing sharing of problems will lead to emotional and behavioral issues. Constantly focusing on the screen makes them unable to focus on multiple tasks leading to inefficiency and decrease attention [18]. Parent's insecurities and wish to upgrade child's educational methods, use as a distracter for children, and a way to handle children's behavior are all different ways to start indulging children in the use of mobile /smartphones which later becomes a habit and an addiction which affects not only physical wellbeing but also social and emotional behavior [19]. Having less interaction with family members, less time for casual family get together and sporadic chances of family meals are all different risk factors in children developing speech delays. This has been reported by parents with children spending more than 30 min on mobile screens were associated with more risk of developing expressive speech delays [20]. In our study, 32.0 % of children showed rude behavior towards their family members, 53.2% of children wanted to be alone with less social interaction and 77.3 % of children were addicted to mobile use although the p-value was not significant as this behavior was noticed in both groups.

When their mobile was taken away from them, these children showed anger, frustration, and irritability. This finding was supported by studies where children showed addiction to its use and anger when their mobile is taken away from them [21] on the contrary our children did not show a significant effect on their academic performance. Maybe parental influence and interest in their academic performance were much more monitored than social and behavior issues. This has been also been observed that children with immoderate screen time at a younger age tend to have developmental delays and show worse performance on tests done for developmental screening [22]. It has been observed that children with screen time of more than 2 hours tend to have more chances of gaining weight [23]. Being a sedentary lifestyle and eating junk food while watching cartoons or movies makes them more prone to develop overweight now and obesity later in life. There has been a negative and positive association between screen time and weight gain. Two studies support the notion that social media exposure of more than 2 hrs is associated with more sedentary behavior and obesity [24-25] on the contrary other studies show no association between screen time and obesity [26-27] still more work is needed to show a significant association between screen time and obesity. Other possible effects on physical health with the prolonged use of mobile phones especially eye problems, sleep disturbances, headache, and muscle pain notably neck pain have become a matter of worry for physicians [28]. Our data support the decrease in sleep time to less than 6 hours in 55 % and the use of glasses in 33% of children. There seems to be an inverse correlation between sleep time and the use of the mobile phone at night time [29]. With the disturbance in sleep time, these children are more likely to have daytime sleepiness which makes them inattentive in school eventually affecting their school performance [21]. There are different studies some showing a positive association between screen time and sleep and some having no association. Still, more data is needed to confirm this association [30].

## CONCLUSION

The study has signified the high level of engagement and nonproductive use of time on mobile, especially in children above 5 years of age. The use of mobile phones has a significant impact not only on education and health but has influenced the psychological aspect of their lives. The negative association between mobile use and psychological well-being has been seen in a range from rude attitude with parents and family members, disobedience with teachers, quarreling and fighting among friends and siblings to frustration, anger, and social isolation.

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## Original Article

## The Evaluation of the Obstetric Outcomes in Re-Pregnancy after Recovery from Peripartum Cardiomyopathy

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## ARTICLE INFO

## Key Words:

Re-pregnancy, Peripartum cardiomyopathy, LV ejection, neonatal outcomes and echocardiography examination

## How to Cite:

Khan, S. ., Begum, S. ., Ayoub, M. ., Ali, J. ., Tahir, L. ., & Bahadar Khan, S. . (2022). The Evaluation of the Obstetric Outcomes in Re-Pregnancy after Recovery from Peripartum Cardiomyopathy: Obstetric Outcomes in Re-Pregnancy after Recovery from Peripartum Cardiomyopathy. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.688>

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Received Date: 11th July, 2022

Acceptance Date: 19th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

The exceptional form of pregnancy specific idiopathic congestive heart failure is known as peripartum cardiomyopathy. Its onset is highly observed during the last month of pregnancies. **Objective:** To evaluate the cardiac outcomes in the subsequent pregnancies of patients having history of the cardiomyopathy. **Methods:** It is a retrospective cohort study conducted at Gynae unit Timergara Teaching hospital Dir Lower KPK for the duration of one year from March 2021 to March 2022. The seventy six patients that had history of peripartum cardiomyopathy with re-pregnancy were selected for the study. The participants were aware of the study and written consent was signed by them. The echocardiography examination of each patients were reviewed. The demographic data maternal and neonatal outcomes data of index was recorded. The SPSS software was used for the statistical analysis of the data. **Results:** Data of seventy six patients that had history of peripartum cardiomyopathy with re-pregnancy were evaluated. The average age of mother at the time of delivery was 26 years. There were 30 patients that reported about mood disorders and they were already taking medications during the pregnancy. 15 patients reported about migraine headache. There were only small number of patients that had prior diagnosis of cardiovascular diseases. The chronic hypertension was observed in 3 patients and 4 patients had Wolf-Parkinson-White syndrome. **Conclusions:** In this study the effect of re-pregnancy on cardiac outcomes were studied among patients who had a history of peripartum cardiomyopathy. Patients having peripartum cardiomyopathy history and recover LV function are at risk for a transient minor decrease in LV ejection fraction during future pregnancies. The promising obstetric and neonatal outcomes were observed.

## INTRODUCTION

The exceptional form of pregnancy specific idiopathic congestive heart failure is known as peripartum cardiomyopathy. The other name for the peripartum cardiomyopathy is postpartum cardiomyopathy. Its onset is highly observed during the last month of pregnancies [1, 2]. The cause for its onset remained undeterminable. The underlying mechanism explaining cause of peripartum cardiomyopathy is not discovered yet. However different researches have reported the hemodynamic stress, microchimerism, viral myocarditis and hormonal insults as the cause of the disease. This terminology was first defined in 1849 [3]. Depending upon the race and geographical regions the incidence and prevalence of the postpartum

cardiomyopathy vary greatly. The incidence of peripartum cardiomyopathy is increasing day by day. The incidence of the cardiomyopathy in the United States is reported to be 10 in every 10,000 live births. However the regions like Asia and Africa are reported the higher incidence of the disease, it is more prevalent in these regions. In Asia, the every one out of 837 deliveries are effected by the cardiomyopathy. In a recent study the incidence of cardiomyopathy is reported to be One in every 968 births [4, 5]. The maternal demographics are evolving with the passage of time. The mortality and morbidity rates are observed to be raised with the increasing incidence of the disease. The clinical outcomes varies from early recovery to eventually

morbidity and mortality of the patients. The recovery time periods of the patients also vary from 2 months to the 6 months and eventually the period of the extra-cardiac morbidity. The percentage incidence of sudden death, thrombolytic events and heart failure is reported to be vary from 10-30% [1, 6]. The survival ratio is improving because of advancement in the rehabilitation programs and improvements in the cardiac care and disease recognition methodologies. Variables long-term outcomes are associated with the postpartum cardiomyopathy. The chronic heart failure development is observed in the 25% of the patients suffering from cardiomyopathy. The heart failure relapse risk is reported to be 30% in the population. In a clinical practice the preconception cardiac stress testing has a limited predictive role [7]. Due to the limited and sparse data available on the obstetric outcomes in the re-pregnancy the cardiomyopathy is posing a challenging conditions for the cardiac surgeons. To optimize the patient's volume status the standardized hear failure therapies are normally used. To improve the ejection fraction the cardiac resynchronization therapy is proved to be highly effective. It is also adding to the expense of the medics. The study aimed to evaluate the obstetric and neonatal outcomes in the patients with subsequent pregnancy having the history of the cardiomyopathy[8, 9].

## METHODS

The seventy six patients that had history of peripartum cardiomyopathy with re-pregnancy were selected for the study. The participants were aware of the study and written consent was signed by them. The ethical and review board committee of our hospital approved the study. According to the inclusion criteria, the women having history of cardiomyopathy development within 5 months of delivery or in last month of pregnancy were included in the study. The cause of cardiac failure was not diagnosed in the included patients. All the patients in which cardiomyopathy was not confirmed after diagnoses were excluded from the study. The patients' medical history was recorded. The data about the subsequent pregnancies and obstetric outcomes of index were also recorded. The echocardiography examination of each patients were reviewed. The demographic data were recorded. The SPSS software was used for the statistical analysis of the data. The median and binary variables were assessed. The increase of LVEF to 50% or more is characterized as LV function recovery.

## RESULTS

Seventy-six patients that had a history of peripartum cardiomyopathy with a repregnancy were identified and selected to check the effect of re-pregnancy on cardiac outcomes in patients that were suffering from peripartum

cardiomyopathy. The participants were aware of the study and written consent was signed by them. 26 years was the calculated average age of the mother at the time of pregnancy. There were 30 patients that reported about mood disorders and they were already taking medications during the pregnancy. 15 patients reported about migraine headache. There were only small number of patients that had prior diagnosis of cardiovascular diseases. There were 3 patients that had chronic hypertension and 4 patients had Wolf-Parkinson-White syndrome. There were only 9 patients whose body mass index was clearly known. And the average body mass index was 25.6. All these pregnancies resulted in healthy babies with 8 cases of preterm deliveries. There were 6 cases where there were twin gestations. The reasons of prematurity came out to be pre-labor rupture of the membrane in case of 3 patients and in case of 8 patients pre-labor was due to hypertension disorders. Cardiomyopathy was observed antenatally in case of 6 participants. There were 63 patients who were reported to develop cardiomyopathy in their postpartum duration. Most of the women reported the onset of signs and symptoms after the first week of delivery. Relapse of the Peripartum cardiomyopathy took place in case of 20% of the pregnancies. Relapse was diagnosed by doctors in the last month of the pregnancy. The ratio of relapse was same in patients that had hypertensive disorders as compared to women not having it.

Features	Percentage (n=76)
Age	26 years
Chronic hypertension	4% (3)
Heart diseases	2% (2)
Mood disorders	10% (8)
Migraines	5% (4)
Smoking	3% (3)
Twin pregnancies	4% (3)
Preterm labor	4% (3)

**Table 1:** The basic features of the patients

Features/characteristics	Value in percentage (n)
Time of diagnosis	
Antepartum	4% (4)
Postpartum	84% (64)
Signs and symptoms	
Palpitations	3% (3)
Chest pain	1% (1)
Echocardiography characteristics	
LVEF (%)	33% (25)
Beta blockers	17% (13)
Cardiac arrest	1% (1)
Recovery	24% (18)

**Table 2:** The index pregnancy n=76: characteristics of Peripartum Cardiomyopathy



Outcomes	Values
Miscarriage	6(14%)
Abortions	4(9%)
Still birth	0
Live birth	33(75%)
Preeclampsia	3(6%)
Cesarean delivery	22(51)
Intrauterine growth contractions	1(3%)

**Table 3:** Obstetric outcomes in subsequent pregnancies(n=45)

## DISCUSSION

With more advances research in the field of science the medical care regarding peripartum cardiomyopathy has improved and it has helped patients to consult their doctors about another pregnancy. As per the guidelines of European Society of Cardiology the consequent pregnancies should not be encouraged in patients that had non-recovered ventricular system. It was directed to these patients that there is no need for even consultation regarding a new pregnancy with their doctors as the chances of recurrence will be increased with a new pregnancy. Another scientific statement by American Heart Association gave similar sort of guidelines. There was no evidence based instructions regarding the reproductive and obstetric counseling of the patients who had prior diagnosis of peripartum cardiomyopathy [10, 11]. The relapse rate of peripartum cardiomyopathy, in this study, was found to be less than the relapse rate reported by previous studies. As most studies have reported it to be more than 30% and in our studies it was 20%. However, the relapse definition has some variations in the literature so direct comparisons cannot be done. There were several studies that linked the occurrence of heart failure during pregnancy in case of such patients even without any decrease in value of LVEF [12]. As reported by a previous study relapse took place in case of 17% of the pregnancies and the patients had LVEF of greater than 55%. There were a total of 9 relapse found in this study, among those 9 cases the LVEF nadir was low as the index diagnosis that indicates the mild form of cardiomyopathy in these pregnancies. All the patients who had a relapse recovered their LV function in a duration of 1 month. As the chances of LV recovery after relapse are good that's why patients who had prior peripartum cardiomyopathy with recovered LV function can be said to have 20% risk of relapse in the future pregnancy [13, 14]. The data regarding the obstetric and the outcomes of cardiac events among these patients with non-recovered LVEF prior to pregnancy was insufficient. Therefore, no recommendation of guidance can be offered to these group of patients. the chance of relapse with LVEF lower than 50% prior to pregnancy ranges from 38% to 52% as per studies that suggest an elevated chance of more damage of LV function in this

group of patients [15]. In our study when the obstetric outcomes were studied it was found that there were no cases of stillbirth, and the miscarriage ratio was also less as compared to other results. All the live births completed their 36 weeks of gestational period. The conditions like postpartum hemorrhage and hypertensive disorders were seen in the index pregnancies and the reoccurrence rates were quite elevated in such cases. In this study it was found that there was elevated rates of lactation in the subsequent pregnancies, that is of great significance as most of the nutritional and immunologic benefits that the baby gets after birth are from lactation. However, this study was not related to finding the effect of lactation in causing cardiac dysfunction, however it was reassuring to find that the lactation had no effect on the peripartum cardiomyopathy [16]. As per recent studies it was found that the re-pregnancy results among the patients who had cardiomyopathy history showed that the use of bromocriptine played a significant role in the treatment of heart failure and positive results were associated with its usage. In our studies no patient reported the use of bromocriptine so the outcome could not be reassured. However, in our study majority of the patients, even before their pregnancy recovered their LEVF [17, 18], so may be that bromocriptine does not gave useful benefits in this subset of patients. In this study all the patients included were managed by specialists and hardworking group of doctors at the tertiary care center [19]. These results could not be found in centers that have limited resources. One of the strengths of this study was that the single group of patients they chose had large number of pregnancy cases. However, the patient volume could be increased and data from different hospitals can be taken for further studies so that variations in data of patients from different clinics can be studied to make further outcomes [20, 21].

## CONCLUSION

In this study the effect of re-pregnancy on cardiac outcomes were studied among patients who had a history of peripartum cardiomyopathy. There was some important information found regarding the obstetric and cardiac results in patients that had peripartum cardiomyopathy. However, there is further need to verify and reassure the results to determine the optimal strategies of management.

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## Original Article

## Comparison of the Effectiveness of Pelvic Floor Muscle Exercises versus Pilates Exercises on Urinary Incontinence in Middle Aged Women”. Randomised . Controlled Trial. RCT

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## ARTICLE INFO

## Key Words:

Urinary incontinence, overweight, postpartum, BMI

## How to Cite:

Khurshid, S. ., Fatima Murtaza, S. ., Fatimah, A. ., Uzair Asghar, H. M. ., Maqbool, S. ., Nasreen, A. ., Saeed, S. ., & Mushtaq, Q. . (2022). Comparison of the Effectiveness of Pelvic Floor Muscle Exercises versus Pilates Exercises on Urinary Incontinence in Middle Aged Women”. Randomized Controlled Trial. RCT: Effectiveness of Pelvic Floor Muscle Exercises and Pilates for Urinary Incontinence. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.653>

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Received Date: 16th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Often impacting elderly women, the urinary incontinence is defined as the involuntary urine loss. **Objective:** The purpose of this study was to see the comparative effectiveness of pelvic floor muscle exercise with pilates training for treatment of urinary incontinence. **Methods:** The study's 36 patients who met the eligibility requirements were accepted. Prior to conducting any examinations, we obtained written informed consents from each participant. Patients with urinary incontinence were divided randomly into two groups. In 'group A' pelvic floor muscle exercises were applied while in 'group B' pilates training was applied. Allocation of patients in two groups was done by computerised generated list. Both groups received conventional therapy, which was the same throughout the study. The conventional therapy includes adductor strengthening of thigh and hot pack for 15 minutes. Group A received conventional therapy and pelvic floor muscle exercise while group B received conventional therapy and pilates training. Treatment frequency was 2 times a week. The duration of treatment was 6 weeks in both groups. Each patient's informed consent was obtained before the questionnaire was filled out. Scores were derived using the Questionnaire for Female Urinary Incontinence Diagnosis (QUID) and the International Consultation on Incontinence Questionnaire (ICIQ). **Results:** Patients in group A significantly outperformed those in group B. **Conclusion:** According to the study's findings, strengthening the pelvic floor muscles is superior than practicing pilates for treating stress urine incontinence. Pelvic floor exercises not only improved the urine leakage problem but also strengthened the muscle of abdomen and pelvis. So these exercises programs should be included in treatment plans along with medications in public health care for the welfare of patients.

## INTRODUCTION

Adults and the elderly, particularly women, frequently struggle with urinary incontinence. Involuntary urine loss is known as urinary incontinence, and it lowers a person's quality of life [1]. The pelvic floor muscles' weakened state is the cause of urinary incontinence. The PFM are skeletal

muscles that make up the pelvic and urogenital region. They are made up of a number of muscles and muscle layers [2]. In this condition, involuntary loss of urine occurs and there are more than 3 to 4 episodes of urine leakage per day. It is diagnosed through history, careful physical

examination and by certain tests and investigations such as ultrasound and cystoscopy [3]. Stress urinary incontinence is the most prevalent type of urine incontinence in women. In this type, urinary leakage occurs due to physical exertion and stress activities like laughing, coughing, and sneezing. It is due to the damage to urethral support which is supported by pelvic muscles. Control over urinary sphincter is lost or may be weakened [4]. These symptoms tend to become worse with the increasing age specially in postmenopausal women. Due to increased intra-abdominal pressure brought on by insufficient urethral closure pressure, stress urine leakage develops. Due to anatomical alterations in the bladder, urethra, and muscles, such as weak pelvic floor muscles, there is insufficient urethral closure pressure, which leads to urine incontinence [5]. The occurrence of urinary incontinence in women can have very distressing psychological effects. Although urinary incontinence is not a dangerous condition, it may cause emotional disorders due to constant wetness and irritation [6]. Not only, it is uncomfortable and intimidating to a women's self-confidence but it may also result in depression and social isolation, affecting quality of life [7]. If a woman is able to utilise treatment strategies, it is premised that she will not be depressed and socially isolated while in the meantime, her quality of life will be improved [8]. In general, specific symptoms or findings, the kind of UI, the frequency of urine leakage, the intensity of the leakage or symptoms, and the degree of difficulties for the women are all characteristics of urinary incontinence. The forms and symptoms of urine incontinence can have a significant impact on estimations of prevalence and incidence. There are currently no epidemiologic definitions for UI or SUI that are standardised or uniform [9]. Women suffering from such incontinence disorders need to strengthen their pelvic floor muscles so they are advised to perform kegal exercises for strengthening and coordination of their pelvic floor and abdominal muscles [10]. The pelvic floor is a set of muscles that maintains and stabilizes the pelvic organs, such as the bladder and bowel. These muscles help in urinary control and continence. When these muscles are weakened then urinary incontinence occurs [11]. The exercises are reported to be 50% to 69% effective in reducing urinary leakage problems and strengthening pelvic floor muscles [12]. For improving the urinary incontinence, pelvic floor muscle exercises are used which help to strengthen pelvic floor muscle and prevents unwanted leakage of urine [13]. In pelvic floor muscle exercises, women learn to perform well controlled, single pelvic floor muscle contraction just at the moment of uncontrolled leakage to develop high urethral pressure and to reduce urinary loss [14]. The exercises that focus on

strengthening the abdominals, lower back, and thigh muscles are taught by the pilates teacher using verbal cues. These exercises are created based on the patient's body weight and level of endurance. Pilates practitioners think their techniques can significantly increase pelvic floor strength, and that these changes are very likely to last over time [15]. If so, the pilates techniques may offer newer, more effective ways of treating and preventing pelvic floor disorders. Pilates exercises are becoming more popular, but little is known about how they specifically affect the female pelvic floor muscle [15, 16]. Breathing exercises and pelvic floor muscle contractions are part of contemporary pilates exercise routines. Pelvic floor muscles are inadvertently trained through exercise and movement, rather than being specifically practised [17]. Inadvertent co-contraction of the pelvic floor muscles during pilates movements would counterbalance increases in intra-abdominal pressure that happen during exercise, avoiding leakage and bolstering the pelvic floor muscles. Pilates training involves breathing and muscle contractions all throughout the therapy session in this way. The usefulness of pilates training in enhancing bladder functioning needs more research [18].

## METHODS

This research study was conducted according to the inclusion and exclusion criteria for the treatment of stress urinary incontinence. Consent was taken through the consent form before starting the treatment of patients. The examination includes data which have a subjective and objective examination. The data consist of demographic information, including age, gender, socioeconomic status, duration of onset nature, and location of symptoms. All those patients who were not willing to participate were excluded from study and those who left treatment session in the middle of research were also excluded. As previously discussed, there are two groups group A and B who were receiving treatment. Both groups are experimental groups. Group A (Experimental Group); This group first received adductor strengthening conventional treatment for 10 minutes and then pelvic floor muscle exercises. These pelvic floor exercises include kegal exercise, squats, bridging, and squeeze and release exercises. All patients of group A repeated single exercises for 10 times and all 4 exercises for 40 times in total. The second group, group B (Experimental Group); first received adductor strengthening conventional treatment for 10 minutes and then pilates training exercises. These include pilates curl, single leg stretch, double leg stretch and roll up exercises. All patients of this group repeated single exercises for 10 times and all 4 exercises for 40 times in total.

## RESULTS

Table 1 shows the demographics of the participants involved. Total 36 patients were included in this study, 18 in group A and 18 in group B, respectively. The gender demographics depict that there were 12 males, 6 females in group A and 6 males, 12 females in group B, respectively. The mean values of age, occupational, marital status were 40.61±11.08, 1.06±0.23, and 0.83±0.38 in group A while 40.22±14.65, 1.06±0.23, and 0.89±0.32 in group B.

Descriptive statistics	Group A (n=18)	Group B (n=18)
Gender	12/6	6/12
Age	40.61±11.08	40.22 ±14.65
Occupational Status	1.06± 0.23	1.06 ±0.23
Marital Status	0.83 ±0.38	0.89 ±0.32

**Table 1:** Descriptive statistical analysis(N=36)between groups

Table 2 depicts the pre- and post- treatment comparison of pelvic floor disability index scale in group A had shown that mean score was 2.822±0.881 which improved to 0.496±0.534 after treatment with the significant value of 0.000 which is less than 0.05 showing that pelvic floor muscle exercises are effective in reducing the urinary in continence and strengthening of pelvic floor muscles. While group B had shown that mean score was 2.855±0.793 before treatment, 2.398±0.673 after treatment with the significant value of 0.001 which is less than 0.05 showing that pilates exercises are effective in reducing the urinary in continence and strengthening of pelvic floor muscles. We can say that pelvic floor muscle exercises of group A were effective in reduction of urinary incontinence as the mean value was improved a lot as compared to other groups and the level of significance was less than 0.005.

		Group A (n=18)	Group B (n=18)
PFDI Score	Pre-value	2.82+0.88	2.855+0.793
	Post-value	0.496+0.53	2.398+0.673
	P-value	0.000	0.000

**Table 2:** Pre and post treatment scores of Group A & B

## DISCUSSION

The present examination was done to check the efficacy of pelvic floor muscle exercises and pilates exercises for the treatment of stress urinary incontinence in women. We have applied two treatment techniques among 36 patients with equal divisions. Group A had received pelvic floor muscle exercises and group B received pilates training. Similarly, 18 patients were allocated to each group. Our aim was comparing the results of pelvic floor muscle exercises and pilates exercises to determine which treatment technique was better. For this purpose, we had used pelvic floor disability index questionnaire scale. Proper consent was taken from each patient. This study program consisted

of 2 sessions per week and in total there were 32 sessions. Follow up was also taken after 6 weeks to check improvements in results. After four to six weeks, we noticed that there was quite alleviation of urinary incontinence in both groups. Ten middle-aged women with little to no pelvic floor dysfunction participated in a study where they underwent 24 one-hour sessions of Pilates exercises over the course of 12 weeks. The findings suggested that the pilates method increased the contractility and pressure of the PFM in these women and decreased urinary incontinence [19]. In another study, women who completed either a structured pilates exercise or a "conventional" pelvic muscle-training programme were compared for their effectiveness in strengthening their pelvic muscles [20]. The major improvement that we observed was at approximately after 40 days. The patients that received pelvic floor exercises felt a large improvement in uncontrolled and unwanted urine frequency one month follow up as compared with participants that were allocated to the pilates training group. This study calculated results of treatment effects. A great difference was found between the pelvic floor muscle exercises treatment group and pilates training treatment group. Those women who received pelvic floor treatment were confident and showed improvement in urinary incontinence problem after 6 weeks. And those who received pilates treatment were not that happy about the results as these exercises not proved much effective as compared to other group. Moreover, some old females found it difficult to perform this training [21]. Although we did not meet our desired of large sample size, this was a relatively small study. This theory was also supported by other researches that pelvic floor exercises are helpful for treating urinary incontinence and more randomised trials are needed to conclude Before we could suggest the wider application of this technique for that goal, we needed to determine whether a Pilates programme may genuinely improve urinary incontinence [22].

## CONCLUSION

Pelvic floor muscles exercises are more effective in reducing the urinary incontinence and strengthening of pelvic floor muscles as compared to pilates exercises. Exercises for the pelvic floor muscles are very useful at preventing incontinence and enhancing their power. These techniques are non-invasive, efficient, and call for fewer trips to the hospital or clinic for a suitable early response. Further research on a larger scale is recommended to prove the effectiveness of other treatment plans in for the stress urinary incontinence in females.

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## Original Article

Multi Drug Resistance *Pseudomonas aeruginosa* Frequency and Antibiogram in a Tertiary Teaching Care Hospital in Pakistan

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## ARTICLE INFO

## Key Words:

Multi Drug Resistance, *Pseudomonas aeruginosa*, Antibiotics, Susceptibility, Resistance

## How to Cite:

Ali Shah, S. H., Ali, W., Ali Shah, F., Fahad Falah, S., Rehman, E., Umar, A., Hidayat, Y., Afreen, S., Riaz, A., & Ullah, I. (2022). Multi Drug Resistance *Pseudomonas Aeruginosa* Frequency and Antibiogram in A Tertiary Teaching Care Hospital in Pakistan: Frequency and Antibiogram of *Pseudomonas aeruginosa*. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.667>

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Received Date: 7th July, 2022

Acceptance Date: 14th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Antibiotic usage and misuse increases the risk of developing bacteria that are resistant to treatment. A Gram-negative, aerobic bacillus called *Pseudomonas aeruginosa* is mostly responsible for nosocomial opportunistic infections. **Objectives:** To assess pathogen load and drug susceptibility profiles of Peshawar clinical specimens collected with MDR *Pseudomonas aeruginosa* isolates. **Methods:** Isolates were gathered from a variety of specimens, including pus, tracheal aspirate, swabs containing wound samples, fluids such as urine or blood, from department of microbiology hospital of Khyber teaching Peshawar. Clinical in-vitro study which were carried out at the Pharmacology Department, University of Peshawar. Kirby Bauer Disc diffusion method was used to identify the pattern of antibiotic susceptibility. Requirements of Clinical and Laboratory Standards Institute (2018) were followed for processing samples. **Results:** *P. aeruginosa* was found to be multidrug-resistant in about 56 percent of cases. The majority of the isolates (36.5%) were found in people between the ages of "60-80". Pus included the greatest percentage of MDR *P. aeruginosa* (34.2%), followed by tracheal aspiration (21.7 percent). Colistin had the highest sensitivity (100%) and was followed by ceftolozane/tazobactam (61 percent). With imipenem, the least sensitivity was noticed (20 percent). However, all anti-pseudomonal medications showed an increase in resistance. **Conclusion:** In our system, MDR *P. aeruginosa* infections are becoming more frequent. This threat can be avoided by prescribing antibiotics carefully. For the community to receive appropriate healthcare, regular lab identification and surveillance of this resistant pathogen is necessary.

## INTRODUCTION

The primary therapeutic method utilized in medicine to treat a variety of bacterial illnesses is antimicrobial medication. One of the most significant developments in contemporary science is the production of antibiotics. Millions of lives have been saved by antibiotics. One of the biggest challenges in the world is the emergence of antibiotic resistance [1]. Increased use and occasionally

abuse of antibiotics leads to the development of germs that no longer respond to treatment [2]. *Pseudomonas aeruginosa* is an aerobic, non-fermenting Gram-negative bacillus that predominately causes nosocomial opportunistic infections [3]. *P. aeruginosa* with therapeutic medicine also have the capacity for acquiring and expressing the number of mechanisms of resistance

via the "loss of the OprD porins, overexpression of efflux pumps, modifications in the target site, and production of specific  $\beta$ -lactamases and carbapenemases enzymes" [4]. Fluoroquinolones (ofloxacin, ciprofloxacin), antipseudomonal penicillins (ticarcillin, piperacillin), cephalosporins (ceftazidime, cefepime), aminoglycosides (amikacin, gentamicin), and carbapenems are now the most effective medications against *P. aeruginosa* [5]. As defined by Center for Disease Control and Prevention, MDR *P. aeruginosa* has developed resistance to at least one agent in three or more groups of antibiotics [6]. Global superbug MDR *P. aeruginosa* has been related to adverse outcome measures, such as increased morbidity and mortality [7]. About 10,000 individuals are admitted to hospitals each year due to infections caused by *P. aeruginosa* MDR, and in extreme instances, fatality rates of up to 20 percent have been reported [8]. *P. aeruginosa* is determined to be a highly common cause of nosocomial pneumonia and a variety of infections of the eye, ear, and urinary tract [9]. Drug-resistant bacteria appeared to be the result of concurrent "overuse and illogical use of antibiotics" as well as the de-novo production of certain resistant germs [10]. Because of this, *P. aeruginosa* is almost resistant to the use of several antibiotics in the treatment of life-threatening illnesses [11]. It is necessary to analyze a recent in-depth investigation via resistance of antimicrobial pattern by MDR *P. aeruginosa* in order to gauge this organism's susceptibility to routinely prescribed antibiotics. The medical professionals might then employ this knowledge to optimize the range of effective treatment options available. The goal of the current study was to assess the prevalence and trends in antibiotic susceptibility of MDR *P. aeruginosa* isolated from various clinical samples at the Peshawar hospital.

## METHODS

An in-vitro clinical trial was conducted at the Pharmacology Department, Peshawar University. In the Kyber Teaching Hospital's Microbiology Lab, 1800 samples from pus, swabs having wound sample, fluids like blood and urine, and endotracheal secretion was proceeded in October 2021 for the sensitivity and culturing according to established guidelines starting. Specimens were inoculated on MacConkey and Blood Agar and the petri dishes were incubated for 24 hours at 37°C. All of the catalase, as well as gram-negative and positive oxidase colonies, were determined beforehand toward the species levels employing a standard microbiological procedure. The Kirby-Bauer disc diffusion method was used to assess antibiotic susceptibility. In this method a lawn of bacterial inoculum was made on 150 mm Mueller Hinton Agar plate (Oxoid UK). Antibiotic disc of Piperacillin/ tazobactam

(100/10ug), Imipenem (10 µgm), Aztreonam (30 µgm), Ceftazidime (30 µgm), Amikacin (30 µgm), Gentamicin (10 µgm), Ciprofloxacin (5 µgm), Colistin (10 µgm), Ceftolozane/tazobactam (30/10µgm) were placed on agar plates which were then incubated at 35°C for 16–24 hours prior to results being determined. According to CLSI recommendations (2018), inhibition zone of growth in every disc of antibiotic was assessed and classified either as sensitive or resistant. SPSS (Version 21.0) was used to analyze the data. Descriptive analyses were given as mean with Standard Deviation for the numerical variables. For categorical variables, frequency and percentage were determined. The relationship between antibiotic susceptibility and resistance patterns were evaluated using the chi-square test. P values lower than 0.05 were considered significant.

## RESULTS

One thousand eight hundred and seventy-seven *P. aeruginosa* strains were isolated from the 1800 samples on the basis of identification techniques. 80 (46%) of these were *P. aeruginosa* with non-MDR and 98 (56%) were *P. aeruginosa* MDR. According to the Table 1, prevalence of MDR *P. aeruginosa* was much more common in females (55 percent) as compared to males, who made up 47 percent of the population.

	TOTAL SAMPLES	MDR	NON-MDR
	1800	98 (56%)	80 (46%)
Male	86	46 (47%)	41 (51.7 %)
Female	90	53 (55%)	38 (47.9%)

**Table 1:** Total number of *P. aeruginosa* samples

According to the data represented in Table 2, the majority of the isolates were collected from pus (35 percent), followed by tracheal aspiration (21.7 percent), urine (19.7 percent), and the least amount was obtained from ear swabs (3.2 percent). The statistically significant P value was less than 0.05. Compared to the outpatient department, where the percentages of isolates were 60 and 42 percent respectively, the indoor patient department have seen a higher percentage of the organism.

SOURCE	MDR	NON-MDR	P-value
	98 (56 %)	80 (46 %)	0.035
Pus	34 (35.1%)	13 (16.2%)	
Tracheal asp	21 (21.7%)	18 (22.6%)	
Urine	19 (19.7%)	25 (31.5%)	
Sputum	15 (15.5%)	15 (18.8%)	
Blood	11 (11.2%)	9 (11.2%)	
Ear swab	3 (3.2 %)	5 (6.2%)	

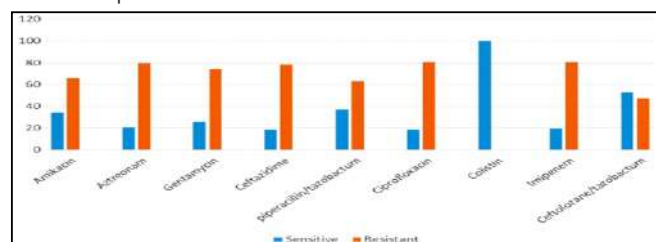
**Table 2:** *P. aeruginosa* MDR prevalence in specimens



As demonstrated in Table 3, surgical ward had the highest percentage of MDR *P. aeruginosa* isolates 27(28.2 percent), while gynecology ward had the lowest percentage 4 (5.2 percent). Increased resistance to practically all anti-pseudomonal medications was seen in MDR *P. aeruginosa*. The most pronounced resistance was seen with imipenem (82.7 percent). The percentage of people showing resistance to Ciprofloxacin were 81.5%, Ceftazidime (79%), Gentamycin (75.3%), Amikacin (67%), Piperacillin/tazobactam (63%) and Ceftolozane/tazobactam (41%), respectively. According to Figure 1, all samples of MDR *P. aeruginosa* were completely susceptible to colistin.

DEPARTMENTS	MDR	NON-MDR
Ward of Gynecology	4 (5.2%)	1(1%)
ICU	17 (17.6%)	18 (22.6%)
Surgical ward	27(28.2%)	31(39.1%)
Medicine ward	12(12.4%)	9(11.2%)

**Table 3:** The proportion isolates of the MDR found on behalf of various department



**Figure 1:** The pattern of resistance and sensitivity from MDR *P. aeruginosa*

## DISCUSSION

A well-known Gram negative bacillus called *P. aeruginosa* has been related to a wide range of diseases, particularly in immunocompromised people, including pneumonia, bacteremia, and also the infections of the urinary system, skin, and soft tissues [12]. *P. aeruginosa* clinical isolates have the potential to be resistant to numerous classes of antibiotics, leaving clinicians with a limited selection of therapeutic antibacterial medications or regimen options for the treatment of infectious illnesses. In this study, MDR *P. aeruginosa* was found to be 56.2 percent common, compared to 57.8 percent and was comparable to the study reported by Zahoor et al., [13]. Studies conducted in the Punjab, Lahore and Rawalpindi produced the mentioned findings: 22.7 percent, 20 percent, and the 21 percent. A study carried out in an Indian tertiary care facility found an 85 percent frequency worldwide [14]. In 2017, 47 percent frequency was noted in Africa. Meanwhile, Egypt also reported a greater frequency (56%) in 2015. From 235 different strains of pseudomonas, 14% of MDR isolates were found. Given the substantial literature review that has been done above, it can be said that *P. aeruginosa* resistance has been steadily rising over time in Pakistan

and throughout the rest of the world. The unusual structure of the *P. aeruginosa*, with a genomic size (bp = 6.3M) is considered the largest sequence of all the bacteria and thus may be the cause of the rise in resistance. This sequence's flexibility results in resistances that are inherent to antibiotics, including regulatory genes in the greatest number, which are also responsible for mutational modifications in the efflux pump or the porin structure [15]. In this study, females (55%) were more likely than males (47 percent) to have MDR *P. aeruginosa*. A study conducted in Nepal revealed the following findings, with nearly identical results for both genders (55.1%) and men (44.9 percent) [16]. A study conducted in Pakistan in 2017 produced conflicting findings, showing *P. aeruginosa* (MDR) that were much prevalent in the males (56 percent) than in females (46 percent). Study carried out in the Iraq and also in India have produced conflicting findings. In those investigations, *P. aeruginosa* (MDR) prevalence in males were higher as compared to females, at 55% and 56%, respectively [17]. The gender prevalence may vary with regional variation and study era could help to explain this. In our investigation, the majority isolates of *P. aeruginosa* (34.2%) was detected in pus, following tracheal aspiration (21.7%) and urine (19.7 percent). Our findings are somewhat consistent with past research in which pus samples were the most frequent source [18]. A proportion of patients with surgical injury issues were found to have damaged areas that were easy targets for nosocomial infections. This explains why isolates exist in the largest amount in the pus. Other potential contributing factors to the development of the resistant strains include the use of antiseptics without proper protocols and inadequate ward cleanliness. In our analysis, the surgical ward contributed the majority of MDR strains (27.9%), followed by the intensive care unit (17.6%), the medicine ward (12.4%), and the gynecological ward (5.2 percent). According to a 2018 study by Saeed et al., the ICU is a substantial source of MDR isolates [10]. The depleting effects of a protracted hospital stay and the usage of medical equipment like airways, cannula and catheters etc. make intensive care unit patients particularly conducive to infection [19]. Currently available drugs against MDR *P. aeruginosa* include Fluoroquinolones (ofloxacin, ciprofloxacin) and antipseudomonal penicillins (ticarcillin, piperacillin), cephalosporins (ceftazidime, cefepime), aminoglycosides (amikacin, gentamicin) and carbapenems (imipenem, meropenem). Yet, strains of *P. aeruginosa* have ultimately outplayed our most effective curative measures. Our research, like other studies, has shown resistance very high to each of  $\beta$ -lactam antibiotic. The antibiotics, imipenem (81.6%), ciprofloxacin (81.5%), ceftazidime (79%), and gentamycin (75.3%) were shown to have the highest

resistance to MDR strains, whereas Colistin (100%) and C/T showed the maximum susceptibility in these bacteria (41 percent). MDR *P. aeruginosa* has the highest resistance to imipenem (100 percent), followed by the gentamycin (98 percent), amikacin (77.8 percent) and the piperacillin/Tazobactam (68.1 percent). It is clear that prevalence of *Pseudomonas* MDR strain is rising in Pakistan. The widespread use of these medications in secondary care hospitals is to blame for the rise in resistance in our community. According to a widely accepted idea, the usage of antibiotics and the emergence of resistance are related causally. Ceftazidime was 100 percent resistant to *P. aeruginosa*, whereas imipenem was 95% sensitive, according to an Iraqi investigation [20]. The gram-negative bacteria are treated with the polymyxin B antibiotic colistin. Although the clinical use of this medication as well as empirical treatments are limited because of its confined index of therapeutic as well as its significant side effects, colistin is a sensitive medication both in our environment and throughout the world [17].

## CONCLUSION

Over the past few decades, resistance of *P. aeruginosa* has increased. The results of the current study indicated that MDR strains were highly resistant to common treatment drugs. The medication that demonstrated the excellent activity against *Pseudomonas* was ceftolozane/tazobactam. For the community to receive appropriate healthcare, there must be regular lab identification and surveillance of this resistant infection.

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## Original Article

## Impact of Cardiac Rehabilitation on Patients with Myocardial Infarction

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## ARTICLE INFO

## Key Words:

Impact, effectiveness, cardiac rehabilitation, cardiovascular disease, myocardial infarction, heart attack, ventricular deficit.

## How to Cite:

Qayyum, Z. ., Aslam, A. ., Aimen, I., Zahra , S. ., Maqsood , M. ., & Sultana, R. . (2022). Impact Of Cardiac Rehabilitation on Patients with Myocardial Infarction: Cardiac Rehabilitation for Myocardial Infarction. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.582>

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Received Date: 12th July, 2022

Acceptance Date: 23rd July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Myocardial Infarction (MI) renowned as "Heart attack" is of 2 main categories ST-Elevation Myocardial Infarction (STEMI) which is symptomatic and Non-ST-Elevation Myocardial Infarction (NSTEMI) with no clear symptoms, killing silently. Cardiac Rehabilitation (CR) is a multidimensional standard of patient care individually tailored to specific needs of participants.

**Objective:** To find out the impact of CR on cardiac abnormalities and associated malfunctions and promote awareness and facilitation of CR. **Methods:** A descriptive cross-sectional study was done via "The Minnesota Living with Heart Failure Questionnaire" (MLHFQ). Data was collected from 90 cardiac patients. **Results:** According to MLHFQ, 7.8% of the population had good QOL, 71.1% had moderate QOL, and 21.1% had poor QOL from age 45 to 60 with MI. **Conclusion:** 71.1% of total participants with MI who followed CR observed enhanced energy levels, managed symptoms effectively, prevented progression, and boosted up confidence level hence results showed positive impact of rehabilitation. Factor affected results were age, cooperation, duration of diagnosis before participating in CR and duration of rehabilitation. Whereas, it had almost similar impact for both male and female of age 45 to 60.

## INTRODUCTION

The term Myocardial Infarction (MI) also called Heart Attack, reflects hypoxic death of cardiac tissues. Symptomized by pain in chest, upper extremity, jaw, epigastric discomfort, dyspnoea, diaphoresis, nausea, and syncope.[1] Typically diagnosed by patient's history, ECG, echocardiography, and serum analysis. Perfusion imbalance between supply and demand can have multiple reasons such as atherosclerotic disease, thrombus, embolus, bacterial or viral infection, blood pressure instability, and other systemic disorders. [2] It is managed by Cardiac Rehabilitation (CR) that addresses every aspect of a patient's condition such as specific diet plan, energy conservation, daily activity modifications, stress

management and maximising potential of patient/client [3]. Rehabilitation refers to a holistic treatment approach aimed to restore a balanced health condition through rejuvenating homeostasis, while CR is oriented specifically on the cardiopulmonary system. This multidisciplinary approach makes the patient/client go through different phases of treatment to achieve his maximum potential of health While each of the phases are time and goal specific[4]. CR is the combination of ongoing education, psychological and physiological interventions which includes interval health monitoring, dietary regime, BMI, BP, and diabetes management, counselling, physical activity guidelines training[5]. Short term goals of

rehabilitation aim to control cardiovascular malfunctioning, augment functional activities, turn down detrimental outcomes of cardiovascular events and strengthen psychosocial performance[6]. CR is based upon 4 phases and patient specific set of goals are determined through CR program periodically Phase 1 is in-hospital phase also called clinical phase, having one-week duration consisting upon bed mobility training, vital monitoring, psychological counselling, nutritional guide, and risk factor assessment. Phase 2 is post-discharge phase having 3 – 6 weeks after discharge and consists of more diligent patient-centred sessions based on three categories; information/counselling, exercise training program, and a relaxation program. [7]Phase 3 is called post-cardiac rehab having 6 – 12 weeks focused on upgrade flexibility, strength, and aerobic conditioning. Patients need to visit CR unit 2 to 3 times in a week for a structured exercise program[8]. Phase 4 is the maintenance phase merely based on maintaining achieved functional status. After following all phases patient can manage himself independently or with minimum help[9]. Duration of rehabilitation lasts 2 – 3 months on average and Every detail is documented to evaluate the outcome of rehabilitation while the patient's cooperation is influential in the therapy[10]. In modern cardiology, CR has evolved as the integral part of standard care proving early ambulation to be of great importance in reduction of coronary events[11]While primary prevention aims at preventing the onset, CR is a secondary prevention category which relies on early detection of the disease [12]A chest pain more than 30 min is not enough information for exact diagnosis of MI.it has 2 types named ST elevation(STEMI)[13] which is symptomatic and easy to diagnose while the other type is non ST elevation(NSTEMI) with misleading overlapping symptoms[13] Among diagnostic tests for MI such as ECG, serum CK MB, CBC, renal function, Cardiac Imaging tests, Troponin stands out to be the most accurate and reliable test worldwide[14] Disruption of cardiac cells membrane causes the intracellular proteins to escape into the blood circulation and be detected in lab tests as markers of infarction. For the suspected and confirmed MI cases, studies showed that CR not only improves the condition but also prevents complications and recurrent instabilities. This inclination towards CR was evidence-based that different exercise regimes improve conditioning as well as prognosis, long term effects, reduce recurrences of cardiac events and extent of recovery depends upon the patient's pre-hospitalised condition, severity of complication, psychological status, and adherence to treatment[15]. Despite the clear recommendations, fewer people attend CR than diagnosed. Factors influencing low rates of participation may be the lack of awareness and

facility, hospital anxiety, no referral to rehabilitation, depression, altered cognitive status, financial issues and in some cases, transportation problems for some patients [16].All of these barriers enhance the rate of recurrent symptoms, progression, and mortality. Besides this, CR programs are of 2 types, centre-based CR followed under supervision and home-based followed after educational sessions from therapists first[17]. If properly followed the plan of care at home, home-based programs have equal efficacy as the supervised centre-based programs [5]. Multiple studies have been published on CR focused on numerous program-associated mortality rate, quality of life, survival rate, obesity, long term effects of CR, expanded cardiac rehabilitation, other barriers, while most of them had males of older age >70 as their target population. Main objective of this study is to assess the influence of advanced cardiac therapies and secondly, awareness and follow up of CR should be promoted to enhance life expectancy by overcoming the obstacles and barrier of conservative therapies equally in all age groups regardless of gender.

## METHODS

Study was conducted in 3 different settings of Lahore, Punjab Institute of Cardiology, General Hospital Lahore, and National Hospital. "The Minnesota Living with Heart Failure Questionnaire" (MLHFQ) along with a consent form was used to collect data. Non- probability convenient sampling technique was used for this study. 90 patients, both men and women, of 45-60 age, diagnosed with MI for >4months, attending at least 3 weeks of CR were included. Freshly diagnosed with cardiac conditions, multiple complications other than heart problems, and patients with unstable symptoms were excluded from the study. Complete data collected for and with the trial was analysed by SPSS version 26.0.

## RESULTS

Results have been obtained by analysing the data collected from 90 MI patients. MLHFQ was used. It is prevailed that 71.1% of MI patients, without multiple diseases, going through CR for about a month or more had a moderately healthy lifestyle. Out of 90 sample sizes from 3 hospital settings 7 patients had good Quality of Life (QOL), 64 had moderately balanced conditions while 19 patients had poor lifestyle. 7 patients with good QOL had ages between 45-48, financially independent fairly social and properly following CR, 64 patients with moderate QOL had ages between 50 – 57and had balanced condition and were going through CR for about 5 – 6 weeks of duration. 19 patients having poor QOL had 58 – 60 age, had higher levels of depression, low socioeconomic status, dependent upon others for their medical expenses, and less follow-up duration of

rehabilitation. The information pertaining to demographics, duration of diagnosis, follow-up, and results of MLFHQ has been demonstrated in different tables below:

Ages	Frequency	Percent
45 - 50	33	36.6%
51 - 55	33	36.6%
56 - 60	24	26.8%
Gender	Frequency	Percent
Male	49	54.4%
Female	41	45.6%
Total	90	100%

**Table 1:** Age and gender frequencies of patients among total population

Duration of Diagnosis	Frequency	Percent
>4 months	50	55.6%
5 months	25	27.8%
6 months	7	7.8%
≈1 year	8	8.9%
Total	90	100%

**Table 2:** Duration of diagnosis of patients

Duration of CR	Frequency	Percent
4 - 6 weeks	38	42.2%
7 - 9 weeks	36	40%
10 - 12 weeks	16	17.8%
Total	90	100%

**Table 3:** Cardiac rehabilitation follows up duration of patients

QOL	Frequency	Percent
Good QOL	7	7.8%
Moderate QOL	64	71.1%
Poor QOL	19	21.1%
Total	90	100%

**Table 4:** Score of MLFHQ

## DISCUSSION

Myocardial Infarction (MI) is one of the leading health concern in Pakistan, causing high rates of mortality with more than 30% in the 45 - 50 years of age regardless of gender while most prevailed type is ST-Elevation Myocardial Infarction (STEMI) for about 56% of all types of cardiovascular disorders which needs to be addressed seriously[18]. Of many reasons, hypertension, type-II diabetes, less physical activity, unhealthy dietary practices, overweight, higher BMI, were considered the leading causative agents of MI in middle age population. Pakistan is a developing country and increasing burden of disease is compromising country's progress and influencing limited resources making it a great challenge for all stakeholders. It is always cost-effective to identify

and address diseases at an early stage for better outcomes[20]. Current article is an observational study of CR in mental and physical dimensions for one of the major CHD affecting Pakistan's overall population, needing timely intervention to curtail the existing burden. According to results, out of 90 participants, 71.1% observed moderate quality of life after follow-up of CR which showed a positive impact of CR on CVS-related complications. On the other hand, 21.11% population out of 90 participants observed poor QOL affected by their socioeconomic status, age, irregular follow up, and onset of other health complications. While 7.71% people had good QOL. Some recent meta-analysis shows that physical activity improves the left ventricular function[21]. The limitation of the present study is its small sample size of MI patients from Punjab Province, Pakistan. There is a great need of well-targeted clinical interventions and awareness campaigns, aimed promotion of CR facilities, with a view to lessen the burden of CHD[22].

## CONCLUSION

This study was conducted to observe the impact of Cardiac Rehabilitation (CR) on patients with Myocardial Infarction (MI). Results of this study indicated stabilisation of cardiovascular symptoms in more than two third of the participating population which is a positive impact, while psychological factors, age and socioeconomic status were the influential variables. Hence there is a need to promote awareness and facilitation of rehabilitation care centres to deal with such seriously burdensome diseases in Pakistan.

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## Original Article

## Association Between Screen-Time and Dietary Habits Among Students of 11-25 Years

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## ARTICLE INFO

## Key Words:

Screen Time, Eating Habits, Eating Patterns, Electronic Gadgets

## How to Cite:

Ahmed, H. ., Rizwan, B. ., Fatima, A. ., Iqra, ., Tariq, M. ., Zafar, R. ., Naeem, M. ., Ali, S., Moazzam, A. ., & Tahir, N. . (2022). Association Between Screen-Time and Dietary Habits Among Students Of 11-25 Years: Screen-Time and Dietary Habits Among students. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.608>

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Received Date: 22<sup>nd</sup> June, 2022Acceptance Date: 10<sup>th</sup>, July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

The continuous technological advancement has provided innovative and attractive electronic devices that led individuals to spend longer times in front of screens. Longer periods of screen time have been linked to poor dietary habits including higher consumption of sugar, low nutritional quality foods like french fries, refined grain products, snacks and desserts, lower intakes of fiber, vegetables, fruits, and whole grains. **Objective:** To compare the association between screen time and eating habits among the students of 11 to 25 years. **Methodology:** A cross-sectional study was conducted to evaluate eating habits and screen time of 150 students from different schools, colleges and universities of Lahore. Participants were selected through non-probability convenient sampling. Data were collected using a self-constructed questionnaire. In exclusion criteria, students off the selected age group, having no screen time and non-cooperative individuals were excluded. SPSS version 25.0 was used for data analysis. **Results:** Total participants of study were 150. Few of them were obese (8%) and more were overweight (26%). Some of them were spending 3-5 hours on screen (23%) while more were spending greater than 7 hours (32%). Mostly skipped breakfast (54%), delayed meals (45%), ate above planned limit (57%). Majority consumed fried food (56%) and sweets (44%) while using electronic gadgets. **Conclusions:** High prevalence of screen time had negatively affected student's eating patterns. Students with longer screen time usually consumed fast food, junk food, sugary desserts, salty snacks and caffeinated beverages as snacks.

## INTRODUCTION

Screen Time (ST), defined as the amount of time spent watching TV and using a computer, accounts for a significant portion of sedentary behavior [1]. Kelishadi R et al., in 2017, investigated the relationship between Screen-Time (ST) (total time spent watching TV and using a computer in leisure time) and snack eating frequency. The subjects were 13,486 of the 14,880 invited children, with 50.8 percent of them being boys. The average (standard deviation) age of the subjects was 12.47 years. Students who had more than four hours of screen time per day had a lower likelihood drinking milk on a daily basis than those who had less than four hours. Fast Food and overeating while watching TV can cause a disruption in dietary habits, which can lead to obesity [2]. Recent studies have shown a

prevalence of sedentary behaviour above 70% in young people [3-5]. Screen Time (ST), or time spent in sedentary behaviour is limited to no more than 2 hours per day for all age groups above 2 years. Obesity is more likely to develop later in life if early intervention is not taken [6]. According to studies, children and adolescents spent the most time with media in a day, other than sleeping, with an average of 7 hours per day [7]. Children watch much TV during school days and at the weekend their average screen time was about 5 hours [8]. People with different age groups and races had different ST [9]. Moreover, people in higher socioeconomic groups spend more time on screen and video games than people in lower-class communities [10]. Screen-based activities (such as entertainment, gaming,



and other screen-based activities) are more prevalent in typical nuclear families [11]. The effects of ST on a number of health-related behaviors, notably eating behaviors, may play a role in these outcomes. Long periods of ST have been linked to poor adult dietary patterns, including increased sugar consumption, particularly from soft drinks; increased consumption of low nutritional quality foods, such as French fries, refined grain products, snacks, and desserts; and decreased consumption of fiber, fish, vegetables, fruits, and whole grains [12, 13]. The media provides viewers with a varied choice of entertainment alternatives, which has been demonstrated to negatively affect adolescents [14]. Advertisements on electronic media have an impact on the nutritional quality of meals consumed by teenagers [15]. In other words, watching TV is associated with eating more junk food because junk food commercials on TV are targeted at children's programmes [16]. As eating fast, research has been conducted on the association between TV viewing time and children's and adolescents' dietary habits [17]. Many reviewed studies have found that watching television is associated with poor dietary habits in children and adolescents [18, 19]. Eating while at the same time sitting in front of the TV is related to terrible eating routine quality among youngsters, including successive utilization of sugar-improved drinks and food varieties high in fat and sugar, and diminishing products of the soil [20, 21]. Similarly, a small number of studies have lately revealed a link between computer use and ST, as well as bad food patterns in children and adolescents. Children and teenagers nowadays spend a large amount of their spare time watching television and playing video games [22-24]. The majority of earlier research focused on the effects of watching TV on snack intake rather than overall ST [25, 26]. A cross-sectional study was performed in Japan by Tsujiguchi H et al., in 2018 to examine the association between screen time and nutrient intake in children and adolescents. Data were collected from children and adolescents aged 6 to 15 in Shika. This study included 1414 students. Longer TV viewing periods in boys were associated with or appeared to be associated with lower protein, potassium, calcium, iron, vitamin K, vitamin B-2, and total dietary fibre intakes, according to the findings of this study. Longer TV viewing durations in females were associated with reduced protein, salt, calcium, , vitamin D, and vitamin B-2 intake. In girls, more extended TV viewing periods were associated with higher consumption of n-6 fatty acids [27]. The study was aimed to assess the eating patterns of adults in relation to their daily screen time. Because when people consume their meals in front of the screen, they mostly binge eat and do not perform physical activity, which leads to weight gain and other health-related issues. Their eating speed and

timing is also effected. If this issue is not addressed, it might lead to an increase in morbidity & mortality rates. As higher ST can increase unhealthy food consumption which leads to chronic diseases like obesity, diabetes, hypertension, depression and many others.

## METHODS

A cross-sectional research was conducted to evaluate eating habits and ST of 150 students from Bahria Town School, Divisional Public School, Punjab College, Bahria Town Campus Lahore, The University of Lahore, The Punjab University, Lahore Garrison University, Lahore. Participants were selected through non-probability convenient sampling. The duration of study is 4 months. A self-structured questionnaire was used to collect data. Data were collected using a self-constructed questionnaire. Exclusion criteria included students who were not in the target age group, had no ST, and were uncooperative. The data were analyzed using SPSS version 25.0. In this study, all data were collected randomly through a survey using a detailed self-constructed questionnaire after approval from experts. All the questions were based on different sections including demographic information, anthropometric measurements, screen time, their knowledge about its effect on lifestyle, eating habits & food preferences in front of the screen. The ethical approval was signed by the ethical committee, Head of the department of the University Institute of Diet and Nutritional Sciences. The consent was taken from the participants before data collection. Questionnaires were distributed among participants, and they were asked to fill them.

## RESULTS

According to table 1 total of 150 participants, 94 were females and 56 were males. Majority of the participants were females. 21 were between 11 -15years, 56 were between 16 - 20years and 73 were between 21 - 25years. Out of all participants, 31 weighed between 25 - 45kg, and 72 were between 46 - 65kg. While 42 were between 66 - 85kg. Only 5 of them were above 86kg. 9 belonged to lower class, 116 belonged to the middle class and 25 were from the upper class. That showed majority of the participants belonged to middle-class. 106 had nuclear families, and 44 had joint families showing the majority of them lived in nuclear families. BMI of 29 were underweight, 70 were within the normal weight, and 39 were overweight, whereas 12 were in the obese category as shown in table 1.3

Demographics		
Variables	Category	Frequency (%)
Gender	Female	94 (62.7%)
	Male	56 (37.3%)
Age	11-15 years	21(14.0%)
	16-20 years	56(37.3%)
	21-25 years	73(48.7%)
Weight	25-45kg	31(20.7%)
	46-65kg	72(48%)
	66-85kg	42(28%)
	86-96kg	5(3.3%)
Socio economic status	Lower class	9(6.0%)
	Middle class	116(77.3%)
	Upper class	25(16.7%)
Family type	Nuclear	106(71%)
	Joint	44(29%)
BMI	Underweight	29(19.3%)
	Normal	70(46.7%)
	Overweight	39(26.0%)
	Obese	12(8.0%)

**Table 1:** Demographics of the participants

From the table 2 out of 150 participants, 74 were eating slowly while watching TV or using mobile, 30 were eating quickly, 46 had normal eating habit. 81 skipped breakfast due to whole night mobile / laptop usage while 69 did not skip breakfast. 68 delayed their meals while working, while 44 did not delay their meal. Only 38 were not sure about delaying meals. 54 used to eat once a day in front of the screen, 41 were eating twice a day and 37 ate three times a day, whereas 18 participants did not eat in front of the screen. 86 were eating more than planned in front of screen, whereas 64 did not agree.

Eating Habits While Using Screen		
Variables	Category	Frequency (%)
Do you think you're eating habits are affected while watching TV or using mobile phone?	Eat slowly	74(49.3%)
	Eat quickly	30(20.0%)
	Normal eating	46(30.7%)
Do you miss your breakfast due to whole night using mobile/ laptop?	Yes	81(54%)
	No	69(46%)
Do you delay your meals when you are working on a screen?	Yes	68(45%)
	No	44(29%)
What is the frequency of your meals intake in front of screen	On and off	38(25%)
	Once a day	54(36.0%)
	Twice a day	41(27.3%)
	Thrice a day	37(24.7%)
	None of these	18(12.0%)
Do you think that when you start eating certain foods, you end up eating much more than planned?	Yes	86(57.3%)
	No	64(42.7%)

**Table 2:** Frequency Distribution of eating habits while using screen

According to the results of table 3, showed that 48 preferred eating fast food in front of a screen while 52 were

eating junk food, 11 were drinking beverages, 11 were eating fruits, 13 were eating desserts, and 15 consumed regular meals. This showed that mostly people preferred junk food in front of the screen. 110 consumed fried food during the usage of electronic gadgets while 40 did not consume fried food showing that majority of the participants were consuming fried foods. 72 were consuming sweets (chocolates, candies) while 78 were not consuming during the usage of electronic gadgets.

Food Choices While Using Screen		
Variables	Category	n (%)
Which type of food do you mostly consume while using screen?	Fast food(pizza, burgers, sugar/ carbs,fat/oil, processed food)	48(30.0%)
	Junk food(nimko, chips/ fries, crackers/lays/ pastries)	52(34.7%)
	Beverage's (soda drinks)	11(7.3%)
	Fresh fruits and veggies	11(7.3%)
	Dessert	13(8.7%)
	Regular meal	15(10.0%)
	Consumption of fried food while using electronic gadgets?	Yes
No		40(26.7%)
Consumption of sweets (chocolate, candies) while using electronic gadgets?	Yes	72(48.0%)
	No	78(52.0%)

**Table 3:** Distribution of food choices while using screen

According to the results of table 4 showed that there was an association between skipping and frequency of meals during screen usage was p-value <0.05, Table 4.

Skipping meals during screen usage	Frequency of meals during screen usage				Total	p-Value
	Once a day	Twice a day	Three times a day	None of these		
Yes	20	23	19	6	68	0.004
No	23	3	13	5	44	
Seldom	11	15	5	7	38	
Total	54	41	37	18	150	

**Table 4:** Association between skipping and frequency of meals during screen usage

There was an association between BMI and consumption of fat (chips, snacks, nuts etc.)while using screen was p-value <0.05, Table 5.

Consumption of fats (chips, snacks, nuts etc.) during screen time	BMI of the respondent				Total	p-Value
	Under weight	Normal	Over weight	Obese		
1/day	5	14	8	4	31	0.034
2/day	2	7	13	2	24	
3/day	3	7	1	1	12	
4/day	11	15	6	4	36	
2/week	0	3	4	0	7	
None	8	24	7	1	40	
Total	29	70	39	12	150	

**Table 5:** Association between BMI and consumption of fats among participants while using screen

## DISCUSSION

The study results of current study showed that out of 150 participants, 48 claimed that they mostly choose fast food in front of a screen while 52 eat junk food, 11 prefer beverages, 11 eat fruits, 13 crave desserts, and 15 consume regular meals. This shows that most people prefer junk food in front of the screen. Another study carried out by Delfino et al., in 2017, to analyze the relationship of the screen-time with the eating habits and physical inactivity of the adolescents concluded that the excessive use of display gadgets is related to excessive intake of snacks, fried foods, chocolates and bodily inactivity in adolescents. A similar study by Delfino LD et al., in 2017 included students of age group 10- 17 years [1]. In the present study socioeconomic status of students was also evaluated to see its effect on increased screen usage time and eating patterns. Out of 150 respondents, 9(6%) were from the lower class, while 116(77%) belonged to the middle class and 25(16.6%) were from the upper class. It showed that most of the respondents were from a middle-class community. A similar study conducted by Ghobad Moradi et al., concluded that people in higher socioeconomic groups spent more time on screen and video games than the people who are in lower-class communities [10]. In current study 106(71%) had nuclear families and had more ST, while 44(29%) participants were living in joint families and had comparatively less screen time. A similar study by Langoy et al., in 2019 proved that children living in lone families had more screen time than those living in blended families and were less likely to take part in outdoor activities [11]. The current study showed that out of 150 participants, 21(14%) were in the age group 11-15 years, 56(37.3%) were between 16-20 years, and 73(48.7%) lied in the age group 21-25 years. In a study conducted by Pinho, MG students of age 11-14 years were analysed [28]. A similar study performed by Benaich S et al., in 2021 among the university students used the age group of 18-26 years [29]. In the current study, the number of total respondents taken was 150, out of which 94(62.7%) were females, and 56(37.3%) were males. All

were taken from different schools, colleges and universities. A similar study performed by Nastaskin et al., included 136 college students [30]. Another study conducted by Alghaider et al., to know the association of screen time with food preferences and physical activity included a total of 214 students who participated and filled questionnaires [31]. In recent study out of 150 participants, 29(19.3%) were underweight, 70(46.7%) were of healthy weight, 39(26%) were overweight, and 12(8%) were found to be obese. A similar study was done by Hicks K et al., to determine the relationship between ST, beverage and snack consumption 2% were underweight, 51% were healthy weight, 21% were overweight, and 26% were obese. Both studies had great similarity [32]. In current study 56(37.3%) were known to be eating slowly while watching TV or using mobile, 30(20%) were eating quickly, 46(30.7%) had normal eating speed, while 18(12%) said their eating was not affected with the use of the screen. An interesting study conducted by Mathur & Stevenson RJ discovered that people eat 14% less when they watch different and engaging content. Eating speed might be normal while watching the same boring content [33]. The study concluded that 81(54%) agreed on skipping breakfast because of spending the whole night on screen and not being able to wake up the next morning for breakfast, while 69(46%) did not agree. A similar study, conducted by Tambalis et al., in 2015 revealed that insufficient sleep duration was linked to unhealthy dietary habits such as skipping breakfast, eating fast food, and bingeing on sweets on a regular basis. Furthermore, insufficient sleep duration was linked to poor dietary habits, increased screen time, and being overweight/obese [34]. In recent study 54(36%) ate meals once a day in front of the screen, 41(27.3%) ate twice a day while 37(24.6%) ate thrice a day, and only 18(12%) claimed they did not eat in front of the screen. According to a similar study conducted by Melissa L Jensen et al. to determine the frequency of eating while watching television, 87.5 percent of participants consumed at least one meal or snack per day while watching television [35].

## CONCLUSION

It was conducted that there was a high prevalence of increased screen time had negatively affected students' eating patterns and food choices. Most of them had more than 7 hours screen usage on daily basis, which is above the recommended screen time limit. Majority of them were skipping breakfast, delaying their meals or eating much more than planned due to high screen usage. Mostly fat consumption, junk food, fast food, and sweet were the most selected snack items while using screen which were badly effecting their overall health.

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## Original Article

## Evaluation of Histopathological Lesion in Oral and Maxillofacial Department at Tertiary Care Hospital Peshawar

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## ARTICLE INFO

## Key Words:

Tumor, Oral, Maxillofacial, Malignant, Benign

## How to Cite:

Ahmad, S. ., Muhammad, A. ., Un Nisa, W. ., Bakhtiar, S. ., Ashfaq, S. ., Ali, F. ., Aslam, M. ., Khalid, A. ., & Ullah, I. . (2022). Evaluation Of Histopathological Lesion In Oral And Maxillofacial Department At Tertiary Care Hospital Peshawar: Histopathological Lesion in Oral and Maxillofacial Department in Peshawar. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.666>

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Received Date: 6<sup>th</sup> July, 2022

Acceptance Date: 14<sup>th</sup> July, 2022

Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Around the world, maxillofacial disorders are distributed widely. The oral and maxillofacial area is affected by a wide variety of illnesses, from inflammatory lesions to benign and malignant cancers. **Objective:** This is a base line study that will aid in the diagnosis and management of oral healthcare and also guide recommendations and associated research in the local population in the future. **Methods:** In this descriptive observational study, 124 patients with orofacial lesions reported at the Hayat Abad medical complex, Department of Oral Maxillofacial and Dental Surgery between 2021 and 2022 were analyzed. **Result:** A total of 124 orofacial lesions were found, of which 47 were malignant and 57 benign, with the posterior mandible being the most commonly affected area. The pathology that affected most frequently was squamous cell carcinoma. In the fourth, fifth, and sixth decades of life, the soft tissue lesion affected 41% of males and 37% of females. These included squamous cell carcinoma well-differentiated in 32 (25.80%), fibrous epulis in 11(8.8%), and pyogenic granuloma in 16(12.90%) of cases. **Conclusion:** With the posterior mandibular area being the most common site, oral squamous cell carcinoma affects adolescents and the elderly with the most incidence rate.

## INTRODUCTION

There are many different pathologies of the oral and maxillofacial region, ranging from inflammatory lesions to benign and malignant tumors. The distribution of maxillofacial diseases varies across the globe, according to reports [1]. Both soft tissue and bone can be affected by these lesions or neoplasms, which can also affect any or both of the structures in the oral or maxillofacial region. The lesion can be divided into odontogenic and non-odontogenic categories [2]. There are two types of oral lesions: benign and malignant. Malignant lesions are

defined by progressive autonomous growth [3] whereas benign lesions are typically inflammatory or the result of a response to some type of irritation or mild injury as well as the effects of chemicals like arsenic and others, radiation, and viral infections like HPV, HIV, and EBV, predisposing genetic factors like genetic mutation and P53 suppression gene modification also play a role. Malignant tumor formation has typically been found to be correlated with immune dysfunction [4]. Oral tumor incidence is on the rise due to environmental variables such as chewable tobacco,

moist snuff, and betel quid. When smoking and alcohol are combined oral disorders are more likely to develop [5]. Patients who have oral or maxillofacial lesions can either show symptoms or not. Depending on the stage, manner, and kind of presentation, symptoms may change. The symptoms might range from a small swelling to large ulceration and mass [3]. Sometimes benign oral soft tissue tumors can appear clinically to be malignant tumors. It might be difficult for clinicians to diagnose these lesions based only on physical examination, clinical presentation, and the physical condition of the afflicted people. Although when making a diagnosis and suggesting a treatment plan, knowledge about the occurrence and location of such lesions is also important [6]. Based on these results, only a clinical differential diagnosis may be determined. It is only when supported by relevant non-invasive and invasive investigations that a conclusive final nature of the disease can be documented. These could consist of blood tests, radiography, and tissues biopsies [3]. According to studies, cancer and blood group may be associated. People with blood group O appear to have an increased chance of developing squamous cell carcinoma, according to a Malaysian study [7]. Without minimizing the value of a correct diagnosis for prognosis and treatment, a biopsy is required to establish the final diagnosis in order to evaluate the histological grade and identify the distinct histological characteristics of lesion [8]. Additionally, any oral mucosal lesion suspected of being a carcinoma requires a biopsy, including ulcers that do not heal in 2 to 3 weeks [9]. A definitive treatment plan can only be tailored considering the lesion's predicted pattern of local growth, risk of metastasis and likely sites of distant spread [10]. If the lesion is big or the operating physician detects a malignancy, an incisional biopsy is performed. If the lesion is little and, in the opinion of the clinician, poses no threat of malignancy, excisional biopsy is used. Depending on the lesions and the doctor's preference, true-cut, broad bore, and punch biopsies are the approaches for histopathological sample. When there is a potential that tumor cells will shed during an open biopsy, fine needle aspiration cytology / fine-needle aspiration biopsy with a 16/23 gauge needle is recommended to distinguish between cystic and solid tumors. Under certain conditions, FNAC and FNAB in inaccessible areas are guided by ultrasound, CT, and MRI to prevent harm to the nearby important tissues. In some situations, frozen section biopsy is used to preserve tissues and help with proper patient management [11-12]. In comparison to developed countries, developing countries, particularly in South Asia, often have a higher incidence of oral lesions [13-14]. This emphasizes the importance of early identification and treatment planning for oral lesions in this region of the

world in order to prevent complications, lower morbidity, and plan appropriate care. To determine the prevalence of oral lesions with respect to age, sex, and site, as well as to highlight the significance of comparing the clinical picture with the histopathological pattern of oral lesions in order to make a definitive diagnosis, the current study was planned in a tertiary care teaching hospital located in the Peshawar, Pakistan. In this study, patients undergoing orofacial surgery at the Hayat Abad medical complex were evaluated for their frequency, type, and site distributions of orofacial lesions.

## METHODS

This study used a non-probability sampling technique to analyze 124 cases of orofacial lesions treated at the Department of Oral Maxillofacial and Dental Surgery in Peshawar between January 2021 and 2022. It is an observational, descriptive study with a cross-sectional design. Only patients who voluntarily decided to participate in the study after providing informed consent were chosen for it. The on-duty doctor routinely checked the patients before referring them to a maxillofacial surgeon for a professional opinion. The surgeon made a pro-visionary diagnosis of the cases necessitating biopsy for confirmation diagnosis based on the patient's major complaint, medical history, and clinical examination. Patients under investigation who had a probable diagnosis had their biopsies scheduled. For lesions with a suspected malignant nature and lesions larger than 2 cm in diameter, incisional biopsies were carried out. Excisional biopsies were performed on patients who had benign lesions according to provisional diagnosis. Under careful infection control procedures, local anesthetic was used for all of the biopsies. The specimens were sent to the medical laboratory for a microscopic examination after being preserved in 1:10 of 10% formalin in a carefully labeled jar. A thorough histo-pathological request form was included with the specimens. Frequency and percentages were substituted for the data. To evaluate the relationship between the lesions diagnosed, the lesion site, and the age, gender, and location of the pathology, the chi-squares was used. A p value of 0.05 or less was considered as statistically significant.

## RESULTS

There were 57 benign and 47 malignant oro-facial lesions diagnosed out of a total of 124. The most common lesions were 79.06 percent soft tissue lesions, which included 41 percent males and 37 percent females. Table 1 shows hard tissue lesions included ameloblastoma (5%), benign cystic lesion (2%), bony trabeculae with necrotic alterations 2 (1.61%), calcifying-odontogenic cyst 2 (1.61%), dentigerous cyst 4 (3.22%), odontogenic keratocyst 3 (2.41%),

osteosarcoma 2 (1.61%), adenocarcinoma 2 (1.61%), radicular cyst 9(7.25%), TB 2(1.61%).

Soft Tissue Lesion	Frequency	Percentage	Hard Tissue Lesion	Frequency	Percentage
Inflammation (Acute)	2	1.61%	Ameloblastoma	5	4.03%
Extravasation (Mucocele)	2	1.61%	Bening Cystic Lesion	2	1.61%
Fibrous (Epulis)	11	8.87%	Bony Trabeculae with Necrotic Changes	2	1.61%
Giant Cell Granuloma	2	1.61%	Calcifying Odontogenic Cyst	2	1.61%
Hyperplastic Mucosa With (Fibrosis and Dilated Duct)	2	1.61%	Dentigerous Cyst	4	3.22%
Inflammatory (Polypoidal Lesion)	2	1.61%	Odontogenic Keratocyst	3	2.41%
Keratotic Hyperplasia with (Mild Dysplasia)	2	1.61%	Osteosarcoma	2	1.61%
Pyogenic Granuloma	16	12.90%	Polymorphous Low-Grade Adenocarcinoma	2	1.61%
SCC (Well-Differentiated)	32	25.80%	Radicular Cyst	9	7.25%
SCC (Moderately Differentiated)	6	4.8%	Tuberculosis	2	1.61%
SCC (Poorly Differentiated)	2	1.61%			
Skin Appendegeal Tumor	2	1.61%			
Spindle Cell Tumour Fibromyxoid Tumour	2	1.61%			
Verrucous Carcinoma	4	3.22%			
Total (N)	91	79.06%	Total (N)	33	20.94%
Grand Total (N)			124		

**Table 1:** Number and percentage for the occurrence of the oral lesions

As shown in table 2, a high incidence of 31 cases was reported in the fourth and fifth decades, followed by 25 cases in the third, indicating a tendency for young adults and the middle-aged. The most common pathology was well-differentiated oral squamous cell carcinoma (SCC), accounting for 32 (25.80%) of cases. Others include pyogenic granuloma 16 (12.90%), fibrous epulis 11 (8.8%), moderately differentiated SCC 6 (4.8%), poorly differentiated SCC 2(1.61%), giant cell granuloma 5(4.08%), verrocous carcinoma 4 (3.22%), spindle cell tumour fibromyxoid tumour 3(2.41%), acute inflammation 2(1.61%), kerototic hyperplasia with mild dysplasia 2 (1.61%), and extravasation mucocele 2(1.61%). Soft tissue lesions were found in 41% of males and 37% of females in their fourth to sixth decade. The average age of all soft and hard tissue lesions was 40 years. There was no statistically significant predilection for soft and hard tissue lesions diagnosed to patient age at p-value 0.10.

Types of Lesion	Age Groups					Total	p-Value
	12<yrs	13-30 yrs	31-40 yrs	41-60 yrs	>60 yrs		
Soft Tissue	4	25	18	31	13	91	0.10
Hard Tissue	2	8	7	2	2	21	

**Table 2:** Distribution of the lesions diagnosed according to the age groups of the patients

In table 3, posterior mandible positive was found in 37% of males and 22% of females, while anterior mandible positivity was found in 5% of males and 11% of females. Anterior maxilla was found in 10% of males and 8% of females, while posterior maxilla was found in 5% of males and 2% of females. For the prevalence of soft and hard

tissue lesions detected, no statistically significant predilection was found at p-value 0.083.

Lesions	Male	Female	Total	p-value
Post Mandible	37	22	59	0.083
Ant Mandible	5	11	16	
Ant Maxilla	10	8	18	
Post Maxilla	5	2	7	
Total(N)	57	43	100	

**Table 3:** Distribution of lesions based on the gender of the patient

The most common location positivity in table 4 was found in the posterior mandible, with 62 cases identified between the 4th and 6th decade, followed by the anterior maxilla with 29 cases, anterior mandible with 19 cases detected between the 13th and 30th years, and posterior maxilla with 10 cases. At a p-value of 0.77, no statistically significant site preference could be identified in the patients for the prevalence of soft and hard tissue lesions diagnosed.

Diagnosed Lesion Type	12<yrs	13-30 yrs	31-40 yrs	41-60 yrs	>60 yrs	Total	p-Value
Posterior Mandible	3	16	15	24	4	62	0.77
Anterior Mandible	1	9	3	5	1	19	
Anterior Maxilla	3	8	7	10	1	29	
Posterior Maxilla	1	2	2	4	1	10	
Total(N)	8	35	27	43	7	120	

**Table 4:** Distribution of lesion based on the site of occurrence

## DISCUSSION

Oral epithelial dysplasia has been observed to rise with gradual variations and the potential for micro-invasion, particularly in the fifth and sixth decades of life, manifesting on the buccal mucosa rather than the floor of the mouth [15-16]. Our data revealed 77 cases of epithelial dysplasia, with the majority (42%) occurring in the second to fourth decades, with an increase among young people



and the highest in the fifth and sixth decades (33 percent). This study indicates 77 cases of epithelial dysplasia, with the majority (42%) arising between the second and fourth decades, with an increase among young individuals and the highest in the 5th and 6th decades (33 percent). A research found 144 malignant lesions, the majority of which were Grade II Oral squamous cell carcinomas in people in their sixth decade as a result of eating Zarda and paan masala [17]. Squamous cell carcinoma is the most common pathology in the current study, with 32 cases, predominantly well differentiated with a male to female ratio of 2:1 between the 4th and 6th decades, which is consistent with a similar study conducted in Karachi, which reported Oral squamous cell carcinoma as the most common pathology among 121 cases out of a total of 256 lesions. Our data revealed that males (57%) and females (43%) were positive for a wide spectrum of oral lesions. Pyogenic granuloma 12.90%, fibrous epulis 8.87%, moderately differentiated SCC 4.8%, poorly differentiated SCC 1.61%, giant cell granuloma 4.8%, verrucous carcinoma 2.41%, spindle cell tumor fibromyxoid tumor 2.41%, acute inflammation 1.61%, keratotic hyperplasia 1.61%, and extravasation mucocele 1.61%, were among the other oral lesions diagnosed in the current study, which are consistent with the findings of a Pakistani audit conducted at Islamic University Pakistan [18]. Like Dentigerous cysts, Odontogenic kerato cysts (OKCs), and nasolabial cysts, odontogenic cysts are frequently of a developmental nature [19]. Odontogenic lesions accounted for 25% of all cases reported in the current study, which included the 4th, 5th, and 6th decades. Adenomatoid tumours and ameloblastomas made about 5% of all bone lesions. Additional hard tissue lesions identified included radicular cysts (7.25%), dentigerous cysts (4.03%), odontogenic kerato cysts (2.41%), benign cystic lesions (1.61%), bony trabeculae with necrotic alterations (1.61%), calcifying-odontogenic cysts (1.61%), and tuberculosis (1.61%). In the fourth to sixth decade, men had a prevalence of hard tissue lesions of 41% and women of 37%. The results of the current study partially agree with those of a related study conducted in Pakistan [20]. The number of cases may vary to indicate an enduring prevalence among the local population. This disparity between local and global statistics may be the result of incorrect diagnosis and referral to laboratory testing.

## CONCLUSION

The posterior mandible was the most often affected region for oral squamous cell carcinoma, which was the most prevalent pathology observed in adolescents and the elderly. The regular consumption of pan, areca nut, zarda, naswar, and paan masala is mostly responsible for the

etiology of these oral lesions.

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## Original Article

## Glycemic Response to Metformin and its Association with Age and Gender in Type II Diabetes

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## ARTICLE INFO

## Key Words:

Metformin, Type -II diabetes, gender, glycemic response

## How to Cite:

Hakim, Z. ., Khan, A. ., Waheed, A. ., Hafeez, A. ., Khohkar, A. ., & Hakim, B. . (2022). Glycemic Response to Metformin and Its Association with Age and Gender in Type II Diabetes: Glycemic Response to Metformin. *Pakistan BioMedical Journal*, 5(7). https://doi.org/10.54393/pbmj.v5i7.691

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## ABSTRACT

Diabetes Mellitus has become a global health concern due to its continued rise in prevalence. According to International Diabetic Federation (IDF), Type II diabetes mellitus (T2DM) currently affects 462 million people worldwide and is expected to grow from this figure to 642 million by 2040. **Objective:** The study was conducted to evaluate the glycemic response to metformin in Type-II diabetes and assess its association with age and gender. **Methods:** A cross sectional study was conducted at the Pharmacology Department of Riphah International University from Jan 2020 to Dec 2021. Type-II diabetic patients (n=200) on metformin monotherapy fulfilling the inclusion criteria were enrolled and followed up till three months. Baseline parameters were documented and reduction in HbA1c was determined. Numerical and categorical data was analyzed by chi-square and t-test using SPSS 23. **Results:** Our study demonstrates that 52% (104) of the patients were metformin responders while 48% (96) were non-responders. The reduction in HbA1c was significantly greater in responders than non-responders (-1.58±1.07% VS -0.32±0.35%). Out of 85 males, 46 (54%) responded to metformin optimally while only half (50%) of the female subjects produced desirable response. However, there was no effect of gender on metformin response status with p=0.60 and changes in HbA1c levels over time were not significantly different in either sex. The mean age of responders and non-responders was found to be 48.23±9.64 years and 44.13±7.82 respectively. The effect of age on response of metformin and mean change in HbA1c among different age groups was found to be statistically significant with p=0.03 and p=0.04 respectively. **Conclusion:** There exists variability in response to metformin in type-II diabetes which is associated with age of the patient but remains un-influenced by gender of the patient.

## INTRODUCTION

Diabetes Mellitus has become a global health concern due to its continued rise in prevalence. According to International Diabetic Federation (IDF), Type II diabetes mellitus (T2DM) currently affects 462 million people worldwide and is expected to grow from this figure to 642 million by 2040 [1]. World Health Organization predicts that this rapidly rising burden would largely be bore by low income developing countries including Pakistan. Pakistan presently ranks 7th with T2DM prevalence of 16.98% [2] and may go up to 4th spot in the coming decade. Diabetes, a chronic debilitating disease is associated with various

micro and macrovascular complications. It can only be managed by early diagnosis and timely initiation of self-management and pharmacotherapy. All therapeutic measures aim at providing effective glycemic control to delay disease progression and prevent complications. Despite the availability of different oral anti diabetic drugs, many international organizations have recommended metformin as the first line treatment of T2DM due to its effectiveness, low cost and safety profile [3]. Metformin produces its pharmacological action by enhancing glucose uptake in peripheral tissue (skeletal tissue) and inhibition of

intestinal glucose absorption. At the molecular level, it inhibits the activity of mitochondrial respiratory chain complex I, resulting in activation of AMP-activated protein kinase (AMPK) and the subsequent suppression of hepatic gluconeogenesis [4]. Heterogeneity in the response to metformin is one of the most important predicament in the efficacy of the drug. About 35 -40% of patients on metformin monotherapy fail to respond optimally [5] making achievement of glycemic targets a challenge. Numerous genetic and phenotypic factors such as hormones, age, gender, weight, insufficient dose, nonadherence, drug-drug interactions, socioeconomic and psychological status interact in a multi-dimensional manner to contribute to this inter-individual variability [6]. Age and gender based differences in the appearance of diabetes and its treatment have been accumulated over time. Many old and new anti-diabetic drugs have shown gender related differences in their actions and effects. Women usually receive low doses of metformin as compared to men but report more gastrointestinal side effects [7]. Studies have also documented greater body weight reduction in females while men experienced greater HbA1c decrease on metformin [8]. Younger patients under 65 years have also demonstrated poorer glycemic control than older ones [9]. Studies identifying the potential role of gender and age in response to antidiabetic treatment are not only limited worldwide, they are almost non-existent in Pakistan. Therefore, this study was designed to determine the impact of gender and age on glycemic response of metformin.

## METHODS

A cross sectional analytical study was conducted at the Department of Pharmacology and Therapeutics, Islamic International Medical College of Riphah International University, Islamabad. The study was conducted in accordance with the current Good Clinical Practices and the Declaration of Helsinki after approval from the Ethical Review Board of the institute [10]. Type -II unrelated diabetic patients of either gender started on metformin monotherapy and aged between 35 and 70 years were enrolled in the study after written informed consent. Patients were clinically diagnosed according to American Diabetic Association fulfilling one of the criteria; fasting blood glucose  $\geq 126$  mg/dl, two hours' glucose  $\geq 200$  mg/dl during an oral glucose tolerance test (OGTT), non-fasting plasma glucose  $> 200$  mg/dl or HbA1c  $\geq 6.5\%$ . Exclusion criteria was Type-I diabetes, pregnant and lactating women, hepatic, renal and cardiac abnormalities and individuals on concurrent treatment that act as substrates or inhibitors of MATE transporters [11]. Sample size of 216 was calculated using the WHO sample size calculator

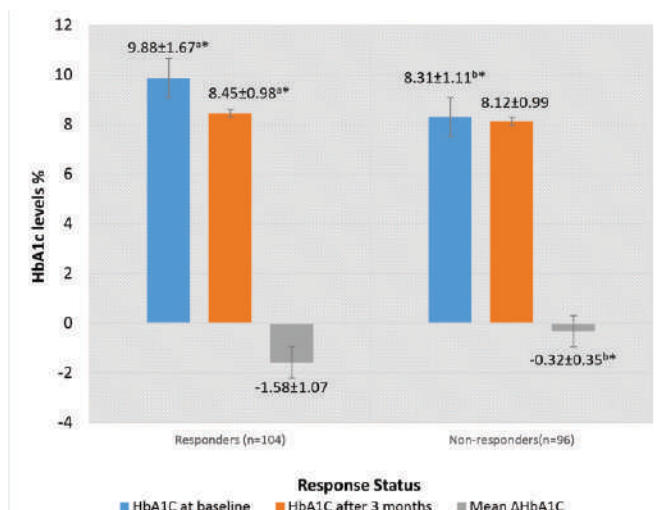
taking 95% as confidence interval and 5% as level of significance. However, because of inclusion criteria and later stage drop out, the sample size was reduced to 200. Patients on metformin monotherapy were followed up for three consecutive months. At the time of induction, all relevant baseline characteristics such as gender, age, weight, height and BMI were collected. Venous blood was withdrawn from each participant under sterile conditions for HbA1c evaluation. HbA1c estimation was done twice in the project once at the initiation of metformin and then after completion of three months of therapy. Based upon the reduction in HbA1c from baseline, the participants were divided into metformin responders and non-responders. In the light of clinical experience and previous researches,  $>0.8\%$  and  $<0.8\%$  reduction in HbA1c levels was selected as the criteria for classifying patients as responders and non-responders [12,13]. HbA1c was quantified by Bio-Rad D-10 Hb testing system which uses the HPLC ion exchange for determination of glycated hemoglobin in the sample. The data was analyzed using Microsoft SPSS-23. Descriptive statistics was used with the mean  $\pm$  SD in groups. To compare differences between continuous variables, independent and paired samples' t -test was used. Chi-square was employed to compare categorical variables. One-way ANOVA and post hoc tukey test was applied to compare changes in HbA1c levels of multiple groups.  $p < 0.05$  was considered significant.

## RESULTS

Based on established inclusion and exclusion criteria, 200 type II diabetic patients were enrolled in the study. The baseline clinical parameters of the study subjects are given in table1.

Age (years)	46.25 $\pm$ 9.02
Gender	
Female	115
Male	85
Weight (kg)	66.54 $\pm$ 10.22
Height (m2)	2.17 $\pm$ 0.36
BMI( kg/m2)	29.76 $\pm$ 5.77
Creatinine level	0.87 $\pm$ 0.20
HbA1c %	9.19 $\pm$ 1.56

**Table 1:** Baseline Characteristics of the study population (n=200)  
Changes in HbA1c in response to metformin: According to the statistical analysis of HbA1c, 104 (52%) patients were classified as responders whereas the remaining 96(48%) patients fail to respond optimally. The difference between HbA1c levels at baseline and after 3 months was significantly different ( $p < 0.05$ ) in both responders and non-responders. The reduction in HbA1c levels was much higher (statistically significant) in responders than non-responders.(Figure 1)



\*p>0.05 is significant

a\* when baseline HbA1c compared with HbA1c at 3 months

b\* when HbA1c levels compared with responders and non-responders

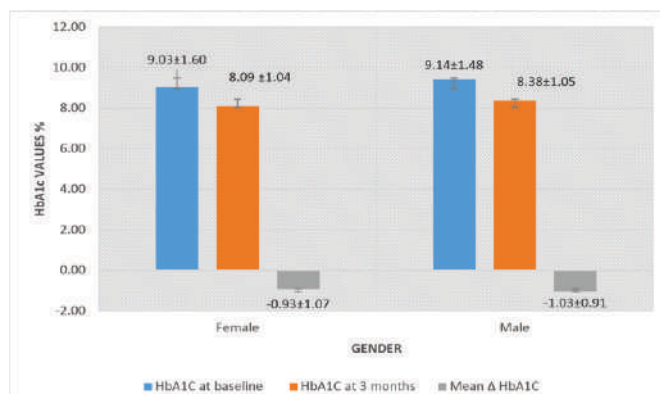
**Figure 1:** Comparison of mean HbA1c values at two different intervals between metformin responders and non-responders (n=200)

Relation of Gender with Response of Metformin: Out of a total sample size of 200 patients, 58% (n=115) were females and 42 % (n=85) were males. Among the responders 58 (56%) females and 46(44%) males were enjoying the glycemic effects of metformin as compared to 57 (60%) females and 39 (40%) males who were metformin non responders. Amongst all the females and males, responders were 50% and 54 % respectively. Chi-square showed that there is no significant difference in metformin response in either sex,  $\chi^2=0.26$  and p value=0.60 (Table 2).

Gender		Response		Total
		Responder	NON Responder	
Female	Count	58	57	115
	% within GENDER	50.4%	49.6%	100.0%
	% within RESPONSE	55.8%	59.4%	57.5%
Male	Count	46	39	85
	% within GENDER	54.1%	45.9%	100.0%
	% within RESPONSE	44.2%	40.6%	42.5%
Total	Count	104	96	200
	% of Total	52.0%	48.0%	100.0%

**Table 2:** Cross tabulation between gender and metformin response

There was greater reduction in HbA1c after metformin therapy among males but it was not found to be significant in comparison with females, p>0.05(Figure 2)



**Figure 2:** Metformin produced changes in HbA1c levels in male and female patients

Relation of Age with Response of Metformin: On the basis of age, all the patients were divided into 5 groups and metformin response status was assessed in each group as shown in Table 3. The mean age of responders was 48.23±9.64 years and non- responders was 44.13±7.82 years. A chi-square test of independence was performed to examine the relation between age and ability to respond to metformin. The relation between these variables was significant, p=0.03.

Gender		Metformin Response Status		Total
		Responder	NON Responder	
Age 18-35	Count	5	6	11
	% within Age Groups	45.5%	54.5%	100.0%
	% within Response	4.8%	6.3%	5.5%
Age 36-45	Count	34	47	81
	% within Age Groups	42.0%	58.0%	100.0%
	% within Response	32.7%	49.0%	40.5%
Age 46-55	Count	41	35	76
	% within Age Groups	53.9%	46.1%	100.0%
	% within Response	39.4%	36.5%	38.0%
Age 56-65	Count	19	7	26
	% within Age Groups	73.1%	26.9%	100.0%
	% within Response	18.3%	7.3%	13.0%
Age 65 and above	Count	5	1	6
	% within Age Groups	83.3%	16.7%	100.0%
	% within Response	4.8%	1.0%	3.0%
Total	Count	104	96	200
	% within Age Groups	52.0%	48.0%	100.0%
	% of Total	52.0%	48.0%	100.0%

**Table 3:** Frequency of metformin responders and non-responders in different age groups

Table 4 shows mean change in HbA1c obtained after three months of metformin monotherapy in different age groups. One-way ANOVA and post hoc tukey tests showed that there was significant difference in mean ΔHbA1c among different age groups, p<0.048.

Age Groups (years)	N=200	Mean $\Delta$ HbA1c %
Age 18-35	11	-.81
Age 36-45	81	-.76
Age 46-55	76	-1.05
Age 56-65	26	-1.34
Age 65 and above	6	-1.55

**Table 4:** Mean  $\Delta$ HbA1c % in different age groups

## DISCUSSION

Achievement of glycemic control is one of the main principle of successful management of T2DM. Even in the presence of treatment recommendations and guidelines, only half of the patients reach their target goals with oral antidiabetic drugs (OAD). Metformin, the first line OAD also exhibits wide interindividual variability in therapeutic response making its efficient prescription and dosing difficult. There is no fixed criterion for characterizing metformin users into responders and non-responders. Studies have identified that OAD produce an estimated decrease of 0.5-1.5% in HbA1c levels [14]. Therefore, a cut off value of  $\geq 0.8\%$  reduction in HbA1c levels was considered as response to metformin therapy [12]. Following metformin monotherapy, HbA1c levels decreased in average by  $-0.97 \pm 1.01\%$  in entire study participants. Fifty-eight females and 46 males responded to metformin optimally while 39 males and 57 females showed an inappropriate response. Classification of study subjects according to response status is comparable to a similar study carried out by Rashid et al., in Pakistan where 59% of patients were labelled as responders and 41% as non-responders [12]. The baseline HbA1c levels were significantly higher in responders as compared to non-responders in our study ( $9.88 \pm 1.67\%$  VS  $8.31 \pm 1.11\%$ ). Parallel to this, the mean change in HbA1c in responders was statistically greater than that in non-responders ( $-1.58 \pm 1.07$  VS  $-0.32 \pm 0.35$ ). This backs the finding that higher baseline A1C levels are associated with greater reduction in HbA1c with metformin [15]. Wilding et al., found out that changes in A1C levels at 6 months were more marked in diabetic patients with higher baseline levels ( $\geq 9.0\%$ ) compared with patients with baseline values (7.5-9.0%) [16]. Thus our study adds to the positive correlation between baseline HbA1c and subsequent reductions in HbA1c levels. There is dearth of studies globally describing gender specific effects of metformin treatment on glycemic response. Results of our study showed that male were more likely to achieve desirable glycemic goals as represented by higher percentage (54% VS 50%) of responders. This is in accordance with the cross sectional research of Cambra et al., who indicated poorer glycemic control of women in type -II diabetes [9]. However, the decrease in HbA1c levels achieved after three months of metformin monotherapy in our research were similar in

both men and women. Non-significant decrement in HbA1c value was seen across both genders in a research done on Indian population [17]. Thus, our project found no gender based differences in response to metformin in type -II diabetes. These findings were consistent with many extensive studies conducted in Texas and United Kingdom demonstrating no significant association between gender and HbA1c levels [18]. However, Schutt et al., conducted a multicenter research of 1908 patients to investigate the effect of different patient characteristics on response to antidiabetic treatment. According to their analysis, metformin displayed significantly greater HbA1c reductions in men as compared to women ( $-0.7 \pm 0.03\%$  VS  $-0.6 \pm 0.03\%$ ) with  $p < 0.05$  [8]. The reason for this different outcome can be attributed to difference in energy and glucose metabolism, psychological factors and adherence to therapy. The outcome of metformin therapy is also connected with many other individual factors like age but the relevant role of age has not been addressed so far. Current study unveiled significant relation of age with treatment response and the magnitude of association seemed different between different age groups with the maximum change in HbA1c levels seen in age group 65 years and above. These results are in agreement with a population based study (n=32,638) of South European Region. They investigated gender and age based differences in glucose lowering effect of metformin and observed patients younger than 65 years with poorer glycemic control than older age groups [8]. Cook et al., also identified younger age and high BMI as predictors of inadequate control (HbA1c level  $< 7.0\%$ ) [19]. Same biological factors were recognized in 3553 diabetic patients in United Kingdom with lower probability of attaining target levels [20]. However, Aschner et al., and Donnelly et al., found no significant association of age with therapeutic response of metformin [21,22]. Thus, in the light of above findings, it is recommended to consider diverse response modifying clinical factors when designing and evaluating diabetic patient's treatment. However, further studies are required to identify the effect of different genetic and demographic factors on pharmacokinetics, pharmacodynamics and adverse effects of OADs. This will improve the individualization of diabetes treatment and contribute to better therapeutic outcomes.

## CONCLUSION

The study revealed that variability in metformin response is quite prevalent in our country and can be assessed through change in HbA1c levels over time. This difference in effectiveness of metformin may be attributed to genetic and non-genetic factors. A positive association with age was documented with no effect of gender on its glucose

lowering action. Thus, a large portion of type 2 diabetic patients could benefit by reducing age inequalities from treatment regimens.

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## Original Article

## Recurrence of Anterior Shoulder Dislocation with or without Physiotherapy

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## ARTICLE INFO

**Key Words:**

Recurrence, Shoulder Dislocation, Physiotherapy

**How to Cite:**Iqbal, M. ., Pasha, H. K. ., Asadullah Arslan, S. ., Ahmad, A. ., Hashim, A. ., Irfan, H. . & Ahmed Ali, S. . (2022). Recurrence Of Anterior Shoulder Dislocation with Or Without Physiotherapy: Anterior Shoulder Dislocation and Physiotherapy. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.694>**\*Corresponding Author:**

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[adnanhashim199@gmail.com](mailto:adnanhashim199@gmail.com)Received Date: 13<sup>th</sup> July, 2022Acceptance Date: 21<sup>st</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Shoulder withdrawals are horrendous and can hinder everyday activities as well as help in sports. The greater part of shoulder separations (>95%) happen in the front course and are from time to time achieved by injury. Discontinuous separations can be avoided and social costs can be diminished with proper treatment. **Objective:** To evaluate the recurrence of anterior should dislocation with or without physiotherapy. **Methods:** This cross-sectional study was conducted over 180 participants of recurrence of anterior shoulder dislocation according to inclusion exclusion criteria. Non probability purposive sampling was used to assemble data from Lahore. Data was collected by questionnaire Functional shoulder Instability. Data were collected from the Patients of the University of Lahore Teaching Hospital, Mansoor Hospital, Jinnah Hospital and Mayo Hospital. **Results:** Out of total 180 participant's, 140 were males and 40 were females. Mean age was 25.9 with a St. Deviation of 5.3 having maximum age of 35.00 and minimum age of 15.00. Injury mechanism among participants was seizure in 20 (11.1%), falls present in 46 (25.6%), sporting injury in 54 (30.0%), motor vehicle accident in 54 (30.0%) and in other is 6 (3.3%). 98 (54.4%) participants have previous instability of other shoulder and 82 (45.6%) don't have previous instability of other shoulder. 74 (41.1%) participants have left dislocation side and 106 (58.9%) participants have right dislocation side. 28 (15.6%) participant's undergoes physiotherapist treatment and 152 (84.4%) participant's undergoes general physician treatment. **Conclusions:** Hence it was concluded that, recurrence of shoulder was occurred mostly in that participants' which were undergoes general physician treatment.

## INTRODUCTION

Shoulder partitions are appalling and can hinder ordinary exercises as well as cooperation in sports. Most of shoulder withdrawals (>95%) occur in the main heading and are a huge piece of the time accomplished by injury. Repetitive divisions can be stayed away from and social expenses can be decreased with certifiable treatment. Patients with first-time detachments as often as possible don't get satisfactory data to pick an educated choice about their treatment. The patient's propensities for activity or non-nosy treatment, their notions, and the probability of repeat should be all over saw as in shared choice making [1-3]. Complexities of isolated shoulder coordinate an extensive wickedness of joint holder, break of more fundamental tuberosity or neck of humerus, and axillary nerve and axillary entry wounds. Fundamental driver for RASD is injury, and different causes combine regular misshapenings, far reaching muscle loss of development

like in hemiplegia where there is no appearance of muscle power. Consistently, divisions considering injury are joined by serious delicate tissue hurt because of expanding or tearing of the plans around the joint. Muscles, ligaments, tendons, synovial sheaths, and ligament might be harmed that could require mindful repair [4-6]. The protection for the expansion in more pre-arranged ladies' event is dim. back shoulder withdrawal is really astonishing, and around 33% of parcels occur considering an atraumatic occasion, like a seizure. Front shoulder segments are astounding, with a few case reports or little case series depicting them. Terrible back glenohumeral joint divisions are absolutely more astonishing than first partitions, and less is had some basic awareness of their results. The clinical extent of these wounds is clearing, going from singular horrendous separations to reiterating instability to withdrawal associated with a proximal humeral fracture [7-9]. As

shown by reference center around overview assessment of a certain review of patients with outrageous, disagreeable, confined back partitions without a proximal humeral break. Individual case reports or insignificant clinical series contain most of past examination on this portrayal of wounds. Taking into account the gathering and noteworthiness of the wounds, reviewing the examination of disease transmission, extended length destiny, and utilitarian result in a tremendous party of patients has never been finished. The specialists expected to take a gander at the examination of disorder transmission and demography of unprecedented horrible back detachment in an immense, constant gathering of patients treated in a solitary unit all through an extensive period of time, as well as the practical outcome and risk of repeat or different issues after treatment [10-12]. Inside the basic ten days after the partition, each of the patients introduced. Anteroposterior and changed focus point radiographs supported the fundamental confirmation. Informed bearing and suitable treatment usage rely on fit and careful dispersal of clinical confirmation. Making an interpretation of confirmation into planning can moreover cultivate thriving outcomes in any case is bound by the difficulties that are associated with relegated dissipating, the responsiveness of an overall public, the intricacy of data, the expenses of assortment, and client uptake [13-15]. Partition of a joint happens when the articular surfaces are totally segregated from one another with the objective that all association is lost. Several joints will without a doubt disconnect than others thinking about their real plans. This is especially so in the event of shoulder. Joint case is free particularly on the central perspective to permit expansive combination of progressions. Front division is accomplished by fall on outstretched hand or by fruitful outer turn and augmentation of the shoulder. Confined humerus could come according to sub-coracoid district (standard among front detachments), sub-glenoid and sub-clavicular are rare [16-17]. The muscles of the shoulder sponsorship and produce the enhancements of the shoulder support. They partner the attached skeleton of the upper part to the middle skeleton of the accumulating compartment. Four of them are tracked down on the central piece of the shoulder, while the lay are organized on the shoulder's back perspective and aft. Taking into account their district, the shoulder muscles are gathered into: Anterior axio-associated muscles (thoraco-attached muscles), Posterior axio-annexed muscles [18, 19]. The reasoning of this study was moreover developed imaging of key shoulder withdrawals and their anatomic injuries could instigate the master to work at a beginning stage. To legitimize this method, a review study was embraced to finish up the repetitive rate in various age packs after

central segments. This information was then separated and those actually appropriated somewhere else.

## METHODS

This cross-sectional study was conducted over 180 participants of recurrence of anterior shoulder dislocation according to inclusion exclusion criteria. Non probability purposive sampling was used to assemble data from Lahore. Data were collected by questionnaire Functional shoulder Instability. Data was collected from the Patients of the University of Lahore Teaching Hospital, Mansoor Hospital, Jinnah Hospital and Mayo Hospital.

## RESULTS

Injury mechanism among participants was seizure in 20(11.1%), falls present in 46(25.6%), sporting injury in 54(30.0%), motor vehicle accident in 54(30.0%) and in other is 6(3.3%) as represented in Table 1.

N	Frequency	Percent
Seizure	20	11.1
Falls Present	46	25.6
Sporting injury	54	30.0
Motor vehicle accident	54	30.0
Other	6	3.3

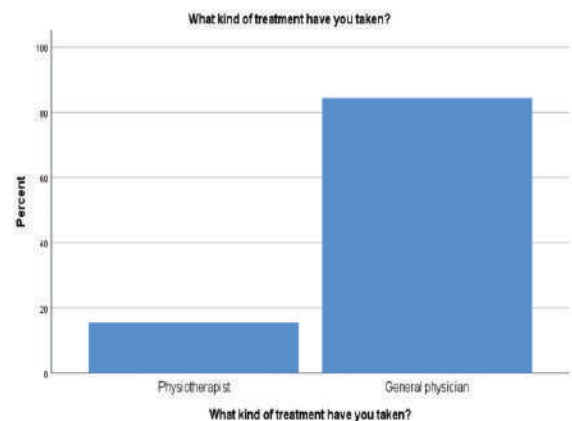
**Table 1:** Descriptive statistics of injury mechanism 74(41.1%) participants have left dislocation side and 106(58.9%) participants have right dislocation side as represented in Table 2.

N	Frequency	Percent
Left	74	41.1
Right	106	58.9

**Table 2:** Descriptive statistics of dislocation side 28(15.6%) participants undergo physiotherapist treatment and 152(84.4%) participants undergoes general physician treatment as represented in Table 3 and Figure 1.

N	Frequency	Percent
Physiotherapist	28	15.6
General physician	152	84.4

**Table 3:** Descriptive statistics of what kind of treatment have you taken?



**Figure 1:** Graphical representation of the treatments taken

## DISCUSSION

In current study, out of total 180 sections, 140 were people and 40 were females. Mean age was 25.9 with a SD of 5.3 having most incredible season of 35.00 and least time of 15.00. Injury part among people was seizure in 20 (11.1%), falls present in 46 (25.6%), wearing injury in 54 (30.0%), engine vehicle difficulty in 54 (30.0%) and in other is 6 (3.3%). 98 (54.4%) people have past dubiousness of other shoulder and 82 (45.6%) don't have past feebleness of other shoulder. 74 (41.1%) people have left withdrawal side and 106 (58.9%) people have right parcel side. 28 (15.6%) part's goes through physiotherapist treatment and 152 (84.4%) part's goes through wide expert treatment. In the past review Davy et al., drove a pack in 2022 to survey the Management of shoulder partition. Vivacious patients with shoulder partition are at high wagered of repeat. Generally, the bosses has been moderate, yet rehabilitative developers are useful in under 20% of patients. Late evaluations propose that early mindful mediation can endlessly out reduce reiterate in lively patients with major terrible front parcel. This study showed that in our space, 21% of all patients giving shoulder separation had as of late continued on through reiterate at 1 year; in the 15-22 years age pack this figure was 43%. We propose to offer youthful patients giving crucial appalling front allotments arthroscopic lavage in some place almost 10 days of injury. The additional wary commitment is reasonable inside our nonstop injury association approaches, and we recognize that this sort of treatment would be pleasing to patients [20]. While in another study, Wheeler et al., drove a pack in 2019 to survey, Arthroscopic versus non-operative treatment of phenomenal shoulder withdrawals in youthful competitors. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*. We assessed the average history of front shoulder separations in a vigorous athletic individual (starts at the United States Military Academy) and separated standard method for non-operative treatment and early arthroscopic treatment (staple haplography or front glenoid scratched spot). The speed of drawn-out weakness after a shoulder withdrawal was 92% (35 of 38) in understudies treated non-operatively. Outrageous adherence to a regulated nonoperative treatment program conclusively influenced the intermittent rate. All repeats of precariousness happened in something like 14 months of the key injury. In evaluation, arthroscopic treatment of outrageous shoulder withdrawals has been useful as of not long ago in that frame of mind (of 9) of enrolled individuals followed for something like 14 months. With the fast of repeat of shoulder dubiousness in fiery competitors, we recognize that arthroscopic careful mediation after the basic shoulder separation can decisively chop down the repetitive rate and ought to be considered as a treatment

choice in youthful athletes [21].

## CONCLUSION

Hence it was concluded that, recurrence of shoulder was occurred mostly in that participants' which were undergoes general physician treatment.

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## Original Article

## Gastrointestinal Cancer Surgeries in COVID-19 Pandemic, Pir Abdul Qadir Shah Gelani (GIMS), Hospital, Gambat

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## ARTICLE INFO

## Key Words:

Gastrointestinal surgery, gastrointestinal carcinoma, coronavirus disease, pandemic

## How to Cite:

Khan, R. ., Ahmed, A. ., Khan, R. ., Masroor Bhatti, A. ., Inayat Hussain, Z. ., & Qasim, M. (2022). Gastrointestinal Cancer Surgeries in COVID-19 Pandemic, Pir Abdul Qadir Shah Gelani (GIMS), Hospital, Gambat: Gastrointestinal Cancer Surgeries in COVID-19. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.522>

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## ABSTRACT

The turnover of gastrointestinal carcinoma is high and mostly undergoes surgery / excision. Coronavirus disease, shortly named as COVID-19, as it started during 2019. It was declared as a pandemic by the World Health Organization in March, 2020. During this period, there are many patients who had delay in surgeries due to the high risk of contamination of patient of surgeon with COVID-19 and this would increase the risk of complications. **Objective:** To find the frequency of gastrointestinal cancer surgery in Pir Abdul Qadir Shah Gelani (GIMS), Hospital, Gambat. **Methods:** This descriptive cross sectional study was conducted from 14th March 2020 to 31 December 2021 in the surgery department of Pir Abdul Qadir Shah Gelani (GIMS) Hospital, Gambat. Total patients with both genders presenting with age 35 to 75 years and histopathological diagnosed with gastric cancer disease were included in this study. Meanwhile patients with age less than 35 years or more than 75 years those with renal failure and liver failure were excluded from study. Data were entered in SPSS version 21.0. Age, were presented ad mean and standard deviation. Categorical data like gender, upper GI, lower GI, operated cases were presented as frequencies & percentage, with histopathological findings were presented in diagram. **Results:** In our study, total 63 patients enrolled. The tumor was upper GI diagnosed in 38 patients and the lower GI diagnosed in 25 patients, 30 cases operated successfully and 17 cases in upper GI and 13 cases in lower GI. In 38 upper GI tumors, 11 were located in esophagus, 15 were in stomach, 8 were in pancreas, 2 were in per ampulla and 2 were duodenum. **Conclusion:** It has been concluded that during COVID-19 pandemic, there is a need for clear guidelines in every surgical unit to ensure both patient and staff safety.

## INTRODUCTION

Pathophysiologically, there are two types of stomach cancers: intestinal and diffuse. Chronic gastritis progresses from atrophic gastritis to intestinal metaplasia and dysplasia as a result of an inflammatory process. Older guys are more likely to have this kind than younger ladies and people under the age of 50. Gastric H. pylori infection is closely linked to this kind, just as it is to the intestinal one. Gastric cancer incidence and death vary greatly by geography and are largely reliant on nutrition and Helicobacter pylori infection [1]. Gastric cancer is a deadly disease that afflicts a huge percentage of Brazilians. Gastric cancer is the fourth most prevalent cancer in Brazil, according to the Brazilian Ministry of Health and the

National Cancer Institute, with a rising prevalence from 35 to 40 years [2]. Upper gastrointestinal surgery, which covers the operational management of the most complicated malignancies in alimentary surgery, is made up of the independent disciplines of oesophagogastric and hepato-pancreato-biliary surgery [3]. Malignancies of the large intestine (colon and rectum) and the anus are referred to as lower GI cancers [4]. The severe acute respiratory syndrome coronavirus 2 is the cause of the COVID- 9 pandemic, also known as the coronavirus (SARSCoV-2)[5]. As of the third week of January 2021, more than 84.6 million cases and 1.83 million deaths associated with COVID-19 had been confirmed [6]. It was firstly exposed in Wuhan, China,

in December of this year. Fever, cough, & shortness of breath (dyspnea) are the most common symptoms of COVID-19, while other symptoms such as fatigue, headache, and muscle pain are also common [7]. Extra-pulmonary symptoms can appear early in the course of the disease. GI symptoms like anorexia, nausea, vomiting, abdominal pain, or diarrhea can appear early in a pandemic, but they are rarely the only presenting sign; GI symptoms are linked to poor clinical outcomes, including a greater risk of mortality [8]. Due to the disease's transmission pathway, patients and, in particular, hospital workers who were at high risk, were subjected to strict preventative measures [8, 9]. Asymptomatic patients can spread the virus by droplet and contact transmission. Nurses, doctors, patients, and their loved ones' safety come first [10, 11]. While the COVID-19 pandemic continues to put strain on healthcare systems throughout the world, other chronic and acute illnesses continue to plague people. Some of these illnesses, such as many malignancies, need prompt surgical intervention [12]. The rationale of the study to find the frequency of different gastrointestinal cancer surgery during the COVID-19 pandemic and determine the success of those surgeries in terms of less complications and mortality of patients after surgery during COVID-19 pandemic.

**METHODS**

This descriptive cross-sectional study was conducted from 14th March 2020 to 31 December 2021 in the Surgery department of Pir Abdul Qadir Shah Gelani (GIMS), Hospital, Gambat. It was after obtaining permission from the Institutional Board of the hospital. Informed written consent was obtained from every patient. Sample size of 60 patients was calculated with 80% power of test, 5% level of significance & taking expected percentage of 13% of gastric patients. All patients with both genders presenting with age 35 to 75 years and diagnosed with gastric cancer disease were included from the study. Patients with other disease like kidney failure liver dysfunction were excluded from the study. Data were entered in SPSS version 21.0. Age, were presented as mean and standard deviation. Categorical data like gender, upper GI, lower GI, operated cases were presented as frequencies & percentage. Histopathological findings were presented as in diagram form.

**RESULTS**

In our study, total 63 patients enrolled with gastric surgery during COVID-19 were admitted in the hospital. There were 33(52.3%) male and 30(47.61%) female and the mean age of patients was 50.23±12.41 years. Out of 63, the tumor was upper GI diagnosed in 38 patients and the lower GI diagnosed in 25 patients, presented with COVID-19 most

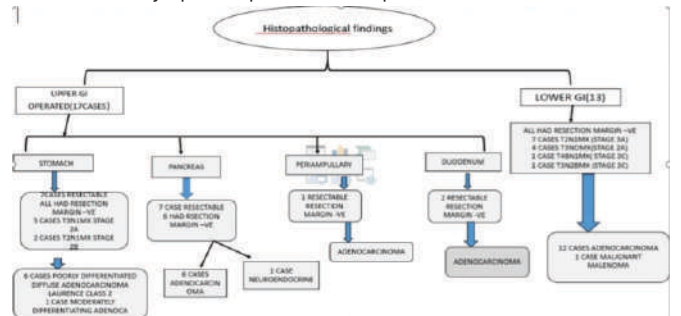
common symptoms like fever, cough, tiredness, and less common symptoms pain, headache, diarrhoea and loss of taste and smell. In 38 upper GI tumors, 11 were located in esophagus, 15 were in stomach, 8 were in pancreas, 2 were in peri-ampulla and 2 were duodenum, 7 unresectable operated in stomach and pancreas and 1 in peri-ampulla. 4 unresectable feeding jejunostomy in stomach esophagus. 5 unresectable refers to oncologist for neoadjuvant chemotherapy in esophagus. 4 refer to also oncologist for chemotherapy in stomach and 1 in peri-ampulla. Out of 63 cases, 30 cases operated successfully. 17 cases in upper GI and 13 cases in lower GI, Table 1. On day 30 of surgery, complications were also noted. 6 (9.5%) patients were wound infection, 2 (3.2%) was chest infection, 2 (3.2%) patients were expiring due to sepsis and the remaining patients was no complications after surgery, Table 2. Hematological findings were presented graph form.

Characteristics	Variables	Percentage %
Age		50.23±12.41
Gender	Male	33(52.3%)
	Female	30(47.61%)
Gastrointestinal Surgery	Lower GI	38(60.31%)
	Upper GI	25(39.68%)
Upper GI	Esophagus	11(28.94%)
	Stomach	15(39.47%)
	Pancreas	8(21.05%)
	Periampulla	2(5.26%)
	Duodenum	2(5.26%)
Lower GI	Operated	13(52%)
	Referred to Oncologist	12(48%)
Surgery cases	Operated Successfully	30(47.69%)
	Non-operated	0

**Table 1:** Basic Information of the patients

Complications	Frequency
Wound Infection	6(9.5%)
Chest Infection	2(3.2%)
Patients expire due to sepsis	2(3.2%)
Total Complication	10(15.9%)

**Table 2:** 30 days' post-operative complication



**Figure 1:** Histopathological Findings

**DISCUSSION**

In March of 2020, the World Health Organization classified

the COVID-19 virus, which is caused by the novel severe acute respiratory syndrome coronavirus 21 (SARS-CoV-2), as a pandemic [13]. While cancer is not an infectious disease, it is quite common and should not be disregarded while dealing with the COVID-19 public health emergency. Telemedicine and remote counseling have advanced significantly throughout the COVID-19 era. This has aided in the reduction of outpatient visits and needless physical interaction. Gambardella et al. shared their treatment experience with elderly cancer patients. They compiled a list of practices that might aid in the prevention of disease spread in patients [14]. Surgeons and nurses did not interact with patients after they were admitted to the hospital. Surgical operations would be undertaken if the patient's temperature was less than 37.3°C or if they no longer had additional pneumonia-related symptoms after three days in the hospital. As a result, there was a longer recuperation time between surgery and discharge. Surgery should be conducted in accordance with the principles of safety and efficiency during COVID-19 to reduce post-operative complications and expedite patient recovery [15-17]. In our study, out of 63 cases, 30 cases operated successfully. 17 cases in upper GI and 13 cases in lower GI. After 30 days' post-operative complications like, 6 patients were wound infection, 2 was chest infection, 1 patient was expiring due to sepsis and the remaining patients was no complications after surgery. Apostolou et al [18] & Fernando et al [19] findings during the lockdown, fewer patients were referred and hospitalized, and the length of stay was much less than it had been before. As compare to our study also only 1 patient in upper GI and 12 patients in lower GI were referred to oncologist for chemotherapy, 30 patients were operated and admitted during Pandemic with SOPs like facial mask, protective goggles, and alcoholic hygiene solution. In upper GI cases, involving stomach 5 cases were in T3N1MX stage 2A, 2 cases were in T2N1MX stage 2B and 5 cases respectable all had resection margin. Further 6 cases were with poorly differentiated diffuse adenocarcinoma. The rest including pancreas, Duodenum and periampula were shown in above figure. Results of our study are also in line with findings of Gupta et al [20]. In the event of a pandemic, the scarcity of resources, along with the risk of infection exposure and spread to patients, and the lack of qualified health-care staff, are frequently the driving forces for the establishment of health-care institutions. The future paradigm of dividing operations between circumstances that are time-sensitive and those that aren't might be beneficial in assessing whether operations, if delayed, might have a detrimental influence on patient significant outcomes.

## CONCLUSION

It has been concluded that during COVID-19 pandemic, there is a need for clear guidelines in every surgical unit to ensure both patient and staff safety. There are very limited studies on the impact of COVID-19 on gastric cancer patients. This pandemic situation has effected the global economy, healthcare strategies and management system. A judicious approach must be adopted as surgical units look to re-open services as the pandemic evolves.

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## Original Article

## Exploring The Effect Of Mutigrain Flour On Glycemic Index Of Diabetic Rats Model

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## ARTICLE INFO

## Key Words:

Multigrain, Diabetes, Glycemic Index, Cereals, Glucose

## How to Cite:

Rafique, S. ., Jabeen, S. ., Tufail, T. ., Bader Ul Ain, H., & Shoukat, R. . (2022). Exploring The Effect of Mutigrain Flour on Glycemic Index of Diabetic Rats Model: Effect of Multigrain Flour on Glycemic Index in rats . Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.620>

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## ABSTRACT

The glycemic index is a measure that assesses the quantity of carbohydrates in meals on a range of zero to 100, reflecting how rapidly an item raises blood sugar. Multigrain flour stayed active for eating, and it had greater storage stability. **Objective:** To evaluate the effect of multigrain flour on glycemic index and insulin levels of diabetic rats. **Methods:** The Current study was designed to evaluate the effect of multigrain flour on diabetes. Sample size was 60 male rats (3 groups were made) 20 in each group and Convenient sampling was used. Proximate chemical analysis of the multigrain flour was also done. SPSS version 24.0 was used to tabulate and analyse the data. **Results:** Highest feed intake at week 1 was (24.10 ± 0.48 g/rat) and highest feed intake at week 4 was (25.80 ± 0.95 g/rat). Highest water intake at week 1 was (21.03 ± 0.51 mL/rat) and highest water intake at week 4 was (25.52 ± 0.54 mL/rat). Highest blood glucose level at 0-day was (177.27 ± 2.40 mg/dL) and highest blood glucose level at 30<sup>th</sup> day was (149.57 ± 4.51 mg/dL). Highest glycemic index value at week 1 (0-minute) was (136 ± 2.04), highest glycemic index value at week 1 (30-minute) was (165 ± 2.47), highest glycemic index value at week 1 (60-minute) was (165 ± 2.47). **Conclusions:** This approach is also beneficial in the management of a variety of disorders. The addition of micronutrients to multi grain flour can boost the nutritional content of goods while also extending their shelf life.

## INTRODUCTION

Poaceae and Gramineae include seeds and grains from cereals. Triticale, oats, rye, maize, and other grains are accessible in various places. Wheat produces nearly half of the world's cereal production, according to global standards. Various structural similarities are identified across all cereals connected with a foetus with chromosomes for a completely new species, as well as a reproductive apparatus clogged with starch grains [1-3]. Diabetes mellitus is a group of metabolic disorders marked by hyperglycemia as a result of insulin shortage, insulin dysfunction, or both. Diabetes causes long-term damage, malfunction, and acute abnormalities in a variety of organs, including the eyes, kidneys, nerves, heart, and blood vessels [4]. Humans have been eating cereals for a long time. These problems are sensitive to diabetes

complications that have been present for a long time, such as insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetic mellitus (NIDDM), both of which cause significant morbidity [5]. Millets and grains can supply additional minerals, phytochemicals, and antioxidants, all of which are essential for overall health [6]. Utilization of remedial multigrain multigrain flour in food products is an area of current interest because of consumer and changing demographics [7]. Foods with a low glycemic index are linked to better metabolic and vascular disease prevention and treatment [8]. Later research revealed that a variety of parameters linked to food consumption affect the rate of glucose absorption, as well as glycemia and insulinemia. At this point, it was thought that rigorous documenting of the distinctions

between carbohydrate meals was necessary. The glycemic index categorization of foods that resulted gave a numerical physiologic classification of significant carbohydrate items in the prevention and treatment of disorders like diabetes [9]. Many dieticians and endocrinologists have indicated that illnesses are connected to defective feeding patterns caused by a lack of variety and increased intake of wheat and rice-based refined meals, based on observations and scientific evidence. Further research has discovered that high-GI meals cause greater eating problems in obese persons than in people of normal weight. Dieticians recommend millets to fight these side effects because of their high fibre content and vitamin profile, which promote a balanced diet. Multigrain flour, for example, is one of several commercial goods with a high nutritional fibre and protein content that has recently entered the Indian market [10,11].

## METHODS

The Current study was designed to evaluate the effect of multigrain flour on diabetes. Convenient sampling was used. This study was conducted at Allied Health Sciences, Lab no.102, University Institute of Diet and Nutritional Sciences (UIDNS), The University of Lahore. Study Duration was 9 months after the approval of synopsis. Sample size was 60 male rats (3 groups were made) 20 in each group were housed in animal room of IMBB, The University of Lahore. Inclusion Criteria was that male Rats having weight of 200-250 g were used as biological model in the study. Exclusion Criteria was that under weight male and female rats were excluded. Rats that were engaged in other experiments were also excluded from the study. Proximate chemical analysis of the multigrain flour was also done. SPSS version 24.0 was used to tabulate and analyse the data [12, 13].

## RESULTS

The inherent composition of food, as well as the proportions of nutrients, determine its quality. The analysis of food components has a considerable impact on the final nutritional content as well as customer approval. The moisture, crude fibre, crude protein, crude fat, and percentage composition of a food sample were determined through compositional analysis. The following table 1 and 2 shows the bioactive composition and proximate composition of multigrain flour. Bioactive compounds in multigrain flour were analyzed by spectrophotometric method and following detections were observed. Anti-oxidant activity (DPPH) was  $22.64 \pm 0.3$  ( $\mu\text{mol TE/g}$ ), Total phenolic contents (TPC) was  $1500 \pm 0.5$  (mg GAE/100g) and Total flavonoids contents (TFC) was  $500 \pm 0.7$  ( $\mu\text{g RE g}^{-1}$ ). Table 3 and 4 indicates the mean values for the glycemic

index of rats in different treatments at different days. Figure 1A indicates the graphical representation of the mean values of the feed intake in different treatments. X-axis indicates the treatments and weeks as the independent variable and y-axis shows the feed intake of rats in grams as the dependent variable. The primary reason for these results is that, T1 values are higher because in this treatment healthy rats were fed with multigrain compared to T0 and T2, where multigrain was not fed in T0 and in T2 diabetic rats were used. Diabetic rates recovered with the passage of time but the increase in feed intake was lower than other two groups of healthy rat. Figure 1B indicates the graphical representation of the mean values of the water intake in different treatments. X-axis indicates the treatments and weeks as the independent variable and y-axis shows the water intake of rats in milliliter as the dependent variable. Figure 1C indicates the graphical representation of the mean values of the blood glucose level in different treatments. X-axis indicates the treatments and days as the independent variable and y-axis shows the blood glucose level of rats in mg/dL as the dependent variable. Blood sugar level in T2 is highest because in this group, diabetic rats were used. Furthermore, with the passage of time blood sugar level decreased by eating the multigrain. Figure 1D indicates the graphical representation of the mean values of the insulin level in different treatments. X-axis indicates the treatments and days as the independent variable and y-axis shows the insulin level of rats in  $\mu\text{IU/mL}$  as the dependent variable. Insulin level in T2 is highest because in this group, diabetic rats were used and more insulin produced in response to high sugar. Furthermore, with the passage of time insulin level decreased in diabetic rats by eating the multigrain.

Bioactive compound analysis of multigrain flour	
Anti-oxidant activity (DPPH)	$22.64 \pm 0.3$ ( $\mu\text{mol TE/g}$ )
Total phenolic contents (TPC)	$1500 \pm 0.5$ (mg GAE/100g)
Total flavonoids contents (TFC)	$500 \pm 0.7$ ( $\mu\text{g RE g}^{-1}$ )

**Table 1:** Bioactive compounds

	Multigrain flour	Wheat	Oats	Quinoa	Rice	Maize
Moisture contents	$21.34 \pm 0.05$ (%)	$23.23 \pm 0.05$ (%)	$19.98 \pm 0.05$ (%)	$20.34 \pm 0.05$ (%)	$20.34 \pm 0.05$ (%)	$21.34 \pm 0.05$ (%)
Protein contents	$17.87 \pm 0.02$ (%)	$16.77 \pm 0.02$ (%)	$17.23 \pm 0.02$ (%)	$18.17 \pm 0.02$ (%)	$15.23 \pm 0.02$ (%)	$19.33 \pm 0.02$ (%)
Fat contents	$12.12 \pm 0.01$ (%)	$10.12 \pm 0.01$ (%)	$10.44 \pm 0.01$ (%)	$13.15 \pm 0.01$ (%)	$10.22 \pm 0.01$ (%)	$11.42 \pm 0.01$ (%)
Ash contents	$4.83 \pm 0.005$ (%)	$5.38 \pm 0.005$ (%)	$4.48 \pm 0.005$ (%)	$4.73 \pm 0.005$ (%)	$5.15 \pm 0.005$ (%)	$4.11 \pm 0.005$ (%)
Fiber contents	$2.18 \pm 0.1$ (%)	$3.12 \pm 0.1$ (%)	$2.78 \pm 0.1$ (%)	$2.00 \pm 0.1$ (%)	$2.12 \pm 0.1$ (%)	$1.75 \pm 0.1$ (%)
NFE (%)	$41.66 \pm 0.21$ (%)	$38.52 \pm 0.21$ (%)	$39.42 \pm 0.21$ (%)	$41.13 \pm 0.21$ (%)	$40.86 \pm 0.21$ (%)	$42.22 \pm 0.21$ (%)

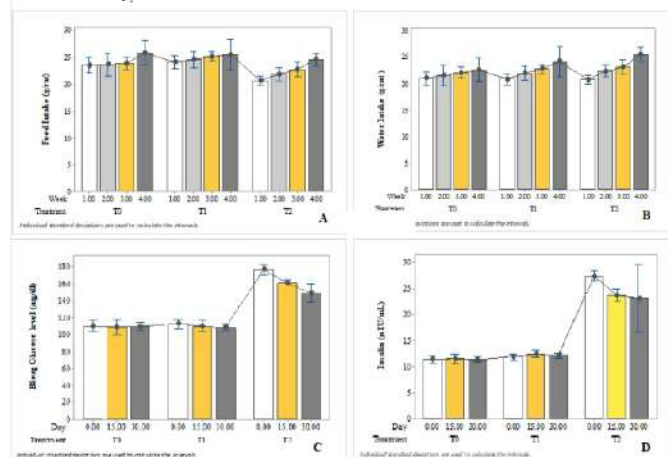
**Table 2:** Proximate chemical analysis of the multigrain flour

Treatments	Week 1 (0-min)	Week 2 (0-min)	Week 3 (0-min)	Week 4 (0-min)
T <sub>0</sub>	92±2.21 <sup>fg</sup>	91±3.19 <sup>efg</sup>	89±1.69 <sup>de</sup>	88±0.58 <sup>cd</sup>
T <sub>1</sub>	87±1.74 <sup>g</sup>	89±2.14 <sup>def</sup>	86±1.29 <sup>cd</sup>	83±2.91 <sup>b</sup>
T <sub>2</sub>	136±2.04 <sup>g</sup>	125±2.63 <sup>cdde</sup>	115±2.57 <sup>bc</sup>	111±4.41 <sup>a</sup>

**Table 3:** Glycemic index table at different weeks and 0-minutes

Treatments	Week 1 (0-min)	Week 2 (0-min)	Week 3 (0-min)	Week 4 (0-min)
T <sub>0</sub>	144±3.46 <sup>fg</sup>	145±5.07 <sup>defg</sup>	150±2.85 <sup>de</sup>	144±3.18 <sup>cd</sup>
T <sub>1</sub>	142±2.84 <sup>g</sup>	139±3.34 <sup>def</sup>	135±2.03 <sup>cd</sup>	130±2.95 <sup>b</sup>
T <sub>2</sub>	200±3.00 <sup>g</sup>	189±3.99 <sup>cdde</sup>	177±3.91 <sup>bc</sup>	172±4.18 <sup>a</sup>

**Table 4:** Glycemic index table at different weeks and 60-minutes



**Figure 1:** A) Means of feed intake by rats on weekly basis. B) Means of water intake by rats on weekly basis (mL/rat). C) Means of blood glucose levels in rats. D) Means of insulin levels in rats

## DISCUSSION

Finally, the physical, chemical, and sensory evaluations of multigrain flour as well as the storage stability of the fortificant produced good findings. Multigrain flour stayed active for eating, and it had greater storage stability [14]. The finest quality multigrain flour may be manufactured along with wheat flour, according to the findings of this study. This will be both nutritional and beneficial to your health. The current study's findings might be crucial in determining whether or not to fortify straight grade wheat flour with multigrain flour to improve nutrition. The findings of this study may prove to be extremely useful in the development of new, highly nutritious food items. The results of feed and water intake in the study are in similar with the findings of Qi et al., who studied the relationship of diet to wit diabetes to cure the patients [15]. The findings of the study also matched with the results of the Tufail et al., who studied the effect of diet on glycemic index of women [16]. The results of blood glucose level in the study are in similar with the findings of Meynier et al., who studied the glycemic index values [17]. The findings of the study also matched with the results of the Brennan who studied the effect of multigrain bread on glycemic index of females

suffering with type 2 diabetes [18]. The results of insulin level in blood in the study are in similar with the findings of Indrani et al., who studied the glycemic index values [19]. The findings of the study also matched with the results of Liu et al., who studied the effect of oat type 2 diabetes in patients [20].

## CONCLUSION

Foods that give special health advantages in addition to basic nutrients are referred to as functional foods. They are consumed as a staple meal by around 90% of Pakistan's population. Wheat, like other grains, is lacking in micronutrients such as zinc, vitamin A, and iron, which can contribute to a variety of significant disorders. Malnutrition is a severe issue in developing and underdeveloped nations, including Pakistan. Micronutrient fortification is becoming a prevalent method in the baking business to enhance people's health. This approach is also beneficial in the management of a variety of disorders. The addition of micronutrients to multi grain flour can boost the nutritional content of goods while also extending their shelf life. As a result, the current technique was used to test the stability of multigrain flour.

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## Original Article

## Effects of High Intensity Aerobics and Pelvic Clock Exercises in Primary Dysmenorrhea

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## ARTICLE INFO

## Key Words:

High intensity Aerobics, Pelvic clock Exercises, Dysmenorrhea, Menstruation.

## How to Cite:

Qamar, A. ., Aabroo, S. ., Afzal, S. ., Azhar, N. ., Aziz, S. ., Ishtiaq, N. ., & Faizan Hamid, M. . (2022). Effects Of High Intensity Aerobics and Pelvic Clock Exercises in Primary Dysmenorrhea: High Intensity Aerobics and Pelvic Clock Exercises in Primary Dysmenorrhea. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.611>

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[biostats1000@gmail.com](mailto:biostats1000@gmail.com)Received Date: 28<sup>th</sup> June, 2022Acceptance Date: 9<sup>th</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Dysmenorrhea is very unpleasant sensation with the presence of painful cramps of uterine origin that occur during menstruation. Prevalence rate of dysmenorrhea is 50% in females' population. Evidence tells that inactive lifestyle as well as poor diet is main reason of primary dysmenorrhea as well as women who exercise have a reduced incidence of dysmenorrhea.

**Objectives:** To find the effectiveness of high intensity aerobics and pelvic clock exercises in primary dysmenorrhea. **Methods:** The study design was randomized control trials. Purposive sampling technique was used. Girls aged 17-24 years with regular menstrual cycle and unmarried girls were included. Athletes, married women with gynecological abnormalities were excluded. A structured 8 weeks' program (3 days in a week, 1hour per day) was given to Group A including set of London bridges (8 mins), Jumping lunges (8 mins), Mountain climbers (8 mins), Quadruped bent knee hip extension (8 mins), Warm up 10 minutes, 25 minutes for high intensity aerobics. Group B were assigned 25 minutes for Pelvic clock exercises (gradually increased during with weeks) performed from 12 to 6 o'clock, as instructed to move from 3 o'clock to 9 o'clock. Then movement in a clockwise manner from 12 to 3 to 6 to 9 and then back to 12 o'clock. Outcome measures were calculated by visual analog scale VAS, DASS 21 and self-administered questionnaire for dysmenorrhea symptoms. **Results:** Both techniques were effective for managing the patients of pain during menstruation, but patients who were treated with high intensity aerobics exercise showed more significant result as compared to another group with p-value < 0.05. **Conclusions:** High intensity aerobics and Pelvic clock exercises in primary dysmenorrhea, both are effective but high intensity aerobics had given more efficient results.

## INTRODUCTION

Painful menstrual cramps of uterine origin in females are defined as Dysmenorrhea, it is the everyday common gynecological condition among girls of the fertile age it is considers as to painful periods [1]. The common occurrence of painful menstruation is as high as 90% and as low as 43% in worldwide. In Pakistan, it is noted and seen that females at their maximum fertile age unable to perform their ADLS constructively during their menstruation period and because of their ethic reasoning they avoid for medical attentiveness as well [2]. The intensity of pain is piercing, and spasmodic, location of pain is in the suprapubic region it starts in the beginning of menses so maximally increases with blood flow. By

examining physically it is normal absolutely but dysmenorrhea can also be associated with other symptoms, such as nausea, vomiting, diarrhea, fatigue, fever, headache, and insomnia. Ultrasound is beneficial in eliminating secondary causes of painful menstruation, for example endometriosis and adenomyosis [3]. There are wide variety of symptoms during periods, inclusive of lower abdominal pain, abdominal cramps, mild to moderate nausea, may or may not vomiting, very commonly seen headache, often diarrhea, fatigue is also has been observed, irritability or feeling of agitation, frustration and depressive mood and unhappiness is also found in females with painful menstruation [4]. Physical therapy is known as

cost effective and noninvasive alternative treatment specially designated to treat girls with primary dysmenorrhea [5]. In spite of fact that primary dysmenorrhea with unpleasant painful menstruation is not a real danger to life yet can affect the standard of female life. It is the nearly common case of severeness [6]. The stress reduction techniques, physical activities like aerobics, walking, jogging, and exercise give outstanding results in treating painful menstruation. They are greatly believing as a source of lessening stress as well as stress-related symptoms. High intensity aerobics and Pelvic Clock Exercises in dysmenorrhea is well studied in help release in endorphins hormones from human brain that increase suffering from pain threshold, they cause to enhance good frame of mind in workout practicing females [7]. Primary dysmenorrhea is also associated with an overproduction of uterine prostaglandins that can results into myometrium hyper contractility as well as arteriolar vasoconstriction so that they both leads to the unpleasant and painful menstrual cramps [8]. Proper and Healthy lifestyle are very helpfully in overcoming and minimizing the seriousness of painful menstruation, so as a result, with a satisfactory and acceptable food ways and eating behavior, structured and well-ordered recreational physical activities, self-maintenance as well as self-care of the females, excellent social relationships, and lessening the stress levels in females of fertile age and the happening of the dysmenorrhea can bring to the point of the reduction [9]. Some researches on students showed that effects of the aerobics in girls having dysmenorrhea in non-athlete girls with the continuous and regular aerobic exercises, premenstrual syndrome as well as heavy bleeding during menstrual phase also manage and lessens the pain [10]. Physical activity not only reduces and minimizes as well as it improves HRQOL, muscular weakness, increases resting time, global progression with therapy, and treatment compliance. Another benefit of physical activity is that it improves dynamic flexibility movement efficiency so intramuscular coordination increases when exercises are performed [11]. Exercises are perfect method to minimize painful menstruation without any reaction. Their mode of action is that by reducing cyclooxygenase pathway activity, inhibiting prostaglandin synthesis [12]. High intensity aerobics and Pelvic Clock Exercises in dysmenorrhea Page 4 High intensity Aerobics increase metabolic activities and increase blood flow which in turn, improves the functions of pelvic organs. It helps in release of endorphin hormones in the brain that raises the pain threshold. Previous researches about high intensity aerobics in dysmenorrhea are very less in literature but only on aerobics and there is no still research on pelvic clock exercises in dysmenorrhea. In this research for the first time, high intensity aerobics

and pelvic clock exercises has been used to treat primary dysmenorrhea. The main purpose of this study was to manage the unpleasant pain suffered by females during menstruation. The aim of this study was to guide physiotherapist that how to apply these exercises to manage dysmenorrhea.

## METHODS

The study design was Randomized control trials conducted at Raheeda Gynea hospital Hafizabad Duration of Study. The duration of the study was 6 months. Purposive sampling technique was employed, sample Size 28 patients were divided in group A and B (calculated by Epitool). Sample size to detect a significant difference between two means with a variable of VAS and DASS 21. Mean 1" "18" "Variance 1" "4.88" "Mean 2" "15.73" "Variance 2" "3.99" "Confidence level" "0.95" "Power" "0.8" "Ratio of sample sizes (n2/n1)" "1" "Tails" "2" "Results" "Sample size" "Sample size 1 (n1):" 14 "Sample size 2 (n2):" 14 "Total sample size (both groups):" 28 With addition of 10% Attrition rate total sample size was 31 [13]. High intensity aerobics and Pelvic Clock Exercises in dysmenorrhea. Girls aged 17-23 years with regular menstrual cycle, Unmarried girls were added in this study while Athletes, Married women, Girls who were regularly exercising Having any pelvic pathology, abnormal menstrual cycle were excluded Before Randomization, demographic data, name, age, marital status, exercise habit was collected through form. Visual Analogue scale and DASS 21 was used for evaluation. The visual analog scale (VAS) is a validated, subjective measure for acute and chronic pain. Scores were recorded by making a mark on a 10-cm line that represents a continuum between "no pain" and "worst pain" [14]. The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content [15]. Self-Administered Questionnaire for Dysmenorrhea symptoms were made to assess the associated symptoms Nausea, LBP, Menstrual cramps and radiating pain towards legs. High intensity aerobics and Pelvic Clock Exercises in dysmenorrhea Interventions High Intensity Aerobics. A structured 8 weeks program (3days/1week, 1hour/day) Warm up 10 minutes, 25 minutes for high intensity aerobics (gradually increased with weeks) "London bridges (8mins)", "Jumping lunges (8mins)", "Mountain climbers (8mins)", "Quadruped bent knee hip extension (8mins)" Aerobics has been shown to raise the levels of  $\beta$ -endorphin 4-5 times in the blood stream. The more doing exercises, the higher level of  $\beta$ -endorphin.  $\beta$ -endorphin will be released and taken by receptors situated in hypothalamus center and limbic system in turn regulate emotions.  $\beta$ -endorphin Increases shown with intimately

relationship with reducing pain, remarkable improvement in sexual performance and breathing.

## RESULTS

During treatment, patients were randomly allocated in two groups. Group A treated with high intensity aerobic training  $n=14$  and group two treated with pelvic clock exercises  $n=14$  and differences in results of both groups were observed. The mean difference of group A and B was seen in VAS in pre, and post treatment as high intensity aerobics showed more significant rather than pelvic clock exercises. Statistical analysis of nausea, LBP, menstrual cramps, radiating lower leg pain, stress and anxiety also showed differences in both group but high intensity aerobics showed more significant differences by  $p$  value in all variables related to pelvic clock exercise. This shows that both techniques were effective for managing the patients of pain during menstruation, but patients who treated with high intensity aerobics exercise shows more significant result as compared to another group. The mean of VAS in HIA is  $2.29 \pm 0.6$  and  $1.07 \pm 2$  pre and post respectively. The mean of nausea in HIA is  $0.79 \pm 0.426$  and  $1.64 \pm 0.497$  pre and post respectively. The mean of lbp in HIA is  $1.07 \pm 0.267$  and  $1.93 \pm 0.267$  pre and post respectively. The mean of menstrual cramps in HIA  $1.57 \pm 0.514$  and  $1.97 \pm 0.267$  pre and post respectively. The mean of stress in HIA pre reading was  $2.79 \pm 1.12$  and  $1.14 \pm 0.363$  post intervention. The mean of anxiety in HIA  $4.84 \pm 0.53$  and  $1.12 \pm 0.426$  pre and post intervention readings respectively. The mean of VAS in PCE is  $2.43 \pm 0.514$  and  $2 \pm 0.8$  pre and post respectively. The mean of nausea in PCE  $0.93 \pm 0.267$  was pre intervention reading and  $1.79 \pm 0.4262$  post intervention reading. The mean of lbp in PCE  $1.71 \pm 0.469$  was pre intervention reading and  $1.71 \pm 0.489$  post intervention reading. The mean of menstrual cramps in PCE  $1.43 \pm 0.514$  and  $1.86 \pm 0.361$  pre and post respectively. The mean of anxiety in PCE  $3.86 \pm 0.770$  and  $1.29 \pm 0.611$ . The within group analysis was analyzed by Paired T-test and difference between group was analyzed by using Independent T-test. The analysis showed that 13 participants were in the age group of 16-20 years of age and remaining were in the age group of 21-24 yrs. The analysis showed that height of 14 female's participants were under 4.0-4.5 feet, 6 under 4.5-5.0 and remaining 8 female participants were above 5 feet.

Groups	Visual Analogue Scale			Total
	Mild (1-3)	Moderate(4-6)	Severe (7-10)	
High-Intensity aerobics	1	8	5	14
Pelvic clock exercise	0	8	6	14
Total	1	16	11	28

**Table 1:** Descriptive statistics of weight of females. The table analysis of VAS shows that 16 participants had moderate pain and 11 participants had worse pain before treatment. Cramps shows that 50% participants had cramping pain during menstruation

before treatment.

Groups	Radiating lower legs pain		Total
	Yes	No	
High Intensity aerobics	10	9	14
Pelvic clock exercise	12	4	14
Total	22	13	28

**Table 2:** Descriptive statistics of radiating lower legs pain during menstruation days before giving treatment. The table shows that radiating lower leg pains was high complained in 22 participants having pain during menstruation before treatment.

Groups	Anxiety During Menstruation				Total
	Mild	Moderate	Severe	Extra Severe	
HighIntensity aerobics	1	1	0	13	14
Pelvic clock exercise	0	2	9	12	14
Total	1	3	9	15	28

**Table 3:** Descriptive statistics of depression during menstruation days before giving treatment-dass21. The table of anxiety shows that 15 participants had very severe anxiety, 9 had severe and remaining had moderate type of anxiety according to DASS-21, before treatment.

Groups	Depression During Menstruation				Total
	Mild	Moderate	Severe	Extra Severe	
High Intensity aerobics	0	6	4	4	14
Pelvicclock exercise	0	5	5	4	14
Total	0	11	9	8	28

**Table 4:** Descriptive statistics of depression during menstruation days before giving treatment-dass21. The table shows that majority of participants had moderate depression before treatment.

Groups	Radiating lower legs pain		Total
	Yes	No	
High Intensity aerobics	1	13	14
Pelvic clock exercise	2	12	14
Total	3	25	28

**Table 5:** Descriptive statistics of cramps during menstruation days after giving treatment

## DISCUSSION

The purpose of present study was to compare the effectiveness of pelvic clock exercise and aerobic dance to treat pain, associated symptoms, and stress in primary dysmenorrhea. Gerzson et al., proposed that there is significant improvement by aerobics as well as evidence gained from many studies stated that regular physical exercise was associated with reduced prevalence of primary dysmenorrhea and plays a key role in reduction of pain [16]. Chen et al., earlier reported a study in which the participants adopted many strategies such as rest, warm bath, or drugs to overcome menstrual pain this study planned to treat dysmenorrhea by means of non-pharmacological method such that by pelvic clock exercise and aerobic dance. Post intervention period, participants belonging to both the groups reported that they experienced drop in dysmenorrhea with improved psychological changes, most of the subjects in Group A

reported that there was more reduction in leg pain, menstrual cramps and low back pain, and subjects in Group B reported that there was reduction in abdomen pain rather than low back pain and this study results matches with presented study [17]. Kannan et al., described that uterine contractions were the main reasons behind abdominal cramps and painful menstruation. Studies reveal that vasoconstriction of uterine arterioles that results in ischemia so that by exercising regularly participants feel a lot of difference between pre and post menstrual conditions by the difference of  $2.43 \pm 0.49$  and after treatment of it was  $2.00 \pm 0.50$  with the  $p < 0.05$ . They improved menstrual cramps, low back pain, legs pains as well as improved psychological health with good improved daily living activities hence this research shows relevant results [18]. Patel et al., performed high intensity aerobics and gives pre and post results  $2.35 \pm 2.75$  and  $1.87 \pm 2.0$  with the value of  $p < 0.05$  respectively [19]. Physical therapy is known as cost effective and noninvasive alternative treatment specially designated to treat girls with primary dysmenorrhea. Regular exercise and physical activity increase blood flow and improved metabolism in uterus so that leads to good menstruation without pain. In other words, increasing blood flow to uterus helps a lot in reduction of dysmenorrhea and its associated menstrual symptoms. So here the results and conclusions also coincide these research studies [20, 21].

## CONCLUSION

From this present study, it is found that aerobics is effective in minimizing primary dysmenorrhea and helps to overcome pain and its associated symptoms along with stress management. Hence, high intensity aerobics can be incorporated as one of the non-pharmacological methods in treating patients with primary dysmenorrhea in clinical Settings.

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## Original Article

## Association of the Thyroid Function Disorder with Recurrent Pregnancy Loss in Women

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## ARTICLE INFO

## Key Words:

Abnormal thyroid function, hypothyroidism

## How to Cite:

Naeem, A., Heema, ., Jan, S. ., & Gohar Shah, B. . (2022). Association of the thyroid Function disorder with recurrent pregnancy loss in women: Thyroid Function Disorder with Recurrent Pregnancy Loss in Women. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.687>

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## ABSTRACT

Thyroid function disorder is a very common disorder among the general population. Almost 3% of the people around the globe are receiving thyroid replacement therapy around the globe.

**Objectives:** The study aimed to screen the thyroid function disorder among the women with recurrent pregnancy loss. The treatment effects of thyroid disorder on the pregnancy outcomes were also assessed. **Methods:** This longitudinal study was conducted at Allama Iqbal Memorial Teaching Hospital Sialkot and Islamic International Medical College, Rawalpindi for duration of six months from October 2021 to March 2022. The 110 patients were included in the study to screen abnormal thyroid function and its association with recurrent pregnancy loss. All patients were fully aware of the study and informed consent was taken. Different screening test such as free thyroxin (FT<sub>4</sub>), Thyroid stimulating hormone (TSH), free tri-iodothyronin (FT<sub>3</sub>) and thyroperoxidase antibodies test were performed and data was collected. The thyroxin was given to the patients with abnormal TSH levels. **Results:** The free thyroxin (FT<sub>4</sub>), (TSH), free tri-iodothyronin (FT<sub>3</sub>) and anti thyroperoxidase level were measured. Out of 110 patients that participated there were 36% in which elevated levels of thyroid stimulating hormone was observed. Among these 36%, there were 22% that had the level of TSH more than 10 mU/L and there were 14% patients that had their TSH levels in the range of 7-10 mU/L. These patients were given thyroxin approximately 26-75 µg per day and the amount of thyroxin was adjusted according to the level of Thyroid stimulating hormone. Out of these 36% women that had high levels of TSH, there were 21 women that conceived within 1 year of treatment. Among the 33% women with high level of TSH, there were 39 that underwent the anti TPO test. **Conclusion:** Women who face recurrent pregnancy loss should be checked for thyroid abnormality as it was detected that there is significant number of women who face hypothyroidism and recurrent pregnancy loss.

## INTRODUCTION

The almost 3% of the people around the globe are receiving thyroid replacement therapy. It is very common disorder among the general population. The hypothyroidism affects approximately 4.1 women and 0.6 men per 1000 people. It mostly remains undiagnosed and untreated therefore it can be the cause of repeated pregnancy losses and even infertility [1-2]. Hypothyroidism is the most prevalent thyroid disorder during pregnancy. An estimated 1.5% to 4.4% of pregnant women are reported to be affected by it. Women with hypothyroidism have a lower fertility rate. The

insufficient iodine intake is the main causes of hypothyroidism. Other causes of hypothyroidism include radioactive iodine therapy, autoimmune thyroiditis, and thyroid gland surgery [3-4]. When a woman with hypothyroidism conceives, she may encounter problems including spontaneous and placental abortions, and irreversible harm to the fetus, such as lack of nerve differentiation, poor central nervous system development. Because of the ovulatory dysfunction there is also higher risk of perinatal death. Thyroxin prescriptions and early

diagnosis of these significant problems can improve the outcomes [5]. Thyroid disorders are the second most prevalent endocrine disorder in the pregnant females. Being the hypermetabolic disorder of pregnancy, TD is associated with poor mother and fetal outcomes. Numerous physiological changes that occur during pregnancy might cause hypothyroidism. Because of increased renal loss and iodine transfer to the growing fetus, pregnancy is a condition of relative iodine deficit [6-7]. The increase in oestrogen level during pregnancy rises the levels of thyroxine-binding globulin. The thyroid is stimulated by a weak thyroid stimulating hormone (TSH), and the actions of human chorionic gonadotrophin produce a reduction in serum thyrotropin levels (HCG). It causes a rise in FT4 and a fall in TSH. The fetus receives maternal thyroxin throughout the pregnancy [8]. Before the development of the embryonic thyroid gland, the maternal thyroxin considered as crucial for fetal brain development. Overt hypothyroidism (OH), is characterized by high blood TSH or subnormal FT4 levels. According to the different studies the prevalence of hypothyroidism during pregnancy varies sharply. OH was observed in 2 out of every 1000 pregnancies [9]. Pregnancy-related overt and subclinical maternal hypothyroidism has strong association with poor maternal outcomes. In our research, we are keen to assess the value of thyroid function testing in women who experience repeated miscarriages as well as the impact of thyroid medication on pregnancy [10].

## METHODS

This longitudinal study was conducted for duration of six months from October 2021 to March 2022. A total of 110 patients who attended the Gynecology department of our institute teaching hospitals were included in the study to evaluate the abnormal thyroid function and its association with recurrent pregnancy loss, all patients were fully aware of the study and written consent was taken from them. Blood samples for TSH, FT3, FT4, and anti TPO were taken. Blood samples were taken for the oral glucose tolerance test, anti-ds DNA, ANA, and TORCH. Different test such as free thyroxin (FT4), Thyroid stimulating hormone (TSH) and free tri-iodothyronin (FT3) were performed and data was collected. The thyroxin was given to the patients with abnormal TSH levels. According to the inclusion criteria woman of age (20 to 40 years old) who had experienced more than three miscarriages were included in the study. The analyzer (Abbott reagent) was used in the Chemiluminiscent Microparticle Immunoassay method for assessment of TSH, free tri-iodothyronin, free thyroxine (FT4), and auto-antibody against thyroperoxidase. For FT3 and TSH, laboratory reference values were taken as 0.4-7mU/L.

## RESULTS

A total of 110 patients were taken to study the abnormal thyroid function and its link to recurrent pregnancy loss, all patients were fully aware of the study and written consent was taken from them. Out of 110 patients that participated there were 36% that reported elevated levels of thyroid stimulating hormone. Among these 36%, there were 22% that had these level of TSH more than 10 mU/L, and there were 14% patients that had their TSH levels in the range of 7-10 mU/L. These patients were given thyroxine approximately 26-75 µg per day and the amount of thyroxine was adjusted according to the level of Thyroid stimulating hormone. The response and the adequacy range was analyzed after every six weeks. Out of these 36% women that had high levels of TSH, there were 21 women that conceived within 1 year of treatment. However, the other patients were still on treatment and did not conceive. Their TSH levels were analyzed and carefully monitored including those patients that had anti TPO. Characteristics of the sample were analyzed and it was found that there was no significant difference in the obstetrical features of patients that had subclinical hypothyroidism, euthyroid and thyroid autoimmunity, except for gestational age which was showing variation in these groups. (Table no.1)

Features	Euthyroid	Thyroid autoimmunity	Subclinical hypothyroidism	p-Value
Maternal age (years)	35.4 ± 5.4	34.3 ± 4.9	34.3 ± 4.9	0.21
Nulliparous (%)	41.9	35.2	35.2	0.4
Earlier miscarriage (%)	24.0	32.3	32.3	0.17
Gestational age at abortion (week)	7.2 ± 1.6	9.2 ± 2.1	9.2 ± 2.1	0.01

**Table 1:** Features of the of the Sample

Logistic regression analysis showed link between early pregnancy loss and the multiple variables. The early pregnancy loss was seen to be associated with the elevated levels of TSH. Similar trend was seen in case of thyroid autoimmunity and early pregnancy loss. Analysis revealed that both of these factors played role in causing early pregnancy loss. The other two factors had no significant link with pregnancy loss. (table no.3).

Value of TSH	No. of women (%)
0.4-7	36(33%)
7-10	15(14%)
>10	24(22%)
High FT levels	12(11%)

**Table 2:** Results showing thyroid function test

Among the 33% women with high level of TSH, there were 39 that underwent the anti TPO test. And it was reported that 5 of them had autoimmune thyroiditis. It was reported by these two women that they also had enlarged nodularity in the thyroid gland as seen in ultrasound. Among 5 of these

patients, three refused to carry out the further testing.

Variables	OR (95% Confidence Interval)	p-Value
Maternal age	1.06 (0.45-2.22)	0.87
Nulliparity	0.91 (0.41-2.17)	0.91
Earlier miscarriage	1.02 (0.45-2.38)	1
Thyroid autoimmunity	3.3 (1.26-8.52)	0.012
Subclinical Hyperthyroidism	6.24 (1.35-23.4)	0.011

**Table 3:** Link between early pregnancy loss and multiple variables  
One patient reported abnormal sugar profile as per her history in the previous pregnancy and the remaining had hypothyroidism but didn't take any medicine. There were 11% patients that had high FT levels.

## DISCUSSION

The primary role of thyroid hormone is the reproductive tissue development and its link with fertility is yet unclear. Studies are going on to find the association between fertility and the thyroid gland functioning [10-11]. However, as per studies the dysfunction of thyroid gland is linked to menstrual irregularity and abnormal sexual development. It is reported that there is link of recurrent pregnancy loss and abnormal functioning of the thyroid gland. The cases like hypothyroid are more known to be linked to such mishaps. As per studies by a group of scientists they found that the overall rate of occurrence of hypothyroidism was 3% whereas the overt thyroid deficiency was reported to be 2 cases in 1000. The occurrence of subclinical hypothyroidism was reported as 5% in women ranging from 18-45 years of age. The risk factor that was shown to be linked to it was heredity however, there must be many other factors that can play role like antimicrobial antibodies and diabetes [12-13]. The iron deficiency is linked to excessive rates of miscarriage in such patients. Because iron deficiency hinders with the normal functioning of the thyroid gland as the thyroid antibodies are associated with the incidence of abortion even if there is a lack of overt hypothyroidism [14-15]. After a meta-analysis and systemic review has helped scientist to report that there is a significant association between thyroid antibodies and the incidence of pregnancy loss. In this study the incidence of pregnancy loss among women suffering from high TSH was 65, whereas it was found that it is not greater occurrence than the normal condition. It was found that there is high chance of co-existence of multiple endocrine abnormality in case of certain women but in this study it was found that only women had recurrent pregnancy loss and diabetes [16]. There is a condition called as subclinical hypothyroidism where women are asymptomatic but if checked through clinical biochemistry the women had high levels of Thyroid stimulating hormone [17]. The studies have shown that up till now there is no case reported where there is link found between subclinical hypothyroidism and

loss of pregnancy. In this study it was found that there were 14% cases found where the patients had subclinical hypothyroidism but here also we found that there was no association between recurrent pregnancy loss and subclinical hypothyroidism [18]. If the woman is suffering from recurrent pregnancy loss, then she should be given treatment and proper care to prevent any mishap during the course of time. According to the studies it was found that there is a link of overt disease and subclinical hypothyroidism. Even in case of patients having hypothyroidism the signs and symptoms like fatigue, decreased vigor, excessive sleep is commonly observed, that's why if such women get pregnant the symptoms of pregnancy are overlooked till they encounter failure in pregnancy or abortion [19]. In 2007, studies were carried out to find the associations between thyroid and the related illness linked to pregnancy loss. In developing countries, it is very difficult to diagnose subclinical hypothyroidism so its link with recurrent pregnancy loss gets undetected every time. So it can be difficult to check such patients and to analyze the data. As per our studies there were also some patients reported that had elevated levels of FT. hyperthyroidism cannot be called as a diagnosis as it is itself a condition and it is depending on so many other causes. It is also linked to many other endocrine disorders [20], there will be further research required in this field to know the exact cause. In case of young children, the main cause comes out to be grave disease or in some cases thyroiditis. In this study there was no evidence found about the thyroid nodularity and hyperthyroidism in these patients. The treatment as prescribed by physician and use of proper iron supplements can help patients recover from any iron deficiency [21]. And it can in turn alter the pregnancy outcomes. So the role of abnormal thyroid function and thyroid antibodies in the recurrent pregnancy loss should be checked so that early treatment can be done to improve the viability of pregnancy [22].

## CONCLUSION

Women who face recurrent pregnancy loss should be checked for thyroid abnormality as it was detected that there is significant number of women who face hypothyroidism and recurrent pregnancy loss. Women that suffer from subclinical hypothyroidism have more ratio of early pregnancy loss. The link of recurrent pregnancy loss was more for hypothyroidism condition as compared to hyperthyroidism. Among all the patients there were one third that got pregnant after treatment with thyroxine which shows that hypothyroidism is treatable and is one of the causes of recurrent pregnancy loss.

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## Original Article

## High Resolution Computed Tomography Chest Findings in Patients with Positive RT-PCR of Covid-19

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## ARTICLE INFO

## Key Words:

COVID-19, high resolution computed tomography, ground glass opacities, mixed patterns, atelectasis, crazy paving.

## How to Cite:

Afzaal, A. ., Yousaf Farooq, S. M. ., Ehsan Cheema, F. ., Mahnoor, ., Yousaf, N. ., Karim, M. ., & Abbas Malik, A. . (2022). High Resolution Computed Tomography Chest Findings in Patients with Positive RT-PCR of Covid-19: High Resolution Computer Tomography Chest Findings in Patients with Positive Covid-19. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.607>

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Received Date: 8<sup>th</sup> July, 2022Acceptance Date: 16<sup>th</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

High-resolution CT chest abnormalities in patients with higher RT-PCR among those with COVID-19 have been poorly studied. It remained unknown what mechanism was responsible for the rise in COVID-19 cases. **Objective:** Observations from high-resolution chest CT scans in patients with a negative RT-PCR for COVID-19. **Methods:** A total of 400 male and female samples were collected using a simple random sampling method. The research method used was a descriptive one. The researchers used CT scans and in-depth interviews to compile their data. The current version of SPSS(21.0.0) was utilized for the statistical analysis. **Results:** There were a total of 245 men and 155 females in the sample pool for this investigation. COVID-19 was present in all of these patients. Based on the findings of the study, the patients were diagnosed with respiratory symptoms as fever, breathlessness, and cough. High resolution computed CT revealed, however, that these patients also have Ground glass opacities, heterogeneous patterns, septal thickening, consolidations, and pleural effusion. The patient population also included smokers. **Conclusion:** High-resolution computed CT results consistent with COVID-19 infection were found to include ground glassware opacities, mixed patterning, septal thickness, restructurings, CORAD classifications, nodules, bronchiectasis, crazy paving, and pleural effusion. Negative RT-PCR results in people with COVID-19 symptoms (such as cough, illness, fever, and shortness of breath) received little to no attention. The HRCT should be used for the overall diagnosis of COVID-19, and this should be the centre of learning and treatment for the population that tested negative with the RT-PCR.

## INTRODUCTION

A continuous respiratory disease epidemic, officially dubbed Coronavirus Disease 2019, poses the newest risk to global health. Recognized as COVID-19 in December of 2019. In late 2019, SARS-CoV-2, a novel coronavirus linked to severe respiratory disease, was detected in Wuhan, China. Direct contact and droplet transmission are the two main modes of transmission, and epidemiological data show that the virus can cause a wide spectrum of clinical disease (mild to severe illness, including death) [1, 2]. It was quickly determined that a novel coronavirus, similar

structurally to the virus that causes Severe Acute Respiratory Syndrome (SARS), was to blame. An outbreak of a novel coronavirus that causes pneumonia, identified as coronavirus disease 2019 (COVID-19) by the World Health Organization on February 11, 2020, has spread swiftly [3, 4]. Coronaviruses belong to the subfamily Coronavirinae, in the family Coronaviridae, of the order Nidovirales [5, 6]. They are big, positive-sense RNA viruses encompassing four genera; alpha, beta, delta, and gamma. Patients hospitalized with COVID-19 frequently have laboratory

abnormalities, including profound lymphopenia, a delayed prothrombin time, high lactate dehydrogenase, and raised D-dimer levels. Similar anomalies in laboratory testing have been observed in patients infected with SARS-CoV and MERS-CoV. X-rays of the chest show bilaterally diffuse shadowing with ground-glass opacities. Acute respiratory distress crisis, arrhythmias, acute heart injury, shock, and acute renal injury are among the most frequently reported side effects of COVID-19. In December of 2019, it was reported that nine people had contracted pneumonia from the Huanan South China Fish Market in Hubei, Hubei Province, China. There were 12,723 confirmed cases of COVID-19 in Pakistan, including 9,216 current cases, 111 severe cases, 269 fatalities, and 2,866 recoveries. There were 55 confirmed cases for every 1 million people. It was determined that there were actually 90,878 instances. While the World Health Organization (WHO) did find a link between the Useful and appropriate South China Fish Market and the coronavirus outbreak, they were unable to pinpoint any particular animals as a possible cause. Clinical manifestations include high body temperature, difficulty breathing, dry cough, and extreme exhaustion [7]. Fever (99%), weariness (70%), dry cough (60%), muscle aches (44%), and dyspnea are the most frequent initial signs of sickness [8]. The most prevalent clinical symptoms upon presenting are fever and coughing in addition to additional nonspecific symptoms like dyspnea, headache, sore muscles, and exhaustion [9]. Less typical symptoms are headache, disorientation, diarrhoea, and nausea [10]. Additionally, to the infection threat provided by SARS-CoV-2, the mental health problems of dealing with a fatal contagious diseases have also been serious, with panic disorders, depression, and poor sleep appearing as major issues. The most frequently described CT findings in patients with COVID-19 are ground-glass opacities and regions of consolidation, often with a rounded shape and peripheral distribution. For COVID-19, hospitalization is indicated mostly by a positive RT-PCR or gene sequencing result from respiratory or blood samples. However, it was found that the entire positive cases of RT-PCR for throat swabs were taken was only between 30% to 60% at initial introduction due to restrictions of sample transport and limits in kit performance [11]. For decades, RT-PCR has been the go-to method for diagnosing COVID-19. Many reports have noted an alarmingly high rate of false negatives [12]. This high false-negative result increases the risk of additional infection as well as delaying the make it easier to keep of suspected patients. CT plays a vital role in the identification of meningeal pneumonic patches. The discovery of patch of viral bacterial meningitis is among the most essential clinical guidelines for the cases reported. CT has been found to have great accuracy in relation to the

RT-PCR [13]. Affected patients may exhibit anything from a dry cough to severe respiratory distress. Causes of Acute Respiratory Distress Syndrome (ARDS) is observed in COVID-19, and it is thought that this is due to damage to an alveolar wall, but the endothelial of vascular system is less affected, leading to less exudation. This explains why COVID-19 individuals experience less impairment to their other organ functions [14]. Despite its potential for rapid and accurate COVID-19 diagnosis, the test has been hampered by its collection method, lengthy turnaround time, and limited availability. In light of this, chest CT scans can be quite useful for identifying and treating COVID-19 pneumonia [15].

## METHODS

During those four months, researchers at Farooq Hospital gathered data from a descriptive survey with a sample of 400. The research period was from June 15, 2021, through October 16, 2021. The researchers used CT scans and in-depth interviews to compile their data. The data were analysed using SPSS 21.0.

## RESULTS

According to the table there have been 245 (61.25%) men and 155 (38.75%) are female patients. There have been 24 (6%) smokers and 376 (94%) non-smokers. There were 109 (27.25%) hypertension, and 291 (72.75%) were non-hypertensive. There were 24 (6%) travellers and 376 (94%) were non travellers. There have been 58 (14.5%) individuals who had light fever, 208 (52%) patients had severe temperature, and 134 (33.5%) had serious fever. Three hundred forty-five patients (86.25%) reported shortness of breath, while fifty-five (13.75%) did not. A total of 397 (99.5%) patients reported having a sore throat, whereas just 3 (0.5%) did not. There have been 9 (2.25%) individuals who already had influenza and 391 (97.75%) individuals had no symptom of flu. There have been 371 (92.75%) patients who already had cough while 29 (7.25%) had no cough Table 1.

Variable	Categories	Frequency
Age	Mean	54.2800
	Std. Deviation	15.77542
Gender	Male	245 (61.25%)
	Female	155 (38.75%)
Smoking	Yes	24 (6%)
	No	376 (94%)
Hypertension	Yes	109 (27.25%)
	No	291 (72.75%)
Travelling	Yes	24 (6%)
	No	376 (94%)
Fever	Mild	58 (14.5%)
	Moderate	208 (52%)
	Severe	134 (33.5%)

Shortness of Breath	Yes	345(86.25%)
	No	55(13.75%)
Sore throat	Yes	397(99.25%)
	No	3(0.75%)
Flu	Yes	9(2.25%)
	No	391(97.75%)
Cough	Yes	371(92.75%)
	No	29(7.25%)

**Table 1:** Frequency of different variables pertaining to patient sample.

Ground glass opacities were present in all 400 patients (100%), as shown in the table. We found that 323 patients, or 80.75%, had a mixed pattern, while 77 patients, or 19.25%, did not. Thirteen individuals, or 3.2%, had thickened septums, while 387 patients, or 96.75%, did not. In total, 323 patients (80.75%) had consolidations, while 77 patients (19.25%) did not. Patients with mild disease numbered 57 (14.25%), those with moderate disease were 209 (52.25%), and those with severe disease numbered 134 (33.5%). Six patients (1.5%) were classified as having CORAD 3, ten (2.5%) were classified as having CORAD 4, fourteen (3.5%) were classified as having CORAD 5, and 370 (92.5%) were classified as having CORAD 6. Thirteen patients, or 3.25%, had only one affected side, whereas 387, or 96.75%, were affected on both sides. Seven patients (1.75%) had diffuse pleural effusion, while 393 (98.25%) had any pleural effusion. A total of 5 patients (1.25%) were found to have nodules in their lungs, while 395 (98.75%) did not. Atelectasis was present in 252 individuals (63%) and was absent in 148 patients (37%). Ten patients (2.5% of the total) displayed irrational behaviours, while 390 (97.5%) did not (Table no 2).

Variable	Categories	Frequency
Ground Glass Opacities	Yes	400(100%)
	No	0(0%)
Mixed Patterns	Yes	323(80.75%)
	No	77(19.25%)
Septal Thickening	Yes	13(3.25%)
	No	387(96.75%)
Consolidations	Yes	323(80.75%)
	No	77(19.25%)
Severity	Mild	57(14.25%)
	Moderate	209(52.25%)
	Severe	134(33.5%)
Distribution	Unilateral	13(3.25%)
	Bilateral	387(96.75%)
Pleural Effusion	Yes	7(1.75%)
	No	393(98.25%)
Nodules	Yes	5(1.25%)
	No	395(98.75%)
Atelectasis	Yes	252(63%)
	No	148(37%)
Crazy Paving	Yes	10(2.5%)
	No	390(97.5%)

**Table 2:** Frequency of multiple variables, including ground glass opacities, mixed patterns, and consolidations, among others in patients.

From the data in the table, we can deduce that out of a total population of 400, only 24 (6%) were smokers, while the remaining 376 (94%) were non-smokers. Yes 323 (80.0%) and No 77 (19.0%) in Mixed Designs; No 387 (96.0%) and Yes 13 (3.3%); No 390 (97.5%) as well as Yes 10 (2.5%) in Crazy Pavement; No 148 (37.0%) and Sure 252 (63.1%) in Airway obstruction; No 395 (98.1%) and Yes 5 (1.3%) in Nodules; No 393 (98.3%) as well as Yes 7 (1.8%) in Pleural Effusion; Yes 387 (96.75%) and No 13 (3.25%) in Septal thickening; Mild Severity is 57 (14.3%) Two hundred and nine moderate (52.3%) and one hundred thirty-four severe (33.5%). (Tables 3, 4, and 5.)

Smoking	Ground Glass Opacities		Mixed Patterns	
	No	Yes	No	Yes
No	0(0%)	376(100%)	71(18.9%)	305(81.1%)
Yes	0(0%)	24(100%)	6(25%)	18(75%)
Total	0(0%)	400(100%)	77(19.3%)	323(80%)
Consolidation		Septal thickening		
No	Yes	No	Yes	
71(18.9%)	305(81.1%)	365(97.1%)	11(2.9%)	
6(25%)	18(75%)	22(91.7%)	2(8.3%)	
77(19.3%)	323(80.8%)	387(96.8%)	13(3.3%)	

**Table 3:** Incidence of smoking, ground glass opacities, mixed patterns, consolidations, and septal thickening in patient sample.

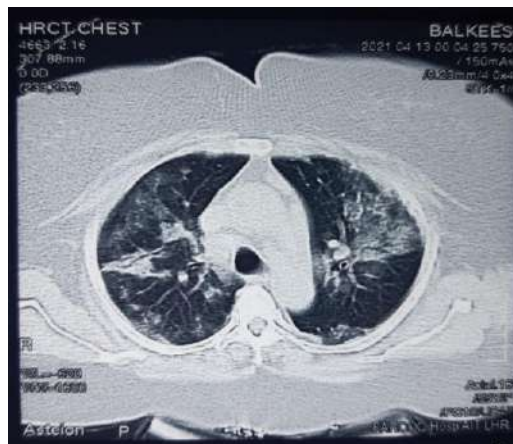


Smoking	Crazy Paving		Atelectasis	
	No	Yes	No	Yes
No	366(97.3%)	10(2.7%)	140(37.2%)	236(62.8%)
Yes	24(100%)	0(0%)	8(33.3%)	16(66.7%)
Total	390(97.5%)	10(2.5%)	148(37.0%)	252(63%)
Nodules	Pleural effusion			
	No	Yes	No	Yes
	371(98.7%)	5(1.3%)	370(98.4%)	6(1.6%)
	24(100%)	0(0%)	23(95.8%)	1(4.2%)
	395(98.8%)	5(1.3%)	393(98.3%)	7(1.8%)

**Table 4:** Prevalence of smoking, crazy paving, atelectasis, nodules, and pleural effusion in patient sample.

Smoking	Crazy Paving		Atelectasis		
	Bilateral	Unilateral	Mild	Moderate	Severe
No	365(97.1%)	11(2.9%)	51(13.6%)	195(51.9%)	130(34.6%)
Yes	22(97.1%)	2(8.3%)	6(25%)	14(58.3%)	4(16.7%)
Total	387(96.8%)	13(3.3%)	57(14.3%)	209(52.3%)	134(33.5%)

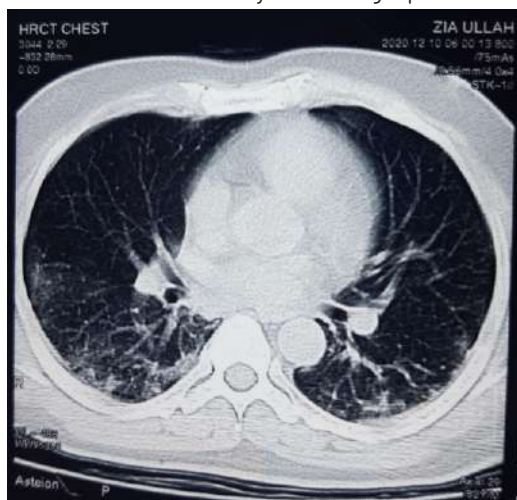
**Table 5:** Distribution and severity of smoking in patient sample.



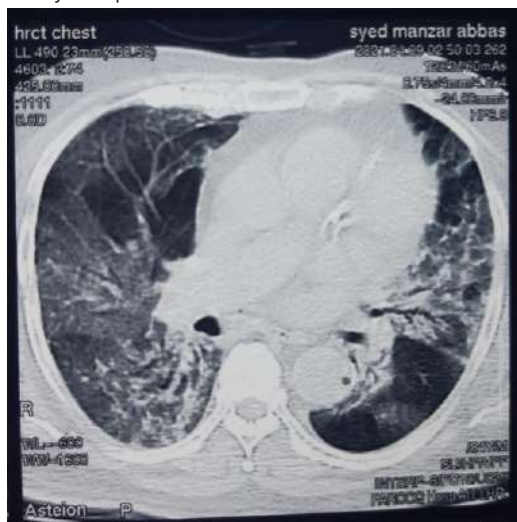
**Figure 3:** Distinct ground glassware opacities with a mosaic pattern both in lung fields shown on a positron emission tomography scan of the chest.

**DISCUSSION**

Yang et al. found that the posterolateral basal and outstanding segments of the inferior portion and the posterolateral sections of the upper lobe were the most frequently involved segments [11]. Our study's severity index of the respiratory system shows that 57 (14.25%) cases were classified as mild, 209(52.25%) as modest, and 134 (33.5%) as severe. The severity of lung participation was less severe during 1-7 days after symptom start, as assessed by CT scoring summing of all lobes of the both lungs, compared to the symptom onset in the range of 8-14 days. After 14 days, the observations have diminished in severity. Our analysis included 58(45.31%) cases diagnosed between days 1 and 7, the majority of which had mild lung involvement (16.5%) but nevertheless required hospitalization(3.91%). Among the 59 individuals who were diagnosed between days 8 and 14, 18(14.06%) had moderate to severe lung tissue involvement, while 8(6.25%) showed only little lung parenchyma involvement. There were 8(6.25%) individuals with just mild lung disease in the >14-day stage (neither moderate nor severe). From their analysis of 100 COVID-19 pneumonia cases in Wuhan, Zhou et al. inferred that the early rapidly advancing stage occurred between days 1 and 7, the advanced stage occurred between days 8 and 14, as well as the abnormalities began to improve after day 14 [3]. Females may be more resistant to viral infections due to the protective effects of the X-linked and sex hormones. From a total of 400 participants, 245 (61.5%) were male and 155 (38.5%) were female, indicating that men make up a sizable majority of the study's male participants. High-resolution ultrasound imaging (CT) chest symptoms in patients with higher RT-PCR for Covid-19 were investigated. Patients were chosen using an easy method. Patients with Covid-19 were found to have ground glass opacities, according to the study. Scan



**Figure 1:** Demonstration of bilateral spotty ground glass opacities and primarily sub-pleural on chest CT scan.



**Figure 2:** CT scan of the chest exhibiting bilateral consolidation in the lower lobe's apical section.

results confirmed that all 400 individuals exhibited ground glass opacities. All 135 patients in a study by Wan S, Xiang Y et al, who were diagnosed with Covid-19, exhibited GGOs on CT scans [16]. Patients diagnosed with COVID-19 were found to have ground glass opacities, according to the study. All four hundred patients scanned positive for ground glass opacities. All 87 individuals scanned by Khaliq M, Raja R et al, who did a similar study, had GGOs [15]. The individuals with COVID-19 were found to have ground glass opacities, according to the study. They found that almost all 400 individuals had crushed glass opacities in their scans. Patients taking COVID-19 had GGOs present on 77.4% of CT scans, according to a separate study by Mohammed YG et al. According to the results of the study, 81% of participants had CT scans that showed consolidations. For example, it was reported that 14.8% of individuals who had consolidations. According to the results of the study, CT scans revealed consolidations in 81% of participants [18]. Chen D et al., who did a comparable study, found that CT scans showed consolidations in 72% of participants. Based on the results of the study, 81% of participants had CT scans that showed consolidations [19]. Another study, this one by Zhao W et al., found that 64% of Covid-19 patients developed merger on the CT scans. The results of the performed investigation revealed that 2.5% of patients had evidence of crazy paving on CT scans [20]. Khaliq M, Raja R et al. found a similar percentage (33.3%) of people with abnormal CT scans, which they referred to as "crazy paving" [15]. 2.5% of people in the sample had evidence of crazy paving on their CT scans, according to the study. Mohamed YG et al., who also performed a CT scan research, found that 18.5% of participants exhibited crazy paving. The results of the study demonstrated that 1.25% of patients had nodules present on CT scans [18]. Yoon SH, Lee KH et al. also found that 48% of patients had nodules on their CT scans [17]. 1.75% of COVID-19 participants were found to have pleural effusion in the research. An identical study by Chen D, Jiang X et al. found that 19% of people with COVID-19 also experienced pleural effusion [19]. The study found that 1.75% of COVID-19 participants experienced pleural effusion. A second study with similar results was published by Khaliq M. et al., and it found that only 2 patients had pleural effusions [15]. Results of the study revealed that 3.25% of patients exhibited thickening of the septum detectable on HRCT of the chest. Septal thickening was detectable on HRCT chest scans in 62% of patients, according to a study by Chen D, Jiang X, et al, [19].

## CONCLUSION

Ground glass one or, mixed patterning, septal thickening, restructurings, CORAD classifications (3, 4, 5, & 6), nodules, bronchiectasis, crazy paving, and pleural effusion were all

observed on Good resolution tomography (CT in patients with COVID-19), according to the study. Negative RT-PCR results in people with COVID-19 symptoms, including cough, illness, fever, and shortness of breath received little to no attention. The HRCT is the best tool for making a definitive diagnosis of COVID-19, and this is where our attention should be focused in terms of both information and treatment for the population that tested negative by RT-PCR.

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## Original Article

## Male Involvement in Maternity Care and Birth Preparedness of Their Spouse

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## ARTICLE INFO

**Key Words:**

Male involvement, maternal care, birth preparedness

**How to Cite:**

Haque Nohri, M. U. ., Akhter Memon, P. ., Ali Mallah, M. ., Bux Mangiro, K. ., Ali Malik, A. ., & Ahmed Soomro, M. . (2022). Male Involvement in Maternity Care And Birth Preparedness Of Their Spouse. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.514>

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Received Date: 1<sup>st</sup> June, 2022

Acceptance Date: 23<sup>rd</sup> June, 2022

Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Lack of involvement in maternity care by male is a major public health issue and it is most neglected aspect of health in Pakistan. although males are involved in every decision making for female and children's for health care facilities. **Objectives:** To explore the role of male involvement in birth preparedness and maternity care and indicate contributing factors for lack of Participation. **Methods:** A descriptive cross sectional study was conducted to select 461 male Participants a Systematic random sampling technique was used. Ethical approval was taken from Ethical Review Committee. The information collected by interview to assess the involvement of male. The data collection tool comprised of two parts demographic variable and maternity and birth preparedness related variables. The mean, standard deviation and percentage, was calculated and know the association and chi-square test applied for data analyze. **Results:** Mean age of male was 35.3 years S.D ±6.6, less than half of the participants (42.3%) were illiterate followed by primary (23.2%), middle (18.9%), and Matric (10.4%), above Matric (5.2%). Husbands were main decision makers for maternity care and place of birth (92.6%) followed by fathers (6.1%) and brothers (1.3%). During the antenatal visits 41.6% men had accompanied their spouses or women for antenatal visits but there is 58.4% men not accompany their spouses or women for antenatal visits. **Conclusions:** Male involvement in maternal care and birth preparedness is not appropriate enough and knowledge related complication and labor, about overall maternal and child health and complications of pregnancy and labor, level of education, encouragement of their spouses, are the decisive factors in availing the benefits of maternal and child care.

## INTRODUCTION

Lack of involvement in maternity care by male is a major public health issue and it is most neglected aspect of maternal health in Pakistan. although males are involved in every decision making for female and children's for health care services. But their involvement in maternity care and complication related to pregnancies, their role remains very little [1]. In developing countries the maternal mortality rate is a major public health issue still, for reducing the maternal mortality rate skilled birth attendance is important at the time of delivery [2]. Very poor participation of male spouses had been observed during labor and delivery, the reasons for low spousal

participation include male dominance, low level of education, destitution, culture, devout convictions, and wellbeing laborer's negative mental states all contributed to destitute marital interest in worker and conveyance. Husbands' involvement provides numerous psychosocial benefits such as emotional attachment and communication in family members, relief from pain and optimistic birth outcome [3-5]. Childbirth has been a women's affair and men have just supported in financial matters and decision making in maternity care spousal involvement has remained a minimum in maternity care. Crucial role played by husband to contribute in pregnancy

and childbirth to decreasing the maternal mortality and infant mortality [6]. World Health Organization indicates more than five lac maternal deaths every year due to the result of complications of pregnancy and child birth [7-10]. In developing countries, low education level, post-partum hemorrhages, eclampsia have been associated with maternal death [11-12]. Several factors such as individual, family, community and state are responsible for maternal health services [13]. For effectiveness of the services these factors need to include in policy making [14]. Nevertheless males are decision makers regarding expenditure of money, family size and even whether or not maternity services in countries avail [15]. Childbirth and pregnancy are generally seen as events involving women, and husbands do not participate. Older women in the group have been respected, including daughters, grandmothers and mothers-in-law, and have been viewed as competent about childbirth problems [16]. Even the messages related to information, education and communication also targeted women who exclude men to achieve equality. The male involvement helps seeking, accessing and receiving care without delay and would bring about positive outcomes of birth [17] in few areas of the world husbands approval is an vital role in health services and maternal care [18, 19] Increased participation in antenatal care ANC to reduce the transmission of infection from mother child during pregnancy and prevent from disease [20-22]. Men have cultural and economic vitals in families that can influence decisions related to the child and her mother health, male participation in family health and ANC is the best solution to maintain infection outcomes, male involvement have a relation with increased adherence to maternal infection prophylaxis [23-25]. Nevertheless, it has been shown that growing male participation enhances health outcomes for the child and her mother. Participation of male in ANC is highly appropriate but rarely done by both men and women. Approaches should make ANC male-friendly, promote the growth of communication skills, enhance the awareness that ANC is not a women's event it is about encouraging child and substantial benefits for men partner involvement, including integrated male health services [26]. The main aim of this study is to explore the role of male involvement in birth preparedness and maternity care and indicate contributing factors for lack of Participation. This study also assess the males' participation in maternal care and birth preparedness and identify factors affecting males' involvement in maternal care and birth preparedness.

## METHODS

The study was carried out at Chachro is a small town and Taluka (tehsil) of District Tharparkar Sindh Pakistan. The total population of taluka chachro is 351,263 and the

Married Male population of union council of chachro is 2850. A descriptive cross sectional study was conducted after the approval of ERC Ethical Review Committee of LUMHS Jamshoro. Study has been completed within three months after ethical approval from LUMHS. Random sampling technique was applied .after identifying first male, then every second male was selected. From previous studies, 50% prevalence of male participation in maternal care, was used to calculate sample size. Final sample was the 384 respondents in order to get 95% confidence level with 0.05 margin of error. By adding 20% non-response rate the sample size was 461. All the married males aged 18 years or above, whose wives have undergone pregnancy during last three years, monogamous as well as polygamous males, males whose wives have encountered bad obstetrical outcomes, males living with their wives, and couples living in nuclear and joint family included in our study. Unmarried men, couples with primary infertility, those who are not willing to participant in study are excluded from our study. The information will be collected by interview to assess the involvement of male and then filling the proforma, the data collection tool comprised of two parts demographic variable and maternity and birth preparedness related variables and comprising of twenty five questions & sub questions. In this study, sociodemographic information such as age (years), gender (male/female), occupation status, education status, maternity care, pregnancy, reproductive age, and antenatal care, were collected by a structured questionnaire administered during a home interview. Data were analyzed by using SPSS version 20.0. For categorical variables, frequency and percentage were calculated and for continuous variable mean and  $\pm$  standard deviation were calculated. To determine the association between male participation and maternal health, chi- square test was applied and the level of significance was set.

## RESULTS

In present study mean age of male was 35.3 years  $\pm$ 6.6, the religion of participants was as Muslims (52.1%) and Hindu (47.9%). In table 1 the level of education of participants is more than half of the participants were literate (57.7%), followed by illiterate (42.3%) the primary level of education is (23.2%), middle (18.9%), and Matric (10.4%), above Matric (5.2%).

Education	Frequency	Percentage	p-value
Literate	266	57.7	0.46
Illiterate	195	42.3	
Primary	107	23.2	
Middle	87	18.9	
Matric	48	10.4	
Matric & above	24	5.2	

**Table 1:** Distribution of Educational level of participants

In table 2 more than half the participants (51.6%) had married in early age between 15 to 18 years, 35.8% of them married between 18 to 22 years, 9.5% between 22-25 years and 3 % had married above 25 years of age.

Age of marriage	Frequency	Percentage
15-18 years	238	51.6
18-22 years	165	35.8
22-25 years	44	9.5
>25 years	14	3.0
Total	461	100.0

**Table 2:** Age distribution of married participant  
49.7% participants reported to have less than two or two children followed by three to four children(37.3%), five to six children (8.2%), more than six children (2.6%) and 2.2% of them had no children as shown in Table 3.

# of children	Frequency	Percentage
None	10	2.2
less than 2 or 2	229	49.7
3-4	172	37.3
5-6	38	8.2
More than 6	12	2.6
Total	461	100.0

**Table 3:** Frequency of children of subjects  
Most of the participants (70.3%) believed in male involvement and child preparedness and 29.7% men did not and were significant at 0.001. Less than half the participants (39.3%) had knowledge about antenatal care but 60.7% had no knowledge about antenatal care and was significant with p value 0.001. More than half of the men (61.8%) encouraged their wives or women about the antenatal care but there is 38.2% did not encourage their spouse or women for antenatal care was significant with p value 0.001. In the table 35.6% of women were helped by men in house chores during pregnancy and 64.4% women not helped by men in house chores during pregnancy was significant (p value 0.02). 9.3% men reported to participate in antenatal sessions and was not significant with p value 0.42 as represented in Table 4.

Believe of male involvement	n	%
Don't Know	61	13.2
weakness of mother and child	135	29.3
Bleeding	89	19.3
Vomiting and restlessness	76	16.5
Maternal death	24	5.2
Abortion	14	3.0
Digestion problems	62	13.4
Total	461	100.

**Table 4:** Believe of male involvement in overall maternal health  
Men's knowledge about complication related to pregnancy was reported as weakness of mother and child (29.3%),bleeding (19.3%),vomiting and restlessness (16.5%),digestion problems

Believe of male involvement in maternal health and child preparedness			
	Frequency	Percentage	p-value
Yes	324	70.3	0.001
No	137	29.7	
Total	461	100.0	

Men's knowledge about antenatal care			
	Frequency	Percentage	p-value
Yes	181	39.3	0.001
No	280	60.7	
Total	461	100.0	

Encouragements of wife/women for antenatal care by spouse			
	Frequency	Percentage	p-value
Yes	285	61.8	0.001
No	176	38.2	
Total	461	100.0	0.02

Men's help in house chores during pregnancy			
	Frequency	Percentage	p-value
Yes	164	35.6	0.001
No	297	64.4	
Total	461	100.0	

Men's participation in antenatal session			
	Frequency	Percentage	p-value
Yes	43	9.3	0.42
No	418	90.7	
Total	461	100.0	

(13.4%),maternal death (5.2%),abortion (3%) and 13.2% men said that they did not know about complications related to pregnancy (Table 5).

**Table 5:** Knowledge about complications related to pregnancy

## DISCUSSION

In this study mean age of male was 35.3 years S.D ± 6.6, and the religion of participants was as Muslims (52.1%) and Hindu 47.9%. another study reported mean age of 32.5 years. In present study showed that the less than half of the participants (42.3%) were illiterate; the age, education of male was not found relation with male participation in maternal care and birth readiness. Another study has revealed that Illiteracy and primary education were associated factors that involved men in maternal care [27]. But another study has shown association between men's higher education and awareness to take part in birth preparedness and make important decision socially and financially [28]. This difference may be because in present study only 5% of male were educated above Matric that shows very low level of education which plays crucial role in maintaining health [29]. Similarly more than half the participants (51.6%) had married in age between 15 to 18 years, 35.8% of them married between 18 to 22 years. It has been customary to get married in early years of life, it may be because of that half the participants were married between fifteen to eighteen years of age. In this study 61.8% of male went with their accomplices to get antenatal care and birth readiness, a study bolstered and finding

appeared that 67.4% guys went with their companions for antenatal care [24], another study on male inclusion in antenatal care and birth readiness has illustrated over all 59.9% predominance of male association [30]. Another study uncovered that the nearness of companion amid antenatal care and at the time of delivery [31]. Nevertheless males are decision makers concerning the consumption of cash, status of sexual relations, family figures and whether or not profit maternity services in creating countries [32]. In this study, 70.3% of participants believed to get male involved in maternal health and child preparedness but most of the male (60.7%) had no knowledge about antenatal care. Another research validates that men's awareness helps seeking, accessing and receiving care without delay and bring about positive outcomes of birth [31]. Husbands were the main decision makers for receiving maternal care and place of birth. Men however, have socio-economic power and enormous influence over their partners and their important health decision especially in developing countries [33, 34]. Present study showed that, 35.6% of husbands helped their partners' in house chores during pregnancy and 64.4% did not one more research supports findings that 49.2% of husbands had assisted their spouses in domestic work during pregnancy [32]. In this study, men's knowledge about complications related to pregnancy was found as weakness of mother and child both (29.3%), followed by bleeding (19.3%), vomiting and restlessness (16.5%), digestive problems (13.4%) maternal death (5.2%), abortion (3%). Likewise, a study has demonstrated that 50.8 % of men had knowledge of complications related to pregnancy [35]. Furthermore, 18.7% of men with high cultural-economic status significantly attend more to labor as compare to less status of cultural and social husbands. Spouses' participation in the delivery and labor processes of their children was very poor [6]. Men told that it was important to take meals on time was, they also emphasized on regular milk intake for pregnant women and 6.5% male gave importance to eat variety of fruits during pregnancy. Most of the men knew that it was important to get advice for rest and should take iron and folic acid. In another study, men told that pregnant women should take adequate nutrition and vitamins, take proper rest and don't carry heavy weight. Take appropriate Nutrition mainly fruit juices and green vegetables [36]. Another study reveals that 80.5% partners agreed that their spouses need more food during pregnancy [37]. In this study, factors such as men's knowledge, encouragement for antenatal care of wife or women, partner's contribution in house chores during pregnancy, awareness about importance of tetanus toxoid vaccine, importance of advice on rest have been found associated with maternal care and birth

preparedness. Ignorance, poverty, cultural and religious practices have been the reasons for low spousal participation.

## CONCLUSION

Male participation in maternal care and birth preparedness is not appropriate enough in union council chachro district Tharparkar. Participants knowledge about overall maternal and child health and complications of pregnancy and labor, level of education, encouragement of their spouses, are the decisive factors in availing the benefits of maternal and child care. There is need to encourage maximum involvement by male in maternity and birth preparedness by incorporating health services or programs which should have mandatory attendance by men.

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## Original Article

## Use of Cinnamon, Vitamin D and Starch Capsules to Attenuate Different Types of Dysmenorrhea

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## ARTICLE INFO

## Key Words:

Cinnamon, Vitamin D, Starch Capsules, Dysmenorrhea

## How to Cite:

Hafeez Khan, M. ., Shahid, M. ., Noor, H. ., Zafar, A. ., Shehzad Muzammil, H., Batool Qaisrani, T. ., Shehzad, K. ., Imran, M. ., Junaid Anwar, M. ., & Hassan, M. . (2022). Use Of Cinnamon, Vitamin D And Starch Capsules to Attenuate Different Types of Dysmenorrhea: Cinnamon, Vitamin D and Starch Capsules in Dysmenorrhea. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.623>

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Received Date: 4<sup>th</sup> July, 2022

Acceptance Date: 13<sup>th</sup> July, 2022

Published Date: 30<sup>th</sup> June, 2022

## ABSTRACT

Dysmenorrhea disorder is a significant concern of this era in young girls at the stage of the menarche or near menstrual period. Primary dysmenorrhea is prevailing all around the world.

**Objectives:** To evaluate reducing effects of Cinnamon, vitamin D and starch capsules in patients suffering from dysmenorrhea. **Methods:** The 30 candidates for each group were selected following the minimum sample size rule. The questionnaire and numeric pain rating scale were the main tools for assessing dysmenorrhea severity, reduction in dysmenorrhea, quality of life and other variables in patients. **Results:** The demographic data showed that the maximum participants belonged to middle-class families, well-educated and living in their own homes. The results depicted that Cinnamon reduced pain severity, bleeding and physical pain and improved physical activity, leisure activities, life satisfaction, health services, meaningful life and body appearance among most participants. Likewise, vitamin D also exhibited a significant reduction in dysmenorrhea symptoms and increased the quality of life among most patients. However, the effects of starch capsules were observed to be less effective than the cinnamon tea and vitamin D. **Conclusions:** The study concluded that cinnamon tea and vitamin D were the best therapy for reducing dysmenorrhea symptoms.

## INTRODUCTION

Menarche and menstrual period are a hallmark of female puberty growth [1]. According to the reported data, almost 75% of young girls face various menstrual issues, i.e., painful, abnormal, delayed, and severe menstrual bleeding [2]. Among these menstrual issues, dysmenorrhea's increasing prevalence rate is a significant threat to the

health of the female population, especially young girls (school-going teenagers) who are at the stage of their initial menstrual periods. In this disease, spasmodic pain and frequent and severe cramping start in the inferior part of the abdomen. Dysmenorrhea disease arises in adolescence at the start or after 0.5-2 years of

menstruation [3]. Dysmenorrhea is categorized into organic (uterine myoma and endometriosis leading the severe pelvic pain during the Menarche period) and functional (Ovarian disorders) depending on pathogenesis [4]. The dysmenorrhea prevalence rate is 16-91% at reproductive age leading to morbidity. Multiple factors such as general health, diet, lifestyle, working conditions, daily activities, the physical environment, and leisure activities have a significant role in the administration of menstrual symptoms. Research investigations suggest that lifestyle plays a vital role in managing anxiety, mental stress due to dysmenorrhea and triggering pressure [5]. Various therapies for dysmenorrhea and dysmenorrhea-linked diseases have been reported, but each therapy has some side effects. Among these types of treatments, herbs and wild vegetation have a miracle role in treating several diseases, especially dysmenorrhea [6]. The herbs and various spices, i.e. roses, Cinnamon, ginger and fennel, used in daily life are at the top due to their therapeutic potential and play a vital role in the management of various chronic and acute diseases and have significant potential in dysmenorrhea management [7]. Cinnamon is considered a widely used spice in ancient times. Cinnamon was several therapeutic potentials in reducing low-density lipoprotein cholesterols (LDLs-C), sugar levels in the blood, cardiovascular diseases and other cancers fighting sites and cells [8, 9]. Moreover, it is depicted to have miracle effects in medication of pain-related disorders, i.e., pelvic pain, menstrual cramps and other dysmenorrheal symptoms in young females [10]. Many in-vitro and in-vivo studies showed that Cinnamon contained higher concentrations of bioactive compounds, i.e. coumarins, diterpenoids, polyphenols, cinnamaldehyde and cinnamic acid use in pharmaceutical treatments such as anti-inflammatory attributes, i.e., analgesic, cholesterol, fat-lowering, antioxidant, antihypertensive, anti-diabetic, anti-cardiovascular, antiulcer, anticancer and antifungal [11]. Cinnamaldehyde in Cinnamon has considerable effects on various diseases, i.e., allergies, various kinds of pains, especially menstrual pain. Along with Cinnamon, Vitamin D plays a vital role as the vitamin D receptors are present in the placenta, deciduas, fallopian tube (epithelial cells), endometrium and ovarian tissue. Moreover, vitamin D's significant effects in lowering the prostaglandin output have also been observed [12]. It is created (80-90%) through the contact of predominant skin to the sunlight, and reaming is taken from diet nutrients and supplementation [13]. It also plays a considerable critical role in dysmenorrhea management. Vitamin D increases the bioavailability of calcium and maintains its homeostasis linked to pain reduction during dysmenorrhea [14]. The current study is planned to explore and evaluate

the proportional impact of vitamin D and Cinnamon among females of different ages suffering from dysmenorrhea. Furthermore, vitamin D and Cinnamon's effect in reducing menstruation bleeding, pain severity and various factors affect the quality of life of females suffering from dysmenorrhea.

## METHODS

The physical measurements were taken via height, tap, board, and weight scale. The data was collected using different tools such as the participants' quality of life, pretested questionnaire (Demographic profile) and a numeric rating scale. This scale is most useful in pain surveys of the population having increased acute or chronic pain-linked diseases along with healthy people [15]. The scale in the current study was designed as: 0 (no pain), 1-3 (mild pain), 4-6 (moderate pain), and 7-10 (severe pain). The study was planned according to a randomized control trial. Nine months' trial period was designed to evaluate the pain conditions in the dysmenorrhea affected females and healthy women. Following the minimum sample size rule, the minimum number of participants should be 30. However, the calculated sample size was 22 participants for each group [16, 17]. The non-probability purposive sampling technique was utilized in this study. The participants were selected by setting inclusion and exclusion criteria to conduct the current research plan. Cooperative 18-45 years old females suffering from dysmenorrhea, 16-30 years old unmarried females and women suffering from initial dysmenorrhea for the last 1-2 years were selected through inclusion criteria. However, women with amenorrhea, known mineral deficiencies, and early osteoporosis suffered from abnormal uterine bleeding in the past. Individuals remained subjects of any other study within the 90 days of this study initiation. The regulations designed by the ethical committee were followed strictly during this research, i.e., consent letters from all participants were collected, collected data and information was kept confidential, participants were guided and informed about the complete study plan, and the privacy of participants was kept in confidentiality etc. The rights of participating individuals were also considered. The adult females suffering from dysmenorrhea (n=30) were selected for the study. These were randomly categorized into control and placebo groups. Initial data on nutrient intake, socioeconomic status, anthropometric measurements and pain severity scores were collected using a numeric rating scale to evaluate the dysmenorrhea on 0-Day. Vitamin D, Cinnamon and placebo were given to the subjects for three days of the menstrual cycle to monitor their compliance. The same data was recorded on the 90th day. The variables were categorized into independent vitamin D capsules and

cinnamon tea vs starch, supplementation intervals and age and dependent variables, i.e., NRS and questionnaire. NRS was used to measure the pain severity, and quality of life was evaluated through WHO-provided Performa for quality of life. The following treatment plan was followed for dysmenorrhea patients

**Treatment 1:** Cinnamon with dosage 3g5 and serving 200ml tea/day

**Treatment 2:** Vitamin D (sunny D) with dosage 600IU33 and serving 1 tablet/day

**Treatment 3:** Starch Tablets with dosage 250 mg and serving 1 tablet/day

The data was arranged and analyzed using the statistical software SPSS (V 25.0). The data was analyzed by using inferential and descriptive statistics. The quantitative demographic factors, i.e., income, age etc., were evaluated using means, standard deviations and standard errors. Frequencies and percentages were utilized to assess the qualitative variables. The Randomized Completely designed was used to evaluate Cinnamon and Vitamin D's statistical effects on dysmenorrhea ( $p \leq 0.05$ ).

## RESULTS

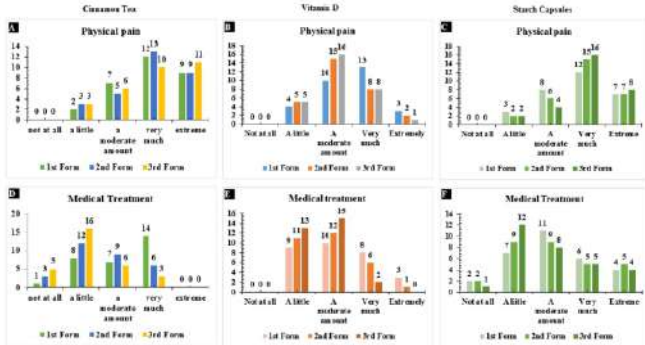
The demographic characteristics of patients were done by focusing on the patient's education, material status, economic support, hostel residency, income status, socioeconomic status, geographical location and residential status. The detailed data about the patients selected for treating dysmenorrhea by giving different therapies such as cinnamon tea, Vitamin D and starch capsules are shown in Table 1. For each medicine, 30 candidates were selected. The most selected subjects for cinnamon treatment, vitamin D and starch capsules had done their graduation, i.e., numbers of candidates were 18, 20 and 17 in treated groups, respectively. However, the remaining candidates' education was matriculated, intermediate and post-graduation. All selected patients for the study were unmarried females. The patients were chosen for the cinnamon tea, Vitamin D, and starch capsule therapy were self-dependent (17, 9 and 7) and family-dependent (13, 21, 23). The selected patients had categorized depending on their residency, i.e., university (2, 7, and 11), day scholar (13, 12 and 13) and unknown /not applicable (15, 11, and 6). The maximum number of participants belonged to middle-class families with an income of 40,000-60,000 PKR. Geographically, most candidates belonged to urban areas such as 26, 24 and 21 for selected groups, i.e., Cinnamon, Vitamin D, and starch capsule. Maximum participants had their residency, and a few lived in rented houses in all groups.

	Cinnamon Tea	Vitamin D	Starch Capsules
<b>Patient's Education</b>			
Matriculation	2	0	2
Intermediate	6	3	6
Graduation	18	20	17
Post-graduation	4	7	5
Total	30	30	30
<b>Marital Status</b>			
Married	0	0	0
Not married	30	30	30
Total	30	30	30
<b>Economic Support</b>			
Self	17	9	7
Family	13	21	23
Husband	0	0	0
Total	30	30	30
<b>University</b>			
Residency	2	7	11
Day scholar	13	12	13
Not applicable	15	11	6
Total	30	30	30
<b>Income</b>			
Below 20,000	2	0	1
20,000-40,000	3	4	5
40,000-60,000	15	15	13
60,000-80,000	7	5	7
Above 80,000	3	6	4
Total	30	30	30
<b>Socioeconomic status</b>			
Lower class	1	4	2
Middle class	27	21	17
High class	2	5	11
Total	30	30	30
<b>Geographical Location</b>			
Urban	26	24	21
Rural	4	6	9
Total	30	30	30
<b>Geographical Location</b>			
Own	25	17	17
Rented	5	13	13
Total	30	30	30

**Table 1:** Socio-Demographic Characterization of Patients Using Cinnamon Tea, Vitamin D and Starch Capsule

The data about physical pain and dysmenorrhea treatment was also collected through the questionnaire. None of the Participants of all forms in all groups said they had no physical pain. The maximum participants in all forms (1st=12, 2nd=13 and 3rd=10) of the cinnamon group selected they have very much physical pain, followed by the participants (1st=9, 2nd=9 and 3rd=11) suffering extreme physical pain and participants (1st=7, 2nd=5 and 3rd=6) a moderate amount of physical pain. In the case of the vitamin D treated group, most participants were suffering from a moderate amount of physical pain, followed by

participants having very much physical pain and participants facing a little physical pain, as shown in Figure 1B. The participants in starch capsule groups mainly were suffering from very much physical pain, followed by participants with extreme physical pain and participants with a moderate amount of physical pain, as shown in Figure 1C. The maximum participants in all forms (1st=8, 2nd= 12 and 3rd=16) of the cinnamon group preferred a little medical treatment for dysmenorrhea, followed by the participants taking a moderate medicine (1st=7, 2nd=9 and 3rd=6) and participants taking very much treatment (1st=14, 2nd= 6 and 3rd=3). In the case of the vitamin D treated group, most participants said they were taking moderate amounts of medical treatment followed by very little and a little, as shown in Figure 1E. The participants in starch capsule groups took a little treatment, followed by participants with moderate, very much and extreme medical treatments, as shown in Figure 1F.

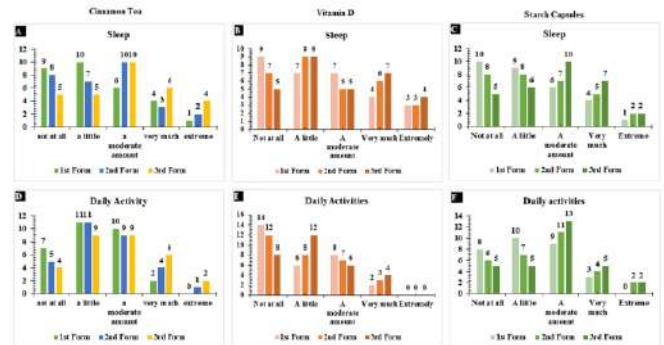


**Figure 1:** A-C: Physical Pain in cinnamon tea, vitamin D and starch capsule consuming groups accordingly, D-

F: Medical treatment in cinnamon tea, vitamin D and starch capsule consuming groups accordingly

The daily work routine of the candidates, including sleep, daily activity and work capacity, were also evaluated using three forms for each variable. Most candidates were getting moderate sleep, followed by the participants with slight and completely restlessness (not at all) suffering from dysmenorrhea. Some patients slept for ample time (very much and extreme), as shown in Figure 2A. Most of the vitamin D consuming group were getting a little time for sleep, followed by the number of participants with no rest at all times, moderate sleep, very much sleep and extreme sleep. The starch capsule-consuming patients are almost equally divided into complete restlessness, little sleep and moderate sleep. However, on average of three forms, five patients were getting very much sleep, and two patients were getting extreme sleep. Most patients suffering from dysmenorrhea were doing a minor and moderate daily activity in the consuming cinnamon group. The maximum participants showed no daily activity followed by little and moderate daily activity in Vitamin D consuming group.

However, in full dysmenorrhea, participants showed moderate daily activity in starch capsule-consuming groups, as shown in Figure 2F.

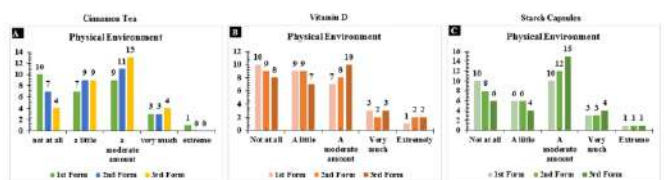


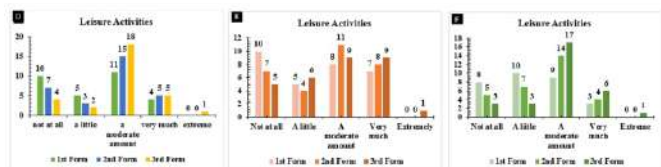
**Figure 2:** A-C: Sleeping habit of cinnamon tea, vitamin D and starch capsule consuming groups accordingly, D-

F: Daily activities of cinnamon tea, vitamin D and starch capsule consuming groups accordingly

The effect of cinnamon tea, vitamin D and starch capsule treatments significantly affected the dysmenorrhea patients' physical environment and leisure activities. Cinnamon treatment affected the physical environment of maximum dysmenorrhea patients at moderate levels, followed by numbers of patients falling in little and not at all effect of cinnamon tea of physical environment as shown in Figure 3A. Maximum participants of vitamin D consuming groups gave their opinion that it has not effect on the physical environment. After that, participants (1st=9, 2nd=9 and 3rd=6) of the vitamin D consuming group suggested the little effect and 1st=7, 2nd=8 and 3rd=10 said that vitamin D had a moderate effect. Moreover, most starch-consuming patients said that starch capsules have mild effects on the physical environment, as shown in Figure 3C.

Cinnamon affected the leisure activities of most patients in moderate amounts, and 1st form=10 patients, 2nd Form=7 patients and 3rd Form=4 patients said that Cinnamon did not affect their leisure activity. Vitamin D did not affect the leisure activity of patients (1st form=10 patients, 2nd Form=7 patients and 3rd Form=5); a moderate effect was observed in patients (1st form=8 patients, 2nd Form=11 patients and 3rd Form=9) very much effect of vitamin D was noticed on eight patients (average of three forms). Starch capsules affected the leisure activities of most patients at moderate levels, followed by little, very much and not at all levels.

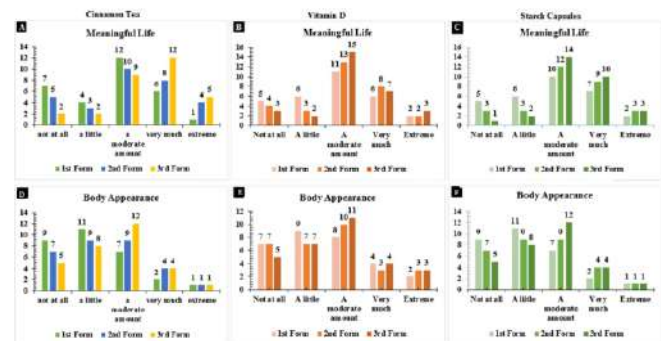




**Figure 3:** A-C: Physical environment of cinnamon tea, vitamin D and starch capsule consuming groups

F: Medical treatment in cinnamon tea, vitamin D and starch capsule consuming groups accordingly

The daily work routine of the candidates, including sleep, daily activity and work capacity, were also evaluated using three forms for each variable. Most candidates were getting moderate sleep, followed by the participants with slight and completely restlessness (not at all) suffering from dysmenorrhea. Some patients slept for ample time (very much and extreme), as shown in Figure 2A. Most of the vitamin D consuming group were getting a little time for sleep, followed by the number of participants with no rest at all times, moderate sleep, very much sleep and extreme sleep. The starch capsule-consuming patients are almost equally divided into complete restlessness, little sleep and moderate sleep. However, on average of three forms, five patients were getting very much sleep, and two patients were getting extreme sleep. Most patients suffering from dysmenorrhea were doing a minor and moderate daily activity in the consuming cinnamon group. The maximum participants showed no daily activity followed by little and moderate daily activity in Vitamin D consuming group.



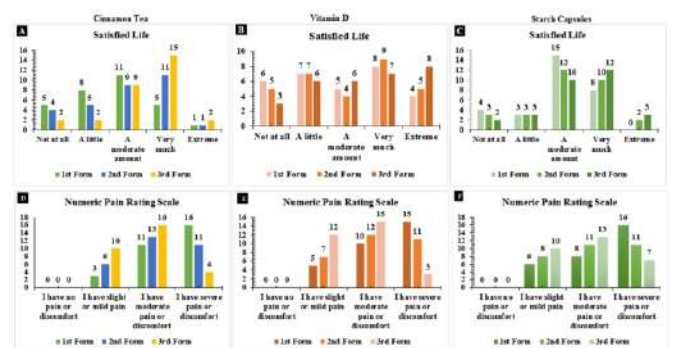
**Figure 4:** A-C: Meaningful life of cinnamon tea, vitamin D and starch capsule consuming groups accordingly,

D-F: Body appearance of cinnamon tea, vitamin D and starch capsule consuming groups accordingly

The Cinnamon enhanced the satisfaction level of life of the patient not at all (5, 4 and 2 patients at 1st, 2nd and 3rd form) a little (8, 5 and 2 patients at 1st, 2nd and 3rd form), moderate (11, 9 and 9 patients at 1st, 2nd and 3rd form), very much (5, 11 and 15 patients at 1st, 2nd and 3rd form) and extreme level (1, 1 and 2 patients at 1st, 2nd and 3rd form). The effects of vitamin D were equal on the satisfaction level of life of patients, i.e., 6, 5, and 3 patients at 1st, 2nd and 3rd form had no effect of vitamin D on their satisfied life. 7, 7 and

6 patients at 1st, 2nd and 3rd form had little impact of vitamin D on their satisfied life. 5, 4, and 6 patients at 1st, 2nd and 3rd record had a moderate effect of vitamin D on their satisfying life, and the remaining patients suggested the extreme impact of vitamin D.

At the end of the study, the numeric pain scale was utilized to evaluate the effects of cinnamon tea, vitamin D and starch capsule treatment. Before cinnamon treatment at 1st, 2nd, and 3rd form, 5, 7, and 12 patients had mild pain, 11, 13, and 16 patients had moderate pain, and 16, 11, and 4 dysmenorrhea patients had severe pain accordingly, which reduced significantly by cinnamon treatment. The same trends were shown by the treatment of vitamin D and starch capsules, but their effects were slightly less than Cinnamon, as shown in Figure 5D-F.



**Figure 5:** A-C: Satisfied life of cinnamon tea, vitamin D and starch capsule consuming groups accordingly, D-F: Numeric pain rating scale of cinnamon tea, vitamin D and starch capsule consuming groups accordingly

## DISCUSSION

The candidates were diagnosed with various diseases at the start of the study, including uterus-related pathological disorders, polycystic ovary syndrome, other medical conditions and diagnosis of dysmenorrhea. There were 3 participants in both Cinnamon and vitamin D groups, and 2 in starch capsule treated groups had uterus-related pathogenic disorders. The symptoms of polycystic ovary syndrome were observed in 2 candidates in cinnamon groups, 6 participants in the vitamin D group and 4 in the starch capsule group. The Cysts were noticed in 3 participants in the cinnamon group and 4 in the vitamin D and starch capsule group. Moreover, the collected data showed that more participants were affected by primary dysmenorrhea, i.e., 25, 24 and 26 in Cinnamon, vitamin D and starch capsule treated groups. However, 1-4 participants were suffering from moderate and severe dysmenorrhea. Cinnamon is selected for the management of dysmenorrhea disorder. Cinnamon, as a coagulant, helps prevent bleeding during dysmenorrhea disorder [18]. Vitamin D plays a crucial role in reducing dysmenorrhea disorder as a randomized trial was suggested to

prevent and administrate the primary dysmenorrhea disorder [19]. Heidarifar et al., [20] reported that the Starch capsule significantly reduced the severity of primary dysmenorrhea. The decreased in physical pain and medical treatment of the participants taking cinnamon tea, Vitamin D and Starch capsule were noticed in current study. Gutman et al., [21] showed that Cinnamon reduced the physical pain in dysmenorrhea and the medications in patients. Jahangirifar et al., [22] reported the inline results to the current study. The daily work routine of the candidates, including sleep, daily activity and work capacity, were also improved significantly in the patients of dysmenorrhea. A study conducted in Saudi Arabia supported the current study and resulted that Cinnamon improved the sleeping pattern of 86.5% of people [23].

Most patients suffering from dysmenorrhea were doing a minor and moderate daily activity in the consuming cinnamon group which was considered the main reason of the cyclic cramps in start and improved after cinnamon consumption. A critical study trial suggested that Cinnamon prevents the cyclic cramps in the pelvic during primary dysmenorrhea that alters the patients' daily activities [22]. The physical environment and leisure activities were the main factors leading to the dysmenorrhea. The given treatments reduced the symptoms and ailments of dysmenorrhea in their current physical environment and leisure activities. A controlled case study in Scotland also resulted that Vitamin D improved the physical environment in perturbations of disease-susceptible patients [24]. Fareena Begum [25] reported that vitamin D improved the patients' leisure activity time and reduced the primary dysmenorrhea-linked symptoms. The overall health condition was improved in the patients of cinnamon consuming groups. According to a study, cinnamon improved the health conditions of patients suffering from dysmenorrhea when used as an alternate medicine option [18]. Mu et al., [26] suggested that vitamin D is a critical element in enhancing the patients' meaningful life and physical environment with polycystic ovary syndrome. Vitamin D showed a moderate impact on maximum patients, very much effect and extreme effect on their body appearance was also observed. Cinnamon improves the cellular levels that will enhance body appearance attributes [27]. During treatment of the patients, the Satisfaction level of the patients was considered. The results indicated that the satisfaction level was greater in maximum number of participants treated with cinnamon tea. A study reported that the cinnamon tea significantly improved the satisfaction level of patients [28]. Moreover, at the end of the study, the numeric pain scale was utilized to evaluate the effects of cinnamon tea, vitamin D and starch capsule treatment. The numeric pain rating scale

suggested that the severity of dysmenorrhea was decreased due to cinnamon tea consumption, which acts as a pain reliever. A study concluded that Cinnamon reduced the severity of primary dysmenorrhea [25]. Huang et al., [29] reported that vitamin D improved quality of life, sleep and pain reduction.

## CONCLUSION

The current study concluded that cinnamon and vitamin D significantly reduced pelvic pain and dysmenorrhea symptoms. Cinnamon extracts and vitamin D supplementation can be utilized against the various kinds of dysmenorrhea disorders to reduce belly cramps, severe pains and bleedings, and improve the quality of life, daily activities and satisfaction levels of life among the young girls.

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## Original Article

## Association between Type of Cataract According to LOCS Classification with Diabetes Mellitus

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## ARTICLE INFO

## Key Words:

Posterior Sub Capsular Cataract, Diabetes Mellitus, Cortical Cataract, Nuclear Cataract.

## How to Cite:

Jan, N. ., Ahmad, M. ., Liaqat, M. ., Iqbal, S. ., Mujahid, M. ., Ullah, S. ., & Faridi, T. . (2022). Association between Type of Cataract According to LOCS Classification with Diabetes Mellitus: Type of cataract and Diabetes Mellitus. Pakistan BioMedical Journal, 5(7).<https://doi.org/10.54393/pbmj.v5i7.502>

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[samiaiqbal988@gmail.com](mailto:samiaiqbal988@gmail.com)Received Date: 14<sup>th</sup> May, 2022Acceptance Date: 5<sup>th</sup> June, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Prevalence of diabetes mellitus has increased over time. DM has several adverse effects on body, out of which cataract is the most common ocular complication. Cataract is found to be more common in patients with diabetes mellitus due to changes in the metabolism of body.

**Objectives:** To determine the association of type of cataract according to LOCS classification with diabetes mellitus. **Methods:** The age of the patients was in the range of 25-80 years old. The inclusion criteria were the diabetic patients having the diabetic history of more than 8 years. Patients who were older than 80 years old and who had a history of any systemic disease were disqualified from the trial. All of the patients who were included underwent thorough eye examination. **Results:** 98 patients were included in the study having positive history of diabetes mellitus. The most common kind of cataract in people with diabetes is PSCC. There were 51 participants with posterior sub-capsular cataract (PSCC) (52.0 percent). This was followed by nuclear sclerosis cataract in twenty (20.04%) patients and cortical cataract in twelve (12.2%) individuals. In contrast, diabetic patients only experienced posterior polar cataract in seven (7.1%) patients and nuclear sclerosis and PSCC in the remaining eight (8.1%) patients. **Conclusions:** Diabetic mellitus patients should be checked for PSCC, which can impair vision, particularly in bright light, or during the day.

## INTRODUCTION

Patients with diabetes mellitus are more likely to develop cataract up to five times at an early age particularly [1]. Increase in the incidence of diabetes mellitus has given rise to cataract resultantly [2, 3]. Several procedures of cataract extraction have been introduced. However, in individuals having diabetes, improvement scale is a matter of deliberation, and many studies have shown complications of cataract surgeries in patients of diabetes [4]. Research of different studies recommended that the polyol pathway through the monosaccharose reductase (AR) catalyzes aldohexose reduction into sorbitol- pathway which is a central part of the mechanism of development

of cataract [5, 6]. Many studies were conducted to clarify the role of AR pathway within the method of cataract development and the accumulation of sorbitol intracellularly ends up in hyperosmotic result that provides rise to hydropic lens fibers that then degenerate and cataract forms [7]. Sorbitol production takes place faster in diabetic patients as compared to non-diabetic patients. Removal of sorbitol intracellularly takes place through diffusion. In a very recent study it had been found that AR levels in patients underneath the age of sixty and people United Nations have polygenic disease from short length had a direct correlation with the prevalence of

posterior subcapsular cataract (PSSC) [8]. Moreover, indirect correlation was testified between the extent of AR in erythrocytes and therefore the lower density of lens tissue cells that is understood in diabetics than in non-diabetics. These outcomes prompt that AR could cause the formations of posterior capsular cataract [9]. The swelling of the tissue lens fibers that causes diffusion stress is another combining mechanism that contributes within the speedy development of cataracts, particularly in young patients [10]. Since the endoplasmic reticulum (ER), which is the primary location where protein synthesis occurs, is stressed as a result of the diffusion stress, free radicals are created. The variation of aldohexose levels, which damages lens fibres with aerophilic pressure, is another source of the pressure in the emergency room [11]. Additionally, when the quantity of aldohexose in bodily fluids increases, lens proteins should glycate, which results in the production of advanced glycation end products. According to some research, diffusion stress in the lens that results in sorbitol buildup kills lens tissue cells involuntarily [12, 13]. By creating a hypoxic environment that leads to cataract development in diabetes patients, quick glycemic control may further intensify these effects within the lens. [14].

## METHODS

The study was conducted in Department of ophthalmology, The university of Lahore teaching Hospital Lahore from May to November 2020. It was a descriptive cross sectional study. Patients between 25-80 years of age with diabetes have been covered in the study. The diabetic patients having history of diabetes for at least 8-9 years were included. Patients having age greater than 80 years and having history of any systematic disorder was excluded. Data were analyzed using SPSS version 25.0.

## RESULTS

In this study, Ninety-eight (n=98) patients were enrolled with positive history of diabetes. Table 1 shows the age with percentages i.e., 25-40 years (23.4%), 41-55 years (39.7%), 56-70 years (26.5%) and remaining 10.2% with the age of 71-80.

Age	Frequency	Percent
25-40	23	23.4
41-55	39	39.7
56-70	26	26.5
71-80	10	10.2
Total	45	100

**Table 1:** Descriptive Statistics

Table 2 shows most typical form of cataract is PSSC in diabetic mellitus. Subjects with posterior sub-capsular cataract (PSSC) were fifty one (52.0%). This was followed by nuclear sclerosis cataract in twenty (20.04%) and cortical

cataract in twelve (12.2%) patients, whereas in diabetic patients posterior polar cataract was seen in 7 (7.1%) patients and remaining eight (8.1%) had PSSC and nuclear sclerosis as represented in Table 2.

Age	Frequency	Percent
PSSC	51	52
Nuclear Sclerosis	20	20.4
Cortical Cataract	12	12.2
Posterior Polar Cataract	7	7.1
PSSC and Nuclear Sclerosis	8	8.2
Total	98	100

**Table 2:** Types of Cataract

## DISCUSSION

Our study result showed that posterior sub-capsular cataract (PSSC) is the most typical variety of cataract in diabetic patients with prevalence of fifty one (52.0%). It absolutely was followed by nuclear sclerosis cataract in twenty (20.04%) and plant tissue cataract in twelve (12.2%) diabetic patients, whereas in diabetic patients posterior polar cataract was less common and seen in 7 (7.1%) patients and remaining eight (8.1%) had PSSC and nuclear sclerosis cataract. According to a recent study, those between the ages of 36 and 50 had the highest rates of lens clouding. When the same survey was published in 2003, it was unquestionably discovered that forty-four percent of people had cataracts [15]. In the current investigation, there were 79 (85.9%) cases of cataract with polygenic condition, and was absent in 20 (19.6 percent) of cases. Taking into account the frequency of females afflicted by polygenic condition, cataract was observed in thirteen (14.1%) and missing in eighty-two (80.4%) patients among non-diabetics. According to a prior study, diabetic individuals were included in the investigation. The cataract cluster served as a substitute for the management cluster in the first cluster [16]. The findings showed that females were more prevalent in the cataract cluster than in the management cluster [17]. Out of 194 patients, 63 (52.94%) were female and 29 (38.66) were male patients who received cataract surgery. The incidence of polygenic disorder was observed to be higher in females as compared to males [18]. In a recent study, researchers looked at the frequency of cataracts in people with and without diabetes. According to the research, 274 people had polygenic disorders, and 256 of them did not have diabetes. The type of cataracts determined within the study were 5% having cortical cataract, forty eighth nuclear cataract and 42.5% PSSC in diabetic patients [15]. It is thus concluded that CC was the foremost common subtype, among the monotype cataracts in patients with sort a pair of DM (15.1%). The mix of PPSC, NC and CC was the foremost common (19.5%) within the mixed sort cataracts. Results of another showed important relationship between polygenic

disorder and PSCC [19]. This study found 43 (54.43%) PSCC, 14 (17.72%) cortical cataracts, and 17 (21.51%) nuclear cataracts in diabetes individuals, which was unquestionably higher than the results of the previous study. While among non-diabetic individuals, three (23.07%) had PSCC, one (7.59%) had premature lenticular alterations, six (46.15%) had nuclear sclerosis cataract, and three (2.37%) had cortical cataract (23.07 percent). Thus, one of the fundamental goals for future research on cataracts must be to accelerate the development of pharmaceutical treatment and safe methods for cataract extraction [20].

## CONCLUSION

Diabetic mellitus patients should be checked for PSCC, which can impair vision, particularly in bright light, or during the day.

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## Original Article

## Comparison between Strength Training and Endurance Training in Neck Pain patients: A RCT

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## ARTICLE INFO

## Key Words:

Posterior Sub Capsular Cataract, Diabetes Mellitus, Cortical Cataract, Nuclear Cataract.

## How to Cite:

 Bugti, M. ., Khan, R., Bugti, M. K. ., Shakoor, U. ., Ammar Naveed, M. ., Shahid Shabbir, M. ., Azfar, H. ., & Latif, D. (2022). Comparison between Strength Training and Endurance Training in Neck patients: A RCT: Strength Training and Endurance Training in Neck patients. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.628>

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Received Date: 5<sup>th</sup> July, 2022Acceptance Date: 14<sup>th</sup> July, 2022Published Date: 30<sup>th</sup> July, 2022

## ABSTRACT

Prevalence of diabetes mellitus has increased over time. DM has several adverse effects on body, out of which cataract is the most common ocular complication. Cataract is found to be more common in patients with diabetes mellitus due to changes in the metabolism of body. **Objectives:** To determine the association of type of cataract according to LOCS classification with diabetes mellitus. **Methods:** The age of the patients was in the range of 25-80 years old. The inclusion criteria were the diabetic patients having the diabetic history of more than 8 years. Patients who were older than 80 years old and who had a history of any systemic disease were disqualified from the trial. All of the patients who were included underwent thorough eye examination. **Results:** 98 patients were included in the study having positive history of diabetes mellitus. The most common kind of cataract in people with diabetes is PSCC. There were 51 participants with posterior sub-capsular cataract (PSCC) (52.0 percent). This was followed by nuclear sclerosis cataract in twenty (20.04%) patients and cortical cataract in twelve (12.2%) individuals. In contrast, diabetic patients only experienced posterior polar cataract in seven (7.1%) patients and nuclear sclerosis and PSCC in the remaining eight (8.1%) patients. **Conclusions:** Diabetic mellitus patients should be checked for PSCC, which can impair vision, particularly in bright light, or during the day.

## INTRODUCTION

Patients with diabetes mellitus are more likely to develop cataract up to five times at an early age particularly [1]. Increase in the incidence of diabetes mellitus has given rise to cataract resultantly [2, 3]. Several procedures of cataract extraction have been introduced. However, in individuals having diabetes, improvement scale is a matter of deliberation, and many studies have shown complications of cataract surgeries in patients of diabetes

[4]. Research of different studies recommended that the polyol pathway through the monosaccharosereducase (AR) catalyzes aldohexose reduction into sorbitol- pathway which is a central a part of the mechanism of development of cataract [5, 6]. Many studies were conducted to clarify the role of AR pathway within the method of cataract development and the accumulation of sorbitolintracellularly ends up in hyperosmotic result that

provides rise to hydropic lens fibers that then degenerate and cataract forms [7]. Sorbitol production takes place faster in diabetic patients as compared to non-diabetic patients. Removal of sorbitol intracellularly takes place through diffusion. In a very recent study it had been found that AR levels in patients underneath the age of sixty and people United Nations have polygenic disease from short length had a direct correlation with the prevalence of posterior subcapsular cataract (PSSC) [8]. Moreover, indirect correlation was testified between the extent of AR in erythrocytes and therefore the lower density of lens tissue cells that is understood in diabetics than in non-diabetics. These outcomes prompt that AR could cause the formations of posterior capsular cataract [9]. The swelling of the tissue lens fibers that causes diffusion stress is another combining mechanism that contributes within the speedy development of cataracts, particularly in young patients [10]. Since the endoplasmic reticulum (ER), which is the primary location where protein synthesis occurs, is stressed as a result of the diffusion stress, free radicals are created. The variation of aldohexose levels, which damages lens fibres with aerophilic pressure, is another source of the pressure in the emergency room [11]. Additionally, when the quantity of aldohexose in bodily fluids increases, lens proteins should glycate, which results in the production of advanced glycation end products. According to some research, diffusion stress in the lens that results in sorbitol buildup kills lens tissue cells involuntarily [12, 13]. By creating a hypoxic environment that leads to cataract development in diabetes patients, quick glycemic control may further intensify these effects within the lens. [14].

## METHODS

The study was conducted in Department of ophthalmology, The university of Lahore teaching Hospital Lahore from May to November 2020. It was a descriptive cross sectional study. Patients between 25-80 years of age with diabetes have been covered in the study. The diabetic patients having history of diabetes for at least 8-9 years were included. Patients having age greater than 80 years and having history of any systematic disorder was excluded. Data were analyzed using SPSS version 25.0.

## RESULTS

In this study, Ninety-eight (n=98) patients were enrolled with positive history of diabetes. Table 1 shows the age with percentages i.e., 25-40 years (23.4%), 41-55 years (39.7%), 56-70 years (26.5%) and remaining 10.2 % with the age of 71-80.

Age	Frequency	Percent
25-40	23	23.4
41-55	39	39.7
56-70	26	26.5
71-80	10	10.2
Total	45	100

**Table 1:** Descriptive Statistics

Table 2 shows most typical form of cataract is PSSC in diabetic mellitus. Subjects with posterior sub-capsular cataract (PSSC) were fifty one (52.0%). This was followed by nuclear sclerosis cataract in twenty (20.04%) and cortical cataract in twelve (12.2%) patients, whereas in diabetic patients posterior polar cataract was seen in 7 (7.1%) patients and remaining eight (8.1%) had PSSC and nuclear sclerosis as represented in Table 2.

Types of Cataract	Frequency	Percent
PSSC	51	52
Nuclear Sclerosis	20	20.4
Cortical Cataract	12	12.2
Posterior Polar Cataract	7	7.1
PSSC and Nuclear Sclerosis	8	8.2
Total	98	100

**Table 2:** Types of Cataract

## DISCUSSION

Our study result showed that posterior sub-capsular cataract (PSSC) is the most typical variety of cataract in diabetic patients with prevalence of fifty one (52.0%). It absolutely was followed by nuclear sclerosis cataract in twenty (20.04%) and plant tissue cataract in twelve (12.2%) diabetic patients, whereas in diabetic patients posterior polar cataract was less common and seen in 7 (7.1%) patients and remaining eight (8.1%) had PSSC and nuclear sclerosis cataract. According to a recent study, those between the ages of 36 and 50 had the highest rates of lens clouding. When the same survey was published in 2003, it was unquestionably discovered that forty-four percent of people had cataracts [15]. In the current investigation, there were 79 (85.9%) cases of cataract with polygenic condition, and was absent in 20 (19.6 percent) of cases. Taking into account the frequency of females afflicted by polygenic condition, cataract was observed in thirteen (14.1%) and missing in eighty-two (80.4%) patients among non-diabetics. According to a prior study, diabetic individuals were included in the investigation. The cataract cluster served as a substitute for the management cluster in the first cluster [16]. The findings showed that females were more prevalent in the cataract cluster than in the management cluster [17]. Out of 194 patients, 63 (52.94%) were female and 29 (38.66) were male patients who received cataract surgery. The incidence of polygenic disorder was observed to be higher in females as compared to males [18]. In a recent study, researchers looked at the

frequency of cataracts in people with and without diabetes. According to the research, 274 people had polygenic disorders, and 256 of them did not have diabetes. The type of cataracts determined within the study were 5% having cortical cataract, forty eighth nuclear cataract and 42.5% PSCC in diabetic patients [15]. It is thus concluded that CC was the foremost common subtype, among the monotype cataracts in patients with sort a pair of DM (15.1%). The mix of PPSC, NC and CC was the foremost common(19.5%)within the mixed sort cataracts. Results of another showed important relationship between polygenic disorder and PSCC[19]. This study found 43(54.43%)PSCC, 14 (17.72%) cortical cataracts, and 17 (21.51%) nuclear cataracts in diabetes individuals, which was unquestionably higher than the results of the previous study. While among non-diabetic individuals, three (23.07%) had PSCC, one (7.59%) had premature lenticular alterations, six(46.15%)had nuclear sclerosis cataract, and three (2.37%) had cortical cataract (23.07 percent). Thus, one of the fundamental goals for future research on cataracts must be to accelerate the development of pharmaceutical treatment and safe methods for cataract extraction[20].

## CONCLUSION

Diabetic mellitus patients should be checked for PSCC, which can impair vision, particularly in bright light, or during the day.

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## Original Article

## Prevalence of Non-Specific Neck Pain Associated with Psychological Motives Among Young Adults During Problematic E-Learning in COVID-19.

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## ARTICLE INFO

## Key Words:

Non-specific neck pain, causes, psychological issues, anxiety, depression, young adults, online education.

## How to Cite:

Jabbar, F., Khalid, A. ., Ahmad, J. ., Munawar, A. ., Munawar, N. ., & Anwar, M. . (2022). Prevalence Of Non-Specific Neck Pain Associated with Psychological Motives Among Young Adults During Problematic E-Learning in COVID-19: Non-Specific Neck Pain with Psychological Motives Among Young Adults . *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.690>

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Received Date: 11<sup>th</sup> July, 2022Acceptance Date: 21<sup>st</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Non-specific neck pain can be described as an acute or chronic cervical and shoulder girdle complication arising from occiput of skull to the spine of scapula that may radiate down to the arms, with or without minimizing cervical range of motion, not associated with history of any infection or fracture. **Objective:** The objective of the study is to observe the incidence of non-specific neck pain and its association with anxiety and depression among young adults during problematic online education. Previous literature showed a significant association of anxiety and depressive disorder with high morbidity in respondents with non-specific neck pain. But very few studies found to highlight the relation of psychological stress with neck discomfort. This research focuses on said prevalence of non-specific neck ailment in relation to anxiety and depression among young students of Government College University Faisalabad during problematic online learning. **Methods:** The study framework adopted was a cross-sectional survey. The sample calculated was 103 depending on previous researches. Subjects were taken from Government College University Faisalabad. A simple random sampling approach was utilized to gather the sample. The self-made questionnaire was used as data collection tool. Data analysis and interpretations was done by using SPSS version 16.0. **Results:** N=103 students including n=21(20.4%) males and n=82(79.6%) females had neck pain because of various psychological factors, such as depression and anxiety. Individuals had mild, moderate and severe pain on pain scale were (37.9%) (22.3%) and (8.7%) respectively with mean and Std. deviation (2.1262±0.9769). Outcomes were reported in the form of frequency distribution bar charts. Results concluded that 74% young adults reported neck pain due to anxiety and depression. The chi-square test parameters defined that there is significant relation of neck pain with anxiety ( $p = 0.001$ ) and no significant association of neck pain with depression ( $p = 0.5$ ) during problematic online learning. **Conclusion:** The inferences of this review indicated that anxiety causes more pain in neck region as compared to depression among young students during problematic e-learning. The study will help to raise the point of management of stressful situations in a better way to avoid the non-specific neck pain.

## INTRODUCTION

Non-specific neck pain is defined as acute or chronic cervical and shoulder girdle distress from occiput of skull to the spine of scapula which may radiate down the arms, as well as decrease of cervical range of motion without any history of trauma, infection or systemic pathology (e. g. fracture) [1]. Neck pain is the most familiar musculoskeletal disorder globally with an annual occurrence rate of 42 to 67% among young adult [2].

Although its precise etiology is unknown, it is considered multifarious in its origin, and researches show strong connection with depression, anxiety, migraine, inactive life style, sleep disturbances and smoking [3]. Office workers have higher annual prevalence (17.7 – 63%) and incidence (34 – 49%) of neck pain than other professionals [4]. It includes both physical risk factors, including extended sedentary or office work hours; an excessive amount of



labor or high expectations; and unsuitable workstation designs etc. and biopsychological risk factors such as stress, anxiety and depression [5]. Female gender, having a history of neck problems, having an eye-level monitoring posture and frequent muscular strain feelings, have all proven to induce discomfort. Perceived muscle tension has the biggest effect on pain in the neck. All three factors have indirectly affected neck pain resolved through discerning muscular tension; the record of neck pain has more influence in perceived muscular stress [6]. The structure of the cervical column, with regressive changes that are observed in individuals with nonspecific cervical discomfort, which also occur with aging. It is observed that there is a weak association between the level of degeneration and the existence of symptoms [7]. A variety of variables may be regarded to contribute to the NP within a "Bio-psycho-social" paradigm. Several risk variables are linked with nonmodifiable factors (e. g. history of trauma, age, gender, and genetics) and modifiable risk factors connected with psychosocial components (that can be changed as well [8]). Several variables have been associated with non-specific neck discomfort, including the gender females, advanced peer group, high paying job expectations, insufficient social or work assistance, past smokers, a history of low back complaints and a history of neck problems [9]. Physical treatments such as orthoses, massage, mobilization, manipulation, and traction are all utilized in the treatment of neck discomfort, as well as other approaches. Thermal modalities include, for example, therapeutic ultrasonography, diathermy, and heat therapy. Heating pads (dry or wet), infrared light, and other similar devices like hydrotherapy, using an ice pack with or without massage is recommended [10]. Cognitive behavioral therapy leads to gradual changes in cognitive behavior and disease by changing the thinking and improving mood of neck pain maladjustment and cervical vertebral dysfunction [11]. Certain MT techniques applied to the cervical spine may be less dangerous than others, and it is conceivable that these two factors may have therapeutic implications in terms of reducing the risk associated with these approaches [12]. This study focuses on said prevalence of non-specific pain in neck and its association with anxiety and depression among young adults during problematic online learning in the era of novel coronavirus pandemic.

## METHODS

The study was conducted at various departments of Government College University Faisalabad including faculty of Life Sciences, faculty of Allied Health Professionals, faculty of Art and Social Sciences, and faculty of Applied Linguistics. People encountered in this

study consisting of both male and female students of GCUF those facing psychological issues during online education. The number of cases in this study was determined on the basis of previous longitudinal observational study arranged by Wirth et al. [13]. The size of sample estimated for this observational study was 103 male and female students. The population included was very diversified, so the most reliable simple random sampling technique was used. Sample selected carefully in accordance to inclusion and exclusion criteria. Both male and female students of Government College University Faisalabad with age ranging between 18-28 years, having experience of online learning/e-learning, and facing psychological complications, such as anxiety and depression during online education were all included in the study. Whereas, individuals having no experience of online learning and taking drugs for anxiety and depression with a past history of neck pain due to trauma, malignancy, cervicogenic headache, cervical radiculopathy, and any other pathology were all excluded. Data collection instrument was self-developed questionnaire that was obtained from the Northwick Park Neck Pain questionnaire including their demographics, questions related to study duration and problems during online education, level of anxiety and depression, working status and intensity of neck strain was accessed by "Numeric Pain Rating Scale" which induces pain description from 0 to 10 as 0 "no pain" and 10 "unbearable pain". Performa were filled after taking acceptance form from all the individuals. This study used descriptive statistics to analyze average frequency, mean and standard deviation of all variables. Pearson chi-square test to find association between anxiety and depression and neck pain among young adults. The p-value >0.05 was assumed statistically significant. All the analysis and interpretation were represented by using SPSS version 16.0.

## RESULTS

Demographic variables of this study comprised of age, gender and level of education. Most of the respondents were female n=82 (79.6%) while male n=21 (20.4%) in this study. Few respondents belonged to age group below 20 years were 7 (6.8%). Maximum population belong to age group 20-25 years were 92 (89.3%), while 26-30 age group comprised of 3 (2.9%) of total sample size with mean 1.9806 and standard deviation  $\pm 0.36997$ . Almost 69 (67.0%) of students had bachelor level of education and 13 (12.6%) of population had master level of qualification showed in table. Table 1 represented that the total number of respondents n=103 were enrolled in this cross-sectional survey out of which female students n= 82 while male students n= 21 were completely met on inclusion criteria.

Out of 103,40 (38.8%) of students graded mild level of anxiety while 44 (42.7%) had moderate level of anxiety, 16 (15.5%) of students reported severe level of anxiety during problematic e learning. 35 of 103 with (34.0%) had mild level of depression while 47 (45.6%) of sample population showed severe level of depression and 14 (13.6%) are those with severe level of depression during problematic e-learning. Results indicated that n=76 students (73.8%) further including 62 female and 14 male students had neck pain due to psychological factors as anxiety and depression. Those with pain at back of skull were 22 (21.4%) of sample. Students with pain at back of shoulders were 45 (43.7%) of total population. Young adults had complaint of pain at posterior region of skull were 30 (29.1%) of total sample size. Numeric pain rating scale deduced that 39 (37.9%) of students rated with mild pain (1-3), while 23 (22.3%) rated with moderate pain (4-6). N=9 (8.7%) of students rated with severe pain (7-9) and 1 (1%) rated with worst pain (10) on pain rating scale with mean 2.1262 and standard deviation of  $\pm 0.97699$ . Table 2 represented the Pearson Chi-Square test results concluded that there is significant association of neck pain with anxiety (p value = 0.001) as compared to depression (p value =0.5) which found that there is no significant association of neck pain with depression among young adults during problematic online learning.

Characteristics	N	Frequency	Percentage
Mean & Std. Deviation (1.9806 $\pm$ 0.369)			
Below 20		7	6.8%
21-25	103	92	89.3%
26-30		3	2.9%
31-35		1	1.0%
Gender			
Male	103	21	20.4%
Female		82	79.6%
Level of education			
Bachelors		69	67.0%
Masters/M-Phill	103	13	12.6%
PhD.		13	12.6%
Others		8	7.8%
Problems during online education			
Internet problems		31	30.1%
Psychological issues	103	13	12.6%
Not understanding things during online education		51	49.5%
Others			
Level of anxiety		8	7.8%
Mild	103	40	38.8%
Moderate		44	42.7%
Severe		16	15.5%
None		3	2.9%

Level of depression			
Mild		35	34.0%
Moderate	103	47	45.6%
Severe		14	13.6%
None		7	6.8%
Neck pain			
Yes	103	76	73.8%
No		27	26.2%
Site of pain			
Back of skull		22	21.4%
Back of shoulders	103	45	43.7%
Posterior part of skull		30	29.1%
Others		6	5.8%
Radiating to arms			
Yes	103	35	34.0%
No		68	66.0%
Intensity of pain			
Mean & Std. Deviation (2.1262 $\pm$ 0.9769)			
No pain (0)		31	30.1%
Mild pain (1-3)		39	37.9%
Moderate pain (4-6)	103	23	22.3%
Severe pain (7-9)		9	8.7%
Worst pain (10)		1	1.0%

**Table 1:** Descriptive Statistics

	Value	DF	Asymp. sig. (2 sided)
Anxiety	15.964 <sup>a</sup>	3	0.001
Depression	2.254 <sup>a</sup>	3	0.521

**Table 2:** Association of anxiety and depression with neck pain by using Pearson Chi-Square test

## DISCUSSION

It was difficult task because there was lack of previous literature available on this topic. Almost 1/3rd of population had problems of neck pain in their lives. Studies showed that 42 to 67% prevalence of neck pain among young adults [2]. Literature found that there is strong correlation of neck pain with depression, anxiety, migraine, inactive life style, sleep disturbances and smoking [3]. According to Liu et al., psychosocial factors like anxiety and depression are the major determinants of non-specific neck pain among young population. Anxiety and depression symptoms are closely related with high mortality in neck pain victims. This study supports the hypothesis that non-specific neck pain mechanisms mediate mental disturbances in neck pain patients [14]. According to Ortego et al., results showed that chronic non-specific neck discomfort is linked to psychological stress. This study shows that stress and non-specific neck pain are strongly interrelated [15]. According to Damasceno et al. that there is no strong association of text neck syndrome and growing prevalence of non-specific neck pain in youngsters [16]. According to Demyttenaere et al., anxiety was more frequent among

people with persistent neck pain to match chronic pain in their heads or necks with psychological problems. These results show that chronic back-to-neck pain is not specific to depressive disease with psychological impairment [17]. Elbinoune and its scientist in 2016 concluded that VAS disability has been statistically associated to anxiety in the univariate analysis ( $p = 0.02$ ). Depression was substantially associated with cervicobrachial neuralgia (CBN). The study shows that chronic neck pain (CNP) patients are frequent due to anxiety and depression. In addition, disability and CBN associated with CNP can forecast which sufferer is more at risk of mental health damage [18]. Tsang et al., declared that the intensity of the neck pain was significantly linked to anxiety ( $p < 0.05$ ). Behind it was significantly linked to anxiety, depression and disaster ( $p < 0.05$ ). Multiple regression analysis had confirmed a significant prediction of anxiety and disaster ( $p < 0.05$ ) for pain-induced dysfunction. The conclusion can be drawn that anxiety, depression and disaster are linked with their self-reported condition in patients with chronic neck pain while anxiety is also accompanied with their pain intensity [19]. According to Miller et al., his work examined the popularity and socio demographic risk factors of chronic and depressive chronic pain. It was mainly female (62,1%;  $n=732$ ) with average age 51.06 (SD=16,21). The sample was mainly female. Chronic pain was 21.9 percent due to any cause. About 35% of chronic pain participants also suffered from co morbid depression (7.7 percent of the entire sample). An analysis of multinomial regression found several demographic links to chronic pain and depression [20]. Results demonstrated that musculoskeletal disorders are significantly associated with elderly depression and anxiety. Logistic regression estimated the linkage of neck pain and disorders with depression and anxiety indicators ( $p < 0.05$ ) by Talvari et al., in his study [21]. Diepenmaat et al deduced that the general prevalence of neck or shoulder, low back and arm pain was 11.5% by 7.5% and 3.9%. in girls and adults living without both parents, the incidence rate of neck/shoulder pain was high. Neck or shoulder pain, low back pain and arm pain have been associated with depressive symptoms. The stress has been combined to pain in the neck/shoulder and low back pain. This study justifies the results of adolescent musculoskeletal pain that is associated with depression and stress [22]. In the research work of Myrtveit et al., gender-based analyses of logistic regression have assessed the connection between fervently occurring neck and shoulder pain and physical activities, depression signs and screen-based activity. In general, 20, 0% (1,797 girls over 8,990) and more often than boys ( $p < 001$ ) had frequent pain in the neck and shoulder. The powerful risk factor for neck and shoulder pain in boys and girls has been

a high number of depressive symptoms [23]. After completing analysis results showed 73.8% prevalence of non-specific neck pain due to psychological motives (anxiety and depression) among young adults during problematic online education.

## CONCLUSION

The inferences of this review indicated that anxiety causes more pain in neck region as compared to depression among young students during problematic e-learning. Anxiety is the most predominant factor in causing neck pain especially in posterior part of skull and back of shoulders during online education. Although depression is not significantly linked to non-specific neck pain among young adults during online learning. This study will help us to manage neck pain disorder through management of stressful situations physically and psychologically.

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## Original Article

## The Time Up &amp; Go Test to Evaluate the Change in Functional Mobility in Post-Stroke Patients

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## ARTICLE INFO

## Key Words:

Time up and Go test, Stroke, Functional Mobility

## How to Cite:

Khan, M., Fahad Khan, M., Muneer, B., Shakoor, A., Ammar Naveed, M., Shahid Shabbir, M., & Azfar, H. (2022). The Time up & Go test to evaluate the change in functional mobility in post-stroke patients: Time Up and Go Test for Change in Functional Mobility. *Pakistan Biomedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.637>

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Received Date: 8<sup>th</sup> July, 2022

Acceptance Date: 17<sup>th</sup> July, 2022

Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Responsiveness depends on properties of statistical analysis, commonly referred to being as, distribution-based responsiveness. Time Up and Go Test (TUG) is a common assessment to evaluate the mobilization in patients with complications pertaining to stroke. **Objective:** The major emphasis of this study was to analyse the improvement in functional mobility of the patients with symptoms related to stroke. **Methods:** This study is carried out in Fauji Foundation Hospital and National Institute of Rehabilitation Medicine (NIRM), Islamabad Pakistan. Sample size consisted of 116 patients including both genders, with age ranging between 45-65 years. Clinically, the diagnosis of stroke can be concluded in compliance with reported criteria and standards of World Health Organization (WHO). Out of total 116 sample size 25 were excluded and 91 patients were assessed to detect mobility response by using TUG test, pertaining to four different intervals. The overall procedure implemented for the conclusion of TUG test included the following points; a) patients were advised to stand on toes, b) walk 3 meters, c) turn around and walk back to the chair from which they initially started, and d) asked to sit down quickly. **Results:** Between the first 7 days and 12 weeks the median of TUG test, time (mobility) was reduced from 17s to 12s. The improvement in mobility is most seen in 1st week to 3rd month. **Conclusion:** Findings indicate that the TUG test is capable to evaluate the change in functional mobility in patients with stroke. Hence, the outcomes justify the use of TUG in stroke rehabilitation.

## INTRODUCTION

After suffering from stroke, patients tend to suffer with limitations of physical activities resulting in restriction in daily physical motion [1, 2]. Numerous effective scenarios and mediums are required to evaluate the post-stroke patient movement for the provision of effectual stroke rehabilitation. The Time Up and Go Test (TUG) is considered to be a common assessment applied for the evaluation of complete patient mobilization with complications related to mobilization. The fundamental function of the test is to comprehend, whether there is any post-stroke mobility

improvement in patients after three months or not [3]. While talking about physical performance evaluative systems, including gait speed, 4-minute walk, and TUG, with the last one being the most reliable and valid as compared to others. The TUG test has also been reported for the treatment of Cognitive Impairment (CI) in elderly personnel. Upon performing a walking activity to establish balance and avoid falls, numerous cognitive domains, including awareness, memory, visual spatial capacity, and executive capabilities are all contested. Even though, the

TUG test is considered to be simple, the conclusion of the test requires consolidation of multiple bodily systems, making it a complicated procedure. The utilization of normative data pertaining to a specific population is required for more validated and authentic interpretation of the TUG results [4, 5, 6]. Based on multiple studies, the risk of fall and the physical mobility of the patients with post-stroke symptoms have been assessed by using different mobility assessment procedures. TUG was reported to be one of the most effective process that can be used for this purpose [7, 8]. The primary focus of the study was to assess the improvement in functional mobility through the TUG test during the early three-months of evaluation and the secondary objective was to analyse the longitudinal change in mobility within one year.

## METHODS

This study was carried out in Fauji foundation Hospital and National Institute of Rehabilitation Medicine (NIRM), Islamabad Pakistan. Total Sample size was 116 stroke patients, out of which 25 patients were excluded. Both genders male and female were included with age ranging between 45-65 years. Clinically, the diagnosis of stroke can be concluded in compliance with reported criteria and standards of World Health Organization (WHO) [9]. A couple of patients were excluded in adherence to the exclusion criteria, which included other pathologies like leg amputation and complications that can interfere with mobilization and assessment process. Consent form was signed by patients and they were informed about the study objectives and study tool [10]. Out of total 116 sample size 91 patients were assessed to detect mobility by TUG test on four different time intervals. 1st measurement was taken during 1st week after stroke [11]. The overall procedure implemented for the conclusion of TUG test included the following points; a) patients were advised to stand on toes, b) walk 3 meters, c) turn around and walk back to the chair from which they initially started, and d) asked to sit down quickly [12]. Those patients who need walking assistance provided walking aid but no physical aid was given. Follow-up time for assessment by using Time up and Go test at 3rd, 6th and 12 months after stroke [13]. Analysis was done via SAS, 9.3 version.  $P < 0.05$  was considered to be significant. Analysis for assessment was carried out for one year, from 1st week post-stroke to 1-year post stroke. The non-parametric sign-test, the parametric t-test, and a mixed typical method to linear regression for repetitive quantities (Proc mixed) were used for the statistical analysis.

## RESULTS

Between the first 7 days and 12 weeks, the median of TUG time (mobility) reduced from 17s to 12s. The improvement in

mobility is most seen in 1st week to 3rd month. After 3rd month TUG test time didn't show any notable significance.

Results	Impact	0-3 Months	3-6 Months	6-12 Months
Improved	Decrease Time up and Go test time (improvement)	51	28	24
	Unable to perform Time up and Go test	15	1	0
Unchanged	No change seen in Time up and Go test time	13	23	15
Increase Time up and Go test time (Detoriation)	Increased time taken to perform Time up and Go test	7	19	27

**Table 1:** Findings on TUG test, since first week to 3 months, 3 – 6 and, from 6 – 12 months' post-stroke

Results	1st week	12 weeks	24 weeks	48 weeks
	N=68	N=77	N=71	N=70
Mean+SD	17.0 + 11.0	14.5 + 10.0	14.2 + 9.4	14.7 + 9.8
Median (IQR)	13.0 (10.6-18.0)	11.0 (10.0-16.3)	11.5 (10.0-16.0)	12.0 (9.0-17.0)

**Table 2:** TUG stint, in moments, aimed at the stroke patients capable to do the assessment for every of the 4 intervals for valuation

## DISCUSSION

Outcomes of current study indicate that TUG test is reactive assessment for detecting progress in functional movements after 3 months of stroke. Another factor which is important in stroke patients' assessment of mobility is responsiveness time [14]. Researches have revealed that patients by slow time of mobility in TUG test have an upper chance of fall afterward the stroke [15]. Current study findings by multiple model approach to liner deterioration indicated longitudinal changes in TUG period for diverse age clusters in post-stroke patients [16]. Primary factor is the resistance to initiate functional movement from three to twelve months in post stroke patients with age 80 years or older. After 12 months the patients showcased decline to the time level associated with TUG test as it was at first week of stroke. These findings justify the implication of time up and Go test in data of stroke rehabilitation [17]. Moreover, Knorr et al conducted a research on sensitivity to change TUG test time during three to eight months in 44 post-stroke patients with an age around 63 years. The outcomes of their study were significantly improved TUG test time with  $p$  value  $< 0.010$ . Our research findings also indicate significant improvement in TUG test time in first week to 3 months [18]. Furthermore, duration of follow-up and time can mark the outcome. In a research with extended experimental time, usually patients suffer with bad health specifically if they are at an older age. Other factors are related to activity level and the therapy they received. These factors might be able to change the outcomes of current study and previous researches. 36% patients needed further rehabilitation at the time of

discharge. Intense training in rehabilitation of different ages of stroke patients can have great impacts on outcomes [19]. There are few limitations that confine the generalization of the outcomes. 22% patients in this study were excluded because they did not participate in the assessment of follow-up intervals. There could be biasness because most disable patients could not contribute in continuation. And, it is difficult to distinguish that the progress is due to sudden neurological recovery or improvement due to rehabilitation. TUG time also rely upon the strength of muscles and will power [20]. On the contrary side, current study had patients with stroke examined in the moderate stage and follow up was for 12 months. Furthermore, sample size was larger as compared to the previous studies. Findings of current study provide advance knowledge regarding to TUG in clinical rehabilitation of stroke patients. Outcomes also add knowledge in terms of retrieval in movement in stroke patients, generally and for different ages. As previous studies showed no significant impact of age on recovery and change in different age groups, presented as TUG time in post stroke patients.

## CONCLUSION

Findings indicate that Time up and Go test is capable to evaluate the change in functional mobility in patients with stroke. Hence, the outcomes justify the use of TUG in rehabilitation of stroke.

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## Original Article

## Effect of Manual Cervical Traction and Inter-vertebral Foramen Opening and Combination of both Techniques in Patients with Cervical Radiculopathy: Randomized Control Trial

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## ARTICLE INFO

## Key Words:

Cervical radiculopathy, posture, hectic work routine, patients

## How to Cite:

Ali Bhutto, M., Farid Nasir, M., Imran, A., Gul Memon, A., Abdul Latif, F., Salahuddin, I., Mustafa, M., & Karim, S. (2022). Effect of manual cervical traction and inter-vertebral foramen opening and combination of both techniques in patients with cervical radiculopathy: Randomized Control Trial: Manual Cervical Traction and Inter-Vertebral Foramen Opening Techniques. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.629>

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## ABSTRACT

Cervical radiculopathy is the problem that probably every other person is complaining now a days and etiology is mostly age-related related posture and hectic work routine. **Objective:** Current trial was designed to associate the impact of cervical pull, foramen initial and both combined techniques on level of disablement, pain and range of motions of cervical spine in individuals having cervical radiculopathy. **Methods:** Sampling technique was non-probability and participants were allocated into 3 groups. A, B and C. Informed consent was taken and all subjects were instructed about the trial. Patients who were taking medications or denied to participate in study were excluded. Patients of age 30-50 years who were not taking medication were included to conclude the impact of manual techniques. Patients were assigned into treatment groups based on inclusion criteria which is diagnosed MRI cervical radiculopathy unilateral upper extremity pain and numbness and 3 result test were positive out of 4. distraction test, Spurling Test, Ipsilateral rotation test and Upper-limb tension test. **Results:** In group A, mean age of subjects was 42.41±6.86 years, 40.95±7.32 years in group B and 42.50±5.77 years in group C. 8(60%) participants were crabby of sharp and shooting pain in group A. 4(35%) describe the pain as burning and tingling and 1(5%) felt deep dull ache. In analysis of baseline and after completion of treatment assessment of each group, all variant determined considerable outcomes with  $p < 0.05$  in terms of Range of motion (ROMs) and neck pain. **Conclusion:** Manual techniques of cervical traction, intervertebral foramen opening and combination of both techniques have similar effect in improving neck ache, ROMs and disability level in patients suffering with cervical radiculopathy.

## INTRODUCTION

Cervical radiculopathy is the problem that probably every other person is complaining now a days and etiology is mostly age-related related posture and hectic work routine [1]. According to a survey its incidence rate is 85 % out of 10 thousand, annually and slightly more in male as compare to female [2]. Patients with cervical radiculopathy come with neck ache, weakness of neck muscles, tingling and

numbing in upper limbs due to nerve compression or any other degenerated conditions [3]. Another most common reason of cervical radiculopathy is disc herniation in young adults with prevalence of 20% [4]. In disc herniation case patients usually complain of pain like needles and tingling sensation in one or both arms. Acute cervical radiculopathy is self-limited and 70% get improved by non-surgical I

treatment such as traditional physical therapy and exercises. And patient get back to normal within days to weeks [4-5]. In some cases, patient does not recover and needs specific elevation and treatment. If it gets prolong or left untreated, symptoms get worse and can lead to paralysis [6]. Moreover, besides this other problem related to articulated structures such as capsular and ligament restriction, inflammation, disc compression due to degenerative changes with age [7-9]. Symptoms can be regenerate by applying Spurling test on affected side of neck with lateral flexion, extension and rotation [10]. Neck ache is categorized in both chronic and acute based on the intensity and time period of pain. If pain continue less than six weeks, then we consider it acute pain and more than 3 weeks it would be called long-lasting discomfort [11,12]. Physical rehabilitation in addition with pull then technique of intervertebral foramen opening can diminishes the pain, joint stiffness and improve the range of motions [13]. Evidence showed that treatment based on multimodal may improve both acute and chronic neck pain [14,15]. Current trial was designed to associate the impact of cervical pull, foramen initial and both combined techniques on level of disablement, pain and range of motions of cervical spine in individuals having cervical radiculopathy.

## METHODS

This study is single-blind randomized control study. Study was carried out in setting of Benazir bhutto hospital, Rawalpindi. Duration was almost six months (jan 2017-july 2017). Patients of both gender were included with upper limb numbness or pain. Sample size was calculated through Epi-tool level 3, with 95% confidence interval (CI), and power 80%, based on the primary measure which is, the Neck Disability Index (NDI) [13]. Sampling technique was non-probability and participants were allocated into 3 groups. A, B and C. Informed consent was taken and all subjects were instructed about the trial. Patients who were taking medications or denied to participate in study were excluded. Patients of age 30-50 years who were not taking medication were included to conclude the impact of manual techniques. Patients were assigned into treatment groups based on inclusion criteria which is diagnosed MRI cervical radiculopathy unilateral upper extremity pain and numbness and 3 result test were positive out of 4: distraction test, Spurling Test, Ipsilateral rotation test and Upper-limb tension test. In patients got opening of intervertebral foremen intervention, Group B were treated with manual cervical traction while group C received both interventions of intervertebral foramen opening and cervical traction. These trial was for 3 weeks and 3 sessions per week. In intervertebral foramen technique, therapist's hand and fingers twitch the neckline to move the

incomplete part of neck. At the meantime, actions remained implemented. Session was carried out in 3 sets of 10 repetitions [9]. In Patient was asked to lying in supine position. Cervical traction, chin was held by physiotherapist. And 25-degree neck flexion forced was applied by therapist. Total time for traction was 10 min in which 10 secs for pull and 5 secs for rest [13,15]. Before getting treatment patients received hot pack for 15 minutes at posterior side of neck. Numeric pain rating scale (NPRS), Neck disability index (NDI) and patients specific fictional scale (PSFS) were used to measure the outcomes. Inclinator was used to measure the ROMs of cervical. Assessment was carried out as pre and post 3 weeks of treatment. No subject was drop out in Group A and B while group C had one participant dropout. Analysis was done by SPSS 21. Normality was checked by Shapiro Wilk test after test parametric and non-parametric test were applied in among groups and for within groups, paired t test was used. In the term of mean and SD data was presented with p values.

## RESULTS

23(70%) patients were male and 17(30%) patients were female in sample. In group A, mean age of subjects was 42.41±6.86 years, 40.95± 7.32 years in group B and 42.50±5.77 years in group C. 8(60%) participants were crabby of sharp and shooting pain in group A. 4(35%) describe the pain as burning and tingling and 1(5%) felt deep dull ache. In analysis of baseline and after completion of treatment assessment of each group, all variant determined considerable outcomes with p <0.05 in terms of Range of motion (ROMs) and neck pain. (Table 1)

Variables	G1		G2		G3	
	Pre	Post	Pre	Post	Pre	Post
NPRS	7.1±1.03	2.5±0.9	7.5±0.67	3.08±0.79	7.5±0.892	2.9±1.18
NDI	19.5±5.3	9.5±3.7	22.4±4.6	10.6±3.38	2.06±6.3	10.7±4.3
PSFS	5.9±1.08	8.8±0.4	5.8±1.15	8.31±1.20	6.13±1.23	8.3±0.76

NDI, NPRS, PSFS: STD: Standard Deviation, Right, Left, P-value <0.05

**Table 1:** Baseline and after treatment analysis in terms of mean & SD of all groups

7(56%) subjects were having shooting and sharp pain, and 6(46%) of subjects felt red-hot and prickly feelings in group B. While in group C 6(40%) participants had burning and shooting pain. 9(64%) patients describe aching in neck which was travel down to the right side of upper limb, 5(35%) complained about pain in the left upper limb as shown in Table 2.

Variables	G1	G2	G3	P-value
	Mean±SD	Mean±SD	Mean±SD	
NPRS	2.58±0.90	3.08±0.79	2.94±1.18	0.45
PSFS	8.80±0.44	8.37±1.201	8.83±0.67	0.33
NDI	9.58±3.77	0.67±3.60	10.75±4.37	0.71
Active flexion	52.33±3.79	53.42±2.57	51.31±4.27	0.34
Active extension	41.92±3.75	41.08±6.43	44.38±6.61	0.31
Rt side flexion	41.33±5.92	41.50±5.60	39.94±3.58	0.66
Lt side flexion	40.33±5.74	44.67±3.82	38.88±5.18	0.01*
Rt t side rotation	58.02±6.97	55.33±4.11	56.44±8.65	0.63
Lt side rotation	61.58±5.80	65.17±4.60	63.00±8.72	0.44

**Table 2:** (ANOVA) test presents post intervention analyses of following variables

4(31%) participants complained about continue pain and 9 out of 69% felt pain in episodes I group A. In Group B, 1(7%) felt constant symptoms and 12(93%) had irregular discomfort. 6(43%) felt continuous discomfort and 8(57%) describe intermittent pain in group C as shown in Table 3. (cervical lateral rotation improved in all groups.

Variables	Group 1 & 2	Group 1 & 3	Group 2 & 3
NPRS	0.31	0.29	0.81
PSFS	0.18	0.45	0.91
NDI	0.24	0.82	0.26
Active flexion	0.71	0.22	0.19
Active extension	0.41	0.51	0.11
Rt side flexion	0.91	0.41	0.41
Lt side flexion	0.04**	0.46	0.02**
Rt t side rotation	0.41	0.81	0.51
Lt side rotation	0.1	0.61	0.41

**Table 3:** Between Groups comparison along with p values

## DISCUSSION

One of the most common cause of neck disability is cervical radiculopathy and its prevalence is on peak in 4 to 5th decade of age [16]. There is lack of evidence in literature to define the significance of best interventional approach [17]. To treat the complications linked to cervical radiculopathy, control- interventional trial was done to determine the impact if treatment strategies. Outcomes of current study showed the significance in terms of mean and SD from pre to the post last session of treatment in NDI, PSFS & NPRS scales. Moreover, ROMs get improved, decrease in neck pain and joint stiffness is also found. These results are being supported by various previous researches [18]. A study showed that by using manual traction and manual foramen opening technique is very beneficial to improve the movements and pain in neck. Based on an outcome of previous study, result has shown that effect of each technique is equally beneficial as both combined techniques. But patients presented significant improvement in movements those get both therapies in combine. It was seen that each 3 groups presented statistically significant progresses in NPRS scaler after

intervention of 3 weeks ( $p < 0.01$ ) and same in case of NDI scale. Analysis of individual group presented extremely positive results in regards to neck pain, improvement in ROMs and disability, showing that combination of therapy in these participants is an effective strategy. This also support that we can use these techniques without limitation in any stage of cervical radiculopathy. Numerous researches have proved that both these techniques either separately or as combination therapy would show promising outcomes in patients with cervical radiculopathy [19]. Each intervention decompresses the nerve compression and expand the foramen. These rehabilitative techniques both improves the stiffness in joints and tenderness in tissues. Same results were seen in the current study. Another study indicated the same findings of manual traction on disability, pain and radiculopathy of cervical spine. Subjects were back to normal functions and pain was diminished. Participants presented significance in measures [20]. The outcomes of the current research may also determine the best possible guidelines for clinical practice for treatment of cervical radiculopathy. Small sample size with both acute and chronic conditions is considers as limitation. Duration was also short. A study with prolong time duration and with a large population size is recommended.

## CONCLUSION

Manual techniques of cervical traction, intervertebral foramen opening and combination of both techniques have similar effect in improving neck ache, ROMs and disability level in patients suffering with cervical radiculopathy.

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## Original Article

## Effects of Kinesio Taping in Management of Spasticity in Stroke Patients

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## ARTICLE INFO

## Key Words:

Spasticity after stroke, Kinesio taping

## How to Cite:

Hassan, T. ., Irshad, A. ., Asad, A., Kouser, S. ., Sattar, U. ., &amp; Akbar, F. . (2022). Effects of Kinesio Taping in Management of Spasticity in Stroke Patients: Kinesio Taping in Stroke Patients. Pakistan BioMedical Journal, 5(7).

<https://doi.org/10.54393/pbmj.v5i7.424>

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Received Date: 17th July, 2022

Acceptance Date: 24th July, 2022

Published Date: 31st July, 2022

## ABSTRACT

Spasticity after stroke may be a common complication in patients with stroke and leads to impaired hand function after stroke. **Objective:** To examine the impacts of kinesio-taping on managing spasticity of upper extremity hence improving function. **Methods:** A randomized managed trial have a look at turned into performed in Al-Nafees medical institution Islamabad. Thirty Participants with stroke inside six months have been randomly enrolled into kinesio taping (Kt) organization or traditional organization. The tape turned into carried out on three days in line with week for 48/seventy two hours for four weeks. The number one final results turned into muscle spasticity as measured through the Modified Ashworth Scale (MAS). Measurements have been taken earlier than the intervention, at once after the intervention (2nd week) and later after the intervention (fourth week). **Results:** Within the group comparison, in the KT group, significant differences were noted in MAS at the second and fourth week ( $P=0.00-0.00$ ), as compared to control group at the second and fourth week ( $P=0.21-0.00$ ). Between-group comparisons showed a significant difference at the fourth week ( $P=0.00$ ). **Conclusions:** Kinesio taping may provide some benefit by reducing spasticity and improving motor performance of the affected hand in patients with subacute stroke. Kinesio Tape may be an option for clinicians to effectively manage spasticity after stroke.

## INTRODUCTION

Post-stroke spasticity (PSS) is a common complication in patients who had a brain damage from a stroke, leading to limbs weakness and impaired coordination between agonist and antagonist muscle contraction [1]. Spasticity is defined as a motor disorder resulting from a velocity-dependent hyper-excitability of muscles to the tonic stretch reflex [2]. Previous studies have reported that 24-42% of post stroke spasticity occurred within 12 months after a stroke event [3-5], the possible risk factors for post stroke spasticity included lower barthel index score,

degree of paresis, pain caused from stroke, and sensory impairments [2, 4]. Stroke survivors experiencing spasticity in their upper limbs might have difficulties obtaining a full range of motion (ROM) of the shoulders, elbows, wrists, and fingers flexors. These limitations can interfere with the functions of reach, grasp, and release while performing daily activities. Reduced ROM and post stroke spasticity can result in secondary limb deformities, functional impairments, and reduced quality of life. Rehabilitation post-stroke focuses on facilitation of the

motor functions, regaining sensory function, and reducing the progression of abnormal muscle tone of affected limbs to improve the functional performance and quality of life. Several therapeutic interventions for post-stroke spasticity control have been previously described. Stretching exercises could increase muscle length and maintain joint motion [6]. Neuromuscular or transcutaneous electrical stimulation also had positive effects on managing spasticity [6, 7]. Pharmacological interventions, such as oral medications and local injection with phenol or botulinum toxin, have been widely used to decrease Post stroke spasticity and improve functional ability after stroke [1, 6, 8, 9]. In recent years, Kinesio taping (KT) has been implemented as a therapeutic technique for hemiplegic patients. The KT results in improved upper extremity function and increased patient independence in engaging in activities of daily living post-stroke [10, 11]. KT has also been reported to be helpful in improving walking balance in patients with stroke and hemiplegia [12-14]. Jaraczewska et al., [10] mentioned that KT combined with other interventions may facilitate muscle function, provide joint support and proprioception feedback, and reduce pain after stroke. However, there was limited evidence to support the benefits of KT in improving upper extremity function, especially hand function among stroke patients. We hypothesized that the application of KT may provide sensory feedback to promote motor recovery on affected upper extremities and minimize spasticity in upper extremities during recovery. Kinesiotaping, developed by Kenzo Kase in 1996, is the application of an elastic bandage to the skin, which promotes a pressure/force mechanism on it during strong pulling, unlike conventional bandages [15], which is constant. Afferent mechanical numbers and sensory stimuli are perceived at the cortical level, induce recruitment of motor units and contribute to neural plasticity [16, 17]. Therefore, muscle function can be assisted or inhibited by the use of elastic bandages. In this way, the bandage will affect the position of the joints [10]. It is thin, rubber-free, anti-allergic and can be stretched along the longitudinal axis. Therefore, less mechanism stress is observed compared with conventional tape [15]. Therapeutic effects of kinesiotaping include reducing pain, increasing muscle strength, improving blood and lymphatic circulation, and repositioning subcutaneous joints by reducing abnormal muscle tension [18]. Kinesiotaping is currently being used in rehabilitation as an adjuvant treatment because of its positive effects on pain and gait [15, 19]. Despite the exact mechanism of action of is unclear, but neurodilation and mechanical limitation have been suggested as possible underlying mechanisms [15, 20]. The aim of this study was to investigate the effect of KT on upper extremity spasticity in stroke patients with

hemiplegia.

## METHODS

A randomized controlled trial was performed at Al-Nafees Hospital, Islamabad. Thirty participants who had a stroke within six months were randomized to the kinesio tape (Kt) or conventional group. In the KT group, Kinesio bandages were applied as an adjunct treatment to the back of the affected arm during intervention. The bandage is applied 3 days a week for 48/72 hours for 4 weeks. The patients in the experimental group received their session's alternate day. The control group received no tape during the intervention. Stretching exercises and repetitive training tasks for hand function were performed for 30 minutes each session, once a day, for 5 days a week during a 4-week intervention program. The number one final results turned into muscle spasticity as measured through the Modified Ashworth Scale (MAS). Measurements have been taken earlier than the intervention, at once after the intervention (2nd week) and later after the intervention (fourth week). The questionnaire provides a subjective assessment for the patient and an objective measure for the clinician. Data were collected using general demographic data, Brunnstrom's stages of stroke recovery, and a modified Ashworth scale to measure spasticity. Data were analyzed using SPSS 20. After evaluation, independent tests, repeated measures of analysis of variance (RMANOVA) and chi-square tests were used for data analysis. Quantitative variables were analyzed for mean and standard deviation while qualitative variables were analyzed for frequency and percentage. The Chi-square test was performed to verify the association between age and spasticity. Patients aged 30-70 years with unilateral hemiplegia at 3 months and able to perform at least hand-holding at recruitment with a Brunnstrom stage of the distal hand between 2 and 4 were included in the study. Patients with MAS score less than or equal to 1, a history of tendon damage to the upper extremity or neuromuscular, a language impairment leading to communication difficulties, and any history of allergy to Kinesio Tape were excluded. A pre-intervention assessment was performed for each participant before they were randomly assigned to the kinesio taping group with physical therapy intervention group and outcome measures were recorded before the intervention, i.e. to be baseline assessment, after 2 weeks of intervention and after 4 weeks of treatment. After treatment, the patients were evaluated post-intervention.

## RESULTS

The mean age of the respondents in conventional group was  $52.9 \pm 8.43$  years where as in interventional group mean age was  $53.2 \pm 10.7$  years ( $p$ -value, 0.9). The mean height of the respondents in conventional group was  $1.70 \pm 0.06$

inches whereas in interventional group mean height was 1.72±0.077 Inches (p-value, 0.4). The mean weight of the respondents in conventional group was 69.17±11.0 kg, whereas in interventional group the mean weight was 68.20±10.5 kg (p-value, 0.8). The mean BMI of respondents in conventional group was 24.0±4.96 where as in interventional group it was 23.0±4.48 (p-value, 0.5) as represented in Table 1.

Statistics	Study Group	Mean ± SD	p-value
Age of Population	Conventional	52.93 ± 8.43	0.9
	Interventional	53.20 ± 10.75	
Height of Participants	Conventional	1.704 ± .068	0.4
	Interventional	1.725 ± .08	
Weight of Participants	Conventional	69.17 ± 11.00	0.8
	Interventional	68.20 ± 10.58	
BMI Status of Participants	Conventional	24.00 ± 4.96	0.5
	Interventional	23.06 ± 4.49	

**Table 1:** Group Statistics

The table 2 shows that in the Conventional group the mean Modified Ashworth scale score at baseline assessment was 3.80 ± 1.01 whereas in Interventional group it was 3.60 ± 0.98 with (p- value, 0.5). Moreover, the mean Modified Ashworth scale score at 2 week assessment in Conventional group was 2.60 ± 0.73 whereas in Interventional group it was 2.06 ± 0.79 with (p- value, 0.06). Similarly, at 4 week assessment the mean of conventional group is 2.06 ± 1.27 whereas in Interventional group it was 0.93 ± 0.88 with (p-value, 0.009). There was no statistical difference in the means of two groups.

Statistics	Study Group	Mean ± SD	p-value
Modified Ashworth Scale Score at baseline assessment (Before Intervention)	Conventional	3.8000 ± 1.01419	0.5
	Interventional	3.6000 ± .98561	
Modified Ashworth Scale Score at 2 week assessment (After 02 weeks of Intervention)	Conventional	2.6000 ± .73679	0.06
	Interventional	2.0667 ± .79881	
Modified Ashworth Scale Score at 4 week assessment (After 04 weeks of Intervention)	Conventional	2.0667 ± 1.27988	0.009
	Interventional	0.9333 ± .88372	

**Table 2:** Comparison between two groups; Modified Ashworth Scale Score Independent T-Test

The table 2 shows that in the Conventional group the mean Modified Ashworth scale score at baseline assessment was 3.80 ± 1.01 whereas in Interventional group it was 3.60 ± 0.98 with (p- value, 0.5). Moreover, the mean Modified Ashworth scale score at 2 week assessment in Conventional group was 2.60 ± 0.73 whereas in Interventional group it was 2.06 ± 0.79 with (p- value, 0.06). Similarly, at 4 week assessment the mean of conventional group is 2.06 ± 1.27 whereas in Interventional group it was 0.93 ± 0.88 with (p-value, 0.009). There was no statistical difference in the means of two

groups.

Measure	Mean ± SD	p-value
Pre-score	3.80 ± 1.01	0.00
Mid-score	2.60 ± 0.73	
Mid-score	2.60 ± 0.73	0.21
Final-score	2.06 ± 1.27	
Pre-score	3.80 ± 1.01	0.00
Final-score	2.06 ± 1.27	

**Table 3:** Modified Ashworth Scale; Within the Group Comparison RM-ANOVA (Conventional Group)

The table 4 depicts that in interventional group, the mean value of pre-score was 3.60 ± 0.98 as compared to mid-score where mean was 2.06 ± 0.79. There is statistically significant difference between pre and mid mean score (P<0.00). Similarly when we compare mean mid-score which was 2.06 ± 0.79 with mean final score 0.93 ± 0.88, and found a significant difference between mid and final score (P<0.00). Moreover, while comparing mean pre-score and final score that was 3.60 ± 0.98 and 0.93 ± 0.88 respectively, a significant difference was found between pre and final score mean (P<0.00).

Measure	Mean ± SD	p-value
Pre-score	3.60 ± 0.98	0.00
Mid-score	2.06 ± 0.79	
Mid-score	2.06 ± 0.79	0.00
Final-score	0.93 ± 0.88	
Pre-score	3.60 ± 0.98	0.00
Final-score	0.93 ± 0.88	

**Table 4:** Modified Ashworth Scale; Within the Group Comparison RM-ANOVA (Interventional Group)

## DISCUSSION

In this study, we found that stroke patients in both control and KT groups had significant improvements on Modified Ashworth scale at the second and fourth weeks. The patients in the KT group had significant improvement in spasticity on forearm of UE at fourth week than that at second week. At fourth week, stroke patients with the KT intervention had better wrist extension (the distal part of UE) than that of the control group. As compared to Huang et al., study conducted in 2019 conclude that stroke patients in both control and KT groups had significant improvements on FMAUE and Brunnstrom stage at the third and fifth weeks. The patients in the KT group had significant improvement on the proximal part of FMA-UE at fifth week than that at third week. At fifth week, stroke patients with the KT intervention had better hand performance (the distal part of fMa-uE) than that of the control group [21]. Additionally, patients in the KT group had significant reductions in Post stroke spasticity, which was not observed in the control group. To the best of our knowledge, this study is the first to support KT in

preventing the progression of post stroke spasticity. As such, Kinesiotaping may play an adjunctive role in improving motor wrist function during forearm rehabilitation in stroke patients at subacute stage. Kinesiotaping has become an increasingly popular therapeutic tool in the field of sports medicine. Japanese Chiropractor dr. Kenzo Kase invented it to alleviate pain and improve the healing in soft tissues [22]. Kinesiotaping comprises polymer elastic wrapped in 100% cotton fibers, which make it easy to evaporate sweat. There is a thin layer of glue attached to the tape, and the glue is applied in a wave-like pattern to imitate the qualities of the fingerprint on the fingertip. Kinesiotaping can be worn during exercise, showering, and even swimming because of its waterproof characteristic. It is hypothesized that Kinesiotaping provides a prolonged stretch of a muscle that could lead to autogenic inhibition to hypertonic muscles. Furthermore, the application of Kt can allow for greater sensorimotor input during rehabilitation. The effects of Kt could be attributed to the cutaneous stimulation of sensorimotor and proprioception systems, both of which may enhance functional outcomes [23, 24]. Other researchers proposed that improved motor function might result from increased recruitment in the motor units of the muscles due to increased proprioceptive stimulus [17]. There are many methods of applications depending on its expected physiological outcomes, but the theories under these methods still lack enough evidence and require further studies. However, in our study, we focused on wrist motor function of stroke patients, and Kinesiotaping was applied on the forearm flexors muscles instead of shoulder girdle muscles. Santamato et al., compared the effectiveness of Kinesiotaping versus manual muscle stretching and splinting for reducing spasticity of the wrist and finger flexor muscles after botulinum toxin injections in stroke patients [25]. Kinesiotaping was reported to have significantly greater decrease in spasticity scores. In our study, we found the benefits of Kinesiotaping not only in reducing spasticity scores of the affected upper extremities, but also in improving the functional scores of hand motor performance. Bell et al., also focused on the application of Kinesiotaping to forearm muscles in stroke patients, but they evaluated the efficacy of KT for reducing hand edema [26]. There is one study which discusses the effects of Kinesiotaping for thumb motor function, but the participants were children with cerebral palsy [27].

## CONCLUSION

The approach with Kinesio Taping has shown to be effective, in fact, from the results obtained, it is clear that the spastic patients treated with the Kinesio Taping application have statistically significant results compared

with the results obtained from conventional group.

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## Original Article

## Effect of Age Under 20-60 years on Central Corneal Thickness

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## ARTICLE INFO

## Key Words:

Age, Gender, Central Corneal Thickness, Pachymetry

## How to Cite:

Hussain, A. ., Tariq, A. ., Rehman, R. ., Farrukh, F. ., Fatima, A. ., Raza, A. ., & Anwar Faridi, T. . (2022). Effect of Age Under 20-60 years on Central Corneal Thickness : Effect of Age on Central Corneal Thickness. Pakistan BioMedical Journal, 5(7), 322-326. <https://doi.org/10.54393/pbmj.v5i7.672>

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Received Date: 18<sup>th</sup> July, 2022Acceptance Date: 25<sup>th</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

The measurement of central corneal thickness is an important measure for the diagnosis of corneal pathologies. 510-520 microns is the standard central corneal thickness. Optical or ultrasound techniques are used for the measurement of thickness CCT. **Objectives:** To evaluate the effect of age on central corneal thickness in normal population visiting The University of Lahore Teaching Hospital, Raiwind road Lahore. **Methods:** Descriptive study design was used. Data was obtained from The University of Lahore Teaching Hospital, Raiwind road Lahore. The sample size of patients was 147 with ages ranging from 20 to 60 years. All genders were included in the data collection. Data were collected through convenient sampling technique by using researcher administrative performa and study was finalized in three months after the approval of synopsis. Data entry and analysis were done using computer software SPSS version 25.0. CCT was measured by non-contact Pachymeter (Canon TX-20P) and values were represented in the form of frequency tables and bar charts. **Results:** CCT drops over time, resulting in thinner corneas in older people. The dependence of CCT on age is greater in men. Mean CCT in male individuals were 538.66 µm and in females mean CCT was 540.37µm. In this study mean central corneal thickness values of right and left eyes were also compared. In males right mean CCT value was 537.94 µm and left mean CCT was 539.39µm. In females the mean CCT value of right was 540.28µm and left mean CCT value was 540.47µm. **Conclusions:** The Central Corneal Thickness decreases with age. Men have thinner corneas than females in every age group.

## INTRODUCTION

Front part of the eye is covered by a dome shaped transparent membrane known as cornea [1]. It allows the light to pass through the eye and is present in front of the iris and pupil [2]. Average diameter of the cornea horizontally and vertically is 11.7mm and 10.6mm respectively [3]. The cornea is made up of protein and cells. It is an avascular structure and is dissimilar from most of the tissues containing blood vessels in the human body. Due to blood vessels cornea may get cloudy, which may adversely affect vision and prevent it from refracting light rays properly. Nutrients are supplied to the cornea from tear and the aqueous humor, a watery fluid in the anterior chamber due to absence of blood vessels. It contributes

around 2/3 66% of refraction process in eye. Its condition is probably identified with the nature of visual perception [4]. The outer layer of the eyeball is formed by the cornea along with sclera, white part of eye. Corneal refractive power in humans is approximately 43 diopters, 74% of total power of the normal eye of humans 58.60 D. Corneal refractive index is 1.376 [5]. LASIK is a surgical procedure used to reshape the surface of cornea [6]. The cornea is consisted on 5 layers: first Epithelium, second Bowman's membrane, third stroma, fourth Descemet's membrane and fifth endothelium [7]. The outermost layer, epithelium, is the arrangement of cells that covers the cornea. Nutrients and oxygen is absorbed from the tears by epithelial membrane

and supply it to the rest of corneal layers. Corneal epithelium is highly sensitive structure because it contains free nerve endings. This also prevents foreign bodies to enter the cornea [8]. Irregular shape or corneal edema disrupts the smoothness of epithelium, and most often causes a sensation of something being on the eye and is accompanied by intense pain, tearing and light sensitivity. The corneal epithelium tends to repair itself in most situations [9]. New layer of the cornea is Dua's layer. Before Descemet's membrane and after stroma it is tough, acellular, and well established. Identification of this layer give great knowledge about corneal surgery of posterior part, biomechanics of cornea, and pathologies of posterior cornea such as Descematocele, pre-Descemet's membrane degenerative disorders and acute hydrops. It is pre-supposed 0.59 miles 15 micrometers thick, the 4th caudal layer, and situated between the Descemet's membrane and stroma of cornea [10]. Descemet's membrane is remarkably tough basement layer, which is special in the body with respect to both of its proportion and formation. It is formed by the cells of leveled squamous epithelium that lines the cornea's posterior surface cornea and is appointed as endothelium of cornea. Thickness is 5-10 microns, the layer of Descemet, like other underground layers, comprised of two different layers, a posterior layer close to the endothelium which is generated by the endothelial cells, collagen lamellae and proteoglycans made up the anterior membrane of cornea [11, 12]. Central corneal thickness CCT plays a significant role for the status of the health of cornea and is an important factor in assessing and managing the corneal diseases. It also helps to evaluate the corneal obstruction and functioning of endothelial pump [13]. Central corneal thickness of the normal eye is about 540  $\mu\text{m}$  and usually consists of stroma has central thickness of 450  $\mu\text{m}$ . Corneal physiological and pathological changes associated with the ocular diseases can be assessed by the measurements of central corneal thickness. In previous studies, different methods to measure the values of central corneal thickness have been used, included Optical Pachymetry, Optical Coherence Topography OCT, Orbscan, Ultrasound Pachymetry, Ultrasound Biomicroscopy and Laser Interferometry [14]. Corneal Pachymetry is used to measure the central thickness of cornea and can be done by contact methods such as ultrasound and microscopy and non-contact methods [15]. It can be used to detect corneal endothelial cells and corneal hydration act in a dual role as a barrier to aqueous humor and act as a metabolic pump. During normal functioning, to maintain the amount of water content of corneal stroma at 78%, as the central corneal thickness is 540 micrometers that is considered normal, so the endothelial pump balances the leakage rate.

Corneal Pachymetry is necessary for other surgeries of cornea such as Limbal Relaxing Incisions LRI that places a pair of incisions of a particular depth and arc length at a steep axis of corneal astigmatism, to decrease the astigmatism of corneal. The surgeon will overcome the risks of eye perforation and improve outcomes of surgery by the use of corneal Pachymeter procedure. Advanced creations of Pachymeter will give more advantage to the surgeons by arranging graphical plans of surgery to remove astigmatism [16].

## METHODS

It was a descriptive cross sectional study. Data were collected from patients visiting The University of Lahore Teaching Hospital for visual assessment. Study was completed in 4 months from February 2021 to May 2021. Using convenient sampling technique sample of 147 patients having central corneal thickness measurement was selected. The study included patients of age group from 20 to 60 years presented for routine eye examination. The patients were divided into four age groups (with 10 years interval): 20-29, 30-39, 40- 49 and 50-60. After getting well-informed written consent, complete eye evaluation was done. Patients eyes were screened by slit lamp examination to exclude anterior segment pathologies, pathologies of cornea such as edema, scarring or corneal dystrophy, corneal ectasia (such as Keratoconus), and different infections, patients presented with history of refractive surgery, history of ocular trauma, glaucomatous eyes, Patients with systemic disease (such as diabetes or rheumatoid arthritis) and patients below 20 years of age were also excluded from research. Inclusion criteria were as follows, at least 20 years of age up to 60 years and all genders were included. All patients experienced Non-contact Pachymeter (Canon TX-20P Fully Automatic, Non-Contact Tonometer with Pachymeter) for measuring the value of central corneal thickness. During this inspection every patient followed the same protocol. They positioned their chin on the chin rest and, simultaneously, their forehead was rested against the provided forehead strap. The patient was requested to look straight in the machine, while the examiner adjusted the focus and alignment of the machine. The machine marked the pupil at three points: the pupil edge, center, and corneal apex and the value of CCT were noted. All data was entering in SPSS version 24.0. All descriptive statistics was calculated through this software which was represented in the form of mean  $\pm$  S.D.

## RESULTS

Out of 147 patients 62 (42.17%) were males and 85 (57.82%) was females (Table 1).

Gender	Frequency	Percent
Male	62	42.2
Female	85	57.8
Total	147	100.0

**Table 1:** Gender wise frequency distribution of male and female  
Central corneal thickness decreases with the progression of age in male on both eye sides. Mean  $\pm$  SD at age 20-29 years on right side was  $544.10 \pm 38.56$  and Mean  $\pm$  SD at age 20-29 years on left side was  $545.90 \pm 38.03$ , Mean  $\pm$  SD at age 30-39 years on right side was  $540.43 \pm 22.45$  and Mean  $\pm$  SD at age 30-39 years on left side was  $540.29 \pm 23.44$ , Mean  $\pm$  SD at age 40-49 years on right side was  $538.90 \pm 21.53$  and Mean  $\pm$  SD at age 40-49 years on left side was  $537.10 \pm 20.40$ , Mean  $\pm$  SD at age 50-60 years on right side was  $528.33 \pm 30.58$  and Mean  $\pm$  SD at age 50-60 years on left side was  $534.28 \pm 28.60$  (Table 2).

Age (years)	N	Male (Right Eye)		
		Mean $\pm$ SD	Minimum	Maximum
20-29	20	$544.10 \pm 38.56$	480	612
30-39	14	$540.43 \pm 22.45$	506	580
40-49	10	$538.90 \pm 21.53$	500	570
50-60	18	$528.33 \pm 30.58$	460	580
Male (Left Eye)				
Mean $\pm$ SD		Minimum	Maximum	
$545.90 \pm 38.03$		490	610	
$540.29 \pm 23.44$		505	580	
$537.10 \pm 20.40$		514	574	
$534.28 \pm 28.60$		470	590	

**Table 2:** Mean CCT ( $\mu$ m) value of males in each age group  
Central corneal thickness decreases with the progression of age in female on both eye sides. Mean  $\pm$  SD at age 20-29 years on right side was  $547.37 \pm 34.60$  and Mean  $\pm$  SD at age 20-29 years on left side was  $548.15 \pm 32.63$ , Mean  $\pm$  SD at age 30-39 years on right side was  $541.67 \pm 28.76$  and Mean  $\pm$  SD at age 30-39 years on left side was  $542.00 \pm 29.92$ , Mean  $\pm$  SD at age 40-49 years on right side was  $540.93 \pm 18.59$  and Mean  $\pm$  SD at age 40-49 years on left side was  $541.07 \pm 17.54$ , Mean  $\pm$  SD at age 50-60 years on right side was  $531.16 \pm 29.45$  and Mean  $\pm$  SD at age 50-60 years on left side was  $530.68 \pm 28.66$  (Table 3).

Age (years)	N	Female (Right Eye)		
		Mean $\pm$ SD	Minimum	Maximum
20-29	27	$547.37 \pm 34.60$	485	625
30-39	24	$541.67 \pm 28.76$	495	600
40-49	15	$540.93 \pm 18.59$	510	570
50-60	19	$531.16 \pm 29.45$	465	590
Female (Left Eye)				
Mean $\pm$ SD		Minimum	Maximum	
$548.15 \pm 32.63$		490	620	
$542.00 \pm 29.92$		490	600	
$541.07 \pm 17.54$		500	565	
$530.68 \pm 28.66$		450	580	

**Table 3:** Mean CCT ( $\mu$ m) value of females in each age group

## DISCUSSION

A study was performed to calculate the mean central corneal thickness (CCT) in the healthy population of Iraq. Kadhim YJ, Farhood QK, and his colleagues performed a cross-sectional study at a Teaching Eye Hospital known as Ibn Al-Haitham. Two hundred and nine healthy individuals with the age ranges from 20 to 75 years were examined and their CCT values were correlated with gender, age, refraction, and corneal curvature. The CCT was measured using an ultrasound Pachymeter. To evaluate the average corneal curvature, an auto-refractometer was used to test the average corneal curvature. Central corneal thickness with a range of 422  $\mu$ m to 636  $\mu$ m, the average central corneal thickness was  $543.95 \pm 32.58$   $\mu$ m. Gender had no impact on CCT [15, 16]. CCT was found to have a negative relationship with age. The spherical equivalent was significantly associated with CCT. CCT decreased dramatically with age in the Iraqi population. The corneas of myopic people were noticeably thinner. CCT and corneal curvature had a small but important negative correlation. For the diagnosis of many ocular diseases central corneal thickness played a very significant role [17]. In the present research all the patients were examined on non-contact Pachymeter (Canon TX-20P) for measuring the CCT. The main purpose of this study was to find the effect of age on central corneal thickness in patients between 20-60 years. Its dependence on age was greater in men. Mean CCT was  $539.51 \pm 27.72$   $\mu$ m [18]. At the Hashmanis Hospital in Karachi, Pakistan, a study was performed on five thousand one hundred and seventy one normal eyes of two thousands five hundred and ninety eight patients. Patients with age between 6 to 70 years were included in the study. An auto-refractometer was used to determine refractive error, and Oculus Pentacam was used to determine CCT. The central corneal thickness readings in males were thinner as compared to females. The interquartile range (IQR) was 44.0  $\mu$ m, while the mean CCT value was 541.0  $\mu$ m, and age had a poor negative association with CCT. Three variables had a major impact on CCT in the Pakistani population: gender, age, and cylinder. There was no correlation between CCT of the left or right eye [19]. Similarly, in the present study males had thinner CCT values than females. In the present research mean CCT in male individuals were 538.665  $\mu$ m and in females mean CCT was 540.37  $\mu$ m. In the study the central corneal thickness (CCT) values of both eyes were also compared [20]. From January 1, 2014, to July 1, 2015, a cross-sectional research was performed on 166 patients between the ages of 30 and 70 who had come in for a regular eye exam. An interview schedule was used to record patient parameters, as well as a full ocular examination, which included visual acuity and IOPs. Pac Scan plus A- Scan/Pachymeter was used to

determine CCT. Vivek Oommen Varghese investigated the relationship between CCT and metabolic factors like gender, age, race, smoking, obesity, metabolic syndrome, hypertension, diabetes mellitus, corneal curvature and axial length at the Ophthalmology Department, Medical Sciences Academy, Pariyaram Kannur, and Kerala, India. In the study 28.3% were females, while 71.7% of the one hundred and sixty six participants were males. The average age of the participants was 47.8 years. Central corneal thickness was found to be reduced with age. There was a strong negative correlation found between central corneal thickness and age [21]. In Contrast to this, in the present study there was a slight statistical variation in the mean central corneal thickness measurements of men and women. Similarly, mentioned in the above study that CCT was drops over time, resulting in thinner corneas in older people. In the present research similar results were found in which CCT drops with the passage of time [22, 23]. In another research which was conducted in 2016, they predominantly evaluate the black population, and explained the results of central corneal thickness and its relationship with intraocular pressure (IOP). There were 1142 participants with pachymetry measurements, in which 58 % were females, while the mean age was 64.3 years. The mean central corneal thickness was 529.8 µm in black participants, 545.2 µm in white participants and 537.8 µm in mixed participants (black and white). The corneas of black participants were thinner. CCT values that increased with age were significantly linked to younger age among black participants. In the above results CCT values increased with age in younger patients that were positively correlated with the present research and the CCT values decreased with increasing age were also positively correlated with present study[24, 25].

## CONCLUSION

In the present research central corneal thickness (CCT) was affected by age. As the age increases the central corneal thickness values decreases and it was more noticeable among the age group of 50-60 years in both males and females. It was due to degenerative changes with the increasing age, in the corneal layers specifically epithelium and endothelium. So, it showed that older people had thinner corneas as compared to younger people. Mean CCT in male individuals were 538.66 µm and in females mean CCT was 540.37 µm. Males had comparatively less central corneal thickness (CCT) values than females also the mean central corneal thickness values of right and left eyes of males and females were different.

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## Original Article

## Antioxidants Activity Assessment and Utilization of Banana Peels to Attenuate the Diabetes Mellitus

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## ARTICLE INFO

## Key Words:

Antioxidant activity, Banana, Peels, Diabetes Mellitus

## How to Cite:

Zahid, B. ., Tufail, T., Imran, M. ., Shehzad Muzammil, H. ., Batool Qaisrani, T. ., Zil-e-huma, S. ., Shehzad, K. ., Junaid Anwar, M., & Chaudhry, S. . (2022). Antioxidants Activity Assessment and Utilization of Banana Peels to Attenuate the Diabetes Mellitus : Antioxidants Activity of Banana Peels against Diabetes Mellitus. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.656>

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Received Date: 17<sup>th</sup> July, 2022

Acceptance Date: 24<sup>th</sup> July, 2022

Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Diabetes is the primary metabolic disorder listed among the top 10 death-causing diseases. The complete cure of diabetes is impossible, but the prevention and maintenance of glucose levels can reduce the diabetes severity. **Objectives:** To utilize the banana peel extracts to evaluate their antioxidant attributes and capability to attenuate diabetes. **Methods:** The antioxidant properties were assessed by measuring the DPPH, total phenolic contents (TPC), and total flavonoid contents (TFC) in ethanol, methanol, and acetone solutions. Moreover, the renal functional tests (Serum creatinine, serum urea, and BUN) and liver function tests (ALT, ASP, Serum Albumin, and total proteins) were also conducted during the 21 days experimental study in diabetes-induced (via Streptozotocin: 350 mg/kg) male Albino Wister rats. **Results:** The results indicated that the DPPH, TPC, and TFC contents were higher in methanol solution, i.e., 74.20±0.98%, 54.78±0.69mg GAE/g, and 39.48±0.37mg GAE/g respectively. Moreover, the results indicated that the unripe, ripe, and overripe significantly reduced liver and renal function parameters in diabetic rats. **Conclusions:** Banana peels have prominent potential to prevent diabetes-linked variables due to their higher antioxidant activity.

## INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder mainly due to hyperglycemia. In this disease, the body fails to produce or respond to average insulin concentrations, leading to high blood glucose levels. Globally, its prevalence is estimated at 536.6 million people (10.5%) in 2021 among 20-79 years

older people and is estimated to rise to 783.2 million (12.2%) in 2045. Its prevalence was equal in males and females but highest in people aged 75-79 [1]. It was listed among the ten top death reasons [2]. DM plays a significant role in changing protein, carbohydrates, and lipids [3]. Diabetes

mellitus is divided into diabetes Type 1 (insulin-dependent) and diabetes type 2 (non-insulin-dependent). Both types collectively affect more than 346 million people, of which diabetes type accounts for 90% of patients. Different therapies are under consideration to prevent and treat diabetes mellitus. Fruits among the natural resources show significant potential to cure various diseases. These are diversified in nature among the plant food groups. Fruits contain multiple nutrients, i.e., carotenoids, polyphenols, and bioactive compounds, in preventing and reducing obesity, diabetes, and different cardiovascular disorders. Plant minerals, vitamins, and phytochemicals have a significant role against inflammatory disorders, oxidation activities, and protective roles against various disorders in the body [4, 5]. Banana (belongs to the Musaceae family) is a most ancient and vital nutritional crop with evidence of its cultivation back to 4000 BCE in New Guinea [6]. The banana peel contains higher amounts of nutrients such as cellulose (7.6-9.5 %), hemicelluloses (6.40-9.50 %), pectin (10-21 %), and lignin (6-12 %) and various polyphenols (from 0.9-3 g/100g) that can be utilized in the management of multiple disorders, i.e., hypoglycemic effects and antidiabetic properties [7]. The banana peels contain higher amounts of potassium, sodium, calcium, manganese, copper, iron, zirconium, rubidium, niobium, strontium, and bromine [8]. The peels of green bananas have been reported to have significant potential to stimulate glucose utilization, insulin production, and hypoglycemic effect. The hypoglycemic effect is directly linked to higher sodium (Na) and Potassium (K) concentrations. Banana peel fibers help lower fasting blood glucose levels and increase hepatic glycogenesis [9]. Banana peels contain higher phenolic compounds than banana pulp and are considered a cheaper natural source of antioxidants [10]. The current study evaluated the antioxidant potential of banana peel at its various stages. Diabetes was induced in the rats by injecting Streptozotocin (STZ) rats, and the antidiabetic potential of banana peel powder was evaluated in hyperglycemic rats.

## METHODS

The bananas were purchased from the local market in Lahore. Bananas were peeled, dirt particles removed from the peels, and the peels were further peeled. Peels were soaked in 0.5% citric acid-containing water for 10 min. Then, the peels were steamed to make them soft in a covered container at 85°C for 10 min. After that, water and banana peels were mixed in the ratio (2:1), and flakes of banana peels were dried through a drum drier to achieve the <1 mm particle size. The approval was taken from the Department of Diet and Nutrition and Medical and Health Research Ethics Committee for efficacy study, and adult

Albino Wistar male rats (*Rattus norvegicus*) with weights ranging from 150-200 g were selected. The rats were acclimatized in cages at room temperature (22 °C) in 12 hours of light-dark cycles. Then rats were fed on a standard diet and tap water. The rats were divided into five groups named I, II, III, IV, and V. The diabetes was induced in four out of five groups. The rats were kept in fasting condition for 24 hours to maintain normal body conditions of rats before injecting Streptozotocin (STZ) (350 mg/kg) prepared in 0.5 mL of saline solution via the peritoneal cavity. The blood glucose was assessed through the glucometer (On-Call Glucometer, EZ-II Version) after three days of diabetes induction. The glucose levels of hyperglycemic or diabetic rats were maintained at equal to or greater than 200 mg/dL throughout the study. The rats were given the standard basal diet and aqueous plant extract (250 mg/kg). The diet plan of the experimental rats consisted of five groups i.e., basal diet only (Normal control group), Basal diet only (Diabetic control group), basal diet + ripe banana peel (250 mg/kg Body weight), basal diet + unripe banana peel (250 mg/kg body weight), basal diet + over ripe banana peel (250 mg/kg body weight). The diet was given to the rats according to the diet mentioned above plan for three weeks. After 1 hour of the last meal, rats were put on a horizontal rod (19.69 inches) on the table surface, 1 cm from the tail's tip (Tail Suspension Test). This test was used to measure the total immobility length, and immobility was recorded for 6 minutes via camera [11]. The ketamine 70 mg/kg BW was injected into each rat's right or left thigh. When rats become unconscious, the blood was collected from the retro-orbital sinus after 72 hours for a diabetes test. The glucose was measured via Accu-Check Go glucometer (Certeza Glucometer, GL-110 Version) at the 7th, 14th, and 21st days to check for diabetes. The serum samples were analyzed via spectrophotometry. The blood chemistry of the rats was analyzed through the diagnostic kits and chemical analyzer using developed methods on blood samples. The liver and renal functional tests i.e., Creatinine (mg/dL) and Urea (mg/dL) test and some liver enzymes i.e., Bilirubin (g/dL), Albumin (g/dL), Total proteins (g/dL), Gamma-glutamyl transferase (GGT), Alkaline phosphatase (ALP), Aspartate transferase (AST) and Alanine aminotransferase [12]. The results were presented in mean  $\pm$  SD. The one-way ANOVA was applied to analyze the data among various parameters such as body weight, blood glucose levels, and liver and renal functions by using SPSS-25 software. The results' statistical significance level ( $p < 0.001$  and  $p < 0.05$ ) was observed.

## RESULTS

Nutrition plays a significant role in preventing and managing any disorder in the body. The mechanisms of various nutrients are specifically linked with the different



conditions. Banana peel extract was also used to improve health as it can manage numerous dangerous diseases, i.e., polycystic ovary syndrome, hyperlipidemia, hyperglycemia, and other skin-linked diseases. In the current study, banana peel extracts anti-hyperglycemic and antioxidant attributes are prepared with acetone, methanol, and ethanol. Then the anti-oxidative properties of banana peel extract against diabetes were assessed by using rat modeling. The mean results for the impact of solvents, i.e., acetone methanol and ethanol, on the antioxidant activity of different banana peel extracts are shown in Table 4. The antioxidant properties were assessed by measuring DPPH (2,2-diphenyl-1-picrylhydrazyl) assay, total phenolic contents (TPC), and total flavonoid contents (TFC). The TPC contents of banana peel extract were observed highest in methanol ( $54.78 \pm 0.69$  mg GAE/g), followed by ethanol ( $30.44 \pm 0.64$  mg GAE/g) and acetone ( $20.14 \pm 0.32$  mg GAE/g) solutions. The highest DPPH and TFC contents of banana peel extract were also noticed in methanol solution ( $74.20 \pm 0.98$  &  $39.48 \pm 0.37\%$ ), followed by ethanol and acetone. The highest values of banana peel extract in methanol solution were due to the reduced pressure process causing the increment in TPC, DPPH, and TFC contents, as shown in Table 1.

Solvent	TPC	DPPH	TFC	Mean $\pm$ SD
Ethanol	$30.44 \pm 0.64$	$52.87 \pm 1.03$	$34.56 \pm 0.87$	$39.29 \pm 0.84$
Methanol	$54.78 \pm 0.69$	$74.20 \pm 0.98$	$39.48 \pm 0.37$	$56.15 \pm 0.68$
Acetone	$20.14 \pm 0.32$	$30.53 \pm 0.70$	$21.40 \pm 0.17$	$24.02 \pm 0.39$

**Table 1:** Antioxidants concentrations in banana peel extract. Values are expressed as means  $\pm$  standard deviation

The glucose present in the blood is known as blood glucose produced from the eaten food. It provides the energy to the whole body's cells for their proper functions. The excess and deficiency of blood glucose are linked with various critical diseases, i.e., higher blood glucose concentrations can lead to diabetes mellitus. The mean values of glucose levels were observed to be higher on the 2nd day, followed by the 7th day, 14th day, and 21st day. However, the most negligible value was observed at 0 day. The results depicted that banana peel extracts significantly affected blood glucose levels at 0, 2nd, 7th, 14th, and 21st day. Multiple blood glucose levels were compared on various days, and the HSD Tucky test was applied to assess the variations and significance levels. Each group was compared to the remaining groups on the 0, 2nd, 7th, 14th and 21st days. The control group was significantly different from the ripe at 0 day. At the same time, a non-significant difference was observed between the control and other groups. Moreover, there was a significant difference in control and all other groups (except ripe) on the 2nd, 7th, 14th, and 21st day. The positive, ripe, unripe, and over-ripe

compression was also analyzed for the other groups, respectively, as shown in Table 2.

(I) Study Groups	(J) Study Groups	Day 0		Day 2		Day 7		Day 14		Day 21	
		Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.
Control	Positive	-2.20	0.991	-143.60	0.055	-190.00	0.001	-250.80	0.000	-286.40	0.000
	Unripe	6.80	0.633	-376.00	0.000	-351.00	0.000	-315.80	0.000	-250.40	0.000
	Ripe	24.00	0.001	-176.00	0.014	-116.00	0.069	-88.80	0.041	-11.40	0.981
	Over Ripe	-5.60	0.776	-188.8	0.008	-161.00	0.007	-149.80	0.000	-97.40	0.001
Positive	Control	2.20	0.991	0143.60	0.055	190.00	0.001	250.80	0.000	286.40	0.000
	Unripe	9.00	0.371	-232.40	0.001	-161.00	0.007	-65.00	0.199	36.00	0.443
	Ripe	26.20	0.000	-32.40	0.962	74.00	0.396	162.00	0.000	275.00	0.000
	Over Ripe	-3.40	0.954	-45.20	0.883	29.00	0.952	101.00	0.017	189.00	0.000
Unripe	Control	-6.80	0.633	376.00	0.000	351.00	0.000	315.80	0.000	250.40	0.000
	Positive	-9.00	0.371	232.40	0.001	161.00	0.007	65.00	0.199	-36.00	0.443
	Ripe	17.20	0.015	200.00	0.005	235.00	0.000	227.00	0.000	239.00	0.000
	Over Ripe	-12.40	0.117	187.20	0.008	190.00	0.001	166.00	0.000	153.00	0.000
Ripe	Control	-24.00	0.001	176.00	0.014	116.00	0.069	88.80	0.041	11.40	0.981
	Positive	-26.20	0.000	32.40	0.962	-74.00	0.396	-162.00	0.000	-275.00	0.000
	Unripe	-17.20	0.015	-200.00	0.005	-235.00	0.000	-227.00	0.000	-239.00	0.000
	Over Ripe	-29.60	0.000	-12.80	0.999	-45.00	0.805	-61.00	0.250	-86.00	0.004
Over Ripe	Control	5.60	0.776	188.80	0.008	161.00	0.007	149.80	0.000	97.40	0.001
	Positive	3.40	0.954	45.20	0.883	-29.00	0.952	-101.00	0.017	-189.00	0.000
	Unripe	12.40	0.117	-187.2000*	0.008	-190.00	0.001	-166.00	0.000	-153.00	0.000
	Ripe	29.60	0.000	12.80000	0.999	45.00	0.805	61.00	0.250	86.00	0.004

**Table 2:** Multiple comparisons of blood glucose on days 0, 2nd, 7th, 14th, and 21st between study groups by applying the Tucky HSD test

The renal functions were tested on the 21st day of the study by assessing serum creatinine, serum urea, and blood urea nitrogen (BUN). A non-significant difference in serum creatinine was observed between the control and ripe (p-value = 0.419) groups, while significant variations were observed between and within the rest of the groups. The non-significant differences in serum urea were observed between the control and Ripe (p-value = 0.589) and positive and unripe (p value= 0.525) groups. At the same time, all other groups showed significant differences between and within the groups, as shown in Table 3. The BUN values were deemed to be non-significant between control and ripe (p-value = 0.715), positive and unripe (p-value = 0.271) and unripe and over-ripe (p-value = 0.186). However, the differences in other groups were observed to be significant.

(I) Study Groups	(J) Study Groups	Serum Creatinine		Serum Urea		BUN	
		Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.
Control	Positive	-3.52	0.000	-24.00	0.000	-15.40	0.000
	Unripe	-2.88	0.000	-21.00	0.000	-11.80	0.000
	Ripe	-0.26	0.419	-2.80	0.589	-2.20	0.715
	Over Ripe	-1.64	0.000	-13.40	0.000	-7.80	0.002
Positive	Control	3.52	0.000	24.00	0.000	15.40	0.000
	Unripe	0.64	0.003	3.00	0.525	3.60	0.271
	Ripe	3.25	0.000	21.20	0.000	13.20	0.000
	Over Ripe	1.88	0.000	10.60	0.000	7.60	0.002

Unripe	Control	2.88	0.000	21.00	0.000	11.80	0.000
	Positive	-0.64	0.003	-3.00	0.525	-3.60	0.271
	Ripe	2.61	0.000	18.20	0.000	9.60	0.000
	Over Ripe	1.24	0.000	7.60	0.006	4.00	0.186
Ripe	Control	0.27	0.419	2.80	0.589	2.20	0.715
	Positive	-3.25	0.000	-21.20	0.000	-13.20	0.000
	Unripe	-2.61	0.000	-18.20	0.000	-9.60	0.000
	Over Ripe	-1.37	0.000	-10.60	0.000	-5.60	0.031
Over Ripe	Control	1.64	0.000	13.40	0.000	7.80	0.002
	Positive	-1.88	0.000	-10.60	0.000	-7.60	0.002
	Unripe	-1.24	0.000	-7.60	0.006	-4.00	0.186
	Ripe	1.37	0.000	10.60	0.000	5.60	0.031

**Table 3:** Multiple comparisons of serum Creatinine at day 21 between study groups by applying the Tucky HSD test

The liver function tests were conducted on the study's last day (21st). The serum obtained from the rats of all groups was tested for the analyses of total bilirubin, ALT, Alkaline Phosphatase, albumin, and total protein. The results indicated that a statistical significant difference was observed between and within the groups. Moreover, an individual comparison was also conducted between the groups, as shown in Table 4. The non-significant differences in total bilirubin were observed as non-significant among the control and ripe group (P-value = 0.989) positive and unripe group (p-value = 0.752). In contrast, all other groups showed significant variations among them. The ALT variations were noticed non-significant between control and ripe (p-value = 1.000), positive and unripe (p-value = 0.305), unripe and over-ripe (0.769). At the same time, significant variations were

observed in all remaining groups. The differences in alkaline phosphatase concentrations were non-significant between control and ripe group ( $p$ -value = 0.297), positive and unripe ( $p$ -value = 0.122), and over ripe and unripe ( $p$ -value = 0.104). Moreover, the non-significant differences in albumin concentrations were observed in unripe and over-ripe ( $p$ -value = 0.252), and ripe and over-ripe were observed ( $p$  = 0.670). Total protein concentrations in control and ripe ( $p$ -value = 0.574), and positive and unripe ( $p$ -value = 0.992) was non-significant. However, the remaining groups showed significant variations in serum concentrations of alkaline phosphatase, albumin, and total proteins.

(I) Study Groups	(J) Study Groups	Day 0		Day 2		Day 7		Day 14		Day 21	
		Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.	Mean Difference (I-J)	Sig.
Control	Positive	-1.41	0.000	-25.60	0.000	-86.60	0.000	2.64	0.000	3.00	0.000
	Unripe	-1.26	0.000	-19.80	0.000	-75.00	0.000	1.78	0.000	2.85	0.000
	Ripe	-0.06	0.989	0.60	1.000	-9.20	0.297	0.80	0.070	-0.52	0.574
	Over Ripe	-0.82	0.000	-16.40	0.000	-63.00	0.000	1.18	0.004	0.92	0.098
Positive	Control	1.41	0.000	25.60	0.000	86.60	0.000	-2.64	0.000	-3.00	0.000
	Unripe	0.15	0.752	5.80	0.305	11.60	0.122	-0.85	0.047	-0.15	0.992
	Ripe	1.35	0.000	26.20	0.000	77.40	0.000	-1.84	0.000	-3.52	0.000
	Over Ripe	0.59	0.001	9.20	0.035	23.60	0.000	-1.458	0.000	-2.08	0.000
Unripe	Control	1.26	0.000	19.80	0.000	75.00	0.000	-1.78	0.000	-2.85	0.000
	Positive	-0.15	0.752	-5.80	0.305	-11.60	0.122	0.86	0.047	0.15	0.992
	Ripe	1.20	0.000	20.40	0.000	65.80	0.000	-0.98	0.019	-3.37	0.000
	Over Ripe	0.44	0.018	3.40000	0.769	12.00	0.104	-0.60	0.252	-1.93	0.000
Ripe	Control	0.06	0.989	-0.60	1.000	9.20	0.297	-0.80	0.070	0.52	0.574
	Positive	-1.35	0.000	-26.20	0.000	-77.40	0.000	1.84	0.000	3.52	0.000
	Unripe	-1.20	0.000	-20.40	0.000	-65.80	0.000	0.98	0.019	3.37	0.000
	Over Ripe	-0.76	0.000	-17.00	0.000	-53.80	0.000	0.38	0.670	1.44	0.004
Over Ripe	Control	0.82	0.000	16.40	0.000	63.00	0.000	-1.18	0.004	-0.92	0.098
	Positive	-0.59	0.001	-9.20	0.035	-23.60	0.000	1.46	0.000	2.08	0.000
	Unripe	-0.44	0.018	-3.40	0.769	-12.00	0.104	0.60	0.252	1.93	0.000
	Ripe	0.76	0.000	17.00	0.000	53.80	0.000	-0.38	0.670	-1.44	0.004

**Table 4:** Multiple comparisons of total bilirubin, ALT, Alkaline phosphate, Albumin, and total Proteins at day 21 between study groups by applying Tucky HSD test

## DISCUSSION

The banana peel extracts were utilized to evaluate their antioxidant attributes and capability to attenuate diabetes. The antioxidant properties were assessed by measuring the DPPH, total phenolic contents (TPC), and total flavonoid contents (TFC) in ethanol, methanol, and acetone solutions. The results exhibited that TPC, DPPH and TFC values were highest in methanol solutions. The results of Kabir et al., were in line with our study. He reported that banana peel showed that the TPC, TFC, and DPPH values were  $53.80 \pm 2.88$  mg GAE/g DM,  $16.44 \pm 1.45$  mg QE/g DM, and  $79.07 \pm 3.70$  % in hexane solution [13]. The results of DPPH were also in consistency González-Montelongo et al., [14] and Rebello et al., [15]. The maximum effect of banana leaf

extract was observed in ripe and over-ripe groups compared to other groups. They reduced the blood glucose levels in serum, suggesting the reducing and preventive effect of banana peel extracts in diabetic rats. The results were in line with the study of Navghare and Dhawale [16]. They demonstrated that rat groups treated with extract of *Musa cavendish* and *Musa acuminata* significantly reduced their blood glucose levels ( $p < 0.01$ ) after 15 minutes than the control group. Moreover, in a hypoglycemic study, the extracts of *Musa paradisiacal* peels (EMP 500 mg/kg) significantly reduced glucose levels at 120 minutes. The glucose levels decreasing trends were in line with the study of Indriawati and Atiyah, who reported that banana peel extract with concentrations of 400 mg/kg BW, 200 mg/kg BW, and 100 mg/kg BW reduced the blood glucose levels from  $337.75 \pm 44.9$  to  $203.01 \pm 47.6$  mg/dl,  $245.83 \pm 6.9$  to  $144.32 \pm 42.9$  mg/dl and  $275.98 \pm 50.1$  to  $171.75 \pm 42.4$  mg/dl,

respectively. The lower concentrations of creatinine in serum indicated that the banana peel extract improves the functionality of the kidneys [17, 18]. The banana peel extracts improved renal functionality as they helped in management of serum creatinine, serum urea, and BUN levels in the normal range during diabetes in the rats. Ahmed et al., showed a significant reduction in serum creatinine by consuming the inner banana peels in the nicotinamide/streptozotocin-induced diabetic rats [19]. The results of another study by Vijay et al., were in line with the current study, which resulted from that diabetes-induced animals given the extract of *Musa acuminata* peel with concentrations of 200 and 400 mg/kg reduced the serum creatinine levels ( $p < 0.01$ ) [20]. Lousek et al., reported that the biomass of green banana enhanced the serum urea ( $37.76 \pm 4.13$  mg/dL), which was greater than the reference value [21]. Rigueira et al., resulted that banana peel maintains the blood urea nitrogen to the value of 16.22 mg/dL [22]. These results were at par with the results of the current study. The unripe, ripe and over ripe banana peels effected serum concentrations of alkaline phosphatase, albumin, and total proteins in rats significantly leading the reduction in diabetes levels. The study of Vijay et al., in the coherence of our results, reported that the extract of *Musa acuminata* peel (EMA) with concentrations of 200 and 400 mg/kg caused a significant increase in serum albumin levels in diabetes-induced rats [20]. Though, extract *Musa acuminata* peel (400 mg/kg) caused a significant increase in total protein levels in serum.

## CONCLUSIONS

The unripe, ripe, and over-ripe banana peel played a prominent role in the reduction of glucose levels among diabetic rats. It also helped maintain serum creatinine, blood urea, and blood urea nitrogen levels, improving renal functionality. Moreover, it improved the liver's functional attributes. The current study suggested that the utilization of banana peels has dual benefits as it will help in environmental waste management and can play a beneficial role in treating diabetes and various other ailments.

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## Original Article

## Effects of Active Release Technique and Active Isolated Stretching on Muscles of Upper Cross Syndrome

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## ARTICLE INFO

## Key Words:

Active release technique (ART), Active Isolated Stretching (AIS), Muscle-length, Upper-cross syndrome(UCS)

## How to Cite:

Ali Syed, F. ., Ahmed Zahoor, I. ., Shabbir, S. ., Ali Rana, A. ., Ibrahim, M. ., & Ghaffar, E. . (2022). Effects Of Active Release Technique and Active Isolated Stretching on Muscles of Upper Cross Syndrome: ART and AIS on Upper Cross Syndrome . Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.621>

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## ABSTRACT

Upper cross syndrome is a condition in which there exist a muscle imbalance in upper quadrant, involving weakness of some muscles and tightness of others. In UCS, levator scapulae muscle, upper fibers of trapezius muscle, and pectoralis minor get stiff and shortened from their original length occasionally involving pectoralis major muscle. **Objectives:** To compare the effect of Active release technique and active isolated stretching on the muscles of upper cross syndrome. **Methods:** This study was a single blinded randomized clinical trial. Muscle length measurement by Vernier calipers and measuring tape between standard bony landmarks, NDI (neck disability index), Cervical rotation ROM, Cranio-vertebral angle & Numeric Pain Rating Scale (NPRS) tools for screening will be used for data collection. Recorded values were analyzed for any change using SPSS 21.0 version. **Results:** In ART the mean value of NPRS was  $2.21 \pm 1.49$  and in AIS was  $2.31 \pm 1.35$ . For ART group the mean NDI score was  $15.12 \pm 8.83$  and for AIS group was  $16.1250 \pm 5.3898$ . The mean of cranio-vertebral angle in AIS group was  $47.2125 \pm 1.9373$  and in ART group was  $48.1819 \pm 1.6483$  which is nearer to normal CV angle. **Conclusions:** The study concluded that both Active release technique (ART) and Active isolated stretching (AIS) are effective methods of treatment. It was indicated that Active release technique (ART) was helpful in pain relief, improving range, cranio-vertebral angle, muscle length and functional status in subjects with Upper-cross syndrome(UCS).

## INTRODUCTION

Upper cross syndrome is a condition in which there exist a muscle imbalance in upper quadrant, involving weakness of some muscles and tightness of others. In upper cross syndrome, elevator scapulae muscle, upper fibers of trapezius muscle, and pectoralis minor muscles get stiff and shortened from their original length occasionally involving pectoralis major muscle. While lower fibers of trapezius muscle and rhomboids with other deep cervical flexor muscles get inhibited [1]. This syndrome can lead to great disorders and joint dysfunctions in human body and

could be a source of headaches. It may cause preliminary decline of the neck and decline in the neck lordosis. This syndrome also involves changes in thoracic spine curvature by increasing the angle of thoracic kyphosis (back-hump). This type of muscle disorder may have a direct impact on kinematics of shoulder joint. This postural imbalance results in such transformation in the biomechanics of cervical vertebrae joints. Such compensation triggers to a decline of cervical spine lordosis(arch). These malalignments in upper cross

syndrome if not treated accurately, may result in degeneration of the cervical spine vertebrae [2]. The functional imbalance of muscles of upper quadrant in a human body is a result of this proximal cross syndrome which frequently is the reason why people with this syndrome develop chronic headache issues. In fact, researchers find evidence that poor posture is linked with rise in death rates in elderly population [3]. Sustained imbalance of muscles of upper quarter may arise through long sitting routines of people e.g., long sitting hours in the classrooms as well as sitting routine for other doings of day-to-day life. There is a high prevalence of upper cross syndrome as kids are not as energetic nowadays. Individuals carry on with such lifestyle till adulthood, where it exclusively gets worse as we grow older [4]. The benefits recommended comprise providing local stimulant by the skin, orientation of fascial tissue, increasing space by uplifting fascia and soft tissues over and above region of swelling, sensory stimulant, elimination of oedema through regulating fluid to lymphatic channels, and assist or limit mobility of joints [5]. Physiotherapy exercises are utilized for elongating muscle fibers, strength training, to gain balance and to relieve pain related to cervical spine. Manual physical therapy involves mobilization of joints and manipulation techniques which are used to rehabilitate normal joint range of motion related with hypo-mobile joints. Soft tissues mobilization techniques include METs, AIS, and massage etc. Several methods are applied by Physical therapists to relieve cervical [6]. Restricted ROM and a subjective sensation of rigidity may go hand in hand with cervical spine pain, which is frequently accelerated by cervical spine motion or continuous cervical spine postures [7]. Janda proposed that prior to any effort is made for strengthening of weak musculature, hypertonus antagonistic musculature should be dealt with suitable therapy which eases (and if applicable expand) them [8]. The aim of this research was to compare the effectiveness of AIS versus ART in the management of upper cross syndrome. Application of ART was found to increase the active cervical lateral flexion, and decreased pain [9]. Following general study, no literature had been placed that uses both the active isolated stretching & ART to take care of this condition [10]. Due to lack of evidence, there is need to find which technique either active release technique or active isolated stretching has more significant effect on the muscles of upper cross syndrome [11]. Past studies indicate to utilize therapy alone can be rather helpful in treating this condition. There are no known studies using ART and active isolated stretching for the rehabilitation of UCS. Most important factors to be addressed, which are not considered in previous research involve reduced in time span passed from work/activities in which the individual

desired to contribute & modification of posture all the way through with alteration in structure is much more significant. The addition of active release technique (ART) and active isolated stretching to make this latest rehabilitation program which theorizes to enhance the usefulness of the outcomes in addition to reduce the time span to attain better outcomes.

## METHODS

This study was a single blinded Randomized Clinical Trial. The assessor was blinded from the allocation in the group. The study conducted in Max rehab Lahore institute which was completed in duration of six months. The sample size of 34 subjects 17 each group was calculated from epitool. Both male and female with age ranging from 20 to 40 years scored 4 or more on numerical pain rating scale (NPRS) and cranio-vertebral angle measured less than or equal to 50 degrees were included in this study. Patients with any inflammatory arthritis including Rheumatoid arthritis, ankylosing spondylitis, cervical spine surgery, cervical spine trauma, cervical spine instability were excluded from this study. Convenient sampling technique was used to collect the data. Based on inclusion and exclusion criteria, potential subjects were recruited for the study. They were requested to take part in the research. Written informed consent was taken. Every subject was asked to draw either No.1 or No.2 from a container. No.1 was assigned to Group A and No.2 was assigned to group B. Group A treated with active release technique while Group B treated with active isolated stretching. Muscle length measurement by Vernier calipers and measuring tape between standard bony landmarks, APECS (AI Posture Evaluation and Correction System) app, NDI (neck disability index), Cervical ROM by Universal Goniometer, Numeric Pain Rating Scale (NPRS) for pain were used as assessment tools. The data was analyzed using SPSS for Windows software, version 21. Statistical significance was set at  $P = 0.05$ . Descriptive statistics, frequency tables, pie charts, bar charts were used to describe summary of group measurements measured over time. For difference between groups independent sample t test was used. This test is used to compare two population at different various intervals.

## RESULTS

At the base line data was normally distributed. To assess normal distribution of data Shapiro-Wilk test was used. 36 individuals were chosen to assess on the base of inclusion and exclusion criteria. Out of 36 subjects who met inclusion criteria 34 were selected. 34 subjects then randomly scattered into 2 treatment groups, Group A: ART (Active Release Technique); Group B: AIS (Active Isolated Stretching). Two subjects from Group A dropped out owing to private problems and two subjects from Group B were

unable to continue all therapy sessions. Therefore, in evaluation their information was not included. Both groups socio-demographic information was similar at baseline. Parametric test was introduced for evaluation to verify between group comparisons at many intervals. Group A showed a higher decrease in NPRS with a mean value of  $2.21 \pm 1.49$  compared to pre-screening value  $5.688 \pm 1.8154$  while the post treatment mean value of NPRS of group B was  $2.313 \pm 1.3525$  as compared to its pre-screening value  $5.125 \pm 1.9958$ . This shows that both groups are statistically significant ( $p$  value  $< 0.05$ ) in reducing pain. This table showed the similarity in both groups at baseline treatment values with  $p$  value  $> 0.05$  in Age, NPRS, NDI, craniovertebral angle, cervical right-side rotation, cervical left side rotation, pect minor length & trapezius length on independent sample t test. In ART the mean value of NPRS was  $2.21 \pm 1.49$  and in AIS was  $2.31 \pm 1.35$ . For ART group the mean NDI score was  $15.12 \pm 8.83$  and for AIS group was  $16.1250 \pm 5.3898$ . The mean of cranio-vertebral angle in AIS group was  $47.2125 \pm 1.9373$  and in ART group was  $48.1819 \pm 1.6483$  which is nearer to normal CV angle. The mean of cervical spine right rotation was  $69.75 \pm 10.63$  and  $68.37 \pm 10.48$  in ART group and AIS group respectively. The mean of cervical spine left rotation was  $65.68 \pm 9.830$  and  $60.87 \pm 11.27$  in ART group and AIS group respectively. The mean of pec minor length was  $12.919 \pm 1.59$  and  $12.26 \pm 1.709$  in ART group and AIS group respectively. The mean of trapezius length was  $140.85 \pm 3.68$  and  $140.68 \pm 5.38$  in ART group and AIS group respectively (Table 1).

NPRS	Treatment groups		
	Active Release Stretching (ART) (n=16)	Active Isolated Stretching (AIS) (n=16)	p-value
Pre-treatment (Mean $\pm$ SD)	$5.68 \pm 1.81$	$5.12 \pm 1.99$	0.30
Post-treatment (Mean $\pm$ SD)	$2.21 \pm 1.49$	$2.31 \pm 1.35$	0.004

**Table 1:** Between Group Comparison of Numeric Pain Rating Scale (NPRS)

The comparing of pre-treatment and post-treatment NPRS outcomes between two groups was done using independent sample t test. Analysis revealed that the difference between two groups was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited greater reduction in NPRS with mean value of  $2.21 \pm 1.49$  as compared to AIS group with mean value of  $2.31 \pm 1.35$ . The comparing of pre-treatment and post-treatment NDI statistics between two groups was done using independent sample t test. Analysis revealed that the difference between two groups was statistically significant with  $p$  value  $< 0.05$ . ART group showed greater reduction in NDI score with mean value of  $15.50 \pm 8.83$  as compared to AIS group with mean value of  $16.12 \pm 5.38$  (Table 2).

NDI	Treatment groups		
	Active Release Stretching (ART) (n=16)	Active Isolated Stretching (AIS) (n=16)	p-value
Pre-treatment (Mean $\pm$ SD)	$30.00 \pm 9.20$	$24.12 \pm 6.46$	0.21
Post-treatment (Mean $\pm$ SD)	$15.12 \pm 8.83$	$16.12 \pm 5.38$	0.001

**Table 2:** Between Group Comparison of NDI

The comparison of pre-treatment and post-treatment cranio-vertebral angle between two groups was done using independent sample t test. Analysis revealed that the difference in ART group was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited greater reduction in cranio-vertebral angle with mean value of  $46.18 \pm 1.64$  as compared to AIS group with mean value of  $47.21 \pm 1.93$  (Table 3).

CVA	Treatment groups		
	Active Release Stretching (ART) (n=16)	Active Isolated Stretching (AIS) (n=16)	p-value
Pre-treatment (Mean $\pm$ SD)	$47.41 \pm 2.59$	$46.61 \pm 3.09$	0.40
Post-treatment (Mean $\pm$ SD)	$46.18 \pm 1.64$	$47.21 \pm 1.93$	0.007

**Table 3:** Between Group Comparison of Cranio-vertebral angle

The comparison of pre-treatment and post-treatment cervical spine right rotation between two groups was done using independent sample t test. Analysis revealed that the difference in ART group was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited greater reduction in cervical spine right rotation with mean value of  $67.75 \pm 10.63$  as compared to AIS group with mean value of  $68.37 \pm 10.48$ . The comparison of pre-treatment and post-treatment cervical spine left rotation between two groups was done using independent sample t test. Analysis revealed that the difference in ART group was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited greater range in cervical spine left rotation with mean value of  $65.68 \pm 9.83$  as compared to AIS group with mean value of  $66.87 \pm 11.27$ . The comparison of pre-treatment and post-treatment pec-minor length between two groups was done using independent sample t test. Analysis revealed that the difference in ART group was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited significant increase in pec-minor length with mean value of  $12.91 \pm 1.59$  as compared to AIS group with mean value of  $13.26 \pm 1.70$ . The comparison of pre-treatment and post-treatment trapezius length between two groups was done using independent sample t test. Analysis revealed that the difference in ART group was statistically significant with  $p$  value  $< 0.05$ . ART group exhibited significant increase in trapezius length with mean value of  $140.85 \pm 3.68$  as compared to AIS group with mean value of  $141.68 \pm 5.38$  (Table 4).



RRO	Treatment groups		
	Active Release Stretching (ART) (n=16)	Active Isolated Stretching (AIS) (n=16)	p-value
Pre-treatment (Mean ± SD)	62.68 ± 10.53	60.87 ± 11.54	0.41
Post-treatment (Mean ± SD)	67.75 ± 10.63	68.37 ± 10.48	0.006

**Table 4:** Between Group Comparison of cervical spine right rotation

## DISCUSSION

The purpose of this research was to compare two non-invasive therapies, one of which was Active Release Technique (ART) and the other was Active Isolated Stretching (AIS). The focus of this research was on the effectiveness of ART and AIS on muscle length in men and women with UCS (upper-cross syndrome). In terms of pain, activity and cervical spine ranges of flexion and rotation and muscle length of the muscles involved, ART Group exhibited an analytically significant variation relative to AIS Group when doing research for different variables. In both groups, the effects of NPRS, NDI, CV angle and muscle length measurements varied considerably. These studies have thus shown that the Active Release Technique (ART) group is more effective in terms of pain, work and range of motion than Active Isolated Stretching (AIS). The target result measure is the effectiveness of incorporating Active release technique and AIS to the care regimen to right Upper cross syndrome measured by alterations in the forward head carriage angle. A new study reveals that heavy computer users appear to have a protruded head their COG was pushed anteriorly, and their balance capacity was also decreased [12-14]. There are many reasons that may lead to musculoskeletal disorders; defective posture could be a significant factor that triggers symptoms [15, 16]. Chronic pain in the cervical and migraine are among the most prevalent painful disorders in infancy. It is a problem as the incidence of both cervical pain and headache complaints has increased in 10 children and that these painful syndromes become chronic more commonly in puberty and adulthood [17, 18]. A survey found that chronic neck pain was more frequent in women (22%) than in men (16%) [19, 20]. A Global study of Headache Incidence and disability indicated that this would bring headache symptoms into the ten most crippling conditions for the two sexes and into the 5 most disabling conditions for women in the WHO list of sources of disability [21]. UCS management by ART recommended activities by demonstrating change in forward head carriage angle relative to the control group in the results of the interventional group. However, these outcomes were minimal and potentially not clinically relevant in comparison. The research strictly examined the environmental and functional effects of headache in Upper cross syndrome to create a symptom database included,

not as result indicator. The researchers conclude that shoulder pain is also a significant problem faced by individuals with Upper cross syndrome [22]. Results of the trial to analyze improvements in electromyography (EMG) and a reliable self-administered result indicator after administering ART to CTS (carpal tunnel syndrome) patients revealed that the mean symptom intensity and functional condition scores of the BQ after the intervention were substantially increased ( $p < 0.05$ ). No substantial variations were identified in the EMG review [23]. In a randomized clinical trial for the sudden benefit of the technique of Active release against MBLR (Mulligan bent leg raise) in participants with hamstring shortening. In Active release technique group, hamstring muscles flexibility and ROM improved more than Mulligan bent leg raise group [24]. Previous research contrasting the efficacy of ART (active release technique) and Capsular Stretch In combination with traditional Frozen Shoulder Treatment Therapy, this research found that ART and Capsular Stretch with traditional therapy is highly efficient in improving range of motion and decreasing frozen shoulder symptoms than solely with traditional therapy. Such modifications are clinically significant [25]. In terms of NPRS, NDI, CV angle range and muscle length, the findings of the current analysis indicate both statistically and clinically relevant results. Both the technique of active release and the technique of active isolated stretching are widely known and recognized recovery approaches. The Active Release Technique procedure was effective in pain relief, improving range and function in participants with UCS (Upper-cross syndrome) in the current study.

## CONCLUSIONS

Results of this research concluded that ART is more effective treatment to improve pain, ROM, reduce disability improve CV angle and to increase muscle length and improve function in patients suffering from Upper-cross syndrome. Active isolated stretching (AIS) is also effective, but results showed significant effects of Active release technique (ART).

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## Original Article

## Determination and Identification the Awareness of Primary Eye Care in Community

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## ARTICLE INFO

## Key Words:

Optometry, Primary eye care, Awareness

## How to Cite:

Jan, N. ., Anjum, M. ., Ahmad, M. ., Anwar Faridi, T. ., Iqbal, S., Mujahid, M. ., & Hussain, A. . (2022). Determination And Identification the Awareness of Primary Eye Care in Community: Awareness of Primary Eye Care in Health care worker of Community. Pakistan BioMedical Journal, 5(7). <https://doi.org/10.54393/pbmj.v5i7.580>

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Received Date: 23<sup>rd</sup> June, 2022Acceptance Date: 10<sup>th</sup> July, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Vision is the essential part of our life. A good eye health is necessary to perform a lot of works such as cooking, sewing, studding, driving. it affects our social, economic life. Vision also affects the quality of life and a person's physical and mental state. **Objective:** The study's main goal was to find out how much people in the community knew about primary eye care. **Methods:** A cross-sectional survey with questionnaires was done. The research site, target population, sample size (194 people), sampling method, research methodology, and work plan were all chosen. **Results:** The level of knowledge and awareness in the community was about average. Most people don't know much about primary eye care because there aren't many places to get information, and they can't access services. The study had 194 people sign up, of which 48.9% were men and 52.2% were women. 58.9% of the participants of study, were well aware and knew about basic eye care. Associated factors with awareness of Health care worker of community about Primary Eye Care showed significant association. **Conclusion:** Most people in the community know about primary eye care, and the results of this study seem to back up what they know. However, teaching people about primary eye care and eye care services is time. I would suggest through this study, to take extra measures to improve general awareness about eye care in community through social media and print media or papers so that people can avoid common eye diseases.

## INTRODUCTION

Vision is the essential part of our life. A good eye health is necessary to perform a lot of works such as cooking, sewing, studding, driving. It affects our social, economic life. Vision also affects the quality of life and a person's Physical and mental state. To live an independent life maintenance of good vision is very necessary and eye health care becoming the priority. National Institutes of Health describing the eye diseases and Visual disorder is the important problem which needs to control or cure [1]. Blindness is the last stage of visual disorder which spreads

all around the world. Peoples lived in rural areas have less knowledge about the disease control and the severity of a minor infection or disease, and the health care services is also not enough to provide services due to lack of availability and unable to afford such services the percentage of visual impairment is high. Many countries such as India [5], Nigeria [4], south Africa [3], Caribbean [2] and Jamacial facing poor accessibility of eye care services. In Timor-Leste [6] studies, explain due to lack of knowledge about the eye care services it affects the use of

eye care. It is important to take attention on the eye care. To avoid blindness and visual impairment it is necessary to take a proper eye exam among children; however, through a recent it is found only 14% children less than 6 yrs get an eye examination. All around America 60% peoples use glasses and contact lens, the need of eye care is increased in adults with the age. As peoples have maximum awareness about the importance of eye care, employers make their plans to get Maximum eye care. The American Optometric Association defines optometrist as: Primary health care providers independently examined, diagnose the disease, treatment and control visual disorder. Optometrist examined the external and internal structure of eye, diagnose cataract, glaucoma and retinal diseases; also, systemic diseases include, Diabetes, Hypertension; visual status such as myopia, hyperopia, astigmatism and presbyopia prescribing distance and near glasses, vision exercises and medication to treat some eye conditions [7]. Visual acuity is the important factor in our daily life routine. Decrease visual acuity affects daily life activities such as cooking, stitching, driving. Decrease vision is the major Issue all over the world [8]. World Health Organization (WHO), explain that 37 million peoples are blind all over the world, in which 1.4 million of children less than 15 years of age and 125 million peoples with significantly altered vision, which are total 160 million peoples facing visual disorder. Uncorrected refractive error leads to visual impairment which affects round about 200-250,000 peoples. To control refractive error is still a challenge which needs to control. Uncontrolled refractive error leads toward diabetic retinopathy and glaucoma like diseases which needs to addressed at time so progression of disease can control. Primary eye care level needs to provide accessible, affordable services all over without any inequality. Primary eye care aims are provided prevention, treatment, promotion and rehabilitation to all over the society so, keep away the community from such conditions like visual impairment and blindness which is still a task [9]. In India visual disorder and blindness are constantly the main health problem. To avoid the visual impairment and blindness availability of primary eye care services is necessary [10].

## METHODS

A quantitative cross sectional study done in three months beginning from October 2021 to December 2021 in health care worker community of Pakistan. The sample size calculated with the help of a web software program software Open-Epi with the aid of the use of taking population length of Lady Health Workers (LHW), Lady Health Visitors (LHV), Lady Health Supervisors (LHS), and dispenser to be one hundred and 80, occurrence taken

modified into 50% and five% margin of errors. The calculated pattern length turns out to be 194. The sampling body of all Primary Health Care Workers (PHCWs) became obtained and statistics changed into gathered from LHW, LHV and dispensers. Records have become collected through a designed questionnaire with each open-ended and close-ended questions. Questions had been made using simple language and had been additionally translated in Urdu. The validity of questionnaire changed into checked earlier than beginning records series with the aid of way of appearing a pilot examine on health care employee network. Questionnaire designed from articles: Knowhow of eye care among health Extension people in Southern Ethiopia and focus of eye health and ailments a number of the population of the Hilly region of Nepal and a few questions had been made after analyzing the additives of national Programmed for Prevention and manipulate of Blindness (Punjab, Pakistan). Facts modified into analyzed via using the usage of statistical software program software SPSS version-26.Zero. Qualitative variables had been given numbers and possibilities. Scale of recognition have become computed and categorized into terrible and suitable awareness by the use of taking median. Chi-square test of independence used to find the affiliation among outcome variable and unbiased variable. This check applied on all impartial variables and final results variables.

## RESULTS

Gender	Frequency
Male	93(48.8%)
female	101(52.2%)
Total	194

**Table1:** Frequency and percentage of male and female participants

Have you ever listened word primary eye care?	Frequency
yes	97(55.7%)
no	77(44.3%)
Total	194

**Table2:** Question and response of participants

The level of knowledge and awareness in the community was about average. Most people don't know much about primary eye care because there aren't many places to get information, and they can't access services. The study had 194 people sign up, of which 48.9% were men and 52.2% were women. 58.9% of the people who took the test knew about basic eye care.

Variable	Awareness about eye care		Chi-Square	P-value
	High	Low		
Age	52.3 Yes	48.6No	4(2)	0.003
Knowledge regarding eye care	(51.2)	(49.7)	3(1)	0.001
Education	54.7	46.2	8(3)	0.005
Experience	> 15 years = 43.2	>5 years =56 years	13(6)	0.002
Designation	(LHV) 62.1	Dispenser (38.2)	26(3)	0.004
No. of eye care training	(YES) 58	NO( 42)	16(2)	0.001
Previous eye care training	(YES) 48	NO( 52)	4(2)	0.006

**Table 2:** Associated factors with awareness of Health care worker of community about Primary Eye Care

The above table showed significant results.

## DISCUSSION

The study based on the awareness of the primary eye care services. By Using a Special formula, we get a sample size of 194 for this study. This study is Performed among the community. This study was taken by a questionnaire which is given to every participant and explain each and every word of the questionnaire to every person in the lay language. The purpose of the study is knowing the level of awareness about the eye care services among the peoples. In 194 participants 48% were males and 52% are females. The Outcome of the study give an idea is there any need to improve or provide more knowledge related to primary eye care services and optometry [13]. Campaigns for primary eye care increased people knowledge which appreciate or encourage peoples to get eye care services at time and avoid the burden of visual disorder and blindness. As it is seen 55.7% students were aware and 44.3% unaware about the eye care services [14]. As in my literature review it shows how glaucoma patients show bad follow up routine due to less knowledge. This study shows  $p=0.0001$  which mean they show highly significant effect [15]. Understanding and stage of perception about cataract, diabetic retinopathy and glaucoma become assessed in an Iranian population. It was visible that as compared to cataract and diabetic retinopathy awareness of glaucoma changed into especially low. Few spoke back have been having initial symptoms of glaucoma and diabetic retinopathy [16,17]. It was located that stage of awareness became relatively better from previous studies Brazil but became nevertheless no longer up to the mark. It become visible that media became an efficient suggest of supplying statistics approximately glaucoma and eye care services [18]. A survey was performed to assess the attention of glaucoma and obstacles to evaluate the health services amongst glaucoma sufferers in Tanzania [19]. It changed into suggested that primary barrier to evaluate the fitness services changed into lack of expertise

approximately glaucoma and boundaries for fitness services. The awareness primarily based sports have been distinctly endorsed [20].

## CONCLUSION

Most people in the community know about primary eye care, and the results of this study seem to back up what they know. However, teaching people about primary eye care and eye care services is time. I would suggest through this study, to take extra measures to improve general awareness about eye care in community through social media and print media or papers so that people can avoid common eye diseases.

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**Case Report****Traumatic Anterolisthesis with Pre-Existing Idiopathic Scoliosis: An Unusual Case Report**Atif Raza<sup>1</sup>, Binash Afzal<sup>1</sup>, Baseerat Iqbal<sup>1</sup> and Zeeshan Amjad<sup>1</sup><sup>1</sup>Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Lahore, Pakistan**ARTICLE INFO****Key Words:**

anterolisthesis, low back pain, cryotherapy

**How to Cite:**

Raza, A., Afzal, B., Iqbal, B., & Amjad, Z. (2022). Traumatic Anterolisthesis with pre-existing idiopathic scoliosis: An unusual case report : Traumatic Anterolisthesis with Pre-Existing Idiopathic Scoliosis. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.602>

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Received Date: 5th July, 2022

Acceptance Date: 17th July, 2022

Published Date: 31st July, 2022

**ABSTRACT**

Low back pain may have different causes and one of the cause is anterolisthesis. Anterolisthesis is the anteriorly slippage of a vertebrae onto its caudal one. Its Grading is done using mayerding classification system on a plain radiograph in oblique view. Grade I is identified less than the 25% of slippage, in grade II its 25 to 50%, grade III of 51 to 75%, and grade IV having 76 to 100% of slippage. Sometimes it may be symptomatic as well as asymptomatic; pattern of pain is usually localized and/or referred to the dermatome of slipped vertebrae. Non-operative management is preferred as long as failure of non-operative management and neurological deficit. Case Summary: we presented the case of traumatic anterolisthesis of grade I with the preexisting idiopathic scoliosis. Cases with other conditions have been reported before like spondylolysis but not with scoliosis. Case was diagnosed with plain radiography as well as physical examination. The condition was managed with physical therapy. Conclusion: Grade I anterolisthesis can be manageable with non-operative methods such as physical therapy. Cryotherapy is found to provide maximum relive of inflammation based pain than thermotherapy. Early diagnosis and treatment is beneficial to rescue patient from state of kinesophobia.

**INTRODUCTION**

Degenerative spondylolisthesis is defined the degeneration or wear and tear of the spinal components including intervertebral discs, spinal ligaments and weakening of para spinal muscles, was divided into two categories according to the direction of slippage: retrolisthesis (posteriorly slipped vertebrae on its caudal one) and anterolisthesis (anteriorly slipped vertebrae on the other one)[1]. Whereas Traumatic spondylolisthesis is an uncommon entity reported in the literature [2]. prevalence of spondylolisthesis among the patients of low back pain was recorded at 7.4% [3]. On the other hand, Scoliosis is multi-dimensional abnormality of the spine identified by a lateral deviation of at least 10 degrees with rotation in the spine, usually accompanied by a decrease in the normal kyphosis of the spine known as hypokyphosis. It

is justified in three types as neuromuscular, congenital or idiopathic [4]. At the best of our knowledge, we present a rare case of L4 traumatic anterolisthesis with the pre-existing idiopathic scoliosis which has not been presented in the literature yet and to discuss its management with the non-operative methods.

**CASE**

A 55 years old house wife came up with two days' history of severe pain in the lower back, medial buttock and lateral thigh. The pain started after she lifted a weight from the ground in flexed spine. Physical examination presented very less mobility in extension of spine and radicular symptoms on provoking. Intensity of pain was gradually increasing after walking a few steps and as well as prolonged sitting. Severe tenderness was felt at L4-L5



region of low back. Radiographs showed Grade-I anterolisthesis at L4 vertebra according to mayerding classification system as well as pre-existing idiopathic scoliosis is determined. Natural tone of para spinal muscles was preserved. Inter vertebral spaces were very narrow than normal.[Figure 2]

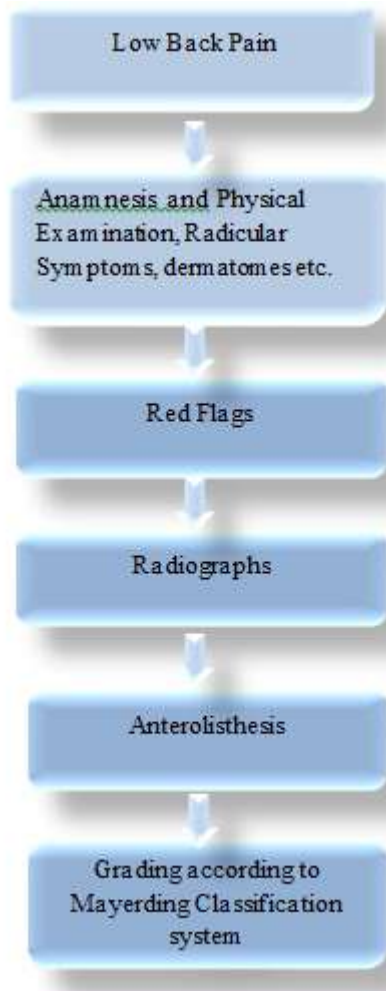


Figure 1: Flow chart Of Assesment



Figure 2: Showing anterolisthesis in oblique view and scoliosis in

PA view

Since, there were no neurological deficits such as impingement of spinal nerve. So, it was finalized not to operate and remaining options were analgesics and physical therapy. Patient have done with stomach flushing due to GERD(gastroesophageal reflux disease) just before 2 days of the onset of this conditions and analgesics like NSAIDS cannot be used in GERD. The only course of action was to manage through physical therapy. Patient was advised to abstain from daily activities and wear lumbo-sacral orthosis at sitting and walking. Cryotherapy was used for the localized pain at L4-L5 level. Spinal Flexion based exercises were more emphasized as they relieve symptoms in anterolisthesis, Active contraction of the abdominal muscles e.g. knee to chest and isometrics of the lower back muscles. Cat and Camel exercise was also the part of regime. After 12 days of sessions patient reported she can perform pain free movements. After It Co-contraction exercises for core stability and proprioceptive stimulations were used to enhance the ability to perform ADLs hazard-free. Daily sessions were conducted for 15 days and day after day sessions were conducted for another 15 days.

## DISCUSSION

At the best of our knowledge, we present a rare case of L4 traumatic anterolisthesis with the pre-existing idiopathic scoliosis which has not been revealed in the literature yet and discuss its management with the non-operative methods. In literature occurrence of anterolisthesis with other conditions such as pedicle fracture have been reported [5] Assessment of a patient with symptomatic anterolisthesis which is the type of spondylolisthesis includes the history, radiographic imaging(X-Rays) as well as physical examination, which also helps in identifying the yellow and red flags as highlighted by the Finucane LM et al [6]. Location of pain itself does not help to differentiate the symptomatic lumbar spondylolisthesis from unparticular LBP. Indeed, pain may be present at both lumbar region and/or referred to the legs. Keeping in mind that pain of lower back comes from many causes, other symptoms must be analyzed to develop a differential diagnosis among conditions having similarity with non-specified LBP (in which occurrence of spondylolisthesis is not relating to the symptoms), and other situations in which the LBP is rationally linked to SPL, when the instability is present at lumbar and its effects are the important feature of assessment [7]. Clinical testing for the symptomatic lumbar SPL may be categorized into different kinds dependent on the purpose. The purpose of these tests is to detect anatomical defects, assess vertebral mobility, provoking/relieving of pain and other marks such as paresthesia, assessing lumbar muscles endurance [8].

Static X-rays have been proven gold standard till date for the determination of SPL when a glide > 3mm in the oblique view is observed as concluded by the Simmonds et al. in his systematic review [9], In this case we used plain radiographs(x-rays) in oblique view stood up to determine the anterolisthesis as reported by the Kuhns BD et al. that Standing Oblique X-rays have a more sensitivity to rule out SPL as compared to supine MRI [10]. In this case It is discovered that anterolisthesis is of Grade I. Grading of the anterolisthesis is very important in aspect of prognosis and clinical decisions like surgery. Mayerding classification system is the commonest used as it's easy to employ. Grade I is identified less than the 25% of slippage, in grade II its 25 to 50%, grade III of 51 to 75% and grade IV having 76 to 100% of slippage [11]. In this case Treatment segment was consist of non-operative management. As endorsed by the Van der Heijden et. al in his case report that indications for surgery include failure of non-operative management and occurrence of neurological deficit [5]. During assessment, patient education should be the important element as it facilitates the changes in behavior. Bearing in mind that the weaker association between the LBP and SPL, the SPL diagnosis should not cause panic for the patient [12]. In this case our first step in course of action was to manage pain. Highly perceiving pain decreases self-awareness in pain and increases the kinesiophobia as highlighted by La Touche et al [13]. In this case localized pain was manage with the help of cryotherapy. In a clinical trial of Morteza Dehghan, he verified that cryotherapy is a significant good approach to relive inflammation and pain than thermotherapy [14]. In this case flexion based exercises of spine were more emphasized as well as cat and camel exercise. Underlying mechanism was employing of tension in the spinal ligaments to realign the slipped vertebrae. Where as in retrolisthesis, extension based exercises are found to efficient facilitated by the latest study of Contreras et. Al [15].

## CONCLUSION

Proper Assessment and differential diagnosis is the key to the right direction of treatment. Grade I anterolisthesis can be manageable with non-operative methods such as physical therapy. Cryotherapy is found to provide maximum relive of inflammation based pain than thermotherapy. Early diagnosis and treatment is beneficial to rescue patient from state of kinesiophobia and patient education have a key role in developing synergy with patient and activation of good cellular brain mechanisms which may help in fast healing.

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## Case Report

## Reversing the Polycystic Kidney Disease Using Dietary Modification: A Case Report

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## ARTICLE INFO

## Key Words:

Polycystic kidney disease, Cortisol hormone, Hematuria, Tenormin, Cumin and Ajwain

## How to Cite:

Raza, A. ., Basharat, S. ., Zafar, A. ., Zia Shahid, M. ., Ambreen, S. ., Fatima, A. ., Javid, A. ., Rida Ameen, S. ., Mumtaz, S. ., & Ikram, A. . (2022). Reversing the Polycystic Kidney Disease Using Dietary Modification: A Case Study: Reversing Polycystic Kidney Disease with Dietary Modification. Pakistan BioMedical Journal, 5(7).  
<https://doi.org/10.54393/pbmj.v5i7.669>

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Received Date: 15<sup>th</sup> July, 2022

Acceptance Date: 23<sup>rd</sup> July, 2022

Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

Polycystic Kidney Disease (PKD) is an inherited disorder in which the anomalous composition of the renal tubules results in the buildout of multiple cysts within the kidney. The genetic PKD mainly occurs between 30 to 40 years of age but acquired PKD can occur because of obesity, persistent high blood pressure, irregular eating patterns, and a sedentary lifestyle at any stage of life. The severe side or back pain, abdomen fullness, edema, hematuria, and weight gain are most common in both females and males. Several therapies are presented for PKD, including weight management, blood pressure control, medicaments like Tenormin, Dietary Approaches to Stop Hypertension (DASH) diet, and the use of cumin along with ajwain in place of salt. **Case Summary:** This case reported a 30-years-old female approached for evaluation of hypertension, severe side or back pain, and high blood pressure as well as overweight with a sedentary lifestyle. **Conclusion:** Cortisol hormone levels were elevated with an increased level of creatinine and urea in the blood. Tenormin and DASH diet, and cumin and ajwain were the best treatment choices for PKD patients that need additional investigation before being recommended on a long-term basis and fruitful treatment result.

## INTRODUCTION

Polycystic Kidney Disease (PKD) is a genetic disorder of the kidneys with the development of cyst clusters, resulting in the kidney enlarging and dropping down functioning with time. The fluid retention in the noncancerous sacs causes the kidneys to enlarge. The different sizes and characteristics of cysts can damage the kidneys. PKD complications can result in cysts developing in the liver and other organs in the body. There are a lot of associated problems, including high blood pressure, hypertension, obesity, and even kidney failure [1,2]. Signs and symptoms can develop at any age depending upon whether the disease is genetic or acquired. Improved diet is the basic

element for the treatment of PKD and its advancement, controlling the damaging impact of PKD problems, including hypertension, hyperkalemia, and metabolic acidosis [3]. In addition, PKD can give rise to flank pain, cyst hemorrhage, nephrolithiasis, Intracranial Aneurysms (ICA), biliary tract disease, intestinal diverticulosis, and cardiac valve defects [4,5]. Several studies related to PKD treatment by Modification in Diet in Renal Disease (MDRD), Dietary Approaches to Stop Hypertension (DASH), healthy blood sugar levels, and healthy weight. There are further studies needed to examine the management of PKD. Here we report a case in which an adult woman with PKD, who

has been treated with Tenormin (01 year) and DASH diet (3 months) along with *Cuminum cyminum* (cumin) and *Trachyspermum ammi*(ajwain)as taste enhancer instead of salt.

### Case Report

In January 2021, a 30-year-old female presented for evaluation of high blood pressure, hypertension, and obesity. She feels the fullness of the abdomen most of the time. She had not been treated with any diet therapy. She was referred from the other treatment center and suffered from ICA, severe headache, and high blood pressure. There is no family history of PKD and she has no practice of alcohol use or cigarette smoking.

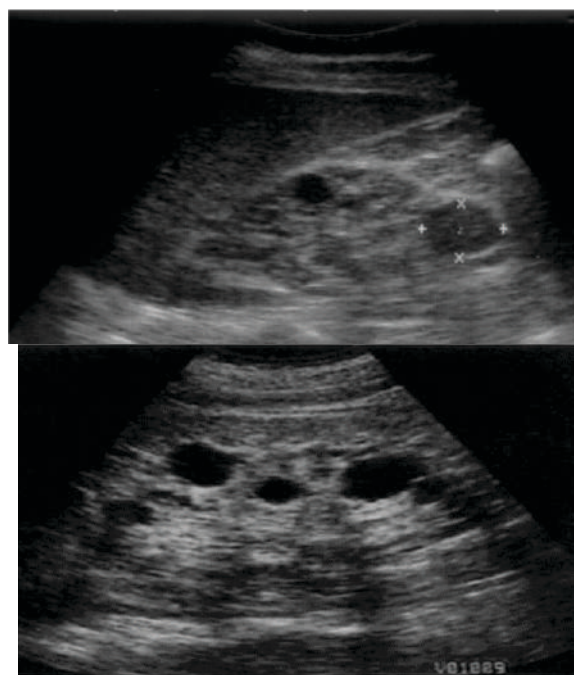
### Patient Assessment

She was suffering from hypertension and obesity with a height of 64.8”(inches)and weight of 95 kg, BMI (Body Mass Index) of 35 kg/m<sup>2</sup>, an ideal body weight of 56.5 kg, blood pressure of 160/95, disturbed history of urination and Hematuria, and having the habit of fast and junk food in a company a sedentary lifestyle which causes to pile the disease. While the patient avoids most of the fruits, vegetables, and carbonated drinks in her daily life. The patient suffered from severe headaches, yellow teeth, pale color of skin, severe, or sometimes side pain with an enlarged abdomen mass due to edema or water retention in the cysts observed during clinical assessment. Cortisol hormone levels were elevated along with increased creatinine and blood urea level. The blood glucose level was on average and the hemoglobin level was low (Table 1). The albumin level was high, as well as the lipid profile was seen as abnormal during lab test examination. Whole abdomen USG showed; there is an anechoic large round cyst in the upper pole with thin walls 14.2x12.4cm, absent calcification, internal septations, or echoes, showing acoustic enhancement, no mass was seen in the left kidney and three anechoic round cysts showing acoustic enhancement, located at inferior pole 9.6x7.6cm at superior pole medially 4.2x4.9cm and at superior lateral pole 7.6x5.9cm, no calcification, internal septations or echoes, no mass was seen in the right kidney. The patient pelvic ultrasound was done (Figure 1). The patient was evaluated by a doctor, physiotherapist, and nutritionist, which guide her lifestyle modification and increase physical activities to manage the weight gain and bring down the weight. The patient already uses Tenormin (atenolol) 50mg/day to control her blood pressure and hypertension, patient recently started a DASH diet to improve her condition. The nutritionist also suggests cumin and ajwain instead of salt to control the severe headache and elevated blood pressure. Within 3 months, the patient was only able to manage the blood pressure by using Tenormin and a slightly improved lipid profile. After 6

months of treatment with Tenormin and DASH diet and cumin and ajwain, weight was 84kg and BMI decreased. The patient lipid profile improved and whereas blood pressure and hypertension were also controlled. The PKD remains but now the headache is not the problem. The side pain or back pain is not the problem as well as no edema or water retention in the body. The patient is still on the DASH diet and Tenormin therapy and cumin and ajwain because she is still overweight [6–10].

Test	Normal Range	Result
RFT (Renal Function Test)	0.6-1.1 mg/dL1	0.9 mg/dL
GFR (Glomerular Filter Rate)	40 mL/min/1.73m	<140 mL/min/ 1.73m <sup>2</sup>
LFT (Liver Function Test)	27-56 units/liter for ALT 10-34 IU/L for AST	34 units/L25IU/L
GGT (gamma-glutamyl transferase)	0 to 51 IU/L	35IU/L
Total Protein	6 and 8.3 gm/dL	8.1 gm/dL
Albumin	3.4 to 5.4 g/dL	5.1 g/dL
Bilirubin	0.3 to 1.9 mg/dL	1.4 mg/dL

**Table 1:** Biochemistry of blood samples of the patient



**Figure 1:** Pelvic Ultrasound report

## DISCUSSION

Kidney disease belongs to a prevalent hereditary disorder: polycystic kidney disease. It results in 5% to 10% of end-stage renal disease in most individuals. It shows that PKD1 (chromosome 16p13.3) and mutations of PKD2 (chromosome 4q13q23) produce effects of 85% and 15%, respectively in patients. Performance of mutations analysis has not been done in our case. Instead of acquired cystic kidney disease (AKCD), In most cases, recessive inheritance and autosomal dominance are the basic

reasons behind polycystic kidney disease. Most patients with chronic kidney failure produce AKCD, which belongs to the extended period of dialysis [6]. Polycystic kidney disease acquired by inheritance contributes to several other disorders like tuberous sclerosis, nephronophthisis, ADPKD, and von-hippel-lindau syndrome along with these, it participates with other genetic diseases which are not common [7]. Diagnosis can be made clinically. The conclusive factors are as follow: family history having such favorable disorders, age, numerous cysts present on both sides of kidneys with increased in size, and at the time of diagnosis restricted functioning of kidneys occur. Mainly, this disease occurs in individuals aged 30-50 years. The disorders like refractory pain, arterial hypertension, and cyst infection are the most common complications associated with renal disease. Excessive intra-abdominal pressure usually causes flank pain, which develops infections and cyst rupture [8]. Those individuals having missed or adverse family history is diagnosed with the help of liver cysts detection and extra renal appearances. The exact elucidation has not been done in which a precise mechanism explains the origin of renal injury in polycystic kidney disease. In PKD, at least two mechanisms are present that intervene in renal injury and the growth of cysts, named cellular proliferation and fluid secretions [9]. Excessive development of fluid accretion can be involved by cyst expansion in PKD, which is supposed to require cystic fibrosis transmembrane conductance regulator protein, CFTR, that transports cAMP-mediated activation of chloride. The changes of cAMP do not mediate any effect on the appearance of FR, along with this, it shows that reduction of glucose accessibility or the suppression of the SIRT-1 pathway either does not mediate any effect on FR [10]. Mimic several effects of FR and Reduction of IGF-1 levels can be done by restricting a single amino acid called methionine restriction. Also, MR increases metabolic health and life span in numerous animal models and in vitro. Moreover, with the help of a presumed vegan diet, IGF-1 suppression and MR can be achieved. Amazingly, some studies have shown that protein load is the major factor in the progression of ADPKD in animal models. Although many types of research have shown that there are no beneficial results on the restriction of protein in patients with progressive ADPKD and kidney failure. Certainly, a trend has been demonstrated for a higher ratio of injuries consuming low protein. According to this, in further studies, there is a need to obtain the crucial role of macronutrients and calories in consequence of nutritional management presented here. Moreover, it is imperative to accomplish the time management of dietary manipulations in humans with ADPKD, where nutrient limitations may have conflicting effects before and after

the development of the disease [11]. In addition, it can also happen that nutrient management like FR can play a role in enhancing the effects of pharmacologic suppressors of the mTOP pathway, such as rapamycin. Antihypertensive, broncho-dilating activity and antispasmodic T. ammi has an antihypertensive effect that can be organized intravenously in vivo, and the broncho-dilating actions and antispasmodic can be administered in vitro. It has been found that plant material shows antispasmodic effects mediated by studies of calcium channel blockage and reviewed that this mechanism participates in their experimental conclusions and reinforced the typical usage of T. ammi diseases like hypertension and states of the gut like diarrhea and colic [12]. According to our study, it has been concluded that preventive effects have appeared with the pre-treatment of black cumin on renal reperfusion injury (I/R) of a kidney. Histological examination and functional parameters have shown this evidence. In this research, worsening kidney functions such as the rise of serum urea, creatinine, and uric acid characterize kidney tissue injury demonstrated by reperfusion injury in animals. According to enhance histopathological destructions these changes might occur like interstitial edema, tubular necrosis, cellular vacuolization, glomerular changes, and hemorrhage, and hyperemia. Though, in the reperfusion rats, black cumin with pre-treatment, histopathological and functional changes were reversed just as biochemical remarks were maintained by a histopathological test of renal stones [13]. Glomerular filtration rate has indicator markers such as Blood Urea Nitrogen (BUN), Serum Creatinine (Scr), and uric acid. Rather than sham operated rats, I/R rats have significantly higher levels of BUN, Scr, and uric acid. It shows that after I/R operations, renal dysfunction occurred. Our study concluded that black cumin pre-treatment lowers the levels of uric acid, BUN, and Scr which were persuaded by the ischemia-reperfusion process. It proves that IR-induced renal dysfunction can be helpfully prevented by pre-treatment with black cumin in a dose-dependent manner. Current research also exposed that the ratio between the weight of the kidney and the weight of the body significantly enhanced and decreased urine production significantly. It is supposed that after renal reperfusion outcomes, interstitial edema by the result of an increased ratio of kidney weight to body weight, and edema is improved by the pre-treatment with black cumin. In adults, oliguria is defined as a urine output of less than 400ml or 500ml per 24 hours [14]. Oliguria is induced by acute tubular necrosis, which is done by different mechanisms. In the first process, the urine flows from the damaged or necrotic tubules within the basement membrane in the renal interstitium due to the loss of

epithelium damaged by necrosis. Other than that, the renin-angiotensin process that affects the glomerular blood flow, filtration, and cortical nephrons is significantly reduced, resulting in less urine formation. Inflammation of various renal tissues, damage to the tubular system, cell necrosis, and glomerular structure injury with the cell debris are all characteristics of acute renal failure damaged by reperfusion and ischemia. Most of the dysfunction and destruction process occurs during the reperfusion (re-oxygenation injury) along with anoxia (hypoxia) & Reactive Oxygen Species ROS (Reactive Oxygen Species) gas being the major contributing factor in reperfusion injury. It is also responsible for cell death due to lipid peroxidation of biological membranes [15]. The cellular pathogenic activity of I/R42 includes free radical scavengers produced during I/R support. The generation of reactivating oxygen species ROS 43,44 plays a role in the kidney injury during the I/R process, they are the result of renal reperfusion and have different toxic effects for example damage to the DNA, oxidation of the protein, apoptosis induction, and nitrosylation. Black cumin's effect on lipid peroxidation was measured in terms of MDA assessed as a stable metabolite of the free radical-mediated lipid peroxidation process [16]. Our research demonstrated enhancement in the renal MDA and antioxidant enzyme pool reduction demonstrated by animals subjected to renal I/R. To some noticeable extent, the increase of MDA is reversed by black cumin, approving their antioxidant role in I/R, representing that protein oxidation and lipid peroxidation are prevented by black cumin in renal I/R. In our research, renal ischemia reperfusion reduction also occurs in GSH which will also be called depleted following an ischemic insult. Rather than their respective controls, pretreated rats demonstrated higher GSH content, representing that in replenishing the GSH pool black cumin helped. The statistic that in comparison with the I/R group, a significant increase was caused by black cumin in GSH-Px, CAT, and, SOD activities. It represents that it may reflect its antioxidant nature in enhancing enzyme activities like GSH-Px, CAT, and SOD. Therefore, the antioxidant activity of black cumin can significantly explain its protective role mechanism in renal I/R injury [17]. The rennin angiotensin system plays a crucial role in hypertension and blood pressure regulations. To form Angiotensin-I, renin acts on angiotensinogen, with the support of the angiotensin converting enzyme, it is converted into angiotensin-II. By gathering all pieces of evidence, intracellular formation of ROS i.e., hydrogen peroxide and superoxide anion (associated with renal damage) stimulated by angiotensin-II. Reperfusion damage includes many causes in which the generation of ROS is one of the main causes. Augmented ROS production

or reduced ROS sifting ability can cause oxidative strain. The inefficiency of cell organization and function can cause by peroxidation. Peroxidation is the process in which ROS link to the polyunsaturated fatty acids in the tissue fats. After re-oxygenation and reperfusion, the inequity between the renewal of oxygen source and mitochondrial respirational function concludes in the immense generation of superoxide anion in mitochondria [18]. Below these circumstances, the protective system, which is called antioxidant enzymes or antioxidants, can't escape the outflow of ROS, specifically in mitochondria, and their impacts on other intracellular sites. This cataract of proceedings is recognized as reperfusion injury. In this research, renal I/R maximized oxidative strain products comprising tissue MDA and washed out the antioxidant enzymes pool, as is obvious from the decreased action of superoxide dismutase, glutathione peroxidase, reduced glutathione, and catalase. It can be shown that pretreatment with black cumin prohibited renal I/R injected lipid peroxidation and prevented the kidneys from the acute raising of ROS products, and reduced glutathione peroxides, superoxide dismutase catalase, and decreased glutathione in rats uncovered to the renal I/R. Taken in all, the usage of this plant in reperfusion injury/renal ischemia is then sustained but the specific active substances of cellular, sites, molecular mechanisms, and black cumin of its pharmacological impact and likely harmfulness and collaboration with other medications are still to be considered. Correspondingly, because of the extended span of providing black cumin, before three weeks of ischemia, this can postpone treatment of stones and renal tumors and be intolerable for kidney harvesting for patients with kidney trauma and cadaveric donors [19]. The various segments of black cumin seeds in different dosages must be measured through animal modeling for their quick therapeutic potential. Though in an animal model, records favor black cumin's role in reducing kidney harm after reperfusion injury/ischemia of the kidneys, however, upcoming research and trials to find the effectiveness and finest doses of this plant in human bodies are essential [20]. In PKD, the mechanism that can slow CKD progression is diet, a disease modifier according to clinical and preclinical evidence. Compliance has been a critical issue with the dietary management of the disease, especially when immediate adverse consequences are not resulting from non-compliance, apart from the utopian reports from a few patients followed for a few weeks. For instance, sodium restriction is recommended by many guidelines and how to monitor sodium intake. No provision is made. It seems realistic as it would probably be required 24hr urine collections. In this regard, compliance may be facilitated by periodic assessment of targets. Regarding calorie

restriction, in all the tested species so far, the only maneuver that has increased life expectancy is the concern about compliance that has led to developing drugs that impersonate the effects of calorie restriction [21]. To help combat monotony and enhance compliance, low osmole/high water diets food restriction to high fat ketogenic diets, or time-restricted ketogenic diets may offer the variety that allows switching from one regime to another and design diverse dietary approaches that slow down PKD progression. Additionally, to promote compliance, the active participation of the patients in guideline development can help to create patient-centered recommendations. So far, Autosomal Dominant Polycystic Kidney Disease (ADPKD) patients that are specially tailored by no dietary intervention trial, have assessed the impact on ADPKD progression. Currently, both with a target urine osmolality of  $\leq 270$  mOsm/kg, ongoing or recently completed clinical trials are only exploring an increased water intake (Prevent-ADPKD and Drink). Unfortunately, we are not optimistic about compliance based on prior trials in general CKD patients [22]. However, salt restriction, which provided benefits despite rampant non-compliance with salt intake targets, there is a margin for eventual clinical success. Therapeutic relationships are highly emphasized by the contribution to compliance and how much the clinician relies on and transmits the efficacy of the dietary manipulation. From a worldwide perspective, to further pursue potential dietary approaches for ADPKD care, the lack of access to drug therapy for most of the human population emphasizes this need. Potential indications for specific dietary manipulation in this context will be appropriate and should be stressed as given by the known physiopathology of ADPKD [23]. Moreover, the fact that in the absence of renal function, ADPKD diagnosis can be made, decline offers the important possibility to act in a preventative way with a specific dietary manipulation. This is independent of the classical protein intake restriction typical of advanced CKD stages, coming from preclinical studies provided by clinical trials, which confirm the promising results. For this reason, the need of the hour for these clinical studies in this field should be emphasized.

## CONCLUSION

This case was distinctive of a patient complicated with hematuria, higher intra-abdominal mass, hypertension, and severe headache who secured recovery results with adequate therapy and diagnosis. This intimate devotion to the low-calorie DASH diet, cumin, and ajwain pose a favorable curative potential for PKD patients.

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**Systematic Review****Transethosomes: A Breakthrough System for Transdermal and Topical Drug Delivery**Jawad Ali<sup>1</sup>, Reesha Raza<sup>1</sup>, Sibgha Ameen<sup>1</sup>, Anam Arshad<sup>1</sup>, Fauzia Karim<sup>1</sup>, Muhammad Waseem Akram<sup>1</sup>, Lubna Shakir<sup>\*1</sup><sup>1</sup>Faculty of Pharmacy, Hajvery University Lahore, Pakistan.

## ARTICLE INFO

**Key Words:**

Nanotechnology, transethosomes, lipid-based delivery system, stratum corneum, liposomes, deformable.

**How to Cite:**

Ali, J. ., Raza, R. ., Ameen, S. ., Arshad, A. ., Karim, F., Waseem Akram, M. ., & Shakir, L. . (2022). Transethosomes: A Breakthrough System for Transdermal and Topical Drug Delivery: Transethosomes for Transdermal and Topical Drug Delivery. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.578>

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Received Date: 17<sup>th</sup> June, 2022Acceptance Date: 28<sup>th</sup> June, 2022Published Date: 31<sup>st</sup> July, 2022

## ABSTRACT

The major hindrance in transdermal delivery of drugs is complex barrier of stratum corneum. New generations lipid based nano-system, particularly transethosomes have ability to permeate from rigid network of stratum corneum. They have proved to be a promising tool for the transport of drugs. This article reviews these ethanol-based, elastic, and deformable vesicles. The major components that provide the vesicles their distinct properties are phospholipids, ethanol, edge activator, and water. Ethanol imparts softness and edge activator increases the permeation by providing elasticity, making it possible to deliver drug molecules in blood. It is a non-invasive technique that can be used as a carrier for NSAID, anticancer, antifungal, and antihypertensive, among other drugs.

## INTRODUCTION

Transdermal drug delivery is the movement of drug formulation from the healthy and intact stratum corneum layer of skin to the systemic circulation of the body [1]. Transdermal drug delivery has more advantages than the oral route and hypodermic injections, as it is non-invasive, painless, and eliminates the risk of transmission of disease by the reuse of needles. It bypasses the first-pass effect, is easier to self-administer, prolonged and improved therapeutic effect, enhanced bioavailability, ensures a sustained release of drugs from the drug formulation, and is inexpensive [2]. This route not only bypasses the first pass-effect but also provides a large surface area for absorption and improves efficacy [3]. Despite all the

benefits, it has some challenges, the most common of which is skin acting as a barrier for drug penetration due to its organized structure [4]. The barrier properties of skin are due to the outermost layer of the epidermis called the stratum corneum. The stratum corneum consists of corneocytes, proteins and is enveloped in a lipid bilayer that prevents the absorption of drugs. It allows the entry of molecules having lipid solubility, and lower molecular weight [5].

**DRUG DELIVERY PATHWAYS THROUGH SKIN**

There are basically three main routes for the drug penetration through the layers of skin, which include transcellular, intercellular, and appendageal routes [6].

The transdermal drug administration through the appendageal route is the least used route due to low diffusion rate and small area for absorption [7]. The transcellular routes are the major pathway for polar drugs during the percutaneous absorption of the drug and for hydrophilic compounds [8].

### TRANSETHOSOMES

Transethosomes are lipid-based, elastic, Ultra-Deformable Vesicles (UDV). These are uneven spherical shaped carriers that have the ability to encapsulate low as well as high molecular weight drugs [9]. After the discovery of transfersomes and ethosomes, the transethosomal system of drug delivery was first introduced in 2012 [10]. The novel transethosomes contain the major benefits of ethosomes and transfersomes i.e., vesicle elasticity and skin permeation. The structure of transethosomes mainly consists of phospholipids along with ethanol, edge activator (surfactant), and water. Phospholipids being amphiphilic perform the main role in bilayer formation [9]. Edge activators like tween 20, tween 60, tween 80, span 60, span 65, span 80, and sodium cholate or sodium deoxycholate, among others, improves the permeability and the flexibility of the vesicle [11, 12]. However, Ethanol (used in concentration up to 30%) is the penetration enhancer and water is the vesicle forming agent [13].

**Permeation mechanism of transethosomes through skin barrier;** transethosomes assist in the drug delivery by enhancing the permeability of the components of the free drug through the skin with the help of vesicle components. Ethanol is the major constituent responsible for the penetration of transethosomes as edge activators alone are not sufficient to penetrate into the lower layers of the skin [14,15]. Ethanol present in transethosomes causes disruption of the phospholipids in the stratum corneum causing fluidization [16]. Increased fluidization results in increased intracellular space which in turn increases the penetration. Transethosomes instigate hydration that broadens the pore size. This allows the edge activator to utilize its deforming properties to help squeeze the molecule through the stratum corneum despite the smaller diameter of the pores [17]. Subsequent to passing through corneum, it goes through feasible epidermis and arrives at the dermis [18].

Therapeutic agent	Title of the study	Major findings	Reference
Brucine-strychnine	Novel transethosomes for the delivery of brucine and strychnine: Formulation optimization, characterization and in vitro evaluation in hepatoma cells	Hematoma cells took up the brucine-strychnine transethosome formulation making the long-term, potent inhibition of proliferation possible to achieve.	[19]
Paeonol	Evaluation of paeonol-loaded transethosomes as transdermal delivery carriers	Bioavailability of paeonol can be increased by using paeonol transethosomes	[20]

Ketoconazole	Study the Antifungal and Ocular Permeation of Ketoconazole from Ophthalmic Formulations Containing Trans-Ethosomes Nanoparticles	Gel formulation loaded with KET trans-ethosomes vesicles was developed and an effective ocular delivery system was observed to treat deep fungal eye infections.	[21]
Coenzyme Q10	Coenzyme Q10 phospholipidic vesicular formulations for treatment of androgenic alopecia: ex vivo permeation and clinical appraisal	CoQ10-loaded transethosomes enhanced the therapeutic efficiency to help treat androgenic alopecia and other topical diseases.	[22]
8-methoxypsoralen	Photodynamic therapy fortified with topical oleyl alcohol-based transethosomal 8-methoxypsoralen for ameliorating vitiligo: Optimization and clinical study	The topical application of the developed 8-MOP transethosomal gel can be utilized to deliver 8-MOP without the requirement of systemic application.	[23]
Progesterone	Progesterone-loaded nanosized transethosomes for vaginal permeation enhancement: formulation, statistical optimization, and clinical evaluation in anovulatory polycystic ovary syndrome	A clinical study was conducted in anovulatory PCOS to study the effects of formulation and a significant increase in the serum PRG, endometrial thickness, echogenicity degree and the pregnancy rate was observed.	[24]
Olmesartan Medoxomil	Use of transethosomes for enhancing the transdermal delivery of olmesartan medoxomil: in vitro, ex vivo, and in vivo evaluation	Transethosomes have proved to be a successful carrier for olmesartan medoxomil	[25]
Piroxicam	Systematic Development of Transethosomal Gel System of Piroxicam: Formulation Optimization, In Vitro Evaluation, and Ex Vivo Assessment	Piroxicam loaded transethosomes showed high elasticity and improved stability.	[26]

**Table 1:** Summarized list of therapeutic agents delivered through transethosomes.

Transethosomes are easy to manufacture and simple to scale up without contribution of refined apparatus at both pilot plant and modern level. Various strategies are utilized to accomplish smaller vesicular size and these vesicles are fused into gels or creams to increment skin infiltration. The commonly used methods are; a) Cold method, b) Hot method, and c) Mechanical Dispersion method. Transethosomes have the combined properties of both transfersomes and ethosomes exhibiting properties of both skin permeation and deformability, this help to bypass the presystemic metabolism, transethosomes provide a non-invasive route of administration and in diseases or conditions, where patients cannot take drugs orally transethosomes can be an effective route of delivery. Skin allergies or contact dermatitis can be a possibility, reasonable molecular size of the drug is needed for absorption and incomplete formulation of vesicles can lead to coalescence.

## CONCLUSION

Ultra-deformable Vesicles (UDVs) have been developed to improve the transdermal drug delivery by augmenting the penetration of the drug molecules through the stratum corneum. Transethosomes have proved to be more effective drug carrier as they have enhanced permeability properties. Transethosomes have combined the

penetration abilities of transfersomes and ethosomes by incorporating the edge activator with the ethanol in the vesicle. More advancement in this area may lead to further innovations creating betterment in the field of pharmaceuticals.

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**Systematic Review****Garlic Activate TRPA Receptor as a potential therapeutic target in skin related diseases**

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**ARTICLE INFO****Key Words:**

Garlic, TRPA1 channel, Allium, Allyl sulphide, AITC, Skin diseases

**How to Cite:**

Muhammad Aqib Saeed, Shahnai Basharat<sup>2</sup>, Shahid, M., Aimen Zafar<sup>4</sup>, Hifza Noor, Asifa Saleem, Dr Imtiaz Ahmad Rana, & Tehreem Jamil. (2022). Garlic Activate TRPA Receptor as a potential therapeutic target in skin related diseases: Garlic Activate TRPA Receptor as a potential therapeutic target in skin related diseases. *Pakistan BioMedical Journal*, 5(7). <https://doi.org/10.54393/pbmj.v5i7.600>

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Received Date: 14<sup>th</sup> May, 2022

Acceptance Date: 5<sup>th</sup> June, 2022

Published Date: 31<sup>st</sup> July, 2022

**ABSTRACT**

Due to its strong flavour, garlic has long been a staple in cuisines all over the world. When chopped and put on the tongue or lips, raw garlic triggers unpleasant burning and prickling sensations by unknown processes. The study showed that temperature-activated ion channels TRPA1 and TRPV1, which are a part of the (TRP) transient receptor potential, are activated by raw garlic. The molecule that activates TRPA1 and TRPV1 is allicin, a volatile compound found in fresh garlic. Allicin and diallyl disulfide, two organosulfur chemicals that give garlic its distinctive flavour and spicy aroma, are produced by the *Allium* genus. *Allium* extracts have been shown to provide a variety of health advantages, including hypotensive and vasorelaxant properties. It's intriguing that allicin and DADS share a structural affinity for allyl isothiocyanate, which triggers pain and inflammation by activating TRPA1.

**INTRODUCTION**

Garlic is a member of the plant genus *Allium* has various sulfur-based natural compounds. One of which is allicin (2-propenyl-2-propene thiosulfate), found particularly in the cloves. When the bulb is crushed, allicin is produced in result of a chemical reaction mediated via vacuolar enzyme, alliinase, which catalyzes the process [1]. Aqueous solutions of allicin and other thiosulfates have a short half-life, resulting in organosulfur bioproducts such as allylsulphides, ajoene, and dithiane, Intriguingly, the structure of these chemicals is quite similar to that of isothiocyanates, which are the spicy substances found in wasabi, yellow mustard, and other Brassica plants [2].

Garlic has been used as an herbal remedy for treating a variety of diseases for many centuries, including hypertension, high cholesterol levels and thrombosis (blood clotting). On the other hand, activation of the TRP channel family (TRPV1 and TRPA1, respectively) is responsible for the excitation of primary sensory neurons by both capsaicin and AITC [3]. Allicin also has antifungal and antibacterial properties. Allicin triggers the activation of TRPA1 and TRPV1. The creation of allicin from compounds by the enzymes conjugase, which is in charge of allicin production, results in the strong aroma that is released when garlic is crushed. 2-propenesulfenic acid is

created when allicin is degraded, and it subsequently binds to free-radical and neutralizes them [4].

### Structure and function of TRPA1 channels

The N-terminus of TRPA1 channels has a considerable length of ankyrin repeats, as well as calcium-sensitive regions in the EF-hand motifs and the S4 membrane segment. TRPA1 valves have a long transmembrane receptor repeat region within their N-terminus. The flexible ankyrin domains may provide the structural basis for protein-protein interactions, according to some theories [5]. Numerous stimuli, including as changes in osmotic pressure, higher and lower temperatures, and irritants that are both natural and synthetic, have been shown to activate TRPA1 channels. It has been postulated that the creation of a noncovalent C422–C622 disulfide bond is responsible for the TRPA1 activation in response to sulphide [6]. Unsaturated fats, low or high pH, and non-reactive compounds that attach with non-covalent contacts have also been demonstrated to trigger TRPA1 valves in vitro. The responses of TRPA1 channels are integrated by activating stimuli such as temperature, light, bacteria toxins, mechanical, and chemical stimuli, among others [7]. TRPA1 channels found in the brain appear to be involved in neurodegenerative and inflammatory autoimmune disorders and Alzheimer's disease, according to recent research, these findings suggest that TRPA1 channel antagonists plays role in the treatment of these diseases [8]. According to the researcher, the channel is extremely  $Ca^{2+}$  porous and that bivalent cations penetrating the channel contributing the channel regulation, which is characterized by early raise followed by insensitivity. The nutrient myo-inositol-1, 2, 3, 4, 5, 6-hexakisphosphate maintains an unexpected novel ligand-binding site as well as an unusual C-terminal coiled coil (phytic acid, IP6). They conclude from this that IP6 and other endogenous solubility intracellular ligands are necessary to maintain the region's agonist-receptive status [9]. Removal of IP6 caused by the inflow of  $Ca^{2+}$  after channel activation might operate as a molecular kill switch, causing the channel to become inactive [10, 11].

### TRPA1 catalysts

In evaluation with different chemoreceptors, which can be normally stimulated via ligands with as a substitute conserved structure, a completely unique characteristics of a TRPA1 that are activated through plenty of structurally unrelated compounds [12].

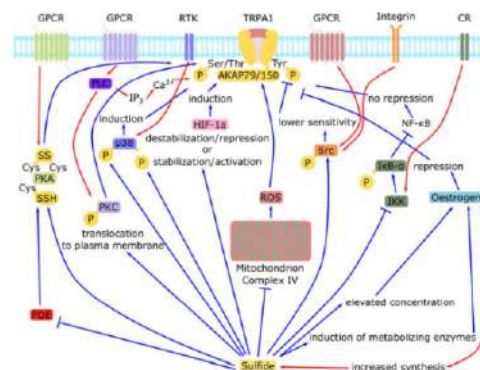
### Exogenous compounds

Garlic has an active component known as thiosulfate, which is important for the pungent and spicy scent, when its stem broke after some hours; the subcellular enzyme alliinase converts the alliin into allicin. It is transformed into more steady compounds like diallylsulphide (DAS),

diallyltrisulfide (DTS) and diallyltrisulfide (DTS) in the same way as other highly reactive sulphur compounds (DATS). These chemicals activate TRPA1 valves results in the production of pro-inflammatory neuropeptides and the sense of pain and inflammation [13].

### Effects of garlic mediated by TRPA1 channels

The garlic compound "ajoene" enhances the effects of several TRPA1 channel agonists in the cells. Capsazepine, a TRPA1 channel antagonist reduce the effects of diallyl compounds. The nerve terminals in the mouse isolated skin were stimulated by DMTS, which resulted in the production of somatostatin. Skin samples anatomized from TRPA1 channel knockout mice were shown to be devoid of the effect. In vitro, DMTS reduced the TRPA1 channel and SSt4 receptors-dependent mechanical hyperalgesia brought on by mild thermal injury. However, in mouse carrageenan-induced paw infection, repeated intravenous administration of DMTS decreased nociception, edoema development, and myeloperoxidase activity [14, 15].



**Figure 1:** Potential ways via which sulphide modifies TRPA1 function or expression. Hormones, reactive substances, transcription factors, and signaling kinases all influence how the TRPA1 ion channel is activated or expressed.

### p38 MAPKs

An improvement in the responsiveness of TRPA1 gates to pharmacological substances and membrane stretch characterizes the odontoblast cells' response to TNF treatment. The effect was facilitated through the stimulation of TRPA1 channels by MAPKs 38 (p38), which was induced by the drug [16]. There may be very little evidence that sulphide chemicals can increase phosphorylation and p38 kinase enzyme activation. By stimulating the p38 MAPK pathway, NaHS increases the glucagon like peptide-1 (GLP- 01) synthesis in mice. In human monocytes, the p38 protein activation as a consequence of NaHS was observed [17]. Similar to cisplatin, garlic-derived DATS reduces oxidative stress in NCI-H460 human lung cancer cells, which is caused by cisplatin exposure [18].

### AMP-activated protein kinase (AMPK)

According to its function, AMPK serves as an energy sensor in cells that are triggered by increasing AMP (reduces ATP) concentrations. AMPK is triggered by either activation or Ca<sup>2+</sup> signals via the Tracks protein kinase. In recent years, it has been proven that AMPK is involved in controlling cell autophagy, as well as atherosclerosis, inflammatory illness, and cancer. TRPA1 channels in DRG neurons were downregulated by AMPK, as shown by a reduction in the quantity of membrane bound TRPA1 peptide in sensitivity to insulin and an increase in the amount of TRPA1 antigen when AMPK action was reduced [19, 20].

#### **IkB kinase complex (IKK)**

IKK may be, is responsible for the phosphorylation and subsequent degradation of the crucial and ubiquitous IL-2, which results in the activation of its inhibitory protein IB-. Data from nociceptor neurons that have been genetically altered to lack IKK reveals that the kinase complex is responsible for the suppression of TRPA1 channel expression [21]. Both inorganic sulphide and organic polysulfides seem to influence IKK, which may have an impact on the expression of TRPA1 channels in a variety of ways. Sulfide has only been studied in non-neuronal tissues to understand how it regulates the IKK complex. According to fig.2 in primary effusion lymphoma cells, garlic-derived DATS induced apoptosis by inhibition of the IKK pathway, limiting proteasome-driven degradation of IB and therefore decreasing nuclear factor-B (NF-B). A similar impact of DADS was seen in rat hepatocytes that had been exposed to carbon tetrachloride [22]. Inorganic sulphide was shown to inhibit NF-B signaling via modulating IKK in rat cardiomyocytes subjected to hemorrhagic shock, which was previously reported in humans. The sulfide-releasing diclofenac may be able to inhibit breast cancer-induced osteoclast development by a mechanism that is like that of diclofenac [23].

#### **Estrogen**

The method by which estrogen modulates TRPA1 channels, as shown here, is extremely disputed and based on a small body of data, only one study has been published on the ovariectomy-induced death of rat hippocampus and DRG neurons, which was shown to be partially dependent on Ca<sup>2+</sup> influx mediated by TRPA1 channels [24]. In addition to the well-known effect of estrogen on the expression of sulfide-producing enzymes, some evidence suggests that sulphide may also influence estrogen production or metabolism. Eight weeks of administration of the sulphide precursors cysteine to rats resulted in a rise in the serum concentrations of 18-oestradiol in the blood. It has been demonstrated that DAS interacts with the internal intrinsic combination of drugs receptor and stimulates the synthesis of sulfotransferases that break down estrogen. Although this had no effect on the serum estrogen levels, it

did influence the levels of exogenously injected hormones [25].

#### **TRPA1 and TRPV1 Collaborate to Cause Skin Disorders**

In addition, genetic deletion of TRPA1 in mouse models of pruritus and psoriasis prevented scratching and improved skin lesions, suggests that the channel regulates itch transmission to the central nervous system as well as pathophysiological changes in the skin. Moreover, the involvement of TRPV1 in skin illnesses has been examined, with results indicating that both channels are implicated in IL-31-induced itching; indeed, TRPV1 or TRPA1 pharmacological inhibition as well as ROS scavengers were shown to reduce itching in mouse models [26]. As of now, it is unclear if the TRPA1 and/or TRPV1 are involved in the pathogenesis of skin irritation (ACD) models. TRPA1 (but not TRPV1) genetic deletion or pharmacological blockade reduced ACD symptoms and dopamine independent scratch behavior [27]. Note that oxidative stress-induced itch is controlled by TRPA1 and is not controlled by TRPV1, but chloroquine and BAM8-22 both caused TRPA1-dependent scratching behavior that was not controlled by TRPV1. When comparing damaged skin samples from Atopic Dermatitis (AD) patients to the controls (healthy ones), the activation of TRPA1 in dermal sensory nerves throughout the disease was shown to be significantly higher than in controls. As a result, TRPA1 is not only required as a sensor for pruritogens, but it is also required for the maintenance of Atopic Dermatitis. Transient receptor potential channels are widely expressed in a variety of skin cell types, including epithelial, mast cells, skin extremity cells, nerve cells, and lymphocytes. They have a variety of functions, including those related to the skin barrier, hair growth, wound healing, and itching [28]. Among the possible targets for itching relief are TRPA1, TRV3, TRV4, and, to a subsidiary extent, TRPV1 and TRPM8, as well as TRPA1. Human psoriatic epidermis biopsies show elevated TRPA1 expression, which is compatible with the condition [29]. Skin-targeted, gain-of-function Trpv3Gly573Ser transgenic mice demonstrate scratching behavior as a result of the gain-of-function mutation. Lesional keratoderma 105 has revealed human TRPV3 mutations, and post-burn pruritus patients exhibit increased TRPV3 expression. Additionally, genetic Trpv4 deletion lowers itching in animal studies of chronic itching, and TRPV4 is overexpressed in skin biopsy specimens from people with chronic pruritus [30]. It has also been reported that a TRPM8 antagonist (menthoxypropanediol) cream may reduce human itching. People with atopic dermatitis can gain from of the Adrenoceptor blocker PAC-14027, which is now being studied in phase III of clinical trials. It lessens itch in people who are affected by it and enhances skin barrier functions. CNS stimulation in TRPV1-Au31



optogenetic mice stimulated TRPV1-expressing neurons, triggering a mucosal immune response, which in turn caused keratinocyte antimicrobial reactions and drew neutrophils to the skin. If this finding is confirmed in humans, it is possible that individuals who are treated with topical TRPV1 inhibitors will be more prone to cutaneous bacterial pathogens infections. TRPV4 has indeed been suggested as a promising receptor in rosacea, while TRPV1 has been associated to psoriasis [31]. Eyedrops containing a TRPM7 agonist, which moisturizes the cornea, may be helpful for patients with dry eye disease [32]. The TRPV4 inhibitor, HC-067047, was demonstrated to be beneficial in preventing scarring (endothelium opacification) after alkaline burn injury in animal studies. Finally, it has been demonstrated that intraocular TRPV1 antagonist injections can treat allergic conjunctivitis. [33, 34].

#### **TRPA1's Function in Skin Pathology and Anatomy**

TRP channels, which are mainly permeable to calcium and serve as cell membrane sensors in a variety of physiological capacities, including pure sensory activities like pain perception and thermal sensation, as well as bodily systems like electrolyte balance and a plethora of other functions like muscle movement and vagal control [35]. However, it is believed that they are crucial for the creation and upkeep of venous calcium homeostasis as well as for the control of membrane trafficking. [36]. TRPs are recognized as distinct polymodal nociceptors because alterations in the intracellular space, as well as a range of outside and internal tactile stimulation and chemical mediators, directly influence their gating. [37].

#### **Garlic and skin health**

Garlic, a member of onion family, is among the most well-researched and best-selling herbal treatments, and it has been used to cure a wide range of health issues for hundreds of years [38]. Enzymes (for example, alliinase), chlorine substances such as alliin, and chemicals formed enzymatically from compounds (for example, allicin) are among its components [39]. There are four kind of garlic preparations that can be purchased: aged garlic extract, dried garlic powder, and raw garlic juice (RGJ, HGJ) (AGE). Although there are pharmacological challenges with different types of garlic preparation, AGE is the most advantageous of the four [40]. By immersing or whole sliced cloves of garlic in an ethanol solution for varied amounts of time, one can produce garlic extract, which has a concentrated flavour [41, 42].

#### **TRPA1 and Skin Disorders**

##### **Allergic contact dermatitis and atopic dermatitis**

A damaged skin barrier, a growing immunological response affected by T helper 2 (Beginnings) cells and related substances including cytokine (IL-13, Interleukin-8, plus IL-13, and an inflammation influenced by neutrophils are the

hallmarks of atopy (Fd) and allergic skin reactions. [43]. In the cells called of dorsal root (DRG) cells from Vascular dementia (AD) rats, TRPA1 expression was elevated [44]. However, TRPA1 was only overexpressed in DRG neural cells in animal studies of ACD, whereas non-neuronal cells in such animals did not exhibit elevated channel expression [45]. This collection of evidence shows a complex interaction between TRPA1+ mast cells and dermal afferent neurons in the Partition inflammatory milieu underlying chronic itch in Alzheimer's disease [46].

#### **Psoriasis**

The most common chronically agitated skin disorder that results in erythema, thick skin, and scaling is psoriasis [47]. Between 60 and 90 percent of the patients are pruritic. New research reveals that the aetiology of psoriasis may be related to nociceptive sensory nerve endings. The pathophysiology of the disease involves these nerve terminals in a variety of ways [48]. It is noteworthy that several investigations have demonstrated increased C-fiber afferent fibers in the epidermal of individuals with psoriasis skin lesions [49]. Furthermore, there was an inverse correlation between the presence of higher neuropeptide levels in psoriasis patients' plasma and the intensity of their condition. [50]. Moreover, cutaneous denervation has been shown to reduce skin inflammation in individuals with psoriasis as well as in mice suffering from it as dermatitis [51]. Similar findings were achieved in psoriatic skin from human participants who had their TRPA1 and TRPV1 genes over-expressed, which was similar to the results obtained in mice [52]. Pharmacological inhibition or genetic deletion of TRPA1 in mice might aggravate the dermatitis associated with psoriasis as well as nicotine and itching behavior, indicates that TRPA1 may have a protective role in the disease [53].

#### **Cutaneous T-Cell Lymphoma**

Mycosis fungoides and Sézary syndrome are the most frequent scientific presentations of primary epidermal lymphoproliferative disorders, among which cutaneous T-cell lymphocytes (CTCL) are the most common clinical manifestations [54]. The degree of pruritus in these patients may be partially explained by their switch to Th2-type immunity, in which neoplastic cells release more Th2-linked mediators such as IL-4 and IL-31. However, current evidence indicates that TRPA1 is an important mediator in the emergence of CTCL-associated itch. [55].

#### **Other itchy skin conditions or systemic illnesses**

Scabies is a common skin illness influenced by itching and pruritus. It is caused by the mite *Sarcoptes scabiei hominis*, which is a contagious parasitic infection. Quasi itching receptors such TRPA1, TRPV1, and the proteolytic enzymes receptor 2 (PAR2) are overexpressed in scabies sufferers' skin, according to research [56]. In vitro, TRPA1

sensitization was heightened by TRG5 stimulation by BA due to increased signal transduction via G, kinases, and calcium. Further evidence for the major factors that contribute of TGR5 and TRPA1 in BA-induced itch was provided by the finding that TRPA1 antagonists lessened the severity of mice overexpressing TRG5's increased spontaneous scratching activity [57]. Although channel expression did not significantly correlate with eosinophil dermal infiltration or the severity of pruritus, TRPA1 overexpression was discovered in the epidermis of patients with bullous pemphigoid, a rare auto-phagocytic disease characterized by excessive pain, when compared to healthy skin [58]. The itching that follows a burn damage also results from physical causes and is a different source of pruritus. According to recent studies, those with itchy burn scars have higher amounts of the mRNAs TRPA1 and TRPV4 in their skin [59]. However, further research is required to determine the involvement of TRPA1 in the development of burn-associated itching.

#### **Therapeutic Perspectives and Future Directions**

It has been shown that TRPA1 is involved in chronic neuropathic and cancer pain [60]. On the other hand, present knowledge of the etiological functions of TRPA1 in the skin is incomplete and requires more research. This study has demonstrated that TRPA1 may have a wide range of functions in a number of physiologic and pathologic skin diseases. A growing body of research suggests that TRPA1 is crucial in the histamine-independent itching that occurs frequently in chronic autoimmune skin conditions like Hypertension, organ failure, or neoplastic diseases like cutaneous T-cell lymphoma. As a result, these conditions make ideal targets for research into TRPA1-targeting medications in people. It has been demonstrated that crocophiline may lessen the formation of chemical mediated inflammatory sensitivities in mice by desensitising TRPA1-peptidergic nerve terminals [61]. The sensitivity of sensory neurons that express TRPA1 and TRPV1 has been shown to be decreased by the combo of alkahtani hcl and fluticasone propionate [62]. After being exposed to isopetasin or parthenolide, the TRPA1 channel and the TRPA1-expressing cells experience a dose-dependent neuronal desensitisation, which could explain why the two plant extracts reduce pain and neurogenic inflammation [63, 64].

For instance, TRPA1 proteins have been found in tumor cell lines, albeit it is yet unknown what role TRPA1 plays in melanoma in vivo. TRPA1 is required for the pain associated with skin malignancies or associated therapy to be signaled [65]. This includes pain related to photodynamic therapy, which is effective in treating non-melanoma skin cancer, and pain related to dacarbazine-induced discomfort in melanoma [66, 67]. Additionally, it could be interesting to

look at TRPA1 activity in relation to the discomfort brought on by infectious or autoimmune skin conditions like vasculitis vulgaris. Finally, mounting evidence points to a role for TRPA1 in the fibrosis development associated with systemic diseases. Given the lack of effective treatments for fibrogenic skin conditions (such as scleroderma) and tissue repair, it is important to investigate if TRPA1 plays a role in fibrosis in these situations [68].

## **CONCLUSION**

This study concluded that Garlic Activate TRPA Receptor as a potential therapeutic target in skin related diseases. Allium extracts have been shown to provide a variety of health advantages, including hypotensive and vasorelaxant properties. It's interesting to note that allucine as well as DADS have a structural affinity for allyl isothiocyanate, which causes inflammation and pain by activating TRPA1.

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