



## 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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## 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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