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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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TABLE OF CONTENTS

Editorial

The Influence of Gut Microbiome Derived Neurotransmitters on Neonatal Immune Response 01
Ahmed Alwazzan

Original Articles

Investigating the Smartphone Addiction among Undergraduate Nursing Students 02
Sunita Aijaz Ali, Pamela Marshall and Shahzad Bashir

Factors Influencing the Academic Performance of Undergraduate Nursing Students at Public Sector Institution, Karachi 07
Vinod Kumar, Badil, Raja, Husan Bano Channar, Ameer Ullah Khan, Tahir Khan, Saran Chandio, Ashok Kumar and Hamid ul Haq

Social Media Usage and it's Relationship with Depression among Nursing Students of a Private University 13
Khalid Hussain, Tanseer Ahmed and Riafat

Exploring Blood Donation: Perspectives among Undergraduate Students in Peshawar, Pakistan 18
Salman Zahir, Khansa Khan, Muhammad Atif, Wisal Khan, Haseeb Khan, Imad Khan, Somia Mazhar and Jamal Shah

Diabetes Distress, Depression and Coping Strategies in Adults with Type 2 Diabetes 24
Nudra Malik, Momina Arshad and Amina Muazzam

Gratitude, Self-Efficacy and Self-Care Behaviors among Patients with Cardiovascular Diseases 30
Sadia Khan, Nudra Malik and Raumish Masud Khan

Prevalence of Anemia in Community-Acquired Pneumonia Patients 36
Samina Saeed, Muhammad Usman Yaqub, Aysha Ghayyur, Shazia Siddique, Muhammad Anwar and Ayesha Afzal

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The Influence of Gut Microbiome Derived Neurotransmitters on Neonatal Immune Response

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The complex interaction between neurotransmitter, gut flora and immune system has expanded dramatically. Infant gut microbiome is a key driver of immune system development [1]. Any disruption in gut microbiota during early life have been associated with childhood disorders such as food allergies, neurodevelopmental disorders and asthma [2].The bacteria in gut are not just inert inhabitants of our digestive systems. Their metabolic activities involve the active creation of neurotransmitters such as GABA, dopamine, and serotonin. Gut is known as second brain because it produces 90% of neurotransmitters including dopamine and serotonin [3]. In adults, neurotransmitters are produced by enterochromaffin cells but in infants there is need to unveil the regulation of neurotransmitters. Some of the studies have shown the relationship between gut flora and immune system.

Neonates are more susceptible to diseases because their gut is not mature enough to produce neurotransmitters. Some specific gut microbiome in infants produce serotonin which activates the T-regulatory cells (Tregs). Tregs act as a defence mechanism against autoimmune disorders and food allergic reactions. The number of serotonin producing neonatal gut flora can be influenced by diets, availability of antibiotics and reduce exposure of microbes in their environment. Any change in level of serotonin might affect the development of Tregs. The reason that makes infant more prone to allergic reactions and autoimmune disorders in developed countries.

Scientists are trying to dig out about how gut bacteria in human newborn samples, produce serotonin. This research could lead to the development of effective immune system training techniques, which would lower the lifetime risk of inflammatory illnesses like allergies and inflammatory bowel disease. This work highlights the importance of gut microbes in developing immunity in infancy and provides opportunities for further studies targeted at reducing immune-related illnesses. Interventions that support healthier immune responses from infancy through maturity may be made possible by better understanding and utilizing the power of gut flora.

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Original Article

Investigating the Smartphone Addiction among Undergraduate Nursing Students

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ABSTRACT

In today's digital era, smartphones have become an essential part of our society. However, excessive use of smartphones can have a wide range of consequences and it affects students' physical and mental health. Nursing students should know the appropriate use of smartphones to prevent health complications. **Objective:** To investigate the prevalence of smartphone addiction among nursing students. **Methods:** A descriptive cross-sectional study design was utilized in a total of 98 nursing students of Saifee Burhani School of Nursing in Karachi, Pakistan. A convenience sampling technique was used to collect data and a Smartphone Addiction Scale short version (SAS-SV) questionnaire was utilized to collect data related to smartphone usage patterns and addiction levels among nursing students. **Results:** The study findings revealed that 68 nursing students (69.39%) were addicted to smartphones. Descriptive statistics, ANOVA, and t-independent test were applied by Statistical Package for Social Sciences (SPSS) software version 25.0 for data analysis. **Conclusions:** The present study revealed that smartphone addiction was found higher among nursing students.

INTRODUCTION

A smartphone is a single device with multiple features to make human life easier. Nowadays, the trend to use a smartphone has become popular all over the world it has changed human life drastically in the last few years [1]. Smartphones aren't just about fun and staying connected; they're like a personal toolkit packed with endless possibilities. From browsing the internet to finding our way with GPS, capturing memories with the camera, and using countless handy apps, they've become indispensable companions in our everyday adventures. Moreover, smartphones provide wireless access to work, emails, and social activities [2]. However, excessive use of smartphones is considered a technology addiction and it has raised concerns about its effects on students' health and academic performance [3]. Addiction is an irrepressible desire for an object even if there is a destructive effect on an individual's health and social life [4]. Smartphone addiction is a common concern worldwide with a high occurrence not only influences developing countries but also the underdeveloped nations [5]. The frequency and duration of time spent on social media sites and messaging applications have been increasing and it has been reported that those people who use a smartphone for more than 20 hours a week have a serious dependency on smartphones [6]. According to 2019 statistics, the incidence of smartphone addiction are more than 5 million globally [7]. A study conducted among medical University students in Saudi Arabia reported strongly negative consequences on the physical and mental health of students due to excessive use of

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smartphones [8]. Moreover, investigating an addiction to smartphones, a study conducted in Rawalpindi-Islamabad reported 57.3% of males whereas 42.6% of females were involved in excessive use of smartphones [9]. Healthcare students are exposed to high levels of stress right from the beginning of the course; as they face unique challenges due to rigorous academic demands and strict clinical training. Smartphone addiction might aggravate this problem as well as reduce the quality of sleep and cause neck discomfort [10].

There is limited research available related to smartphone addiction, that specifically targets nursing students in Pakistan. Therefore, understanding the extent of Smartphone addiction among nursing students and its implications is crucial for promoting their well-being and ensuring their academic success. Consequently, this study aimed to investigate smartphone addiction among nursing students and gain insight into these problems in the Pakistani context.

METHODS

This study investigated the prevalence of smartphone addiction in Bachelor of Science in nursing students at Saifee Burhani School of Nursing in Karachi, Pakistan. Data were collected from an organized method after getting approval for data collection from the study setting and the Ethical Review Committee of Ziauddin University (7440723SANUR; September 05, 2023). It was a Descriptive cross-sectional study conducted in one month October 2023 using convenience sampling technique by using the Smartphone Addiction Scale Short Version (SAS-SV) questionnaire [11]. The questionnaire contains 10 items related to the use of smartphones with a Likert scale score of 1 to 6 indicated (1 = strongly disagree to 6 = strongly agree). The overall score of SAS-SV ranges from 10 to 60 and the cut-off point for addiction in males is 31 and 33 for females. The tool's reliability is 0.94 and the validity is 0.71-0.78. This study used a convenience sampling method, The sample size was calculated by online software "OpenEpi" version 3 with a 95% confidence interval by taking a previous study done in 2022 as reference "Addicted to smartphones: Exploring the prevalence of smartphone usage patterns and addiction among undergraduates in South Punjab" mean and the standard deviation is taken from the article [12]. The inclusive criteria were nursing students who were enrolled in the Bachelor of Science in Nursing program and using smartphones for more than 1 year for at least 2 hours per day and the exclusive criteria were the students who did not meet the inclusion criteria and were unwilling to participate. Informed consent was taken by a primary researcher from the study participants before including them in the study for voluntary participation without coercion. Finally, the data were analyzed by Statistical Package for Social Science (SPSS Version 25.0). Descriptive statistics for frequency tables, mean and standard deviation, and statistical test ANOVA and independent t-test were utilized to find out the relationship among different variables with smartphone addiction.

RESULTS

Table 1 presents that out of a total of 98 participants, 80 participants (61.6%) belonged to the 18-23 years age group, 15 (15.3%) belonged to the 24-28 years age group, and only 3 (3.1%) belonged to the 29-33 years age group. Among all, 51 (52%) were female and 47 (48%) were male. Most of the subjects 89 (90.8%) subjects were single while only 9 (9.2%) were married. Among all participants, 16 (16.3%) were in 1st year, 40 (40.8%) were in 2nd year, 24 (24.5%) were in 3rd year and 18 (18.4%) were in the 4th year. In addition, most of the participants 87 (88.8%) used smartphones for social media while 75 (76.5%) participants used smartphones for assignment purposes, and 48 (49%) utilized smartphones for entertainment and calls.

Table 1: Frequency of Socio-Demographics Factors

Demographics		N (%)
Age Groups (in Years)	18-23	80 (81.6)
	24-28	15 (15.3)
	29-33	3 (3.1)
Gender	Male	47 (48)
	Female	51 (52)
Marital Status	Married	9 (9.2)
	Single	89 (90.8)
Semester	Year 1 Semester 2	16 (16.3)
	Year 2 Semester 4	40 (40.8)
	Year 3 Semester 6	24 (24.5)
	Year 4 Semester 8	18 (18.4)
Assignment Purpose	Yes	75 (76.5)
	No	23 (23.5)
Entertainment Purpose	Yes	48 (49)
	No	50 (51)
Social Media Purpose	Yes	87 (88.8)
	No	11 (11.2)
Calls Purpose	Yes	50 (51)
	No	48 (49)
Duration of Smartphone Usage	More than 2 Hours	98 (100)

Table 2 presents that for the age group of 18-23 years, scores obtained on the distribution of SAS-SV with socio-demographic variables were 38.04 (SD = 8.83), for 24-28 years 40.07 (SD = 9.69) and 29-33 years 28.67 (SD = 10.69). In respective to the male gender, scores obtained 38.53 (SD =9.92) and for females 37.63 (SD = 8.31). In respective to marital status, 34.78 (SD = 8.80) were married and 38.39 (SD = 9.09) were single. The semester results showed that 2nd semester score was 32.56 (SD = 8.09), the 4th semester score was 39.10 (SD = 9.96), 6th semester score was 37.79

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(SD = 9.96), and the 8th semester score was 41.00 (SD = 8.80). Respectively to the assignment purpose, scores were obtained 41.91 (SD = 7.62), for entertainment 38.27 (SD = 8.41), for social media 38.78 (SD = 8.98), and for calls 38.18 (SD = 9.11). In respective to the duration of smartphone use, the results obtained were 38.06 (SD = 9.08).

Table 2: Distribution of Smart Phone Addiction Scores with Socio-Demographics

Characteristics		Mean ± SD
Age Groups (in Years)	18-23	38.04 ± 8.83
	24-28	40.07 ± 9.69
	29-33	28.67 ± 10.06
Gender	Male	38.53 ± 9.92
	Female	37.63 ± 8.31
Marital Status	Married	34.78 ± 8.80
	Single	38.39 ± 9.09
Semester	Year 1 Semester 2	32.56 ± 8.09
	Year 2 Semester 4	39.10 ± 9.96
	Year 3 Semester 6	37.79 ± 9.96
	Year 4 Semester 8	41.00 ± 8.80
Assignment Purpose	Yes	36.88 ± 9.21
	No	41.91 ± 7.62
Entertainment Purpose	Yes	38.27 ± 8.41
	No	37.86 ± 9.77
Social Media Purpose	Yes	38.78 ± 8.98
	No	32.36 ± 8.14
Calls Purpose	Yes	38.18 ± 9.11
	No	37.94 ± 9.15
Duration of Smartphone Usage	More than 2 Hours	38.06 ± 9.08

Table 3 shows that 68 (69.39%) nursing students were addicted to smartphones and 30 (30.6%) were not addicted to smartphones.

Table 3: Prevalence of Smartphone Addiction

Smartphone Usage	n (%)
Not Addicted to Smartphones	30 (30.61)
Addicted to Smart Phone	68 (69.39)

Table 4 represents that 36 (71%) females and 32 (68%) males were addicted to smartphones.

Table 4: Prevalence of Smartphone Addiction in Males and Females

Gender	N	Not Addicted to Smartphone	Addicted to Smartphone
Male	47	15 (32%)	32 (68%)
Female	51	15 (29%)	36 (71%)
Total	98	30	68

Table 5 shows the result of an association of different variables with smartphone addiction short version scale (SAS-SV) scores. The age group did not show a significant association with SAS-SV Scores (p = 0.140). Gender exhibited no significant relationship (p = 0.625) with SAS-SV scores. Marital status also showed no significant relationship with SASSV scores (p = 0.257). However, the semester showed a significant difference in SASSV scores (p = 0.038). Significant results were also found in the assignment purpose variable and social media purpose variable (p-values: 0.019, 0.027). Additionally, variables entertainment purpose and call purpose showed no significant relationship with SASSV scores.

Table 5: Comparison of Smartphone Addiction Scores with Different Variables

Characteristics		Mean ± SD	N	p-value
Age Groups (in Years)	18-23	38.04 ± 8.83	80	0.140[a]
	24-28	40.07 ± 9.69	15	
	29-33	28.67 ± 10.06	3	
Gender	Male	38.53 ± 9.92	47	0.625[b]
	Female	37.63 ± 8.31	51	
Marital Status	Married	34.78 ± 8.80	9	0.257[b]
	Single	38.39 ± 9.09	89	
Semester	Year 1 Semester 2	32.56 ± 8.09	16	0.038[a*]
	Year 2 Semester 4	39.10 ± 9.96	40	
	Year 3 Semester 6	37.79 ± 9.96	24	
	Year 4 Semester 8	41.00 ± 8.80	18	
Assignment Purpose	Yes	36.88 ± 9.21	75	0.019[b*]
	No	41.91 ± 7.62	23	
Entertainment Purpose	Yes	38.27 ± 8.41	48	0.824[b]
	No	37.86 ± 9.77	50	
Social Media Purpose	Yes	38.78 ± 8.98	87	0.027[b*]
	No	32.36 ± 8.14	11	
Calls Purpose	Yes	38.18 ± 9.11	50	0.896[b]
	No	37.94 ± 9.15	48	

[an] ANOVA test has been applied
[b] Independent T-test has been applied

DISCUSSION

In the current study, most of the participants were 51 (52%) females as compared to males were 47 (48%). These findings were parallel to the study in which 63.9% were female and 36.1% were male [13]. In contrast, the literature endorses that a large proportion of males was 53.4% as compared to females 35.9% [14]. The possible reasons for this contrast in the Pakistani context were perhaps the male-dominant society, cultural norms, and restrictions on women's mobility in certain areas may have led them to rely more on smartphones for social interaction to stay connected with friends and family which could contribute higher smartphone addiction among females. The majority of participants (90.8%) were single in the current study. These findings were similar to a study in which most participants 97.65% were single [15]. A large proportion (94.9%) of the study participants' age group was 18-23 years. The findings were parallel to the results of the study in which the majority of the participants (69.2%) belonged to the 18-25 years age group. According to the educational status of the participants (16.3%) were in 1st year semester

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2, (40.8%) were in 2nd year semester 4, (24.5%) were in 3rd year semester 6 and, (18.4%) were in 4th year semester 8. The findings were parallel to the findings of the study in which most of the participants 43.4% were enrolled in the second year 41.1% were in the third year and 19.1% were in 4th year [15]. The possible reasons for this distinction are that as students' progress through their studies, they may experience a heavier course load, longer study hours, and increased clinical responsibilities, which can lead to prolonged periods spent on smartphones to complete assignments and social media to refresh their minds. The current study revealed that nursing students were using smartphones more than two hours per day. The findings were comparable to the findings of the study in which the majority of participants spent 2 hours and 39 minutes using their smartphones [16]. The present findings revealed that 68 (69.39%) nursing students were addicted to smartphones of which 32 (68%) were male and 36 (71%) were female. Similarly, a study conducted in Sweden reported that 60% of females and 35% of males were addicted to smartphones [17]. In contrast, a study conducted in Jeddah reported that males were more addicted to smartphones than females and the overall addiction was 66 (36.5%) [18]. The possible reason for this difference in Pakistan was perhaps the availability of low-cost internet access to smartphone devices to stay connected with social media and a lack of awareness related to the healthy use of digital devices. Moreover, the current study showed a statistically significant relationship found that smartphone use for assignment (p-value = 0.019), and social media purpose (p-value = 0.027). The study findings were similar to the study that was conducted in Saudi Arabia reported that nursing students were using smartphones more frequently for social media and entertainment purposes (82.2%) rather than educational activities [19]. On the other hand, a study conducted in Taiwan by Lai *et al.*, which highlighted that nursing students have favorable behavioral intentions toward the usage of nursing information smartphones, emphasizing their perceived utility and simplicity of use, which supports the blending of practical skills [20].

CONCLUSIONS

In conclusion, the overall prevalence of smartphone addiction was found high (69.39%) among undergraduate nursing students.

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Methodology: PM, SB
Formal analysis: SAA, SB
Writing-review and editing: SAA, PM, SB

All authors have read and agreed to the published version of the manuscript.

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Original Article

Factors Influencing the Academic Performance of Undergraduate Nursing Students at Public Sector Institution, Karachi

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ABSTRACT

Academic performance is a measurement of student accomplishment, which is tremendously achieved by providing a robust learning environment. Factors that hinder the incredible academic performance of nursing students include an uncomfortable learning environment, a shortage of committed faculty, and students' financial backgrounds. **Objective:** To determine the factors influencing the academic performance of undergraduate nursing students at a public sector institution in Karachi. **Methods:** A descriptive cross-sectional study was completed at the Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi. All students who were enrolled in the BSN 4 Years Degree Program were the targeted population. The calculated sample was 300 nursing students. Data were collected by adopted and validated questionnaire "Combined Survey Questionnaire". Factors influencing the academic performance of nursing students were computed in mean and standard deviation. **Results:** Out of total, most participants (67.7%) were unmarried, and nearly one-third (61.7%) were female. Almost (49.3%) of the study participants were between 18 and 24 years old. The highest grand mean value was obtained for teacher-related factors, whereas the lowest mean was found for home-related factors. A significant difference has been established in age (p-value=0.003), marital status (p-value=0.011), discipline (p-value=0.001), and family income (p-value=0.006) have on the academic performance of the student nurse. **Conclusions:** It is established that nursing students face considerable issues depending upon teacher-related factors followed by home-related factors that are linked to deterring the student's academic performance.

INTRODUCTION

The institution is a vital body for imparting quality education to students. The organization plays an increasingly imperative role in developing robust communication skills. However, graduate students face various and considerable challenges during the learning phase [1]. It is established by current research that a highly conducive learning environment can lead to increased learning considerably [2]. On the other hand, the learning climate includes physical, social, and passionate factors that can escalate undergraduate pressure, like feeble scholastic structure, several evaluations, responsibility, and teacher's help [3]. Numerous factors affect the undergraduate's approach to learning and consideration, including educational strategies, educational plans, evaluation of undergraduate learning, and over-burdened educational programs [4]. An organization considers incredible academic performance as a significant instrument in hiring. To accomplish the greatest

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opportunity, students must work hard and be eager to score high grades [5]. Learning can be markedly enhanced in students through certain unprecedented attributes, including optimism, motivation, persistence, perseverance, and passion [6]. The current research study revealed that internal and external factors affect a student's performance. The internal factors are students' competence in English, class strength, class timing, English course book, learning environment, homework, class assignment, internet facility, difficult course content, and examination system [7]. The external factors include financial problems, workplace difficulties, and family issues; a student's capability can be affected by a different factor [8]. A shortage of clinical nursing faculty can undesirably impact the learner's performance in the clinical setting [9]. Furthermore, unskilled and incompetent clinical teachers are equally responsible for the inadequate clinical performance of students [10, 11]. A stressful learning environment has a detrimental effect on students' learning [12]. It has been depicted in recent research that students' poor financial position may deter students' educational performances [13]. The qualified instructor ensures productivity in education by utilizing psychomotor skills, critical thinking skills, communication skills, and soft skills [14]. Furthermore, skillful teachers are attentive to approaches and instructional resources that create meaningful educational environments [15].

This study aimed to determine factors influencing nursing students' academic performance.

METHODS

This cross-sectional analytical study was performed at the Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi. The study was conducted over six months, from October 2019 to March 2020. Both male and female students, who were enrolled in BSN and Post RN BSN, 18 years and above, were included in the study. Intern students and those who refused to participate were excluded from the study. A non-probability convenient sampling technique was utilized to recruit the study participants. Sample size was calculated by using Slovin's Formula. Total population N=200. Therefore, the minimum sample size required for the study was 135. We collected a sample of 150 individuals in each setting. There were two study settings, hence, the sample size was 300 after including 10% for reducing error chance and minimize the missing information. The calculated sample size was 300 participants of both genders. Moreover, written informed consent was obtained from all study participants before data collection. The participants participated voluntarily. Confidentiality of the data were assured. The ethical approval was obtained by the Internal Research Committee (IRC) of the Institute of Nursing and Midwifery, Dow University of Health Sciences (Ref no: ION/MSN/2019-18-661). The research study was conducted according to the declaration of Helsinki in 2013. Data were collected by the adopted and validated questionnaire "Combined Survey Questionnaire" and permission for instrument use was obtained from the author [16]. The questionnaire was divided into two parts. The first part comprises demographic data, and the second is factors that affect the academic performance of nursing students, including student-related factors, school-related factors and teacher-related factors. The tool contains a five-point Likert Scale, scoring five to one as always, often, sometimes, rarely and never. Analysis of the data was done through SPSS version 24. Categorical variables were reported as frequency and proportions. At the same time, means and standard deviations were shown for the quantitative variables.

RESULTS

Table 1 exhibits the sociodemographic characteristics of the study participants. Out of 300 subjects, most of the study participants were unmarried, 203 (67.7%) and the female gender was prominent, 185 (61.7%). Nearly half of the study population belonged to the age group 18 to 24. Half of the study participants were either BSN generic or Post RN BSN.

Table 1: Sociodemographic Characteristics of Study Participants (n=300)

Variables	F (%)
Age (Years)	
18-24	148 (49.3)
25-31	110 (36.7)
32-38	38 (12.7)
39-45	4 (1.3)
Gender	
Male	115 (38.3)
Female	185 (61.7)
Marital Status	
Unmarried	203 (67.7)
Married	97 (32.3)
Discipline	
Generic BSN	150 (50.0)
Post RN BSN	150 (50.0)
Previous School	
Private	139 (46.3)
Public	161 (53.7)
Family Monthly Income (Rupees)	
10001-20000	18 (6.0)
20001-30000	44 (14.7)
30001-40000	71 (23.7)
40001-50000	95 (31.7)
50001-60000	72 (24.0)

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Table 2 depicts the Student Related Factors that affect the academic performance of the student nurses. In this section, the highest mean value reported for the item about how well to listen to the teacher was 4.306, followed by the item related to study and preparation and test as 4.1567. The lowest mean value was obtained for the item about preference for finishing studying and assignments before watching television. However, the grand mean value for the students' related factors was 3.8329, with a standard deviation of 0.368.

Table 2: Student Related Factors that Affect the Academic Performance of the Student-Nurses(n=300)

S.No.	Items	Mean ± SD
1	How attentively did you pay attention to the teacher?	4.30 ± 0.82
2	How well do you want to complete the quiz, test projects, tasks, and assignments with a respectable grade?	3.98 ± 0.83
3	How effectively do you reply to exercises and clear stuff you do not understand in the conversation?	4.14 ± 0.76
4	How well did you make me ready for substances?	4.13 ± 0.79
5	How did you react angrily when a conversation or discussion was interrupted if the teacher wasn't there?	3.48 ± 0.92
6	How successfully did you use a struggle when faced with a challenging assignment?	3.81 ± 0.88
7	How effectively did you retain the lesson you missed by missing class?	3.73 ± 0.95
8	How well do you read and prepare for exams and quizzes?	4.15 ± 0.85
9	How well did you understand that extracurricular activities did not interfere with your academic progress?	3.61 ± 0.95
10	How well-kept and organized was the space you designated as your reading retreat?	3.78 ± 1.02
11	How well did you fix your task regularly?	4.09 ± 0.85
12	How well did you use your downtime to complete a project or learn your lesson?	3.68 ± 0.97
13	How diligently did you study after receiving the minimum scores to improve your performance?	3.86 ± 0.97
14	How effectively did you concentrate even more on your studies by spending less time with pals throughout the school days?	3.44 ± 0.96
15	How much preference did you have for finishing your homework and tasks before watching any TV?	3.27 ± 1.16
Grand Mean		3.83 ± 0.36

Table 3 displays school-related factors affecting the academic performance of the scholar nurse. The highest mean value was obtained for the item related to the use of facilities in performing coursework at 4.07, followed by the item about the use of learning facilities available in the university at 3.990. Even though the lowest mean value was observed for the item related to adherence to the "Speak English Policy" as 3.260. The grand mean value for the school-related factors was 3.783, with a standard deviation of 0.589.

Table 3: School Related Factors that Affect the Academic Performance of the Student-Nurses(n=300)

S.No.	Items	Mean ± SD
1	How effectively do you utilize the university's learning resources, including the whiteboard, computer lab, and library?	3.99 ± 0.98
2	How well do you use the learning resources to complete your coursework?	4.07 ± 0.83
3	How well do you believe the university's facilities, including lighting, classroom size, air conditioning, tables and seats, adhere to the standards for physical requirements?	3.83 ± 1.00
4	How successfully can you use the library's internet access?	3.76 ± 1.01
5	How strictly do you abide by the university's "Speak English Policy"?	3.26 ± 0.96
Grand Mean		3.83 ± 0.36

Table 4 discloses teacher-related factors affecting the academic performance of the student nurse. The highest mean value was obtained for the item related to allowing suggestions and opinions by the teacher at 4.23, followed by the item related to imposing discipline by the teacher and is not lenient in prescribed rules at 4.04. The lowest mean value was observed for the item related to showing the teachers' various strategies and teaching aids in presenting lessons as 3.643. The grand mean value for teacher-related factors was 4.00, with a standard deviation of 0.471.

Table 4: Teacher Factors that Affect the Academic Performance of the Student-Nurses(n=300)

S.No.	Items	Mean ± SD
1	Do your instructors have respectable relationships with their students and their peers?	3.88 ± 1.01
2	Do your instructors enforce the prescribed regulations with fairness and adequate discipline?	4.04 ± 0.84
3	Do your teachers introduce you to concepts, viewpoints, and praiseworthy material?	4.23 ± 0.76
4	Do your instructors make wise decisions with assurance and stability?	4.13 ± 0.87
5	Are the personalities of your lecturers appealing, and do they have a sense of humor?	4.02 ± 0.92
6	Do your lecturers clearly state the course objectives at the beginning of each lecture?	4.09 ± 0.78
7	Are your instructors experts in the subject matter?	4.07 ± 0.84
8	Do your lecturers follow a set procedure when preparing the presentation of the object?	4.02 ± 0.83
9	Do your instructors have up-to-date knowledge of the subject matter, and are they well-trained?	3.92 ± 0.88
10	During lectures, do your instructors demonstrate various strategies, such as teaching methods and teaching devices?	3.64 ± 1.03
Grand Mean		4.00 ± 0.47

Table 5 shows the significant difference in the extent of effect factors has on academic performance of student nurse. T-tests and Analysis of Variance (ANOVA) were used to compare the given data. Results reveal that there was no significant difference in the extent of effect gender and

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type of the previous school on the academic performance of the student (p-values > 0.05). Data show a significant difference in the extent of the effect of age (p-value=0.003), marital status (p-value=0.011), discipline (p-value=0.001), and family income (p-value=0.006) have on the academic performance of the student nurse.

Table 5: Significant Difference in the Extent of Effect Factors has on Academic Performance of Student-Nurses(n=300)

Variables	Response Mean ± SD	t-value / F- value	p-value
Age (Years)			
18-24	3.82 ± 0.34	5.947	0.003
25-31	3.68 ± 0.30		
32 and above	3.70 ± 0.27		
Gender			
Male	3.73 ± 0.31	-1.041	0.299
Female	3.77 ± 0.33		
Marital Status			
Unmarried	3.78 ± 0.34	2.559	0.011
Married	3.68 ± 0.29		
Discipline			
Generic BSN	3.82 ± 0.34	3.823	<0.001
Post RN BSN	3.68 ± 0.29		
Previous School			
Private	3.78 ± 0.33	1.457	0.146
Public	3.73 ± 0.31		
Family Monthly Income (Rupees)			
10001-20000	3.97 ± 0.29	3.652	0.006
20001-30000	3.76 ± 0.29		
30001-40000	3.80 ± 0.34		
40001-50000	3.68 ± 0.31		
50001-60000	3.74 ± 0.34		

DISCUSSION

Our research findings exhibited that all the factors related to home, student, teacher, and school have a massive effect on the academic performance of the scholar nurse. The outcomes further elaborated that the teacher-related factors showed the maximum impact on academic performance among all four factors. It was demonstrated that the study participant believed the relationship between student and teacher, teaching tactics, and interaction difficulty hampers their academic recital. This finding aligned with the study's outcome accomplished by Alos *et al* [17]. They examined various factors and found that all factors had a massive effect on the student's academic performance; moreover, the uppermost factor was teacher-related factors. Thus, teachers have a key task in the student's performance and are significantly accountable for any student's performance. A research study unveiled that 'teachers must develop a conducive environment favorable to learning to improve student's learning experiences [18]. Another research completed by Richardson and Fallona unveiled that if a teacher does not have experience or he/she is not passionate about his/her teaching job, ultimately, students may not be capable of developing a thorough comprehension of their subject [19]. Likewise, suppose a teacher is hurt by classroom management difficulty, like despotism. In that case, the classroom environment may hinder effective class discussions and collective learning and can discourage the highest usage of their skills [20]. The range also described that teachers must enhance the teaching approach and masters the class to increase students' accomplishment. In tackling the issues of hindrances with the teaching approach, Tom *et al.*, emphasized that students and teachers must sit together, share their thoughts, hopes, and beliefs, and mutually construct approaches that enhance the student's learning [21]. Our findings also align with another study conducted in Phillpines by the Oducado, which reported that teacher should motivate the students to enhance academic performance and self-esteem of the students [22]. A current research study endorsed that teachers must exemplify positive qualities like passion and commitment and be enthusiastic about forwarding such potential to their peers and students [23]. As revealed by Gillespie, the relationship between student and teacher is vital to humanistic nursing education that may improve caring, completeness, competence, empathy, integrity, and confidence [24]. This finding is consistent with the research accomplished by Kusurkar *et al.*, which addressed the effect of self-motivation on the scores of scholars. Such studies prove that an extremely inspired scholar can do well in class; however, a scholar who might be proficient in getting higher marks but does not simply care about his education might have an inadequate academic performance [25]. It is also revealed by a research study that student learns if they expect to acquire and when they understand the aim of knowledge. When the scholar recognizes those aims, the student develops more energetic, rigorous, and improved plans to follow those aims [26].

CONCLUSIONS

It is concluded that nursing students experience significant teacher-related factors followed by home-related factors connected to reducing the student's academic performance. It is imperative that institution should devise robot interventional program to improve the academic performance of the nursing students.

Authors Contribution

Conceptualization: VK
Methodology: B, R, AK
Formal analysis: HBC, AUK, TK
Writing, review and editing: SC, HUH

All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Social Media Usage and it's Relationship with Depression among Nursing Students of a Private University

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ABSTRACT

Social media is a group of electronic and digital appliances which has its basis on internet and allow sharing, transforming and exchanging ideas, information, educational material and content. In the 21st century, internet usage has been increased significantly. Our life has been entirely changed by the internet and social media. Social media cause different health related issues and academic decline among students. **Objective:** To observe the relationship between social media use and depression among nursing students. **Methods:** Cross-sectional analytical study was performed on 120 nursing students. Ethical permission was obtained from Ethical Review Committee, Sohail University, Karachi. Descriptive statistics was performed on demographic variables. Pearson Correlation test was performed to check the relationship between social media use and depression. **Results:** Beyond 120 participants, males were in majority (57.5%). Mostly (58.3%) participants were in their 1st and 2nd year, 20.8% were married and 69.2% were living with their friends. Largely (77.5%) belong to Generic BSN program and 55.0% partakers were using social media from 0-4 hours per day. Mostly (44.2%) participant have moderate to extreme level of depression. We found positive correlation of social media use with depression. **Conclusions:** The findings of this study suggest significant correlation between depression and social media use. Spending more time on using social media can lead to depression. Therefore, policy makers should pay attention in planning to minimize the harmful effects of social media usage among students.

INTRODUCTION

In the twenty-first century, Internet usage has been increasing significantly. The universe has moved from traditional methods to the new age of internet applications and social media [1]. Social media is a group of electronic and digital appliances which has its basis on internet and allow the sharing, transforming and exchanging the ideas, information, educational material and content. The health care system has been using internet and different applications for gathering data from a huge number of sick persons and identifies diagnostic trends based, treatment regimens to figure out the disease progress among them [2]. Internet overuse has undesirable and adverse consequences on the academic performance of medical and nursing students' and also it is linked to drug misuse [3]. As social media has become a basic and vital part of everyone's life [4]. Numerous social media applications such as Ticktok, Twitter, Facebook, Instagram WhatsApp, Snapchat, YouTube, and Google are widely used all over the world. Despite the advantages, researchers also revealed unsuitable and wrong online activities among youngsters and students of all disciplines specially health professionals. Currently, social media is not only playing a significant role in the lives of youngsters and adolescents but it also causes different health related issues among them. The nursing professionals are elemental in maintaining health, promoting healthy routines, and creating awareness [5]. In this regard, it's crucial to ascertain the healthy lifestyle habits of nursing students

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who will eventually work as healthcare professionals as well as their usage of social media, which is on the rise and has a substantial negative impact on people's health. Education programs must be developed to encourage healthy lifestyle behaviors among nursing students and to discourage the use of social media [6]. Misuse or overuse of social media is recognized as a mental disorder. There are disagreements over its official diagnosis. In the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)'s, "Social media use disorder" has been proposed by the American Psychiatric Association recently. Numerous research studies revealed an association between depressive symptoms and regular use of social media [7]. Several studies retrieved that individuals who are dependent on internet and social media applications face difficulty in establishing personal relations and paying attention on their studies and as a result they have a higher tendency to develop depression and attempt suicide [8]. Social media and networking is a novel experience and this new phenomenon is linked with negative outcomes on psychological health as stated in several studies. [9]. The increasing inclination of using social media applications and its relationship with different mental ailments has been retrieved in several studies but on both of these issues, the nursing students have been overlooked. Therefore, the purpose of this study was to identify the association between the use of social media and depression among nursing students.

METHODS

Analytical cross-sectional study design with convenient sampling technique was used for data collection from 120 students of Jinnah College of Nursing, Sohail University Karachi. The undergraduate students who were studying in Generic BSN and Post RN BSN and belongs to Jinnah College of Nursing, Sohail University were willing to participate were included. Unwilling students, Post graduate and students of other disciplines and other than Sohail University were excluded. The duration who were agreed of study was August 2022 to December 2022. The sample size was calculated via Open-epi by using 41% of depression prevalence and keeping 95% confidence interval and 5% margin of error [8]. An ethical approval was obtained from ethical review committee, Sohail University, Karachi (Protocol #: 000237/22). Permission of data collection was taken from the Principal of Jinnah College of Nursing. Data were gathered via self-developed demographic form including questions regarding daily social media usage (in hours) and Beck's Depression Inventory scale. Beck Depression Inventory is a 21-item, self-report rating inventory which measures the attitudes, characteristics and symptoms of depression. It consists of 21 items about the subjective feelings of an individual in the last week. Each question has a set of 04 possible choices, ranging in intensity. Its 0-9 scoring indicates minimal symptoms, 10-18 designates mild depression, 19-29 specifies moderate and 30-63 denotes severe depression. Its reliability ranged from 0.75 to 0.92 and the validity ranged from 0.77 to 0.93 [9]. The social media usage was assessed by putting self-developed questions regarding hours of use during 24 hours in demographic form. SPSS version 24.0 was used for statistical analysis. To check frequencies; descriptive statistics was performed on demographic variables. Moreover a Pearson Correlation test was also performed to find out the relationship between social media use and depression.

RESULTS

Table 1 demonstrates the demographic characteristics of the study participants. In current study, 120 nursing students were actively participated and out of 120 participants, 93 (77.5%) were belongs to Generic BSN program and only 27 (22.5%) were students of Post-RN. In these 120 respondents, the males were in majority (57.5%) and 57.9% participants were between 18-22 years of age. Mostly (58.3%) participants were in their 1st and 2nd year of study, 20.8% were married and 69.2% were living with their friends shown in table 1.

Table 1: Demographic Characteristics (n=120)

Demographics		Frequency (%)
Gender	Male	69 (57.5%)
	Female	51 (42.5%)
Age Group	18-22 years	69 (57.5%)
	23-27 years	40 (33.3%)
	Above 27 years	11 (9.2%)
Year of Study	1st and 2nd year	70 (58.3%)
	3rd and 4th year	50 (41.7%)
Marital Status	Married	25 (20.8%)
	Unmarried	95 (79.2%)
Nature of living	With Family/Friend	83 (69.2%)
	Alone	27 (30.8%)
Study Program	G-BSN	93 (77.5%)
	Post RN	27 (22.5%)

Table 2 presents the social media usage in hours and the depression level among nursing students. Majority of the nursing students (55.0%) were using social media from 0-4 hours, 27.5 were spending their 5 to 8 hours in using social media applications whereas only 17.5% were using social media more than 8 hours per day. Mostly (44.2%) participants have moderate to extreme level of depression, 11.7% have mild mood disturbances, 4.5% were lying on borderline depression and only 40% were considered normal according to the Beck Depression Inventory.

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Table 2: Social Media Usage Time and Depression Level (n=120)

Variables	Frequency (%)
Social Media Usage Time	
0-4 hours	66 (55.0%)
5-8 hours	33 (27.5%)
Above 8 hours	21 (17.5%)
Total	120 (100%)
Level of Depression	
Normal	48 (40.0%)
Mild mood disturbance	14 (11.7%)
Borderline clinical depression	05 (4.2%)
Moderate depression	22 (18.3%)
Severe depression	23 (19.2%)
Extreme depression	08 (6.7%)
Total	120 (100%)

Table 3 displays the correlation of social media use and depression. We found that the Spearman's rank order correlation is significant (120) =0.001, p<0.05. We retrieved that if time of social media increases 1 hour then the level of depression will also increase up to 0.311 which is positive and significant but weak correlation.

Table 3: Correlation between Social Media Use and Depression (n=120)

Spearman's Correlations			Social media use	Depression
Spearman's rho	Social media addiction	Correlation Coefficient	1.000	.311**
		Sig. (2-tailed)	-	.001
		N	120	120
	Depression	Correlation Coefficient	.311**	1.000
		Sig. (2-tailed)	.001	-
		N		120

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

DISCUSSION

This study was aimed to observe the association between social media use and depression among nursing students. Mostly nursing students were using social media from 0-4 hours and a few than one fourth were spending more than 8 hours per day on social media. Nearly fifty percent of the participants had moderate to extreme depression. Similarly students were using social media from 0 to 4 hours observed by previous studies [8 - 14]. Some of the past studies found their study participants spending more than 4 hours on social media platforms [6, 9, 15-17]. The authors assumed that students get help in their learning and communication from peers, mentors and teachers and also get entertainment from social media applications and it could be reason for the abuse of social media. We found moderate to severe depression among majority of the students. Correspondingly the participants of some prior studies' had moderate to severe depression [3, 8, 14, 17]. In contrast, few past studies found mild depression among study participants [12, 18], and one study retrieved moderate depression [11]. Social media dependence, misuse, academic competition, study stress could be the causative factors. The primary aim of current study was to observe the relationship between social media usage and depression and as per our expectations, the results revealed significant correlation between social media addiction and depression. Few previously published studies has similar results as they also found social media and depression significantly associated [1, 3, 4, 6, 8]. It was also elaborated in detail by Akalin [6] that students who were using social media for more time per day, were with poor academic performance and deprived health perception. A previous study conducted by Jelenchick *et al.*, in 2013 explained that spending more hours in using different applications of social media and internet browsing can increase students' level of depression on Beck's scale of depression [19]. Despite of social media use different factors as loneliness, interpersonal distrust, and neuroticism may cause depression as stated by Rich & Scovel [20]. Some other researchers argue that the rising popularity of different applications of social media can be another possible cause of increase mental health problems such as anxiety and depression. [21]. A recent study verified that Facebook and other social media applications were not correlated with depressive symptoms. The scholars measured Facebook and other social media apps usage, the symptoms of depression and the personality traits such as emotional unstableness and extroversion among adolescents. They concluded that there was not any direct and significant relationship. They also shared that regular social media applications and Facebook users, had lower level of depression [22]. Another previous research study argued that there is a need to go beyond usage–effect approaches and hypothesizing, measuring and labeling social media use and its relationship with physical and mental health [23]. A study by O'Reilly *et al.*, revealed that youngsters commonly use social media and internet to get information regarding physical and mental health and this social media acts to show possibility to promote positive physical and mental health. Despite different risks, challenges and problems related to social media usage, social media offers a beneficial and constructive way to educate and reaching teenagers to promote their physical and mental health and psychological wellbeing [24].

CONCLUSIONS

This study concludes that our mostly participants spending more time on social media and nearly half of the partakers had moderate to extreme depression. The correlation between depression and social media use was found significantl. Furthermore, spending more time on internet and using social media lead to depressive symptoms among nursing students who are gradually

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dealing with social media applications nowadays.

Authors Contribution

Conceptualization: KH, R
Methodology: KH, R
Formal analysis: KH, TA
Writing-review and editing: KH, TA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Exploring Blood Donation: Perspectives among Undergraduate Students in Peshawar, Pakistan

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ABSTRACT

To improve voluntary donation and public health in the face of Pakistan's shifting regulations and challenges, it is crucial to comprehend the blood donation patterns of undergraduate students in Peshawar. **Objective:** To compare and assess undergraduate students in medical, allied health sciences, and non-medical fields in Peshawar, Pakistan, on their knowledge, attitudes, barriers to, and motivations for, blood donation. **Methods:** An eight-month observational cross-sectional study with 1232 undergraduate students from various academic fields was conducted. Participants were assessed through a comprehensive questionnaire regarding blood donation. Data were analyzed using SPSS version 27.0, employing descriptive statistics and the chi-square test. **Results:** The study enrolled 1232 undergraduate students, with 65.2% male and 34.6% female participants. Among them, 82.3% were aware of their blood group. While 24.74% exhibited poor knowledge about blood donation, 62.98% demonstrated moderate knowledge, and 12.29% had good knowledge. Additionally, 39.9% had never donated blood, but 83.9% expressed willingness to donate in the future. Fear of needles (13.90%), fear of infection (13.20%), and medical unfitness (13.10%) were significant barriers, while motivations included saving lives (22.20%), helping friends and family (19.40%), and moral obligation (14.80%). **Conclusions:** The study concluded that undergraduate students in Peshawar possess a moderate level of understanding regarding blood donation, with medical students showing higher knowledge levels. Despite variations across disciplines, positive attitudes towards donation were common, indicating potential for increased voluntary donation.

INTRODUCTION

Blood donation and transfusion practices in Pakistan are less developed compared to global standards, with around 170 public and 450 private, mostly hospital-based, blood banks [1]. The country's low human development index reflects a lack of a reliable blood service system, similar to other underdeveloped regions [2, 3]. There is a significant gap between the demand for and availability of blood due to a shortage of regular donors [3]. Safety concerns, particularly regarding transfusion transmissible diseases, are also critical in underdeveloped nations like Pakistan [4]. Voluntary donors, who represent only 10% of donors in Pakistan, are crucial for supplying safe, high-quality blood, whereas 90% of donations come from replacement or paid donors. Women, nearly half the population, are notably underrepresented in blood donation statistics [1, 4, 5]. Studies show widespread misconceptions and varying attitudes towards blood donation, alongside reasons for not donating such as lack of awareness, family disapproval, and fear of pain or side effects [6-8]. Contrarily, incentives like free health checks or gifts can encourage voluntary donations [9]. Despite limited research, physically fit university students could be key potential donors [10]. The rationale for this study underscores the urgent necessity to comprehend the knowledge, attitudes, barriers, and motivational factors influencing voluntary blood donation among undergraduate students in Peshawar, Pakistan.

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This study aimed to inform evidence-based strategies that promote altruism and improve public health outcomes in the community.

METHODS

The study utilized a comparative observational cross-sectional method in Peshawar, Khyber Pakhtunkhwa, Pakistan from May to December 2023. A total of 1250 questionnaires were distributed to achieve a target sample of 1082 participants, calculated using the Open Epi Sample Size Calculator with a 99.9% confidence level and a 5% confidence limit. Out of these, 1232 were returned completed. Participants included 496 medical, 385 non-medical, and 351 allied health sciences students, selected via a convenient non-random method. Inclusion criteria were students enrolled in relevant undergraduate programs, excluding non-enrolled, non-consenting, or those submitting incomplete questionnaires. Confidentiality and verbal consent were ensured, with ethics approval from the Northwest School of Medicine's Institutional Review Board (IRB) (Reference No: EC/2023-SM/064, dated: 20th March, 2023). Data were gathered using a standardized questionnaire covering demographics, knowledge, attitudes, barriers, and motivations related to blood donation and analyzed using SPSS version 27.0, employing descriptive statistics and the chi-square test to assess relationships across disciplines, with a significance level of 0.05. Knowledge scores ranged from (0-12), categorized into poor (0-4), moderate (5-8), and good (9-12).

RESULTS

1232 people from 385 non-medical, 496 medical, and 351 allied health science fields were polled for the study. The participants were aged 18 to 30 (average age 21.39 ± 2.098), with 34.6% being female and 65.2% being male. 45.1% of the institutional distribution was private and 54.7% was public. Most students (70.2%) had junior status academically, and 82.3% knew their blood type. Among those who knew, the blood group breakdown was comprised of 236 A+, 43 A-, 279 B+, 50 B-, 132 O+, 30 O-, 193 AB+, and 54 AB-(Table 1).

Table 1: Demographics of the Participants

Variables	Medical (%)	Non-Medical (%)	Allied Health Sciences (%)	Total (%)
Male	295 (36.6)	273 (33.9)	237 (29.4)	805 (100)
Female	201 (47.1)	112 (26.2)	114 (26.7)	427 (100)
Private	312 (56)	199 (35.7)	46 (8.3)	557 (100)
Public	184 (27.3)	186 (27.6)	305 (45.2)	675 (100)
Junior Year	344 (39.7)	254 (29.3)	269 (31)	867 (100)
Senior Year	152 (41.6)	131 (35.9)	82 (22.5)	365 (100)
Urban	360 (48.5)	182 (24.5)	201 (27.1)	743 (100)
Rural	136 (27.8)	203 (41.5)	150 (30.7)	489 (100)
Do you know your Blood Group?				
Yes	455 (44.7)	292 (28.7)	270 (26.5)	1017 (100)
No	41 (19.1)	93 (43.3)	81 (37.7)	215 (100)
Total	496 (40.3)	385 (31.3)	351 (28.5)	1232 (100)

Table 2 demonstrates in detail the knowledge of the participants regarding blood donation, along with the chi-square and p-values for each corresponding variable.

Table 2: Knowledge of the Participants Regarding Blood Donation

Variables	Medical (%)	Non-Medical (%)	Allied Health Sciences (%)	Total (%)	P-Value	X^2-Value
Can a person be infected by receiving Blood Donation?						
Yes	426 (46.7)	295 (32.3)	192 (21)	913 (100)	0.000	108.233
No	51 (19.9)	75 (29.3)	130 (50.8)	256 (100)		
Don't Know	19 (30.2)	15 (23.8)	29 (46)	63 (100)		
Can Individuals with infectious diseases donate blood?						
Yes	69 (26.4)	108 (41.4)	84 (32.2)	261 (100)	0.000	76.669
No	414 (47.1)	248 (28.2)	217 (24.7)	879 (100)		
Don't Know	13 (14.1)	29 (31.5)	50 (54.3)	92 (100)		
How often can an individual donate blood?						
Weekly	7 (15.9)	16 (36.4)	21 (47.7)	44 (100)	0.000	169.033
Monthly	37 (48.7)	16 (21.1)	23 (30.3)	76 (100)		
3 Months	284 (49.9)	101 (17.8)	184 (32.3)	569 (100)		
6 Months	115 (36.3)	112 (35.3)	90 (28.4)	317 (100)		
Annually	17 (27.9)	35 (57.4)	9 (14.8)	61 (100)		
Don't Know	36 (21.8)	105 (63.6)	24 (1.5)	165 (100)		
What do you think is the minimum age limit for blood donation?						
16 Years	94 (27.6)	119 (35)	127 (37.4)	340 (100)	0.000	38.544
18 Years	336 (45.5)	209 (28.3)	193 (26.2)	738 (100)		
20 Years	66 (42.9)	57 (37)	31 (20.1)	154 (100)		
What do you think is the maximum age limit for blood donation?						
55 Years	347 (37.1)	307 (32.8)	281 (30.1)	935 (100)	0.001	17.868
65 Years	125 (51.7)	64 (26.4)	53 (21.9)	242 (100)		
75 Years	23 (42.6)	14 (25.9)	17 (31.5)	54 (100)		
What volume of blood is collected during each donation?						
500ml	292 (43.1)	174 (25.7)	211 (31.2)	677 (100)	0.001	60.539
Upto 1000ml	102 (34.5)	88 (29.7)	106 (35.8)	296 (100)		
Don't Know	102 (39.5)	122 (47.3)	34 (13.2)	258 (100)		
What is the duration of donation process?						
<20 min	213 (37.3)	185 (32.4)	173 (30.3)	571 (100)	0.000	47.638
20-60 min	173 (44.8)	81 (21)	132 (34.2)	386 (100)		
Don't Know	110 (40)	119 (43.3)	46 (16.7)	275 (100)		
Minimum weight for blood donation?						
50kg	286 (43.7)	151 (23.1)	218 (33.3)	655 (100)	0.000	47.056
70kg	185 (36.5)	209 (41.2)	113 (22.3)	507 (100)		
100kg	24 (34.8)	25 (36.2)	20 (29)	69 (100)		
Minimum Hemoglobin for male donor?						
11.5g/dl	45 (26.5)	36 (21.2)	89 (52.4)	170 (100)	0.000	294.820
12.5g/dl	168 (35.1)	169 (35.3)	142 (29.6)	479 (100)		
13.5g/dl	247 (61.4)	48 (11.9)	107 (26.6)	402 (100)		
Don't Know	36 (19.9)	132 (72.9)	13 (7.2)	181 (100)		

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Minimum Hemoglobin for female donor?						
11.5g/dl	158 (41.7)	94 (24.8)	127 (33.5)	379 (100)	0.000	178.247
12.5g/dl	211 (44.6)	103 (21.8)	159 (33.6)	473 (100)		
13.5g/dl	72 (48)	33 (22)	45 (30)	150 (100)		
Don't Know	55 (23.9)	155 (67.4)	20 (8.7)	230 (100)		
Which Blood type is universal donor?						
A	8 (6.5)	104 (84.6)	11 (8.9)	123 (100)	0.000	243.029
B	10 (18.9)	35 (66)	8 (15.1)	53 (100)		
AB	18 (24.3)	32 (43.2)	24 (32.4)	74 (100)		
O	460 (46.8)	214 (21.8)	308 (31.4)	982 (100)		
Which blood type is universal recipient?						
A	8 (7.4)	79 (73.1)	21 (19.4)	108 (100)	0.000	421.077
B	13 (16.9)	55 (71.4)	9 (11.7)	77 (100)		
AB	458 (52.5)	123 (14.1)	292 (33.4)	873 (100)		
O	17 (9.8)	128 (73.6)	29 (16.7)	174 (100)		

Figure 1 data showcases that among the participants, 24.74% exhibited a poor level of knowledge regarding blood donation. 62.98%, demonstrated a moderate level of knowledge on the subject. While a smaller yet notable portion of the participants, amounting to 12.29%, showed a good level of knowledge regarding blood donation.

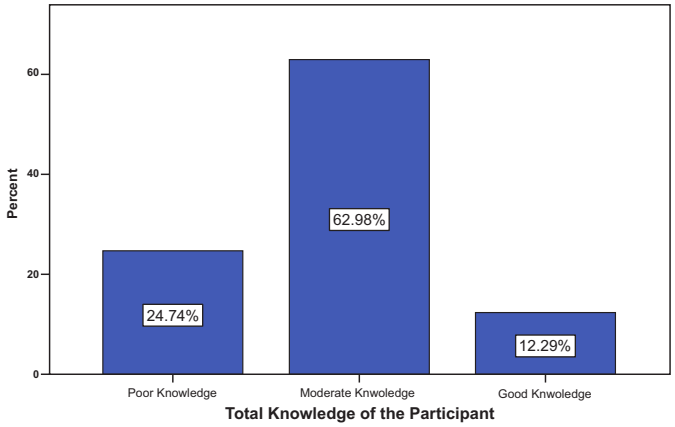

Figure 1: Total Knowledge of the Participants

Comparison of attitudes towards blood donation among participants from medical, non-medical, and allied health sciences backgrounds, including corresponding chi-square values and p-values for each variable, is presented in table 3.

Table 3: Attitude of Participants towards Blood Donation

Variables	Medical (%)	Non-Medical (%)	Allied Health Sciences (%)	Total (%)	P-Value	X^2-Value
Do you believe the best way to donate blood is at the request of relatives?						
Agree	243 (34.4)	227 (32.1)	237 (33.5)	707 (100)	0.000	29.426
Disagree	253 (48.2)	158 (30.1)	114 (21.8)	525 (100)		
Do you think that the best way to donate blood is through paid donations?						
Agree	120 (29.1)	142 (34.5)	150 (36.4)	412 (100)	0.000	34.727
Disagree	376 (45.9)	243 (29.6)	201 (24.5)	820 (100)		
Do you think people who donate blood should receive something in exchange?						
Agree	120 (29.1)	142 (34.5)	150 (36.4)	412 (100)	0.000	34.727
Disagree	376 (45.9)	243 (29.6)	201 (24.5)	820 (100)		
Do you believe people who donate blood can contract diseases?						
Agree	233 (41.6)	148 (26.4)	179 (32)	560 (100)	0.002	12.449
Disagree	263 (39.1)	237 (35.3)	172 (25.6)	672 (100)		
Do you think people who donate blood become temporarily weakened?						
Agree	297 (46)	156 (24.2)	192 (29.8)	645 (100)	0.000	33.651
Disagree	199 (33.9)	229 (39)	159 (27.1)	587 (100)		
Do you donate blood to get free investigation?						
Agree	202 (33.3)	174 (28.7)	230 (38)	606 (100)	0.000	54.159
Disagree	294 (47)	211 (33.7)	121 (19.3)	626 (100)		
Do you think blood donation saves lives?						
Agree	433 (42.8)	302 (29.9)	276 (27.3)	1011 (100)	0.000	15.472
Disagree	63 (28.5)	83 (37.6)	75 (33.9)	221 (100)		
Do you consider blood donation a moral activity?						
Agree	415 (41.7)	308 (30.9)	273 (27.4)	996 (100)	0.088	4.865
Disagree	81 (34.3)	77 (32.6)	78 (33.1)	236 (100)		
Do you think young people should donate blood more frequently than older individuals?						
Agree	406 (41.7)	300 (30.8)	267 (27.4)	973 (100)	0.104	4.521
Disagree	90 (34.7)	85 (32.8)	84 (32.4)	259 (100)		
Do you believe people with knowledge donate more often?						
Agree	352 (42.5)	256 (30.9)	221 (26.7)	828 (100)	0.046	6.145
Disagree	144 (35.7)	129 (32)	130 (32.2)	403 (100)		
Do you think the best way to donate blood is through voluntary unpaid methods?						
Agree	378 (45.1)	204 (24.3)	257 (30.6)	839 (100)	0.000	59.729
Disagree	118 (30)	181 (46.1)	94 (23.9)	393 (100)		
Prior to blood donation, should individuals truthfully disclose their health status?						
Agree	424 (47.5)	235 (26.3)	233 (26.1)	892 (100)	0.000	73.727
Disagree	72 (21.2)	150 (44.1)	118 (34.7)	340 (100)		
Have you ever donated blood before?						
Yes	261 (52.9)	125 (25.4)	107 (21.7)	493 (100)	0.000	55.256
No	235 (31.8)	260 (35.2)	244 (33)	739 (100)		
Are you currently fit to donate blood?						
Yes	182 (56)	75 (32.1)	68 (20.9)	325 (100)	0.000	45.476
No	314 (34.6)	310 (34.2)	283 (31.2)	907 (100)		
Would you consider donating blood in future?						
Yes	86 (43.9)	58 (29.6)	52 (26.5)	196 (100)	0.528	1.277
No	410 (39.6)	327 (31.6)	299 (28.9)	1036 (100)		
Are you afraid of needles?						
Yes	325 (43.7)	231 (31)	188 (25.3)	744 (100)	0.002	12.333
No	171 (35)	154 (31.6)	163 (33.4)	488 (100)		
Do you feel apprehensive about learning your blood profile results during donation?						
Yes	337 (46.2)	218 (29.9)	175 (24)	730 (100)	0.000	28.875
No	160 (31.9)	166 (33.1)	176 (35.1)	502 (100)		
Is it possible for donated blood to be sold?						
Yes	233 (41.2)	211 (37.3)	122 (21.6)	566 (100)	0.000	30.070
No	263 (39.5)	174 (26.1)	229 (34.4)	666 (100)		
Have you encouraged anyone to donate blood?						
Yes	154 (47.8)	84 (26.1)	84 (26.1)	322 (100)	0.005	10.802
No	342 (37.6)	301 (33.1)	267 (29.3)	910 (100)		

The study identified barriers to blood donation, including fear of needles (13.90%), fear of infection (13.20%), and medical unfitness (13.10%). Parental restrictions affected

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12.10%, dissatisfaction with preventive measures and uncertainty about donation locations were cited by 10.10% and 9.60%, respectively. Findings are summarized in figure2.

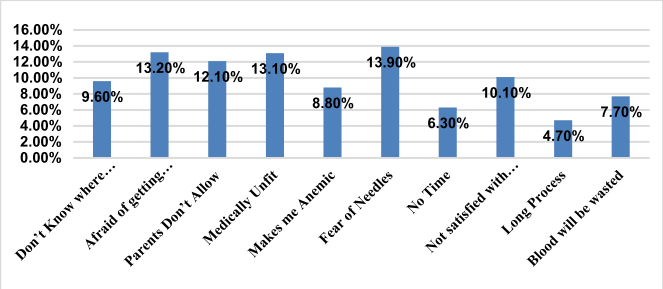

Figure 2: Barriers towards Blood Donations

The study found that 22.10% donated blood to save lives, 19.40% to help friends and family, and 17.20% for self-satisfaction. Figure 3; illustrate the varied motivations behind blood donation.

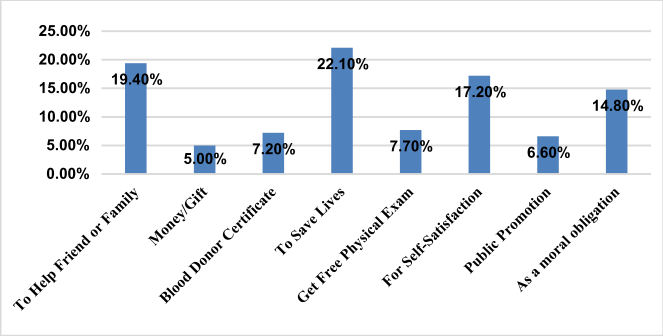

Figure 3: Motivational Factors towards Blood Donation

DISCUSSION

Our research involved 1232 students from diverse academic backgrounds and colleges in Peshawar. The rate of blood donation among these students was 59.8%, which aligned with a separate study conducted in Bangladesh involving 201 students, where the frequency was recorded at 50.74%. Additionally, within the same study, it was observed that male students exhibited a higher frequency of blood donation, approximately 80.39% in Bangladesh and 70.9% in our study [11]. Likewise, in a national study conducted in Faisalabad, obstacles to blood donation were identified, and these barriers were consistent with those revealed in our own study. They encompassed concerns such as fear, limited proximity to collection facilities, time constraints, and a shared motivating factor centered on the desire to save lives [12]. Similarly, in another study conducted with students in Nigeria, there was a higher level of knowledge concerning blood donation compared to our study. For example, 86.7% of Nigerian students were aware that 500ml of blood is typically taken during each donation, whereas only 54.8% of our students had this understanding. This indicates the importance of raising awareness among our student population. Furthermore, both Nigerian and Pakistani students displayed positive attitudes and eagerness towards participating in blood donation in the future [13]. The same findings of low level of knowledge and a positive attitude were also found in another study conducted in Malaysia [14]. Another study from North India involving 235 students concluded that the mean overall knowledge score was 74.4% with 95.7% of the participants aware of their blood group whereas in our study 82.3% of the participants knew their blood types. The same study showed that the practice of blood donation among the students of north India was as low as 22.9% and in another research conducted in Southeast Nigeria 84.7% of the participants had knowledge of their blood groups [15, 16]. A study conducted in Saudi Arabia found that students exhibited a commendable level of understanding regarding blood donations. Concerning motivational factors, one aspect highlighted was the possession of a blood donor certificate, which was reported among 47.8% of Saudi students and only 7.2% of Pakistani students [17]. A study conducted in Iraq revealed a notable gap in knowledge between medical and non-medical students. Despite their positive attitudes, there was a low reported incidence of previous blood transfusions among them [18]. Regarding the practices of blood donation 59.8% of our participants had previously donated blood, while in a study conducted in Egypt the rate of previous blood donations was only 35.1% among the participants, the same rate (34.8%) was also found in a multi centric study of Italy [19, 20].

CONCLUSIONS

The study reveals that Peshawar students have a moderate understanding of blood donation, with medical students showing more knowledge than those in allied health sciences and non-medical fields. Although knowledge levels vary, the overall attitude towards blood donation is positive, and many participants have donated blood before.

Authors Contribution

Conceptualization: SZ, KK, SM
Methodology: SZ, KK, WK, HK, IK
Formal analysis: SZ, KK, MA, WK, HK, IK, SM, JS
Writing, review and editing: SZ, KK, MA, SM, JS

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Diabetes Distress, Depression and Coping Strategies in Adults with Type 2 Diabetes

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ABSTRACT

People with diabetes often experience two mental health conditions which are diabetes distress and depression. Both the conditions affect them negatively and increase their risk of diabetes complications and poor disease management. **Objectives:** To find out the prevalence of diabetes distress and depression in our sample and examine the relationship among diabetes distress, depression and coping strategies among adults with Type 2 diabetes. **Methods:** Cross-sectional research design was used in this study. The sample consisted of 125 patients of Type 2 diabetes with age range between 40 to 55 years (M=49.94, SD=4.21). Non probability purposive sampling technique was used to select the sample. Diabetes distress scale, depression scale and coping scale were used to assess the study variables. **Results:** 34% patients had moderate distress worthy of attention. Being woman, younger age, having poor coping skills and depression were significantly associated with diabetes distress. **Conclusions:** High rates of diabetes distress in the study highlights the significance of identifying distress and other mental health issues in individuals having diabetes to provide psychological management and collaborative care to them.

INTRODUCTION

Worldwide, 463 adults are estimated to have diabetes with 90% of the people suffering from Type 2 diabetes mellitus [1]. Pakistan is ranked 3rd in diabetes prevalence in the world after China and India and according to the International Diabetes Federation (2022), about 27% of the people are suffering from diabetes in Pakistan which makes it almost 33,000,000 cases. This is an alarmingly high number which is increasing every year. Not only this but a large number of patients remains undiagnosed exacerbating to risk of diabetes related complications even higher [2]. Diabetes distress refers to the emotional distress related to living with diabetes and managing it, and not attributable to any other factors of general emotional distress or mental health issues [3]. A number of adults living with diabetes go through high levels of emotional distress originating from their apprehensions and uncertainties about diabetes. Diabetes distress affects individuals' mood, relationships, quality of life and overall diabetes management. Individuals experiencing diabetes distress get less benefit with the diabetes treatment and need be supported by the doctor and family by encouraging them to use coping strategies to overcome diabetes distress [4]. Effective coping skills help the patients in improving perception about themselves, improving their ability to cope up with the situation, minimizing disease burden and by involving others to assist with the situation. Often the emotional distress of adjustment resulting by negative disease appraisals can result in maladaptive coping behaviors which may result in poor disease management. Health professionals should address the aspects of healthy emotional state by providing effective coping strategies for diabetes distress while providing

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standard medical treatment of diabetes as well [5]. Coping skills have important role in helping individuals with diabetes distress and are recommended as a helpful tool for diabetes distress prevention. Coping skills like acceptance, optimism, planning, action and self-care could be learned and acquired by the patients and facilitate them in taking proper diet, regular exercise, taking proper medications, and self-monitoring [6]. Depression is highly prevalent in diabetic population. The prevalence rates of depression are 3 times higher in patients with type-1 diabetes and 2 times higher in people with type-2 diabetes as compared to the worldwide general population. Patients with depression and diabetes tend to have poor prognosis and higher death rates. An individual experiences psychological burden after being diagnosed with diabetes which could trigger symptoms of depression. Comorbid depression could result in reduction in quality of life and have more negative impact on an individual. In such a case, diabetes and depression should be treated simultaneously to avoid health related complications and to maintain diabetes control in patients. Depression is usually under diagnosed and remains untreated in diabetic patients and awareness should be made for depression in diabetes to improve health-related consequences and there should be method to screen depression in diabetic follow up [7]. Biologically, depression and diabetes are linked with the dysfunction in hypothalamic pituitary adrenal (HPA) axis. Cortisol (stress hormone) increases during the stimulation of hypothalamic pituitary adrenal axis. Excess stress hormone levels (cortisol) results in increased glucose level. Depressive symptoms are worsened by changes in monoamine system and hippocampus by induction of cortisol. Collaborative care interventions are effective in comorbid depression and diabetes which leads to increased health care and improved glycemic control in diabetic patients. According to guidelines given by American Diabetes Association, a stepwise collaborative care technique is essential for the management of depression in patients with diabetes. It could consist of a multidisciplinary team which provides recommendations to reduce potential risk of incidents of diabetes and depression by providing education, medication managing technique and focuses on patient's empowerment by developing appropriate coping skills in them with regular supervision combined with treatment intervention, education, learning and mental support to facilitate patient outcomes [8]. Population based studies have shown diabetes distress and depression to be fairly prevalent among adults with type 2 diabetes [9, 10].

Despite all the data, there is not much data available in Pakistan examining the factors associated with diabetes distress. Although work has been done on depression in diabetes patients in Pakistan but diabetes distress is not given much attention to. Hence, this study aimed at examining diabetes-specific distress, depression and coping skills in patients with type 2 diabetes in Pakistani population.

METHODS

Cross-sectional research design was used in the study in order to investigate the relationship between diabetes distress, depression and coping strategies among adults with diabetes. Non probability purposive sampling technique was used in the study. The sample consisted of 125 patients having diabetes with age range between 40-59 years (M=49.94, SD=4.21). The sample size was selected through G power analysis. Data was collected from outdoor units of two private hospitals of Lahore. For inclusion, patients with selected if they had: confirmed diagnosis of Type 2 diabetes; their minimum duration of illness was at least one year. Individuals with diagnosis of any other diabetes, or women with gestational diabetes were not included. Also individuals having a diagnosis of any terminal illness were also excluded. The data were collected between January 2023 and April 2023. Demographic form was used for information on gender, age, marital status, education, occupation and duration of disease. Diabetes Distress Scale consisting of 17 items was used in the study. Its reliability for the scale is .92. The response format ranges from '1' not a problem to '6' a very significant problem based on a six-point Likert scale. This scale explains four critical dimensions of distress which include emotional burden, regimen distress, interpersonal distress and physician distress. The total score obtained by an individual and the mean score is used to determine the severity of distress with little/no distress (0–2), moderate distress (2–2.9), and severe distress (3 and more) [11]. Beck Depression Inventory was used to assess the presence and degree of depressive symptoms. It consists of 21 items and a score of 0–13 is considered minimal, 14–19 is mild, 20–28 is moderate, and 29–63 is severe depression. It has excellent internal consistency reliability [12]. To assess the level of coping in our sample, the 13 item coping scale was used. The response items of the scale range from 1 (not true about me) to 4 (mostly true about me). The score ranges between 13-52 and higher scores indicate better coping [13]. Ethical approval for the study was obtained from the Convener, research Ethics, Institutional Review Board of Lahore College for Women University vide letter no. ORIC/LCW/447. Approval was also obtained from the hospital authorities for collecting data from the patients visiting the diabetes units. The consent to use the scales was taken from the authors of the scales. Complete briefing was given to the participants about the purpose and nature of the study. Informed consent was taken from the participants and they were assured that the

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information would remain confidential and be used for research purpose only. Confidentiality, anonymity and privacy was assured. Next according to inclusive criteria, the study participants of interest were approached. The questionnaires were given to the participants to be filled and instructions were given. The participants had to pick any one option according to his/her choice on the basis of previous experiences. The maximum time taken by each participant for filling the form was 10-15 minutes. After data collection, data were entered into SPSS software and was analyzed by using SPSS version 22.0. In the first step, frequencies and percentages were computed for socio demographic and clinical characteristics of sample to get clear information about the characteristics of sample. Pearson product moment correlation was applied to gauge the relationship between main study variables (diabetes distress, depression, coping strategies) as well as with the demographics (gender, age, marital status, duration of disease) in the study. In the next step, multiple linear regression analysis was applied for diabetes distress and coping to predict depression in adults with diabetes.

RESULTS

The demographic and clinical characteristics of the sample have been numerically represented in the table 1. Sample consisted of both genders with 46.4% males and 53.6% females. Most of the patients were married that made 76.8% while 23.2% were single. 55.2% were unemployed while 44.8% were employed. The mean duration of illness was 3.85 and standard deviation was 2.06. The percentages of patients falling into various categories of diabetes distress and depression are also given in table 1. Almost 46% of the patients had moderate distress and 40% were experiencing severe distress. For depression, 26% patients had mild, 33% moderate and 7% had severe depression.

Table 1: Demographic and Clinical Characteristics of the Sample (N=125)

Characteristics	F (%)
Age	
Mean ± SD	49.94 ± 4.21
Gender	
Male	58 (46.4)
Female	67 (53.6)
Marital Status	
Married	96 (76.8)
Single	29 (23.2)
Occupation	
Employed	56 (44.8)
Unemployed	69 (55.2)
Duration of Diabetes	
Mean ± SD	3.85 ± 2.06
Depression Level	
No or Minimal	52 (41.6)
Mild	43 (34.4)
Moderate	21 (16.8)
Severe	09 (7.2)
Diabetes Distress	
No Distress	28 (22.4)
Moderate Distress	57 (45.6)
High Distress	40 (32)
Coping	
Mean ± SD	26.18 ± 3.11

Results in table 2 revealed that there was a strong positive correlation between age and duration of disease (r=.51**) and moderate negative correlation between age and diabetes distress (r=-.16*) indicating higher distress in younger age. There was a significant moderate relationship between duration of disease and diabetes distress (r=.146*) which indicated that distress increased with more duration of diabetes. Distress also had a strong relationship with coping strategies (r=-.239**) and depression (r=.427**) which showed that with higher levels of distress there was less coping and higher depression levels. There was a significant relationship between coping strategies and depression (r=-.458**).

Table 2: Bivariate Correlations among Main Study Variables (N=125)

Variables	1	2	3	4	5	6	7
Gender	-	.085	-.135	-.038	.053	.104	.056
Age	-	-	-.177*	.509**	-.161*	-.067	.127
Marital Status	-	-	-	-.042	-.043	-.099	-.172
Duration of Disease	-	-	-	-	.146*	-.129	.045
Diabetes Distress	-	-	-	-	-	-.239**	.427**
Coping	-	-	-	-	-	-	-.458**
Depression	-	-	-	-	-	-	-

Note: **Correlations is significant at the 0.01 level (2-tailed)

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

Table 3 reports the results of multiple linear regression. It was hypothesized that diabetes distress and use of coping will predict depression in individuals with diabetes. The results showed that diabetes distress (β=.33**) and coping methods (β=.29*) were significant predictors of depression. The overall model was also significant [F=10.38; p<.05] and the predictor variables contributed to 35% variance in depression.

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Table 3: Multiple Linear Regression Analysis for Depression (N=125)

Variables	Depression		
	B	SEB	β
Duration of Diabetes	.10	.021	.21
Diabetes Distress	.13	.024	.33**
Coping	.11	.01	.29*
R^2	.35		
F	10.38**		

DISCUSSION

This study identified the level of diabetes distress and depression in individuals with Type 2 diabetes and examined its association with coping strategies. The study found a significant number of individuals reporting a moderate (46%) to high (32%) level of distress. The findings are consistent with previous studies conducted in Pakistan. A study conducted in Islamabad, Pakistan also reported similar statistics with 76.2% patients to experience diabetes distress with 47% having moderate and 29% having high level distress. The findings are also comparable to that of studies conducted elsewhere which have reported high levels of distress in these patients. Findings from other countries have reported diabetes distress prevalence of 64% in China [14], 37% in Iran [15] and 42% in India [16]. Our study found a substantial number of patients reporting moderate (17%) to severe (7%) symptoms of depression. This presence of depression symptoms observed in our study is quite similar with other studies which have indicated both diabetes distress and depression to be prevalent among these patients. However, the rate of depression found in our study was lower as compared to studies conducted elsewhere which have reported a prevalence of 28% to 44% depression in diabetic patients. Two other studies reported depressive symptoms to be present in 22% [17] and 58% [18] of the diabetic patients. The prevalence of depression was assessed in Kuwait and the results indicated that there is high prevalence of depression in individuals with diabetes distress with a rate of comorbid depression and diabetes distress to be 29% and 14% respectively [19]. Diabetes distress is an important condition which involves worries and concerns of the patients about their disease management, emotional burden and access to healthcare resources [4]. Our study found a significant correlation between diabetes distress, depression and coping in adults with diabetes indicating that increase in diabetes distress and depressive symptoms were associated with decrease in coping skills and vice versa. Studies conducted on role of coping mechanisms in diabetes have also supported this finding [20]. Another study found active coping skills to be associated with better health outcomes and maladaptive coping to be associated with low quality of life, and more depressive symptoms and distress [21]. Our study found significantly higher distress levels in younger adults as compared to older ones. Consistent with other studies, this could be due to the reason that diabetes needs a lot of lifestyle adjustments and is stressful for them to cope with a chronic disease demands. This suggests that these individuals could benefit from clinical attention to lower their distress. Our study found diabetes distress and level of coping to be significant predictors of depression. This finding supports the existing literature and is comparable to other studies that signifies not only the co-occurrence of depression and diabetes distress in patients with diabetes but also indicates diabetes distress as a predictor of depression [22]. This could be due to the reason that diabetes is a health condition that requires lifetime management and could place emotional and psychological burden on the patient. They experience setbacks with diabetes self-care and management and consequently may avoid dealing with their diabetes and experience setbacks, such as hypoglycemia, hyperglycemia contributing further to their feelings of distress and depression [23]. The findings of the study could be implicated in health settings. As high levels of diabetes distress can also lead to poor diabetes management and lack of self-care behaviors, hence, health psychologists and clinical psychologists may help patients by devising proper management plans for their health and wellbeing.

CONCLUSIONS

The study concluded that diabetes distress and depression (mild to severe) were prevalent in patients with Type 2 diabetes. Also, higher levels of diabetes distress and poor coping strategies predicted depressive symptoms in these patients. However, diabetes and depression can be managed by diabetes self-management programs to help patients manage diabetes distress and depression through effective coping and improve their quality of life.

Authors Contribution

Conceptualization: NM, AM
Methodology: NM, MA
Formal analysis: NM, AM, MA
Writing-review and editing: NM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Gratitude, Self-Efficacy and Self-Care Behaviors among Patients with Cardiovascular Diseases

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ABSTRACT

Cardiovascular disease (CVD) is a complex disease with persistent course of treatment having serious consequences for the patients' wellbeing. Positive psychological factors can play a significant role in improving CVD outcomes. **Objectives:** To better understand the intricate relationships among gratitude, self-efficacy, and self-care behaviors in individuals diagnosed with cardiovascular diseases. **Methods:** A quantitative cross-sectional research design was employed for the study. 160 patients with CVD aged between 40 to 60 years (M=49.79, SD=5.59) were selected for the study through purposive sampling. The Gratitude Questionnaire, Self-Care Behavior Scale-9 and General Self Efficacy Scale were used to measure gratitude, self-care behaviors, and self-efficacy respectively. **Results:** Results revealed a significant relationship between gratitude, self-care behaviors and self-efficacy. The findings also indicated self-efficacy to be a significant predictor of self-care behaviors. **Conclusions:** The study advocates for inclusive healthcare interventions that emphasize the role of gratitude and self-efficacy on self-care behaviors for enhancing wellbeing of CVD patients. It contributes to the understanding of the psychological dynamics within CVD patients emphasizing the role of interventions that promote holistic well-being.

INTRODUCTION

Cardiovascular diseases (CVD) are a leading cause of mortality all over the world affecting millions of individuals and imposing a significant burden on the healthcare systems. Approximately 17.9 million individuals suffered from CVDs in 2019 only and accounted for one-third of mortalities globally. However, more alarming is the fact that about three quarters of these deaths occurred in low- and middle-income countries [1]. This calls for a critical need to devise strategies aimed at reducing prevalence and/or adverse impact of CVDs on people. Pakistan also struggles with the rising numbers of CVD cases and lacks a policy to prevent and manage it effectively. A lot of research literature has examined the role of psychological conditions like depression, anxiety, stress and hostility on the onset, progression and outcomes of CVD [2]. However, more recently, an increasing number of studies are also focusing on the positive psychological traits that lead to better health and influence positive self-care behaviors in CVD patients [3]. These traits are observed to be associated with lower CVD risk factors and conditions. A heightened sense of wellbeing is also associated with reduced risk of secondary cardiovascular events and mortality rates [4]. Psychological traits that have positive impact on mental and physical health include optimism, life satisfaction, hope, gratitude and emotional vitality. Amongst these traits, gratitude interventions are the ones observed to be most effective in cardiology practice. Gratitude is a positive emotional response that is

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characterized by an appreciation of positive aspects of life and a feeling of thankfulness for the received life benefits [5]. Growing gratitude research has demonstrated a wide range of benefits for CVD including better immunological and cardiovascular health. It is also associated with greater self-care and reduced disease discomfort [6]. Understanding the profound impact of gratitude on cardiovascular health is pivotal, yet studies investigating this relationship remain limited. Early research has indicated that individuals who attributed their heart attack to external factors are more likely to experience subsequent incidents, emphasizing the psychological dimension of cardiovascular health [7]. Further comprehensive reviews have underscored gratitude's potential in improving biomarkers associated with cardiovascular diseases. These studies collectively suggest that integrating gratitude into the self-care practices of cardiovascular disease patients may hold significant promise in enhancing their overall well-being and health outcomes [8]. Self-efficacy is an individual's confidence in his/her capability to achieve certain actions or behaviors necessary to accomplish desired results in managing their cardiovascular health. In the realm of cardiovascular health, self-efficacy emerges as a pivotal determinant of self-care behaviors among patients grappling with heart-related conditions. A series of studies have highlighted the profound impact of self-efficacy on various facets of cardiovascular management [9]. Research has indicated that higher levels of gratitude in individuals influence their self-efficacy and consequently reinforces treatment regimen specifically medication adherence in asymptomatic heart failure patients [10]. Similarly, studies emphasize that increased self-efficacy and understanding of one's condition significantly increases treatment compliance in patients with CVD. Literature has strongly highlighted the essential role of self-efficacy in practicing adherence to recommended treatment regimens and overall disease management in chronic diseases. All these findings demonstrate self-efficacy as an indispensable factor in shaping self-care behaviors and serve as a critical tool in enhancing the wellbeing and health outcomes in CVD patients [11]. Such valuable insights serve as a basis for holistic approach to cardiovascular care that includes not only medical interventions but also reinforcing self-efficacy to empower patients on their journey to better heart health. Self-care behaviors are a range of deliberate and proactive behaviors that people undertake for effective management of their condition and enhance their wellbeing. They include monitoring of vital functions, regular exercise, prescribed medication adherence, dietary modifications and timely interventions and medical care when needed [12]. As per recent empirical evidence, adherence to prescribed treatment regimen in CVD patients is largely influenced by perceived control, self-care confidence and disease knowledge in shaping adherence to recommended practices [13]. Strengthening of self-care behaviors for CVD patients is required for enhancing their quality of life and treatment outcomes [14]. Adherence to treatment regimen and self-care not only helps in stabilization of their condition but also lowers down the probability of repeated hospitalizations and complications. Moreover, self-care practices also empower the individuals in taking a proactive role in their health and adopting self-control in managing their disease. This underscores the need to effectively identify, promote and support self-care behaviors and make them a part of the care plan for CVD patients.

The current study aimed to examine the relationship between gratitude, self-efficacy and self-care behaviors in individuals having CVD. Furthermore, the study endeavored to uncover the predictive role of both self-efficacy and gratitude in influencing self-care behaviors within this context.

The current study aimed to examine the relationship between gratitude, self-efficacy and self-care behaviors in individuals having CVD. Furthermore, the study endeavored to uncover the predictive role of both self-efficacy and gratitude in influencing self-care behaviors within this context.

METHODS

The current study adopted a cross-sectional research design. Participants were selected based on specific variables of interest. The sample selection followed the non-probability purposive sampling approach. The total number of participants included in the study were 160 with age range of 40 to 60 years (M=49.79, SD=5.59). The sample size was determined by using the G power formula. The participants were recruited from the OPD of the hospital settings. The participants were taken from the District Head Quarter Hospital, Mianwali, Pakistan. The sample was drawn from the population of CVD patients who were having the disease for at least 6 months or above. The participants who were diagnosed with any psychological illness or refused to participate in the research or did not meet the inclusion criteria were excluded from the sample. After seeking consent, the participants were asked to fill the demographic sheet in which demographical information was required from the participants for instance age, gender, education, marital status, socioeconomic class, occupation, duration of disease and type of disease. The Gratitude Questionnaire Six Item form is a short self-report questionnaire which is used to assess the level of gratitude that people experience in their routine life activities. Individuals are asked to answer each

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of the six statements on a 7-point Likert scale ranging from (1= "strongly agree", 7= "strongly disagree"). To ensure appropriate responses, two of the six items are reversely scored. It has internal reliability between .82 and .87 [15]. The European Heart Failure Self-Care Behavior Scale (EHFScBs) consisting of nine items is a self-report standardized scale that assesses self-care behavior of patients with CVDs. The participants mark their response on a five point Likert scale from totally agree to totally disagree. Initially the EHFScBS consisted of 19-item which are now reduced to 12-item and 9-item version. It has good internal consistency reliability of .77 [16]. The General self-efficacy scale is a self-administered scale which is designed to assess perceived self-efficacy in the individuals while facing challenging daily life problems and stressful life events. It consists of 10-items on which the responses are made on a 4-point scale. It has the reliability ranging from .76 to .90 [17]. The study adhered to ethical standards throughout the execution. All participants provided informed consent, and we obtained necessary permissions to use the assessment tools. The study received ethical approval from the Convener, Research Ethics, Institutional Review Board of Lahore College for Women University vide letter no. ORIC/LCWU/19. The hospital authorities also granted approval for data collection on their premises. Before administering the scales, participants received a clear explanation of the study's purpose and nature. We assured them of complete confidentiality and explained that the acquired information would only be used for research purposes and informed consent was obtained. These steps were taken to maintain the ethical guidelines and integrity of the study and protect the rights of the participants. The data were analyzed using SPSS version 26. Frequencies and percentages were calculated for socio demographic and clinical characteristics of sample. Next, internal consistency reliability of the measures used in the study was done. Bivariate correlation was applied to examine the relationship among study variables and last, multiple linear regression was run to determine the predictive role of gratitude and self-efficacy on self-care behaviors.

RESULTS

Table 1 consists of details of demographic characteristics of the participants. The sample consisted of 160 cardiovascular patients including males (N = 79) and females (N = 81). The mean age of patients was 49.79. All of the participants were married (100%). Maximum number of participants' education level was primary (32.5%), and then matriculation (18.8%), graduate (18.8%), intermediate (16.3%), and middle (13.8%). Most of the participants belongs to middle class (136%), lower class (10%) and upper class (5%). 36.9% participants were working, 45.6% non-working, and 17.5% self-employed. Most common type of cardiovascular disease among the patients was heart failure (33.1%), then ischemic heart disease (24.4%), hypertension (19.4%), other (14.4%), angina (8.8%). Almost no participant come up with stroke. The duration of disease of most of the patients was more than one year (73.1%), and 26.9% had the duration from 6 months to 1 year.

Table 1: Demographic Characteristics of Participants (N=160)

Variables	F (%)
Age	
Mean ± SD	49.79 ± 5.59
Gender	
Male	79 (49.4)
Female	81 (50.6)
Education Level	
Primary	52 (32.5)
Middle	22 (13.8)
Matriculation	30 (18.8)
Intermediate	26 (16.3)
Graduation	30 (18.8)
Marital Status	
Married	160 (100)
Occupation	
Working	87 (54.4)
Not Working	73 (45.6)
Type of Disease	
Stroke	14 (8.8)
Angina	53 (33.1)
Heart Failure	31 (19.4)
Hypertension	39 (24.4)
Ischemic Heart Disease	23 (14.4)
Duration of Disease	
6 Months to 1 Year	43 (26.9)
More than One Year	117 (73.1)

Note: F = frequency, % = Percentage, SD = Standard Deviation

Table 2 gives details of the scales used in the study including number of items, mean, standard deviation and Cronbach's Alpha values of the study scales. All the scales were observed to have good reliability.

Table 2: Descriptive Statistics and Cronbach's Alpha of Study Scales (N=160)

Scales	N	Mean ± SD	α
Gratitude Questionnaire	6	33.54 ± 5.92	.85
Self-care Behaviors Scale	9	28.67 ± 4.25	.63
General Self-Efficacy Scale	10	30.33 ± 5.99	.87

Note: N = No. of items, α = Cronbach's alpha

It was hypothesized that there will be a significant relationship among self-efficacy, gratitude and self-care behaviors in individuals with cardiovascular disease. Results in table 3 show that there was a significant positive correlation between gratitude and self-efficacy (r=.69,

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p<.01), and self-care behaviors (r=.49, p<.01), which meant that the higher the gratitude among cardiovascular patients, the higher will be the self-efficacy and self-care behaviors among them. Moreover, there was a significant positive correlation between self-efficacy and self-care behaviors (r=.67, p<.01), which indicated that the higher the self-efficacy among cardiovascular patients, the more will they adhere to self-care behaviors. Furthermore, the result had shown a significant positive correlation between education and self-care behaviors among cardiovascular patients (r=.20, p<.05), which reflected that as the education increases, self-care behaviors also increases. It had also been shown that there was significant negative correlation between the duration of disease and self-care behaviors (r=-.17, p<.05), which indicated that as the duration of disease increases, the patients becomes less concerned about their self-care behaviors.

Table 3: Correlations among Study Variables (N=160)

Measures	Mean ± SD	1	2	3	4	5	6
Gratitude	33.54 ± 5.92	-	-	-	-	-	-
Self-Efficacy	30.33± 5.99	.69**	-	-	-	-	-
Self-Care Behaviors	28.67 ± 4.25	.49**	.67**	-	-	-	-
Age	49.79 ± 5.59	.09	-.04	.01	-	-	-
Education	2.75 ± 1.52	.07	.12	.20*	-.04	-	-
Duration of Disease	1.73 ± .44	-.17*	-.05	-.05	-.09	-.05	-

Note: SD = Standard Deviation
**p < .01, *p<.05

It was hypothesized that self-efficacy and gratitude will predict self-care behaviors in the patients with cardiovascular disease. Results in table 4 show the impact of gratitude, self-efficacy, age education, occupation and duration of disease on self-care behaviors among cardiovascular patients. The R2 value of .49 revealed that the predictor variables explained 49% variance in the outcome variable with F(2877.44) = 21.06, p<.001. The findings revealed self-efficacy as a significant positive predictor of self-care behaviors (β=.65, p<.001) whereas gratitude had no significant effect on self-care behaviors (β=.04, p>.05). It indicated that increase in self-efficacy will increase the self-care behaviors in cardiovascular patients. Moreover, education was seen to be the significant positive predictor of self-care behaviors (β=.52, p<.01), whereas age (β=, p>.05), occupation (β=, p>.05) and duration of disease (β=, p>.05) did not have any significant effect on self-care behaviors.

Table 4: Linear Regression on Gratitude and Self-Efficacy as Predictors of Self-Care Behaviors (N=160)

Measures	B	SE	β	R^2	F
Constant	-	1.49	9.84***		
Gratitude	.03	.06	.02		
Self-Efficacy	.65	.06	.46***		
Age	.04	.04	.03	.49	21.06
Education	.19	.18	.52**		
Occupation	.17	.36	.80		
Duration of Disease	.001	.57	.01		

Note: B = Unstandardized Beta, SE = Standard Error, β = Standardized Beta
***p < .001, **p<.01

DISCUSSION

The study aimed at finding the relationships between self-efficacy, gratitude, and self-care behaviors in individuals diagnosed with cardiovascular conditions. The study's findings revealed significant relationships among self-care behaviors, gratitude and self-efficacy. This finding is in line with similar studies and showed a relationship between gratitude and self-care behaviors like treatment adherence through self-efficacy [18]. Additionally, self-efficacy had a stronger relationship to self-care behaviors as compared to gratitude, emphasizing its importance in motivating individuals to engage in proactive health practices, a principle well-established in existing research [19]. Notably, self-efficacy also emerged as a significant predictor of self-care behaviors, underscoring its pivotal role in motivating proactive health practices. However, the relationship of gratitude with self-care behaviors was insignificant. This finding is inconsistent with most of the recent literature which have indicated a significant influence of gratitude on self-care in CVD [20]. However, there have been studies which didn't find any relationship between the two emphasizing the need for further exploration into potential moderating factors [21]. Our results indicate that perceived efficacy plays a significant role in shaping self-care behaviors related to CVD management. Specifically, it was found that individuals who had higher levels of efficacy beliefs engaged more in proactive self-care behaviors like dietary adjustments, medicine adherence, inclusion of physical activity in daily routine, and regular checking of vital functions [22]. This finding strengthens the previous literature that one's belief in one's ability to manage their disease efficiently is a significant factor of self-care behaviors in CVD. Self-efficacy beliefs served as a stronger predictor of behaviors related to self-care than gratitude or demographic variables [23]. This emphasizes the significance of psychological factors in influencing health-related behaviors and outcomes among individuals with CVD. Education was also found to be a significant predictor of self-care behaviors in CVD patients in our study. This is consistent with previous studies and indicate that higher levels of education are more likely to make the patients adopt better lifestyle and indulge in proactive behaviors like taking healthy diet, adhering to medication and other treatment regimen. It suggests that education has its

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significance in promoting health literacy, and facilitate informed decisions about positive health outcomes [24]. The results highlight the need for addressing self-efficacy beliefs for promotion of self-care behaviors among patients with CVD. Strategies like skills training and education that improve individuals' confidence in their ability to manage their condition should be incorporated by healthcare professionals. Our study also stresses the need to tailor interventions that could address barriers to self-care and facilitate positive health outcomes for patients with CVD. Empowering the individuals to manage their condition effectively would lead to reduced hospitalizations and utilization of healthcare services.

CONCLUSIONS

This study has advanced our understanding of the relationships between self-efficacy, gratitude and self-care behaviors in individuals with cardiovascular conditions. It indicated a significant relation among these variables and revealed self-efficacy to be a significant predictor of self-care behaviors in CVD. By shedding light on these intricate dynamics, the study contributes to the effectiveness of positive attributes and suggests use of more positive psychology interventions in this population for enhancing their overall health and well-being.

Authors Contribution

Conceptualization: SK, NM
Methodology: SK, NM, RMK
Formal analysis: NM, RMK
Writing-review and editing: SK, NM, RMK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Prevalence of Anemia in Community-Acquired Pneumonia Patients

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ABSTRACT

The frequency of anemia in intensive care units is well documented. Less is known, however, about the prevalence of anaemia in hospitalised patients with community-acquired pneumonia, which is one of the common reasons for hospitalisation, affecting both healthy and co-morbid individuals and is usually not accompanied with acute blood loss. **Objective:** To determine the frequency of anemia in patients presenting with pneumonia. **Methods:** This descriptive cross-sectional study was conducted with pneumonia patients at Department of Medicine Pulmonology in HDU/ICU Jinnah Hospital, Lahore curing thr period of three months. The 345 subjects with mean age 44.4 ± 9.4 (range: 20 – 60) years, male to female ratio 1:1.12, diagnosed with pneumonia underwent assessment of hemoglobin levels at presentation. Relationship between anemia and other co-morbidities has been evaluated that included duration of pneumonia, obesity, diabetes mellitus and hypertension. **Results:** The mean duration of pneumonia symptoms was 8.7 ± 6.9 (range: 2-25) days whereas the mean hemoglobin concentration was found 12.3 ± 6.9 g/dL ranged from 7.1 –14.6 g/dL. The prevalence of anemia was found to be 37.7% and 215(62.3%) of the 345 patients have shown normal hemoglobin levels. Female gender, higher age, greater duration of pneumonia symptoms and presence of diabetes mellitus significantly correlated with anemia in pneumonia (p-value < 0.05). Whereas, obesity did not have any significant effects on anemia in pneumonia (p-value > 0.05). **Conclusions:** Anemia was present in significant number of patients with pneumonia and was associated with female gender, Diabetes ,Hypertension and prolonged duration of pneumonia.

INTRODUCTION

Pneumonia is the most common cause of infectious disease-related morbidity and mortality despite advancements in microbiological diagnostic testing, antibiotic therapy, and preventive measures [1]. The main reasons behind the rise in global mortality are the effects of pneumonia on chronic illnesses, the ageing of the population, and the virulence features of the causing bacterium Other then iron, zinc and vitamin d deficiency also play role in weakening of human defence mechanisms [2].The most common cause of pneumonia is pnemococcal pneumonia. When selecting an antibiotic medication, clinicians face numerous obstacles due to the increasing prevalence of multidrug-resistant bacteria, hard-to-treat pathogens, and the emergence of novel diseases [3]. In developing nations, Acute Respiratory Tract (ARI) infections account for one in five childhood deaths; pneumonia causes 90% of these deaths. Severe Community Acquired Pneumonia (CAP) is more common in patients with underlying cardiac disease, lung diseases or previous hospitalization for pneumonia and the overall state of patients even get more worse when these patients became anemic. In vitro decreased red cell mass is associated with impaired phagocytic capacity and decreases cell mediated imunity [4]. Thirty percent of patients with Community Acquired Pneumonia (CAP) or pneumococcal pneumonia have been shown to have low haemoglobin levels [5]. Risk factors(clinical / laboratrical) associated with nosocomial pneumonia development in adult hospitalized patients are severe anemia, severe hypoalbuminemia, altered consciousness, and previous

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use of antibiotics [6]. Anemia's unexplained feature could indicate an underlying ailment or put a person at risk for infection. In the Pneumonia Severity Index (PSI), low hematocrit has been associated with a poor outcome for community-acquired pneumonia. According to the pneumonia prognosis, inpatient CAP patients frequently have low hematocrit and haemoglobin levels, associated with longer stay at hospital [7]. Han *et al.*, reported anemia (hemolytic type) in a patient with Mycoplasma pneumonia, after receiving antimicrobial therapy, lung lesions healed and haemoglobin levels increased [8]. The prevalenceof anaemia among hospitalised patients with less severe conditions or no organ dysfunction is less well-documented.

The current study aims to ascertain the prevalence of anemia and its potential function as a risk factor among hospitalised pneumonia patients.

METHODS

A descriptive cross-sectional study was carried out at the Medical floor, Pulmonology and HDU/ICU of Jinnah Hospital Lahore for a period of three months, after approval from the Ethical Review Board (ERB). The sample size of 345 cases was calculated using WHO Sample size calculator at 5% level of significance and 5% margin of error and 33.9% (97) expected percentage of anemia in pneumonia patients. The sampling was nonprobability, consecutive sampling. Male and female patients between the age of 20-60 years having pneumonia (as per operational definition) were included in the study. The study excludes cases of Cystic fibrosis, bronchiectasis, patients with comorbidities like Coronary Artery Disease (CAD), Chronic Liver Disease(CLD), Chronic Renal Failure (CRF) and bleeding disorders, previously diagnosed cases of brain tumor, tuberculous meningitis, viral or bacterial encephalitis or multiple sclerosis (based on history and medical record), Patients taking iron supplementation, Pregnant ladies and Patients not giving consent of participation. The patients admitted to the medical floor were selected as per inclusion and exclusion criteria. Confidentiality and anonymity-related issues were ensured. The data was collected on a self-designed preform formally approved by the Intuitional Ethical Review Committee. After informed consent the collected venous blood 3 ml samples were sent to the central laboratory of Jinnah Hospital Lahore to determine the hemoglobin levels to diagnose anemia within 24 hours of admission in hospital. The data was collected, compiled and analyzed statistically using SPSS. In order to determine the mean and standard deviation quantitative variables like age, symptom durations, and haemoglobin levels were used. For qualitative variables such as gender, diabetes, hypertension, anaemia (yes/no), frequencies and percentages were computed. Stratification was used to control effect modifiers like age, gender, diabetes, hypertension, aetiology, residential status, and length of symptoms. To investigate the impact on result, the post-stratification chi-square test was implemented. A p-value equal or less than 0.05 was considered as statistically significant.

RESULTS

The table 1 represents the age distribution of population (345 subjects) in the study with average age 44.4 ± 9.4 (range: 20 – 60) years. The highest number of patients were in the age group 41 – 50 years i.e., 165 (47.8%) with male to female ratio 1:1.12.

Table 1: Age Distribution of The Study Population

Age Groups (Years)	Number Of Subjects N (%)
21 – 30	21 (3.1%)
31 – 40	69 (20%)
41 – 50	165 (47.8%)
51 – 60	90 (26.1%)
Total	345 (100%)
Mean Age: 44.4 ± 9.4 years, Range: 20-60 years	

The mean duration of pneumonia symptoms in under investigation population was 8.7 ± 6.9 (full range 2 - 25) days. Majority (29.9%) of the patients fell in the duration of symptom group from 6 -10 days. Forty patients (11.6%) presented to us with pneumonia symptoms prevailing for more than 21 days. Table 2 represents the stratification of patients on basis of presence and absence of obesity, diabetes mellitus and hypertension. The 130 (37.7%) patients were identified to be obese whereas 215 (62.3%) did not fulfill the criteria of being obese. Similarly, 160 (46.3%) of the patients suffered from diabetes mellitus whereas 185 (53.7%) gave negative history about diabetes mellitus. In case of hypertension, 153 (44.3%) of the patients were hypertensive whereas 192 (55.7%) were normotensives.

Table 2: Stratification of Patients Based on Presence or Absence of Obesity, Diabetes Mellitus and Hypertension

Presence (Yes/No)	N (%)
Obesity	
Yes	130 (37.7%)
No	215 (62.3%)
Diabetes Mellitus	
Yes	160 (46.3%)
No	185 (53.7%)
Hypertension	
Yes	153 (44.3%)
No	192 (55.7%)

The average hemoglobin concentration value 12.3 ± 6.9 g/dL was observed for the patients under observation. The details readings are listed in Table 3.

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Table 3: Hemoglobin Concentration of our Study Population

Hemoglobin (g/dL)	Number of Patients N (%)
≤ 10	10 (2.9%)
10.1 – 11.0	22 (6.4%)
11.1 – 12.0	98 (28.4%)
12.1 – 13.0	150 (43.5%)
> 13.0	65 (18.8%)

Mean Hemoglobin Levels: 12.3 ± 6.9 g/dL, Range: 7.1 – 14.6 g/dL

The prevalence of anemia was found 37.7% whereas 215 (62.3%) of the patients shown normal hemoglobin levels. The stratification of pneumonia patients with anemia diagnosis in context of age group are listed in Table 4. The data in Table 4 presents the effect of age to the prevalence of anemia. Maximum numbers of patients with anemia were in the age group 51-60 years. The 55 (61.1%) pneumonia patients were suffering from anemia in this age group. As far as effect of gender is concerned, the female population showed significantly higher prevalence of anemia than male population 80 (42.6%) in females versus 50 (31.8%) in males and the effect was statistically significant (p-value < 0.05).

Table 4: Relationship Between Anemia and age of The Pneumonia Patients

Age Groups (Years)	Anemia		Number of Subjects (n = 345) N (%)	p-Value
	Yes N (%)	No N (%)		
20 – 30	5 (23.80)	16 (76.10)	21 (6.1%)	0.0589
31 – 40	21 (30.00)	48 (70.00)	69 (20%)	
41 – 50	49 (29.00)	116 (71.00)	165 (47.8%)	
51 – 60	55 (61.00)	45 (39.00)	90 (26.1%)	
Total	130 (37.00)	215 (63.00)	345 (100%)	

Similarly, another statistical significance was observed in the relationship between anemia, in pneumonia patients, and duration of pneumonia symptoms. With increasing duration of pneumonia, lower values of hemoglobin were recorded giving a p-value of 0.00031 as depicted in Table 5.

Table 5: Relationship Between Duration of Symptoms of Pneumonia with Anemia

Age Groups (Years)	Anemia		Number of Subjects (n = 345) N (%)	p-Value
	Yes N (%)	No N (%)		
0 – 5	9 (10.00)	75 (90.00)	84 (24.3%)	0.00031
6 – 10	40 (38.00)	63 (62.00)	103 (29.9%)	
11 – 15	30 (46.00)	35 (54.00)	65 (18.8%)	
16 – 20	26 (49.00)	27 (51.00)	53 (15.4%)	
>20	25 (62.00)	15 (38.00)	40 (11.6%)	
Total	130 (37.00)	215 (63.00)	345 (100%)	

Amongst diabetes, hypertension and obesity, diabetes and hypertension has shown significantly higher prevalence of anemia in pneumonia patients whereas obesity did not reveal any statistically significant relationship with anemia in pneumonia patients as represented in Table 6.

Table 6: Stratification of Anemia in Patients with Respect to Obesity, Diabetes Mellitus and Hypertension

Diseases	Presence (Yes/No)	Anemia		p-Value
		Present N (%)	Absent N (%)	
Obesity	Yes	37.00 (37.7%)	63.00	0.0708
	No	38.00 (62.3%)	62.00	
Diabetes Mellitus	Yes	31.00 (69%)	69.00	0.0042
	No	43.00 (57.7%)	57.00	
Hypertension	Yes	36.00 (64%)	64.00	0.0241
	No	38.00 (55.7%)	62.00	

DISCUSSION

Community Acquired Pneumonia is a leading cause of admissions on medical floor [9]. Anemia can hamper the recovery of pneumonia patients and can be fetal at times. Low hemoglobin concentration has been linked to mortality risk in studies involving CAP patients [10]. There is growing intrest in hemoglobin levels of a person and its deficiency in nutrition and clinical medicine because of its crucial role in celluar function, energy metabolism and innate immunity [11]. it has been observed that a few studies have evaluated impact of baseline hemoglobin levels on different infection or overall imunity of humans.in a meta –analysis. [12] said that hemoglobin levels decrease with increasing age, diabetes, hypertension and with comorbidities and all these are risk factors for developing community acquired pneumonia. According to WHO criteria (Hb <12g/dl in females and <13g/dl in males), the prevalence of anaemia in the general population is 2.9% in men and 7.5% in women; among the elderly,the overall prevalence of anemia was 15.2% (15). Using an optimistic threshold of 12 g/dL for each gender, the results of our study discovered a significantly higher prevalence of anaemia than the overall population. The prevalence of anemia in community acquired pneumoniain our study is 37.7% Taking into account that anaemia is known to be linked to diminished mental and physical capacities as well as an increased risk of death, with each 1 g/dL rise in hemoglobin leads to 6% decrease in frailty [13]. Another study showed that 7–12% of patients had anaemia at presentation [7]. This ratio does not match those found in our investigation. Although Doshi *et al.*, in his study noted low hemoglobin in upto 30% of patients with CAP pnemococal pneumonia [4]. In another study Yanjun *et al.*, says that anemia wih low albumin is associated with severe community acquired pneumonia in pregnant ladies [14]. According to another study, the rapid decrease in haemoglobin levels that took place during the initial few days of the patient's hospital stay is consistent with reported values for intensive care unit patients [15, 16]. When these individuals are not bleeding, their haemoglobin levels can decrease by more than 0.5 g/dL/day. In addition to the dilutional effects of fluids and repeated blood draws,

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there are a number of other possible causes of these low readings, including gastrointestinal stress haemorrhage, surgical procedures, inflammatory cytokine effects, insufficient red cell production, and excessive red cell death [16]. Similar to our research, a study conducted by Michael C *et al.*, in 2010 [17] affirms their conclusion that anaemia was prevalent in hospitalized cases of community-acquired pneumonia (CAP). This was the case not only in patients with severe illness or risk factors for anaemia but also in patients with mild illness and a lack of risk factors. They also state that the development of anaemia was independently related to higher mortality after 90 days in patients with moderate to severe anaemia. However, further research has to be done to determine whether or not the treatment or prevention of CAP-associated anaemia might result in better clinical results. In line with our findings, where patients with diabetes mellitus had a significantly higher prevalence of anaemia in pneumonia, a study conducted by Sijun *et al.*, in September 2020 concluded that the parameter of diabetes mellitus and other comorbidities should be recognized in clinical practice, with active interventions to improve treatment success rates and clinical decision-making guidance [18]. According to a similar study conducted in 2021 by Dong *et al.*, individuals with Type-2 diabetes mellitus (T2DM) who have Severe Community-Acquired Pneumonia (SCAP) had different clinical features including anmia and a greater death rate compared to people without diabetes [19].Another study on the prevalence of anaemia in children, conducted in Bangladesh in 2022 by Mohammod *et al.*, reveals that 1712 (49.4%) of the 3,468 children who were diagnosed with pneumonia also had anaemia [20]. This finding supports the notion that anaemia is not exclusively prevalent among adults with pneumonia; minors also exhibit a similar pattern

CONCLUSIONS

Anemia is significantly prevalent in patients with community acquired pneumonia. The presence of anemia is more related to female gender, hypertension, duration of symptoms of pneumonia and presence of diabetes mellitus. Health policies on anemia screening should be employed to all pneumonia patients to avoid the adverse outcomes associated with anemia in pneumonia. Patients. Recognition, assessment, and management of anemia amongst this vulnerable population should me implemented.

Authors Contribution

Conceptualization: SS
Methodology: MUY
Formal analysis: SS[1], AG, SS[2], AA, MA
Writing, review and editing: SS, MUY

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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