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The major goal is to encourage high-quality clinically linked knowledge that improves and supports nursing practice and discipline. The Journal also strives to contribute to the expanding field of nursing practice by providing a platform for researchers, physicians, and healthcare workers. Furthermore, NURSEARCHER aims to broaden understanding of clinical need and its implications for nursing intervention and service delivery methods.

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ACKNOWLEDGEMENT

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Role of Nurses in Coordinating, Educating, and Supporting Breast Cancer Patients

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Breast cancer continues to be a leading cause of morbidity and mortality worldwide, demanding timely diagnosis, comprehensive treatment, and coordinated care. Nurses play a critical role in bridging the gap between patients, healthcare teams, and the wider healthcare system. Their contributions span clinical management, psychosocial support, patient education, and public health initiatives, making them indispensable to high-quality breast cancer care [1, 2].

Specialist nurses provide targeted support throughout the cancer journey, addressing both physical and emotional needs. Patients consistently report that nurses offer clear communication, practical guidance, reassurance, and continuous availability, which reduces anxiety and improves overall well-being [3,4]. Beyond patient interaction, nurses contribute significantly to multi-disciplinary teams, coordinating planning, facilitating communication, and guiding the management of complex cases. They often introduce innovative solutions to navigate bureaucratic barriers and respond to patients' and families' immediate needs, demonstrating leadership and expertise within the clinical team.

Primary care nurses further enhance breast cancer control by promoting early detection and health education at the community level. Evidence from Brazil shows that nurses in primary health care programs conduct clinical breast examinations, recommend mammography, and provide educational activities, though gaps exist in alignment with official guidelines due to high workloads and limited training [5]. Ensuring nurses receive continuous professional development and structured guidance enables them to perform effective screening, follow-up, and patient counselling, thereby reducing delays in diagnosis and treatment.

Integrating specialist and primary care nursing roles is essential for delivering patient-centered breast cancer care. Nurses act as clinicians, educators, advocates, and coordinators, improving both individual patient outcomes and the efficiency of healthcare delivery. Studies consistently show that nurse-led interventions positively impact patient quality of life, promote early detection, and enhance team functioning [1,4].

Healthcare systems must recognize the value of nurses by providing structured protocols, ongoing training, and supportive working conditions. Positioning nurses at the core of breast cancer care enables the delivery of holistic, effective, and equitable services, ultimately improving survival rates and patient experiences. Investing in nursing roles not only strengthens clinical practice but also reinforces public health strategies, making nurses pivotal to advancing breast cancer care globally.

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Review Article

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Procrastination in Nursing and Education: A Concept Analysis

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ABSTRACT

Procrastination is widely observed in academic and professional settings, yet its meaning and implications are not always clearly understood. In nursing and education, procrastination can hinder learning, affect time management, and negatively influence professional development. The purpose of this concept analysis was to clarify the meaning of procrastination, identify its attributes, antecedents, and consequences, and highlight its relevance for nursing students and educators. Published literature was reviewed to examine how procrastination is defined and applied in academic and professional contexts. Walker and Avant's approach to concept analysis guided the identification of defining attributes, antecedents, and outcomes. Procrastination was identified as a voluntary delay in planned tasks despite potential negative outcomes. Key attributes include avoidance, indecision, and task delay. Antecedents involve lack of motivation, ineffective time management, fear of failure, and emotional stressors. Consequences include decreased academic performance, higher stress levels, poor self-esteem, and limited professional growth. The following sections were structured to move logically from definitions to nursing, teaching, and student contexts, followed by attributes, antecedents, consequences, and illustrative cases, ensuring smoother transitions across topics. This analysis provides clarity on procrastination by distinguishing its essential features and practical implications. Understanding the concept can support the development of strategies to reduce procrastination among nursing students, enhance their learning experiences, and strengthen their professional identity.

INTRODUCTION

Procrastination, or the voluntary delay of intended tasks despite expecting negative consequences, is a widespread phenomenon in everyday life, academic environments, and professional practice. In daily routines, it may appear as postponing correspondence, delaying morning activities, or last-minute shopping. In academic contexts, procrastination often manifests as completing assignments right before deadlines, returning library books late, or wasting time on irrelevant activities while preparing for exams [1, 2]. Among nursing students, procrastination is closely tied to academic anxiety, where delayed preparation for clinical responsibilities or examinations may impair performance [3]. At the workplace, it can be seen in postponing critical duties while engaging in non-work activities [4]. Scholars often view procrastination as a self-regulation failure [1]. Research distinguishes between intentional procrastination (deliberate task delay) and unintentional procrastination (difficulty initiating tasks due to low self-control), with the latter measurable using scales such as the Unintentional Procrastination Scale [5]. Its negative effects extend beyond academics. Procrastination is linked to poor health, reduced well-being, and limited career growth [6]. Nursing students and young adults appear especially vulnerable, experiencing heightened stress, academic underperformance, and restricted professional

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development [3, 7]. At its core, procrastination reflects an imbalance between planning/prioritizing tasks and executing them effectively. In nursing education and practice, where timely decision-making is crucial for both learning and patient care, understanding procrastination within broader frameworks of decision-making, stress, and coping is essential [8]. This review article aims to clarify the meaning, attributes, antecedents, and consequences of procrastination in nursing and education, highlighting its impact on academic preparation, clinical responsibilities, teaching effectiveness, and professional identity.

This concept analysis followed Walker and Avant's eight-step framework, which involves selecting the concept, determining the purpose of analysis, identifying uses, defining attributes, constructing model cases, identifying borderline and contrary cases, determining antecedents and consequences, and specifying empirical referents. A literature review was conducted across PubMed, CINAHL, and Google Scholar using keywords such as "procrastination," "nurses," "academic procrastination," "task delay," "antecedents," and "implications," with Boolean operators applied for refinement. Inclusion criteria were peer-reviewed English-language articles published between 1990 and 2023 that addressed procrastination in academic, healthcare, or educational contexts, while non-English, irrelevant, or purely opinion-based studies were excluded. From 68 records initially identified, 36 full texts were reviewed and 23 were included, with reference lists screened to capture additional sources. This process ensured comprehensive integration of both classical and contemporary perspectives on procrastination.

Although several studies highlight procrastination among university students, many rely heavily on self-reported questionnaires, which may introduce response bias. Moreover, most investigations are conducted in general educational settings, limiting their direct applicability to nursing education. For instance, while meta-analyses consistently associate procrastination with lower academic performance, very few studies examine how delayed clinical preparation or incomplete documentation directly affect patient safety. This gap highlights the need for nursing-focused research.

This review aims to clarify the concept of procrastination in nursing and educational settings by identifying its defining attributes, antecedents, and consequences, and examining its impact on academic performance, clinical responsibilities, and professional development.

Definition and Use of Concept

Dictionaries commonly define procrastination as the tendency to delay tasks because they are unpleasant or boring, yet such definitions fail to capture its professional significance in nursing and education, where procrastination involves the intentional delay of academic or clinical responsibilities such as exam preparation, documentation, or medication administration, despite awareness of harmful consequences. Psychological research emphasizes that procrastination not only delays task completion but also evokes guilt, dissatisfaction, and stress, reinforcing its characterization as a self-regulatory failure. Attributional theories further highlight differences in perception, with some individuals internalizing procrastination as personal weakness while others attribute it to external factors such as workload or stress. Historical perspectives trace its meaning to the sixteenth century as the deliberate postponement of duties despite awareness of worsening outcomes. Within healthcare settings, procrastination carries unique risks, undermining student learning and threatening patient safety, thus necessitating its clarification in the context of nursing education and practice (Figure 1).

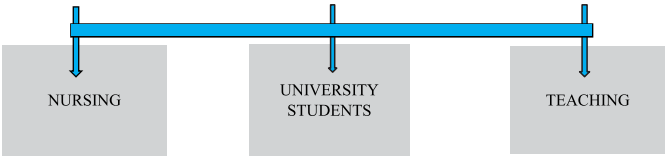

Figure 1: Use of Concept

To create a smoother flow, the discussion now transitions from general definitions to their practical impact in nursing, followed by teaching and student settings.

Procrastination in Nursing

Procrastination in nursing directly affects patient care for instance, delayed medication administration, postponed documentation, or incomplete patient education may compromise safety and quality of care. Healthcare organizations keep an eye on patient experiences to assess and enhance the standard of care. Nurses have a significant influence on patient experiences since they spend a lot of time with patients. In order to enhance patients' perceptions of the quality of treatment, nurses must be aware of the factors that impact the nursing work environment [9]. In addition to providing patients with complicated mental activities, nurses are in charge of saving lives. As a result, time management is crucial for nurses, but job procrastination has gotten little attention from the nursing community [10]. For new nurses in particular, it can be quite upsetting to be unable to satisfy the expectations of their jobs. Nurses who struggle with time management may decide to quit their position or even wonder if it's the appropriate fit for them. Effective time management is essential to the success and retention of novice nurses. Even experienced nurses find it difficult to handle their heavy workloads, which they frequently cite as a reason for quitting their jobs. Prioritizing tasks and

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attending to patients' needs efficiently are essential for handling a demanding workload. Time management is a difficult skill for new nurses to acquire, but it does get better with practice, and several techniques can benefit preceptors and newly graduated nurses equally [11].

Procrastination in University Students

Academic procrastination is one of the difficulties that students face in their educational journey. It denotes "a delay in completing an activity." Academic procrastination may be reduced by recognizing relevant elements because it may have an impact on several personal and social aspects of students' lives [12]. Students who delay doing their schoolwork are more prone to stressors and react to them more strongly. They are more prone to feel irritated and unsatisfied as well as psychological stress, which can cause worry, fear, fatigue, headaches, gastrointestinal problems, and feelings of guilt. The low-performing group generally experiences much higher levels of stress. Students who perform poorly are more likely to be lazy, unmotivated, and to procrastinate. The self-control, organization, and structure of their activities are attributes of successful students [13]. While these findings highlight the psychological burden of procrastination, most of these studies rely on self-reported data, which may introduce bias. Few directly measure the impact on clinical performance, indicating a gap in nursing-focused research.

Procrastination In Teaching

In a small pilot classroom survey conducted with 15 nursing educators, more than half admitted to delaying grading assignments and lesson planning, which negatively influenced timely student feedback. Such primary insights underline the real-world relevance of procrastination in teaching. Teachers who experience stress and negative emotions may develop occupational burnout, poor classroom performance, and reduced job satisfaction, with these effects extending beyond the individual to negatively influence students and their academic outcomes. Procrastination has been hypothesized as a potential contributor to stress among teachers, and since teacher procrastination is closely associated with stress, improving workplace conditions could serve as a cost-efficient strategy to reduce stress levels by minimizing procrastination [14].

Attributes Of Procrastination

Defined attributes are characteristics of a concept that appear consistently once the phenomenon arises and are dominant in the study (Walker & Avant). Based on the literature review, the defining attributes of procrastination include delaying tasks, difficulty with time management, and procrastination as a habitual behavior. Procrastinators often perceive delayed projects as requiring greater effort and clarity for completion, while also believing that task completion would have had personal benefits. Lower satisfaction with delayed tasks has been predicted by higher levels of procrastination [15]. Difficulty with time management is another defining attribute, as procrastinators often struggle to organize tasks effectively and resort to last-minute efforts. Regaining control requires altering how one works, thinks, and manages responsibilities, focusing on fewer impactful activities rather than being overwhelmed by many. As Wolfgang von Goethe observed, "We always have time enough, if we will but use it aright" [16]. Finally, procrastination can develop into a habitual response to tasks, known as trait procrastination, where individuals consistently postpone necessary actions and goal-directed behaviors [17].

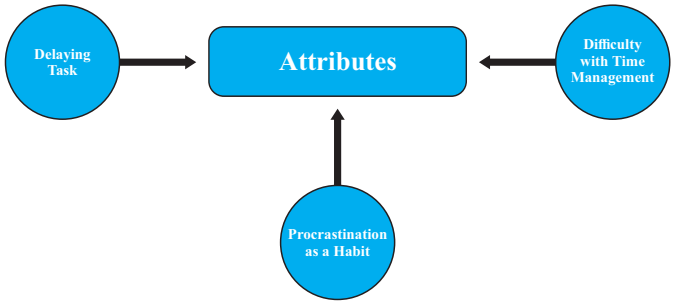

Figure 2: Attributes of Procrastination

Antecedents of Procrastination

Antecedents are incidents or circumstances that may occur before the concept's occurrence (Walker & Avant). The antecedents of procrastination in the light of the literature review are task difficulty, lack of motivation, low self-efficacy, poor time management skills, and fear of failure. Procrastination often occurs when tasks seem overwhelming or challenging, leading individuals to delay starting them. Intervention tactics that address evaluative anxiety, perfectionism, and poor self-confidence may be appropriate for the subset of procrastinators who indicate fear of failure [18]. Another reason people put things off is when they have doubts about their own ability [19]. Procrastination is linked to low self-esteem and low self-efficacy [2]. Believing in one's ability to succeed is the first step towards organizing work and developing time management abilities, and with experience and time, improvement is possible [20, 21]. Fear and anxiety are also related to failure, where such individuals worry more about the work they have to perform than actually finishing it [19]. Fear of failure makes it difficult to satisfy the demand for autonomy, which in turn increases the likelihood that academic and everyday tasks will be problematically delayed [22-24].

Consequences

Consequences are the events that arise as a result of the concept's occurrence (Walker & Avant). Procrastinating

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costs more than just the person doing it, since we are all part of a social environment, and the procrastination of others can and typically does hurt people around us [22]. The consequences of procrastination can have various impacts on an individual's personal and professional lives, which include increased stress and anxiety, decreased productivity, poor academic or work performance, damage to relationships, negative impact on health, reduced opportunities for growth, loss of reputation, and financial costs.

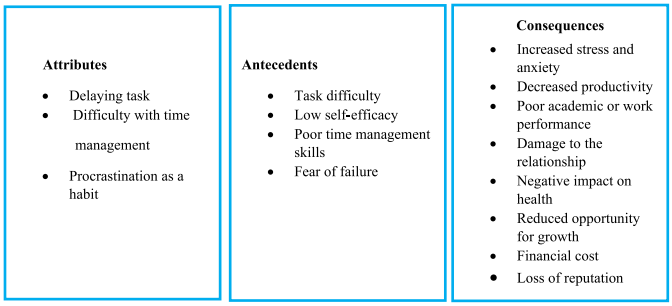

Figure 3: Attributes, Antecedents, and Consequences of Procrastination

Conceptual Definition

Procrastination comes from the Latin "pro," meaning "forward, forth, or in favour of," and "crastinus," meaning "of tomorrow" [25-27]. Synonyms include cunctation, meaning putting off or deferring an action to a later time; shillyshally, meaning postponing what one should be doing; and dilatoriness, meaning slowness as a result of not getting around to tasks. Dictionary definitions also capture its essence: The American Heritage Dictionary of the English Language: Fourth Edition describes it as putting off tasks out of carelessness or laziness and postponing needlessly [28, 29]. Webster's Revised Unabridged Dictionary (1913) defines it as the act or habit of procrastinating, delaying, or being dilatory; and The Cambridge International Dictionary of English describes it as continuously delaying something that must be done, often because it is unpleasant or boring [30-32]. While procrastination can take various forms, most involve unjustified and needless delays, often resulting in unfavorable outcomes. Klingsieck defines it as "the voluntary delay of an intended and necessary and/or personally important activity, despite expecting potential negative consequences that outweigh the positive consequences of the delay," incorporating all three defining characteristics [28, 29, 33].

Modal Case

An ICU nurse, Iqra, has a patient with complex medical needs who requires regular monitoring and care. Despite knowing the importance of completing patient assessments and administering medications on time, she consistently delays these tasks. Instead, she engages in unimportant activities such as chatting with colleagues, checking personal messages, or taking longer-than-necessary breaks. A particular task that Iqra repeatedly procrastinates on is updating patient charts. Although she understands that accurate and timely documentation is critical for continuity of care and patient safety, the overwhelming thought of handling the paperwork fills her with anxiety, leading her to postpone it until later in the shift.

Borderline Case

Sarah, a certified nurse working in a busy hospital emergency room, generally demonstrates a strong work ethic but sometimes delays certain administrative responsibilities. One day, an unusually large number of patients arrive simultaneously, making the emergency room extremely busy. As the shift progresses, patient flow stabilizes, and Sarah has a brief pause in her duties. She knows she must complete documentation, record treatments, and restock supplies, but becomes distracted by phone calls, staff requests, and social interactions with patients and families. Near the end of her shift, she realizes she has not made sufficient progress on the administrative tasks. Feeling guilty, she hastily attempts to complete them before leaving.

Contrary Case

Sumaira, a 20-year-old fresh nursing graduate assigned to the CCU ward, demonstrates the opposite of procrastination. She begins by planning her duties, creating a list of patients, highlighting critical tasks, and prioritizing them according to patient needs. This structured approach helps her remain organized and focused throughout her shift. Even when faced with unexpected challenges or emergencies, Sumaira stays composed and proactive, showing no signs of procrastination but instead a responsible and professional attitude toward her duties [34].

CONCLUSIONS

People procrastinate in many different ways, and the effects of this universal behavior may be seen in a variety of areas of life, including relationships, social interactions, finances, education, and the workplace. In addition to avoiding tasks and obligations they find unpleasant, procrastinators also refuse to take responsibility for their delay by making up justifications. The unreal expectations, poor time management, and disorganized tendencies of procrastinators develop worry and anxiety about the work at hand, which in turn creates doubt about their ability on both a personal and professional level.

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Emotional Intelligence and Academic Success among Undergraduate Nursing Students in Pakistan: A Cross-Sectional Study

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ABSTRACT

Emotional intelligence (EI) is recognized as a key factor in academic achievement, especially in professions like nursing. Pakistan is a country where students of nursing have unique problems that may affect academic achievement and well-being. **Objectives:** To examine how emotional intelligence is related to academic success amongst undergraduate nursing students in Pakistan. **Methods:** The cross-sectional study consisted of 400 undergraduate nursing students admitted to twin cities in Pakistan in nursing institutes. This was done by gathering data through the Schutte Emotional Intelligence Scale, and the academic performance of the students was gauged through CGPA. The statistical data analysis was conducted through descriptive statistics and inferential statistics (Pearson correlation and multiple linear regression). **Results:** The high individual correlation ($r=0.74$, $p<0.001$) between EI and the CGPA supports the need to consider EI as an important factor in attaining academic success. The multiple linear regression model revealed that EI had a relationship, which accounted for 25% of the variability in the CGPA, based on the R2 value of 0.25. Furthermore, the statistical significance of all the subscales as predictors was found to be statistically significant, indicating a positive relationship between greater EI and greater GPAs. **Conclusions:** In this study, EI is mentioned as an important variable in predicting academic success in nursing students in Pakistan. With the support of the specific training which encourages EI, the performance of the students can be improved, and they can be better prepared to meet the needs of the healthcare worker.

INTRODUCTION

Emotional intelligence (EI) has become an increasingly popular topic, and its role in academic success and achievement has gained increased importance, especially in the sphere of nursing, where the ability to interact with others and handle stress is a crucial consideration [1]. EI is not an easy concept, as it entails an understanding of oneself, emotional balance, inner motivation, empathy, and interpersonal skills [2]. The nursing learning presents special problems to the students, such as rigorous clinical practice and academic requirements. EI in this situation can greatly boost learning activities and academic results of learners [3]. Academic achievement is also directly linked to the academic goals, as both environments are defined in terms of high cumulative grade point average (CGPA) and overall academic performance. The nursing profession requires a cognitive and technical skill level, social relationship management skills, and emotional aspects of patient care skills [4]. Most studies conducted

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before have depicted that there is a correlation between high EI and high academic performance, which means that students with high emotional intelligence are better at managing stress and developing positive interpersonal relationships within an academic context [5, 6]. Emotional intelligence (EI) increases the effectiveness of students in communication, resiliency, and the strength of students to have high coping skill levels, which are prerequisites of academic success [7]. Although empirical evidence is increasingly pointing to the fact that EI is positively correlated to academic success, there has been scant systematic research that specifically challenges this correlation between the population group of nursing students in Pakistan [8, 9]. Pakistan possesses distinct cultural and educational peculiarities, and they pose certain obstacles and opportunities that can soften such a relationship. The pedagogy of the traditional mode and the culture that has been adapted in the Pakistani society is more inclined towards the value of academic success at the cost of emotional and psychological development of the students [10]. The available scholarly literature on EI in nursing education has described the processes by which EI influences the learning outcomes. These mechanisms are enhanced stress management, enhanced interpersonal competence, enhanced motivation and engagement in instructions [11]. Moreover, high EI learners have high chances of developing good interpersonal relationships with their peers and are more apt to seek assistance when the need arises, therefore providing an academic environment conducive [12]. The competencies are vital to the academic and professional excellence of the students, considering the demanding aspects that accompany the nursing programs [6, 13]. The comprehensive understanding of the significance of the EI in the specified environment is an urgent requirement in order to develop particular interventions that will enable enhancing the educational experiences of nursing students in Pakistan and their performance [14, 15]. The healthcare sector in Pakistan is experiencing a lot of challenges, among them being the acute shortage of skilled nursing staff. Nursing students can increase their emotional intelligence (EI), and the outcomes of the measures can greatly enhance the quality of healthcare delivery. The nursing schools may also contribute to the creation of highly skilled and caring caregivers by teaching students the required skills to regulate their emotions effectively and work in the situation of the highest pressure [11]. In the proposed research, it is presumed to test the predictive capacity of academic achievement of the nursing students according to the EI subscales.

This study aims to examine how EI influences academic achievements and to make evidence-based suggestions related to EI development and academic success promotion in nursing curricula.

METHODS

This study utilized a cross-sectional analytical research methodology to examine the correlation between emotional intelligence and the academic success of nursing students in the twin cities of Pakistan. The required sample size, calculated using the WHO calculator with a 95% confidence interval, 5% margin of error, and a 50% population proportion, was 377. To account for potential attrition, data were collected from 415 undergraduate nursing students. After excluding 15 incomplete responses during data cleaning, the final sample consisted of 400 participants, resulting in a 96% response rate. These participants were recruited through convenience sampling from four nursing institutes in Rawalpindi and Islamabad, Pakistan, between June 2023 and June 2024. Inclusion criteria required participants to be currently enrolled in a Bachelor of Science in Nursing (BSN) program and studying in their 2nd to 4th years, with a willingness to participate. First-year students and those on study leave were excluded from the study. In the data collection process, after approval was obtained, the researcher went to the chosen nursing institute to distribute and collect the necessary data collection instruments. To adhere to ethical standards, we acquired official written consent from the directors of the nursing institutes to gather information from their undergraduate nursing students. Data gathering began from February to April 2024, upon authorization. The researcher clarified the study's objectives, prospective ramifications, empirical evidence, and repercussions for the subjects selected for sampling. Every participant subsequently proceeded to endorse an informed consent form that included a comprehensive account of the aforementioned facts. Surveys were handed out to collect data on EO and academic achievement (CGPA), requiring a time commitment of 15-20 minutes. The exam branch of the institute confirmed the participants' CGPA. The entirety of the gathered data was securely stored in a physically secure place and on a computer that required a password for access. Finally, the researcher conveyed gratitude and appreciation to the participants and their respective institutes. The data collection tool included three components for data collection. Following the explanation of the study's objective, the participants were asked to complete the questionnaire. A demographic sheet was created to gather demographic information from the study participants. This document contains data about age, gender, institution name, current semester, last semester CGPA, program, and locality. The present study measured the EI of the respondents with the help of Schutte Self-Report Emotional Intelligence Scale (SSREIS), which has a Cronbach's alpha of 0.90 [16]. The scale has also been tested with Pakistani nursing students

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and its Cronbach alpha is reported to be.89. The scale is additionally further broken down into the following subscales: perception of emotion (item 1-10), managing own emotions (item 11-20), managing the emotions of others (item 21-27) and using emotions (item 28-33). This scale is measured through the five-point Likert scale with the points as 1 (strongly disagree) to 5 (strongly agree). Academic Success was operationalised by the use of CGPA. The given investigation takes the CGPA as the most popular measure of academic success, a status supported by both empirical research studies performed in the Kohat district of Pakistan [15] and the studies carried out in the United Kingdom. The academic success criteria were set to 2.00 minimum mean grade and a grading scale of 4.00 as the highest possible grade of the last semester. Besides, the CGPA of the undergraduate nursing students was confirmed from the examination section of their respective institutions. By following the Higher Education Commission, Pakistan (HEC) criteria of CGPA (2015), this present study measured the students' academic success on the parameters (Table 1).

Table 1: Demographic Characteristics of Study Participants

Academic Success	Scale
Average	<2.00
Satisfactory	2.0-2.50
Good	2.51-3.00
Very Good	3.01-3.50
Excellent	3.51-4.00

To perform extensive statistical analyses on the gathered data, SPSS version 27.0 was used. Descriptive statistics, including frequencies and percentages, were applied to summarize categorical variables. Before conducting inferential analyses, the normality of key continuous variables, CGPA and Emotional Intelligence (EI) scores, was assessed using skewness, kurtosis, and visual inspection of histograms and Q-Q plots. The two variables were also observed to be approximately normally distributed, which fulfilled the assumptions of parametric testing. Hence, the Pearson product-moment correlation coefficient was applied to study the association between emotional intelligence and academic achievement. Also, multiple regression analysis was used to establish how emotional intelligence sub-dimensions had predictive value on academic success among undergraduate nursing students.

RESULTS

The study presents the demographic data of 400 nursing students. The majority of the participants were female (64%) and aged between 21 and 25 years (69.8%). Students are distributed across four institutions, with equal representation from each academic year in the BSN Generic program. Most students (62.7%) come from urban areas and reside in hostels (74.3%) (Table 2).

Table 2: Demographic Characteristics of the Study Participants

Variables		Frequency (%)
Age of Respondents	15-20 Years	121 (30.2%)
	21-25 Years	279 (69.8%)
Academic Program	BSN Generic	400 (100%)
Current Study Year	2nd Year	132 (33%)
	3rd Year	132 (33%)
	4th Year	136 (34%)
Locality	Urban	251 (62.7%)
	Rural	149 (37.3%)
Residence	Day scholar	103 (25.7%)
	Hostelite	297 (74.3%)

Note: f = frequency, % = percentage

Results present the correlation between emotional intelligence and college achievement in 400 undergraduate nursing students. The Pearson correlation coefficient (r) of 0.74 shown in the table indicates that emotional intelligence has a very high positive relationship with academic success as measured by the CGPA of students. This link has a statistical significance that has been proven with a p-value of 0.000, which highlights the positive association between emotional intelligence and academic success. The positive correlation is quite high, which means that students who belong to higher levels of emotional intelligence tend to do well in school (Table 3).

Table 3: Correlations (r) Between EI and Academic Success Among Undergraduate Nursing Students (n=400)

Variables	r-Value	p-Value
Emotional Intelligence vs Academic Success	0.74	0.000

The results include the findings of a multiple linear regression model, which predicts the academic success of the students (CGPA) through four emotional intelligence subscales. Diagnostic tests of collinearity were performed, and all the Variance Inflation Factor (VIF) values were less than 5, meaning that there was no multicollinearity. This model accounts for 25% of CGPA ($R2 = 0.25$), implying that academic performance is moderately influenced by emotional intelligence. All four EI subscales, perception of emotions, managing one's own emotions, managing other emotions, and utilization of emotions were statistically significant predictors of CGPA ($p<0.001$). The positive standardized beta coefficients (β) indicate that higher scores on each subscale are associated with higher academic achievement (Table 4).

Table 4: Multiple Linear Regression Coefficients of EI Subscales in Predicting Student Academic Success (CGPA) (n=400)

Variables	B	β	SE	T	p-Value	95% CI for B
(Constant)	23.05	—	3.22	7.16	<0.001	16.72,29.38 16.72,29.38

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Perception of Emotions	0.89	0.43	0.13	6.85	<0.001	0.63,1.15 0.63,1.15
Managing Own Emotions	0.24	0.50	0.04	6.00	<0.001	0.16,0.32 0.16,0.32
Managing Other Emotions	0.87	0.44	0.14	6.21	<0.001	0.59,1.15 0.59,1.15
Utilization of Emotions	0.16	0.40	0.06	2.67	0.008	-

Note: CI= Confidence Interval

DISCUSSION

The study explored that there was a strong and positive relationship between emotional intelligence and academic performance among nursing students in a nursing institute in Pakistan (r=0.74, p<0.001). These findings support the past studies in various fields of discipline. In a study conducted by Fillipova and Biyalov, students with greater emotional intelligence are positively associated with academic success, which led to the conclusion that they have a stronger ability to cope with stress, maintain their motivation, and actively engage in the learning environment [17]. Additionally, the current results match research held on students in Pakistan by Suleman *et al.* which revealed that EI has a positive effect on academic performance [15]. The experiment has shown that those students with better scores in the parameters of emotional intelligence (EI) showed better competence in the handling of academic stress and achieved higher academic results compared to those with lower EI scores. Ahmed *et al.* also indicated that EI has a substantial impact on the educational achievement of Pakistani university students, especially when it comes to the field where interpersonal communication needs to be frequent [18]. Thus, this data incriminates the role of EI as an important factor of academic success in the discussed context. The results of the current study indicate that the EI training should be integrated into the nursing curricula in connection with the improvements of the academic results of the students and their preparation to face the upcoming professional life challenges. Moreover, the paper has explored how EI subscale variables contribute to the academic achievement of undergraduate Pakistani nursing students as indicated by cumulative grade point average (CGPA). The results also indicate that EI is a strong predictor of academic success as it explains 25% of the variation in the academic performance in CGPA (R2 =0.25). All four subscales of EI reported statistically significant correlation with CGPA. The subscale that measured the perceptions connected to the emotion presented a significant positive contribution to predictive outcomes of school participation, which reinforces the importance of the ability of students to both effectively perceive and understand emotions in themselves and others. Similar findings were cited by Rehman *et al.* which showed that teenagers who possess better skills of emotion perception have greater adaptability to the affective needs in academic settings [19]. When the ability to perceive emotions is improved, the learning and problem-solving capacity of an individual will be increased, thus resulting in excellent academic performance [20, 21]. This leads to the need to integrate emotional awareness training in the learning programmes to complement the academic success that students are exposed to by preparing them with skills to adapt, thus enhancing the learning process and overall performance. Similarly, the EI subscale of emotional self-regulation and academic success was significantly correlated. This finding conforms to the findings of the literature available internationally, including an investigation carried out by MacCann et al. who stressed the importance of self-regulation in academic settings [22]. Possession of emotional self-regulation skills enables students to enhance concentration, minimise stress, and become more motivated, therefore, positively impacting academic achievements [15]. The competencies are particularly applicable to the Pakistani case, considering cultural and social constraints of the students of the country where the Russian language is studied, as was demonstrated by Ramadan *et al.* [23]. These findings are consistent with the works of Christianson, who found that high performance in academic and clinical zones and the ability of nursing students to handle emotion showed a positive correlation. The experience gained over time suggests that interpersonal skills might be developed to enhance the group performance and academic outcomes of nursing programmes [12]. The ability to react to the feelings of other people has also been identified as a key predictor of school success and interpersonal skills in the educational environment, where teamwork and negotiation skills are vital. A high degree of expertise in manoeuvring the feelings of peers can lead to improved relationship aspects within the group and conflict management, which are all vital in the achievement of excellence in nursing institutions where teamwork is at the core [24]. The research conducted by Saeed *et al.* and Talman *et al.* proves the idea that nursing students who possess strong skills in handling the emotions of others have a high standard of success in educational and clinical settings [25, 26]. In addition, the subscale which identified positive use of emotions had a positive relationship with the academic performance of nursing students. The same finding agrees with the earlier research, which postulates that the ability to harness emotions positively enhances the ability to make judgments and come up with new ways of approaching problem-solving. Excellence in academics is primarily based on competencies, and this fact is supported by past studies [27, 28]. Siddiqui supposed that

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when students are trained to apply their emotions in a learning context, they will have a better chance of coming up with new solutions to the thorny problems, which will improve their academic performance [29]. Overall, such findings can be compared with the existing literature regarding the relationship between EI and academic performance, not only throughout the world, but also in the Pakistani context. The results of the research are consistent with other studies that were done previously, which indicate that emotional intelligence, particularly subscales, plays a very important role in predicting academic success among nursing students in Pakistan. The facts show that the subsequent advancement of emotional intelligence (EI) can be a strategic move towards the facilitation of academic success in the sphere of nursing education. Another example, which should be investigated in future studies, is the ability to change the academic performance based on EI and test the interventions applied to develop EI skills in nursing students, which will allow the development of more effective educational activities to improve academic and professional development.

CONCLUSIONS

This study highlights the crucial role of emotional intelligence (EI) in predicting the academic achievement of undergraduate nursing students in Pakistan. The results indicate that those with higher levels of emotional intelligence, namely, in the domains of emotional perception, emotional management (both self and others), and the utilization of emotions, tend to have improved academic success, as assessed by their CGPA. Integrating emotional intelligence (EI) development into nursing education is crucial because it enhances students' ability to manage stress, collaborate effectively, and overcome the challenges of academic and clinical settings. Considering the specific cultural and socioeconomic influences in Pakistan, promoting EI among nursing students might have the dual benefit of enhancing their academic performance and equipping them with the necessary emotional skills required in the healthcare field.

Authors Contribution

Conceptualization: SB
Methodology: SB, SK, AJ
Formal analysis: SB, SK
Writing review and editing: SB, SK, AJ, AG, KP

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Original Article

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Examining Clinical Instructors' Understanding, Perspectives, and Implementation of Evidence-Based Practice (EBP): A Multi-Institutional Study

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ABSTRACT

The adoption of evidence-based practice in healthcare has gathered significant appreciation across disciplines, aiming to improve patient care outcomes. In nursing, the primary objective is to deliver safe and standardized care by integrating evidence-based practice into clinical decision-making. Consequently, nursing educators must equip future nurses with the skills to decrease mortality rates and enhance patients' quality of life through the utilization of the best available evidence. **Objectives:** To assess the understanding, perspectives, and implementation of evidence-based practice among clinical instructors across five nursing educational institutes. **Methods:** A descriptive cross-sectional design was employed for this study. A total of 110 clinical instructors from both public and private sector educational institutes were recruited using convenience sampling. Participants completed a structured self-administered questionnaire, and data were measured using descriptive and inferential statistics in SPSS (Version 23.0). **Results:** Clinical instructors possessing master's degrees demonstrated a good understanding of evidence-based practice steps and their application. On the other hand, no significant differences (p-value>0.05) were received in overall perspectives towards evidence-based practice based on gender, qualification, and experience. **Conclusions:** It was concluded that clinical instructors with master's degrees demonstrated favourable perspectives and practices towards evidence-based practice. Female showed higher knowledge scores, while male excelled in perspectives and implementation.

INTRODUCTION

Evidence-based practice (EBP) has received worldwide acknowledgment from the healthcare industry in improving healthcare delivery and suggesting solutions for patients and families [1-3]. EBP is a clinical decision-making approach in which current research evidence is incorporated with healthcare provider competence, and clients' preferences [4-8]. Recently, the nursing profession has had to face technological advancement along with new emerging health conditions and diseases as a complex challenge to deal with [9, 10]. This has shifted a great responsibility to train coming nursing generations to tackle these complexities tactfully by adopting new teaching and learning techniques and updating their knowledge [11]. Therefore, this is the need of the hour that old clinical and teaching practices should be transformed with active engagement from both educators and clinical instructors [12, 13]. The incorporation of EBP into the culture of organizations is a time-consuming task that requires active management and enough resources [14, 15]. Despite the great significance of EBP the nursing faculty faces many challenges in training and transferring EBP knowledge and skills in nursing students [16]. The research highlighted that clinical instructors play a significant role in implementing guidelines and procedural checklists to

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ensure EBP application in clinical settings. Nursing faculty also play an important role in supervising students regarding EBP techniques while performing nursing care procedures [17, 18]. Nursing education plays as a cornerstone in nurturing a shift towards scientific inquiry which is necessary for navigating the complex and evolving healthcare landscape [19]. Moreover, both undergraduate and graduate nursing students are expected not only to practice EBP but also to contribute to generating new research-based knowledge [20]. Nursing instructors bear the responsibility of instilling a spirit of inquiry and critical thinking in their students, facilitating their ability to apply these skills long after graduation [4]. Overcoming the challenge of imparting skills rooted in scientific principles, rather than relying solely on traditional methods, is crucial for nursing educators [21]. EBP necessitates that nurse clinicians base their actions on clinically relevant research, rather than relying solely on traditional, experience-based approaches, prompting clinical educators to expand their teaching methodologies beyond conventional resources [12].

This study aims to assess the understanding, perspectives, and implementation of EBP among clinical instructors across five nursing educational institutes. This study includes questions: What is the clinical instructor's level of understanding, perspectives, and implementation of EBP? Is there any difference between clinical instructors' demographic characteristics and the level of understanding, perspectives, and implementation of EBP?

METHODS

A descriptive cross-sectional study was conducted for 6 months from May 2024 to Oct 2024 at six nursing colleges including both public and private sectors after getting ethical Approval. This study involves a total of n=110 clinical instructors (CIs). Inclusion criteria were Master of Science in Nursing (MSN)/ Master of Public Health (MPH) or Bachler of Science in Nursing (BSN)/PRN degree students, current registration with the Pakistan Nursing Council (PNC), and more than one year of clinical teaching experience. Exclusion criteria were clinical instructors on deputation/leave, and those in administrative roles not engaged in teaching. Informed consent was taken. Convenience sampling was utilized, with a universal sample size employed, resulting in 110 nursing instructors participating in classroom, laboratory, and clinical instruction. A self-administered questionnaire contained 33 close-ended questions, adapted from McInerney and Suleman [21]. The Questionnaire had 4 sections: section "A" was about knowledge and had 08 questions, section "B" was about perspectives and had 10 questions, section "C" was about implementation and had 10 questions, and demographic characteristics had 05 questions. Modified Bloom's cut-off point was considered to set the levels for understanding, perspectives, and implementation of EBP. EBP scores were divided into three equal tertiles. The first tertile indicated a poor level of understanding and implementation for scores less than 50%. The second tertile showed a moderate level of understanding and implementation for scores between 50.01% to 79.9% and the third tertile represented a good level for scores between 80% to 100%. While for the perspectives section; scores ≤50% were considered as under-developed perspectives whereas scores above 50% were labelled as developed perspectives [22]. SPSS version 23.0 was used for data analysis, with a significance level set at $p<0.05$. Quantitative variables understanding, perspectives, and implementation were analyzed with descriptive statistics (mean, median, range, and standard deviation). Shapiro-Wilk Test was performed to define the normality of the sample to decide on the tests appropriate for the statistical analysis. Inferential statistics were used to find the difference between demographic and outcome variables (Understanding, Perspectives, and Implementation). It was performed on Understanding, Perspectives, Implementation, age, and experience to measure the differences. Mann-Whitney U-test and Kruskal Wallis test measured the difference in Understanding, Perspectives, and Implementation among the demographic variables. Approval was obtained from the Institutional Review Board (IRB) Shifa Tameer-e-Millat University, Islamabad. Moreover, data collection permissions were obtained from the administration of all six nursing colleges. Confidentiality and anonymity of participants and colleges were rigorously maintained throughout the study.

RESULTS

The research included 110 clinical instructors. The majority of research participants—95, or 86.4%—were women. Sixty-seven percent of the participants, or 69 people, held a bachelor's degree. The age range was 26 to 55 years old, with the total mean age being 43.38 years (SD ± 9.363). Of the participants, 43 (39.1%) were between the ages of 46 and 55. The average number of years of experience was 18.57 (SD ± 9.736). Among the 35 participants, nearly one-third (31.8%) had between one and ten years of experience (Table 1).

Table 1: Demographic Features of the Participants (n=110)

Variables	Frequency (%)	Mean ± SD
Gender		
Male	15 (13.6%)	-
Female	95 (86.4%)	
Qualification		
PRN/BSN	69 (62.7%)	-
MSN/MPH	41 (37.3%)	
Age (Years)		
26-35	31 (28.2%)	43.38 ± 9.363

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36-45	25 (22.7%)	
46-55	43 (39.1%)	
>55	11 (10.0%)	
Experience		
1-10	35 (31.8%)	18.57 ± 9.736
11-20	31 (28.2%)	
21-30	30 (27.3%)	
>30	14 (12.7%)	

Utilizing Bloom's cut-off scores, which are classified as excellent, middling, and poor for comprehension and practice, examine participants' viewpoints, degree of understanding, and application of EBP. The understanding of the majority (96.1%) of the participants was good. Less than half of the participants (43.6%) had developed perspectives on the perspective scale, whereas 56.2% reported having underdeveloped perspectives on EBP. Similarly, almost half (47.7%) of the participants demonstrated strong EBP implementation, while another half (50.2%) demonstrated moderate EBP implementation. Only 1.8% of the individuals showed poor EBP compliance (Table 2).

Table 2: Clinical Instructors' Level of Understanding, Perspectives, and Implementation for EBP (n=110)

Levels	Understanding	Perspectives	Implementation
	Frequency (%)	Frequency (%)	Frequency (%)
Poor	-	-	2 (1.8%)
Moderate	4 (3.5%)	-	55 (50.2%)
Good	105 (96.1%)	-	53 (47.7%)
Under-Developed	-	62 (56.2%)	-
Developed	-	48 (43.6%)	-

The study demonstrated that no significant difference in EBP knowledge between clinical instructors having bachelor's and master's degrees. However, bachelor's degree holders demonstrated higher knowledge in the item "utilizing current literature for enhancing clinical teaching and staying updated with new nursing protocols". On the other hand, master's degree instructors showed stronger knowledge in "integrating EBP components and understanding the steps of performing EBP". Results also showed that there were no significant differences (p-value>0.05) observed in overall clinical instructors' perspectives towards EBP based on qualification, gender, and experience. However, instructors with master's had ranked higher on items emphasizing the "significance of new evidence and the intent to apply EBP", while those with bachelor's degrees were more inclined to "dislike their teaching practice being questioned and view EBP as a waste of time". Male instructors were inclined to rank higher on "intentions to read relevant literature and apply EBP", while females were more likely to express "difficulty in improving due to heavy workload and perceive EBP as a waste of time". Moreover, clinical instructors holding Master's degrees demonstrated high performance in the overall practice of EBP compared to those with bachelor's degrees. They were significantly ranked higher in various items, including "searching the literature", "using significant resources", "using evidence to improve clinical teaching", and "participating in professional development, and sharing research findings at the workplace", as opposed to the bachelor degree holders. However, there were no significant differences observed in clinical instructors' practice of EBP based on gender, although male instructors tended to better perform than female colleagues in several practice items such as "searching the published literature and attending seminars, workshops, conferences, and training on EBP" (Table 3).

Table 3: The Comparison of Clinical Instructors' Understanding, Perspectives, and Implementation of EBP by Qualification, Gender and Experience (n=110)

Sr. No.	Questions	Qualification*		Gender*		Experience**	
		Master		Female		>30 Years	
		Bachelor		Male		21-30 Years	
		-		-		11-20 Years	
						1-10 Years	
		Ranks Mean	p-Value	Ranks Mean	p-Value	Ranks Mean	p-Value
	Understanding of EBP	55.51	0.995	55.82	0.616	61.00	0.158
		55.49		53.50		59.23	
		-	-	-	-	51.74	
						53.43	
1	EBP is the method of clinical decision-making based on the latest research evidence	55.50	1.000	55.50	1.000	55.50	1.000
		55.50		55.50		55.50	
		-	-	-	-	55.50	
						55.50	
2	EBP is the method of clinical decision-making based on the latest research evidence	55.50	1.000	55.50	1.000	55.50	1.000
		55.50		55.50		55.50	
		-	-	-	-	55.50	

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						55.50	
3	The EBP stages are as follows: Pose a query, look for reliable evidence, analyze, apply, and assess its value.	57.00 54.61 –	0.178 –	55.26 57.00 –	0.487 –	55.17 53.45 57.00 57.00	0.390
4	Clinical instructors are kept informed about emerging nursing practices for patient care using EBP.	52.98 57.00 –	0.023 –	56.42 49.67 –	0.007 –	53.57 54.85 55.11 57.17	0.983
	Perspectives for EBP	60.57 52.49 –	0.197 –	55.04 58.43 –	0.700 –	57.00 57.00 53.45 55.43	0.418
5	I do not like that my teaching practice is questioned	49.13 59.28 –	0.078 -	55.77 53.77 –	0.805 –	65.29 55.23 52.21 54.73	0.575
6	I appreciate questions about me teaching and clinical practice	58.35 53.80 –	0.418 –	55.63 54.70 –	0.907 –	50.82 52.98 54.66 60.27	0.654
7	I am interested in reading relevant researched literature to update my understanding	55.95 55.23 –	0.900 –	53.75 66.57 –	0.111 –	51.61 55.20 57.21 55.80	0.947
8	I want to apply current evidence findings to improve me teaching and clinical practice	60.24 52.68 –	0.186 –	54.05 64.67 –	0.188 –	51.29 54.08 56.77 57.27	0.906
9	I want to improve my ability to locate, acquire, and evaluate evidence that is pertinent to my field of expertise	53.16 56.89 –	0.507 –	53.96 65.23 –	0.203 –	50.11 55.10 57.84 55.93	0.868
	Implementation of EBP	66.55 48.93 –	0.005 –	54.95 58.97 –	0.613 –	54.96 45.70 55.74 63.90	0.152
10	Clinical instructors have to apply EBP in clinical teaching and practice	61.62 51.86 –	0.059 –	54.19 63.80 –	0.187 –	61.89 49.35 57.39 56.54	0.440
11	My current teaching and clinical practice is based on EBP	59.57 53.08 –	0.277 –	55.78 53.73 –	0.808 –	63.43 55.02 47.11 60.17	0.243
12	To stay current, I use sources including journals, textbooks, the internet, coworkers, and clinical recommendations.	64.50 50.15 –	0.012 –	54.74 60.33 –	0.486 –	62.93 45.32 58.55 58.56	0.147
13	I use research evidence from different resources to improve my teaching and clinical understanding	62.62 51.27 –	0.045 –	53.92 65.50 –	0.166 –	68.50 43.13 55.08 61.27	0.029

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14	I informally Share and discuss literature/search findings with colleagues at my workplace	60.15	0.216	55.45	0.964	59.75	0.240
		52.74		55.83		46.18	
		–	-	–	–	56.61	
						60.80	
15	I attend workshops, seminars, courses, conferences, and training on EBP	67.43	0.002	53.18	0.045	53.54	0.005
		48.41		70.20		42.32	
		-	–	-	-	53.56	
						69.30	

DISCUSSION

This study recorded no significant difference in overall knowledge between clinical instructors with Master's and Bachelor's degrees although those with Bachelor's degrees scored higher on specific knowledge items. This discrepancy could stem from the appointment of Master of Public Health (MPH) nurses lacking clinical experience as instructors to address educator shortages, or biased questionnaire statements favouring undergraduate-level understanding [21]. In contrast, while no significant difference in perspectives was found between Master's and Bachelor's degree holders (p-value=0.197), instructors with Master's degrees generally displayed more positive perspectives toward EBP. Likewise, instructors with Master's degrees significantly outperformed in practice than those with Bachelor's degrees (p-value=0.005), scoring higher on various practice items. This aligns with previous studies indicating that higher nursing degrees correlate with more favourable perspectives and greater involvement in research and professional development activities [15]. There are disparities in EBP understanding, perspectives, and practice between male and female clinical instructors. Female instructors generally exhibited higher knowledge levels compared to males, aligning with findings from previous research in Saudi Arabia [6]. Conversely, male instructors demonstrated higher mean ranks on attitude (p-value=0.700) and practice scales (p-value=0.613), consistent with the prior study highlighting their efforts to establish credibility in a predominantly female field [12]. The current study demonstrated no significant differences in EBP understanding (p-value=0.158), perspectives (p-value=0.418), and implementation (p-value=0.152) among clinical instructors on the base of their work experience. These findings are contradictory to international research, which indicates higher EBP scores among clinical instructors with vast experience [8]. Remarkably, the clinical instructors having extensive experience showed eagerness for traditional and old, already tested and tried methods and exhibited resistance to new scientific approaches to patient care, reflecting a lack of involvement in policy development and implementation seen in other studies. However, instructors with less experience were found more engaged in skill development training like seminars and workshops, resulting in good evidenced-based practice perspectives. These results are similar to earlier research highlighting the significance of existing clinical education and practice of EBP to enhance its application [7].

CONCLUSIONS

It was concluded that clinical instructors with master's degrees demonstrated favourable perspectives and practices toward EBP. Females showed higher knowledge scores, while males excelled in perspectives and implementation.

Authors Contribution

Conceptualization: TY
Methodology: TY, TK
Formal analysis: TY
Writing review and editing: TK, FA

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Assessment of Levels of Knowledge of Mosquitoes as Vectors of Viral Diseases among Pregnant Women in Semi-Urban Areas of Abuja, Nigeria

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ABSTRACT

Mosquitoes transmit not only Malaria but also a host of viruses that affect and cause disease in humans. **Objectives:** To assess the level of knowledge pregnant women have about mosquitoes as vectors of viral disease in semi-urban areas of Abuja, Nigeria. **Methods:** Respondents for this study were apparently healthy pregnant women attending three primary health care centers in Abaji, Federal Capital City, Nigeria. Demographic data and necessary information on knowledge levels were collected with the aid of an interviewer-delivered questionnaire. **Result:** The level of Knowledge of mosquitoes as a vector of Malaria and Viruses was 99.2% vs 12.9%. Age ($p<0.001$) and Educational status ($p<0.001$) were significant determining factors of knowledge levels. Parity status ($p=0.1717$) and Gravidity ($p=0.3120$) were not significant confounders. **Conclusions:** The inclusion of detailed knowledge about the capacity of infectious disease transmission by mosquitoes should be incorporated into regular talks during antenatal clinic visits.

INTRODUCTION

Mosquitoes are ubiquitous with a cosmopolitan distribution [1]. They are found in every region of the world, except Antarctica, a few polar islands in the subpolar climates, and Iceland. It has been observed that the complete absence of mosquitoes from Iceland is a result of quirks of the climate [2]. Thousands of mosquito species feed on the blood of various hosts, including mammals, birds, reptiles, amphibians, and some fish, along with some invertebrates, primarily other arthropods [3]. The mosquito's saliva is transferred to the host during the bite and can cause an itchy rash. In addition, many species can ingest pathogens while biting and transmit them to future hosts [4]. Mosquitoes are important vectors of a range of diseases, such as malaria and filariasis, and arboviral diseases such as yellow fever, Chikungunya, West Nile, dengue fever, and Zika [5]. Mosquitoes serve as vectors for several diseases that cause the death of over 700,000 people each year [6]. The myriads of viral diseases that can be transmitted by mosquitoes are numerous; it will be noteworthy for public knowledge to be high in this regard. Public knowledge of mosquitoes as a vector of malaria in our society is commonplace. Drug abuse is possible when there is a misconception of disease after an intermittent mosquito bite to be Malaria; proper clinical and laboratory

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diagnosis should be the mainstay rather than. This study was a cross-sectional evaluation of awareness and knowledge levels of the capacity and capability of mosquitoes to transmit viral infections. The sole aim of this study is purely to educate society to perform the required preventive actions against mosquitoes in our environment. Abaji is a local government area in the Federal Capital Territory of Nigeria, Abuja. Abaji Area Council is the farthest area council from the city Centre, and occupies about 1,100 square kilometers. Created in 1986, the council has a population of over 46,600 inhabitants according to a 2006 national census.

This study aims to assess the level of knowledge pregnant women have about mosquitoes as vectors of viral disease in semi-urban areas of Abuja, Nigeria.

METHODS

This was a cross-sectional study conducted for three months from January to March 2023. This study was part of the Viral Diseases, Malaria and Cholera Prevention Alert (VDCPA) program, an infectious disease enlightenment program in underserved populations of Nigeria. A convenience sampling technique was used to recruit participants from the three primary health care centers. All eligible pregnant women attending the clinics during the study period were invited to participate until the target sample size was achieved. This study was carried out in three primary health care centers in the suburban communities of Abaji Local Government Area of Abuja, Federal Capital Territory, Nigeria. The initial sample size calculated was 246. However, to enhance the statistical power of the study, account for potential non-response or incomplete data, and ensure robust subgroup analyses (e.g., by age, education level), the final sample size was increased to 395. This adjustment aligns with methodological recommendations for improving accuracy and generalizability in cross-sectional studies. The sample size for this study was determined using the formula for finite population correction: $n=N/(1+N(e)^2)$. Where: N = Total population size (estimated annual number of pregnant women attending the three primary health care centers = 800), e = Margin of error (0.05), and n = Required sample size. Calculation: $n=800/(1+800\times(0.05)^2)=246$. To improve statistical power and account for potential non-response, the final sample size was increased to 395 respondents. To increase accuracy, the sample was doubled to 395 respondents. Ethical approval was received from the Local Health Authority Ethics Committee of Abaji Local Government, FCT Abuja. Written or verbal informed consent was obtained from respondents. The interviewer-administered questionnaire was pre-tested for clarity and relevance. Its reliability was confirmed using Cronbach's alpha ($\alpha = 0.78$), indicating good internal consistency. This process ensured the tool was both valid and reliable for data collection. In total, three hundred and ninety-five pregnant women of the 543 that were approached provided consent to be part of this study. They were administered an interviewer-delivered questionnaire, and questions were asked in relation to their knowledge of mosquitoes as a disease vector of both Malaria and Viruses. Data on demographics were collected only from respondents who provided consent for inclusion in this study. Data collected included Age, Educational status, economic status, marital status, parity, and Primigravidae.

RESULTS

The majority of study participants were in the age bracket of 26-30 years, with a population prevalence of 43.0%. Data on the educational status, economic status, marital status, parity, and gravidity status are also summarized (Table 1).

Table 1: Demographic Characteristics of Study Participants

Variables	Frequency (%)
Age	
16-25	113 (28.7%)
26-30	170 (43.0%)
31-40	89 (22.5%)
41-50	23 (5.8%)
Educational Status	
No education/Primary	54 (13.7%)
Secondary	258 (65.3%)
Higher education	83 (21.0%)
Economic Status	
Working	230 (58.0%)
Non-Working	165 (42.0%)
Marital status	
Married	228 (57.7%)
Living Together	137 (34.7%)
Single	30 (7.6%)
Parity	
1st Trimester	136 (34.4%)
2nd Trimester	196 (49.6%)
3rd Trimester	63 (16.0%)
Gravidity	
Primigravidae	160 (40.5%)
Multigravidae	235 (59.5%)

In this study, the overall percentage of respondents (pregnant women) interviewed who knew that Malaria could also transmit viruses was 12.9%, which was found to be significantly lower than the majority of respondents, 87.1% who responded negatively (Table 2).

Table 2: Knowledge of Mosquitoes as Vectors of Viral Diseases

Parameter	Respondents (n=395)			
Mosquitoes as Vectors	**Malaria**	**Virus**	**Chi**	**p-Value**
Yes	392 (99.25%)	51 (12.9%)	597.5891	<0.0001
No	3 (0.8%)	344 (87.1%)		

The association between factors responsible for the level

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of knowledge of Mosquitoes as vectors of Virus transmission is summarized. It was found that respondents with low educational status were significantly more unaware of the capacity of mosquitoes to transmit viruses (Table 3).

Table 3: Factors of Knowledge of Mosquitoes as Vectors of Viral Diseases

Factors	Yes (%)	No (%)	p-Value
Age (Years)			
16-25	3 (2.7%)	110 (97.3%)	<0.00001
26-30	15 (8.8%)	155 (91.2%)	
31-40	28 (31.4%)	61 (68.6%)	
41-50	5 (21.7%)	18 (78.0%)	
Educational Status			
No education/Primary	2 (3.7%)	52 (96.3%)	<0.00001
Secondary	13 (5.0%)	245 (95.0%)	
Higher education	36 (43.0%)	47 (57.0%)	
Economic Status			
Working	29 (12.6%)	201 (87.4%)	0.83225
Non-Working	22 (13.3%)	143 (86.7%)	
Marital status			
Married	37 (16.2%)	191 (83.8%)	0.6853
Living Together	11 (8.0%)	126 (92.0%)	
Single	3 (10.0%)	27 (90.0%)	
Parity			
1st Trimester	19 (14.0%)	117 (86.0%)	0.1717
2nd Trimester	20 (10.2%)	176 (89.8%)	
3rd Trimester	12 (19.0%)	51 (80.1%)	
Gravidity			
Primigravidae	14 (8.8%)	146 (91.2%)	0.3120
Multigravidae	37 (15.7%)	198 (84.3%)	

DISCUSSION

In a population of three hundred and ninety-five women, those aware that Mosquitoes are vectors of Viral diseases were 51/395 (12.9%), as compared to Malaria, which was 392/395 (99.2%). It is observed that in the study population, there was a high level of unawareness of the capacity to transmit Viral infections. There is a possibility that these respondents assume that all diseases post persistent mosquito bites are Malaria, these may lead to increased and irrational abuse of malaria medications without seeking proper medical diagnosis and examinations. There is evidence of increasing prevalence of mosquito-transmitted viral diseases in Nigeria [7-9]. Arbovirus prevalence has been investigated among pregnant women in Ibadan with a sero-prevalence rate of 55.6%, 38.9% and 25% for Zika, Dengue, and Chikungunya viruses [9]. Also studies on viruses transmitted by Mosquitoes with varying prevalence in various part of the country abounds, example a prevalence of 2% and 1.4% pregnant women were sero-positive for Zika antibodies in Lagos Nigeria [10], a 19% IgM Zika virus was also found in Nassarawa State [11], and finally Ifeorah and colleagues [12], found a prevalence of 1.6% Igm Zika virus prevalence in 2021. Dengue fever has also been recognized as a major cause of fever of unknown origin among pregnant women in Nigeria [13-15]. A 2% dengue prevalence has been reported among ante-natal attendees in Bauchi State [16], 16.8% Dengue IgM in a pooled study in Nigeria [17], and Onyedibe reported a 23.9% IgM dengue Virus in North-Eastern Nigeria [18]. Chikungunya has also been studied in Nigeria with varying prevalence reports. A 2020 meta-analytical study found a chikungunya pooled prevalence of 26.7% IgG [19]. The findings of this study have also been corroborated by the studies of Asaga et al. [20]. Educating expectant mothers on the other diseases that can be transmitted by Mosquitoes will reduce the inordinate use of drugs and further appreciate the need for them to seek proper malaria protection by ensuring they consistently use standard mosquito-treated nets and ensuring cleanliness around their surroundings and homes. The economic importance of mosquitoes other than Malaria should constitute part of the talks when pregnant women visit antenatal clinics in primary health care centers and in obstetric care homes. Health workers need to include basic vector biology in the seminars in medical symposiums and lecture series. As observed in this study, matured antenatal attendees were more aware that mosquitoes can transmit Viruses. The educated class was also more aware; being educated could increase curiosity and the search for knowledge. Parity status and Gravidity were not significantly associated with the knowledge level of Mosquitoes as vectors of viral diseases.

CONCLUSIONS

This study provides an elaborate knowledge base for pregnant women; however, emphasized; pregnant women should be taught mosquito prevention modalities and techniques, including the extended capacity of mosquitoes as vectors other than Malaria, which has become very essential with the increasing prevalence of arbovirus diseases in our study area.

Authors Contribution

Conceptualization: FO, AUD
Methodology: FO, AUD
Formal analysis: FO, AUD
Writing review and editing: FO, AUD

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Perceived Level of Knowledge and Hand Hygiene Practices among Primary School Children in Shakari Mangalore, Swat, Pakistan

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ABSTRACT

Hand washing is particularly vital among children, as improper hand hygiene can lead to increased mortality rates from diseases like diarrhea and pneumonia, especially in low- and middle-income countries. **Objective:** To evaluate the level of knowledge and hand hygiene practices among primary school children aged 8–14 years in Shakari Mangalore, Swat, Pakistan. **Methods:** A cross-sectional study was conducted with 50 students from a government primary school. A structured questionnaire, adapted from previous studies, was used to gather demographic data and hand hygiene-related responses. The data were analyzed using SPSS version 25.0 to calculate frequencies and percentages. **Results:** The findings showed that 88% of participants recognized the importance of hand washing during school, and 100% acknowledged the significance of washing hands to remove germs and dirt. However, the use of soap and hand washing in school settings was notably lower, with only 10% using soap regularly. **Conclusions:** While awareness of hand hygiene was high, adherence to proper hand-washing practices was inconsistent. The study highlights the need for better education, particularly regarding soap usage and consistent hand-washing behaviors, to improve hygiene practices in schools and prevent the spread of infectious diseases.

INTRODUCTION

Hand washing could significantly lower the incidence of respiratory infections and diarrhea. The majority of child fatalities worldwide occur as a result of incorrect hand washing, which is a necessary condition for a child's survival. However, in low- and middle-income nations, school-age children typically do not wash their hands at crucial moments, like after using the restroom, before eating, and before preparing meals [1, 2]. Furthermore, half of all child fatalities each year are caused by respiratory and diarrhoeal infections in children, which are mostly caused by poor and inadequate hand-washing practices [3]. In addition, the number of respiratory and gastrointestinal infections, including influenza, severe acute respiratory syndrome (SARS), and coronavirus disease 2019 (COVID-19), can be spread by dirty hands. Serious consequences may arise from certain infectious disorders, particularly in those with weakened immune systems. For example, among children under five, diarrhea and pneumonia rank as the two most common causes of death, accounting for around 1.8 million deaths annually [4]. The risks of a variety of illnesses that are directly linked to hand washing generally rise over time. These include food and waterborne illnesses, infectious diseases, severe acute respiratory syndrome (SARS), H1N1 influenza A, norovirus, cholera, malaria, dysentery, meningitis, shigellosis, and multi-resistant Staphylococcus aureus [5]. The

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development of children is harmed by a high incidence of infectious illnesses brought on by poor personal cleanliness [6]. The success of these activities, which are primarily focused on changing behavior, will rely on a detailed mapping of present hand hygiene habits as well as data on attitudes, hand hygiene barriers, and hand hygiene enablers. In order to create and implement successful interventions, this information will be useful in identifying the weaknesses in the current approaches as well as areas for improvement. Since young people are the "silent carriers" who unwittingly contribute significantly to the spread of infections in the community, it is especially crucial to investigate their hand hygiene habits, even though studying population hand hygiene practices is interesting in and of itself [7, 8]. Moreover, an efficient technique for cleaning and disinfecting the hands' surface is hand washing with water and soap [9]. Furthermore, to stop the spread of illnesses, the most basic and important infection control preventative strategy is hand hygiene [10]. Additionally, maintaining good hand hygiene is essential to prevent the spread of other infectious diseases, as well as during the COVID-19 pandemic [11, 12]. However, schools are among the most crucial venues for advancing health services and education. Students can acquire healthy behaviors, knowledge, and abilities related to hand washing and several other hygiene activities [5]. It has been demonstrated that hand washing lowers the prevalence of upper respiratory infections by 24% and reduces diarrhea morbidity and life-threatening diarrhea by 42% to 48% [3]. In addition, teaching proper hand hygiene is a top priority for schools. Parents and other caregivers must make sure their child with special needs washes their hands on a frequent basis [13, 14]. Hand hygiene is still not a widespread worldwide health behavior, even though it is a regular public health practice to stop the spread of infectious diseases [15]. Before interventions on hand washing practices can be carried out with confidence to prevent the transmission of illness, such as in the case of SARS-CoV-2, the levels of hand washing practices by nation must be appropriately educated through public health awareness programs [16, 17]. In this regard, a Pakistani study shows that handwashing following feces (30.6%), before cooking (54.1%), before eating (28.2%), and before child nursing (21.2%) [18]. Another study claimed that there is not enough information available about hand wash cleanliness in Pakistani schools to draw any firm conclusions [3].

This study aimed to evaluate the level of knowledge and hand hygiene practices among primary school children aged 8–14 years in Shakari Mangalore, Swat, Pakistan

METHODS

This cross-sectional study was conducted among 50 participants in the government primary school Khyber Pakhtunkhwa Shakari Mangalore Swat, Pakistan. Shakari Mangalore is a rural locality in the Swat District of Khyber Pakhtunkhwa province in Pakistan, where sanitation practices are under-researched. Moreover, a convenient sampling technique was used to gather data from the participants. A sample size of 50 was selected based on resource constraints and feasibility. This study was conducted from May 2025 to July 2025. The study participants were the students in class 4, both male and female, from ages 8 to 14 years, who were part of this study. The inclusion criteria were voluntary participation and age 8-14 years. All students were within this age range, and no one below 8 years was included. Students with developmental or cognitive disabilities were excluded from the study. The structured questionnaire was used in this study. The questionnaire was adopted from the previous study. Using SPSS version 25.0, Cronbach's alpha test was used to assess the questionnaire's reliability; the results showed that it was 0.608 [19]. The tool consists of two sections. The 1st section was demographic data, which includes 2 questions. The 2nd was about hand hygiene, which consisted of 16 questions. Ethical approval was obtained from the higher authority of the school with reference number 148/DCNS/25. After that, researchers visited the class and introduced themselves, and after that, questionnaires in hard copy were distributed among the students. Before the distribution, the study's purpose and objective were explained to the study participants. Official permission has been taken from the higher authority of the school. Due to the absence of parents or guardians at the time of data collection, informed consent was obtained from the class teacher, who served as the responsible authority for the students during school hours. In addition, verbal assent was obtained from each participating child. The consent process and study purpose were explained to the children in their native Pashto language to ensure clear understanding and voluntary participation. Moreover, confidentiality was maintained for each participant. For the data analysis, the study used the SPSS version 25.0 to analyze the response of each participant, and it was measured through frequency and percentage.

RESULTS

This study shows the demographic data of the participants. The data shows that males make up 60% of the population and females 40%. Regarding age, 100% were aged 8 to 14 (Table 1).

Table 1: Demographic Data of the Participants (n=50)

Variables	Frequency (%)
Gender	
Male	30 (60%)
Female	20 (40%)

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Age	
8-14	50 (100%)

Participants' answers about their awareness of hand hygiene are shown. Nearly all students (98–100%) understood the function that hand washing plays in maintaining personal cleanliness, preventing disease, and eliminating germs. The majority of students (88%) recognized the significance of hand washing during school hours. Most people (84%) cleansed their hands before eating, and 90% after using the restroom, even though 62% said they had received hand-washing training. Though 70% of people washed their hands after playing with friends, just 72% did so after handling rubbish. Remarkably, only 26% of people cleaned their hands after blowing their nose or coughing. Just 54% of students washed their hands at school, and only 10% used soap. 94% of respondents nevertheless thought that drying hands after washing is essential (Table 2).

Table 2: Perceived Level of Knowledge and Practices on Hand Hygiene

Sr. No.	Statements	Yes, n (%)	No, n (%)
1	Is it necessary to use soap to wash your hands at school?	44 (88.0%)	6 (12.0%)
2	Is hand washing with water essential for preventing illness?	49 (98.0%)	1 (2.0%)
3	Does using soap to wash your hands help avoid illness?	50 (100.0%)	0 (0.0%)
4	Does washing your hands help get rid of germs?	50 (100.0%)	0 (0.0%)
5	Is hand washing necessary to get rid of dirt?	49 (98.0%)	1 (2.0%)
6	Is hand washing a necessary part of personal hygiene?	49 (98.0%)	1 (2.0%)
7	Have you ever received instructions on hand-washing techniques?	31 (62.0%)	19 (38.0%)
8	Before and after eating, do you wash your hands?	42 (84.0%)	8 (16.0%)
9	When you handle trash or garbage, do you wash your hands?	36 (72.0%)	14 (28.0%)
10	Have you washed your hands before cooking?	41 (82.0%)	9 (18.0%)
11	Every time you use the bathroom, do you wash your hands?	45 (90.0%)	5 (10.0%)
12	After playing with colleagues, do you wash your hands?	35 (70.0%)	15 (30.0%)
13	After blowing your nose or coughing, do you wash your hands?	13 (26.0%)	37 (74.0%)
14	In school, did you wash your hands?	27 (54.0%)	23 (46.0%)
15	Did you use soap to wash your hands at school?	5 (10.0%)	45 (90.0%)
16	After washing your hands, is it necessary to dry them?	47 (94.0%)	3 (6.0%)

DISCUSSION

The current findings show that 60% were male and were female 40%. In contrast, another study shows the result of gender distribution, male were 34.5% and female were 65.5% [19]. The current study shows the importance of hand washing during school time 88% of the participants said yes, and 12% said no. According to a different study, hand washing with soap at school, 12.2% of participants replied no, while 87.1% said yes. Additionally, it is essential to wash your hands with water to avoid getting sick. 2% of participants replied no, while 98% said yes. Similarly, another survey reveals that just 44.6% of individuals agreed that washing their hands with water can prevent infections. Additionally, washing your hands with soap is crucial to avoiding getting sick. All participants (100%) replied "yes." However, according to a different survey, just 45.8% of individuals said "yes. However, to remove grime, hand cleaning is required. Yes, according to 98% of participants. However, according to another finding, only 39.9% of participants said "yes". Hand washing is a necessary part of personal hygiene; 98% of participants said yes. Another study found almost the same result with 82.7%. Additionally, just 38% of respondents claimed they had never received hand-washing instruction. It was 8.5% in another study. Before preparing food, do you wash your hands? Participants agreed in 82% of cases. Additional results reveal that 83.4% of participants concurred. According to the current study, 90% of respondents replied "yes" when asked if they washed their hands after using the bathroom 90% of respondents replied "yes." A different study reveals that just 52.0% of participants concurred [19]. Regarding this, another study found that just 1.4% of respondents said they rarely or never wash their hands after using a bathroom [20]. Additionally, do you wash your hands when playing with friends? 30% of the participants replied no, whereas 70% of them said yes. According to a different study, 68.3% of individuals agreed. Additionally, do you wash your hands after coughing or blowing your nose? 74% of those who took part said no. Nearly the same outcome was obtained in another investigation. Yes, according to 68.3% of participants. During school time did you wash your hands 54% said yes, and 44% of participants said no. In contrast, 84.9% said yes and 14.8% said no. Furthermore, during school time, did you use soap to wash your hands? 10% said yes, and 90% said no. Current findings showed that 52.8% said yes, and 46.9% said no [19].

CONCLUSIONS

The results show that students are highly aware of the significance of hand hygiene, especially in preventing illness and preserving cleanliness. Although the majority of students reported washing their hands after eating and using the restroom, fewer followed proper practices after coughing or handling trash, and very few consistently used soap. The findings highlight the need for school-based education programs that reinforce both knowledge and

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everyday hand hygiene practices, with special focus on soap use and consistent hand-washing behaviors.

Authors Contribution

Conceptualization: ZA, AB, DSK
Methodology: ZA, AB, DSK
Formal analysis: ZA, AB, DSK
Writing review and editing: ZA, AB, DSK, MJ, SR, AK

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Original Article

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Awareness and Practices Regarding Oral Hygiene Among School-Going Children in Swat

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ABSTRACT

Oral health greatly affects the overall health and well-being of children. Dental problems are not the only diseases associated with poor oral hygiene because it is also associated with systemic diseases, including diabetes and cardiovascular diseases. **Objectives:** To determine the level of awareness and oral hygiene behaviors among school-going children in Swat, Khyber Pakhtunkhwa. **Methods:** A descriptive cross-sectional study was conducted from May 2025 to July 2025 in Government Primary School Shakaro Manglawar. Fifty students were selected via convenience sampling. Data were analyzed using SPSS version 25.0 using descriptive statistics. **Results:** The study results show that 66% of participants were male, and 60% were above 11 years. 66% brushed once daily, while 34% used a toothbrush and toothpaste. 26% visited the dentist, often only in pain. Half of the participants were unaware of tongue hygiene. **Conclusions:** Limited awareness and inconsistent hygiene practices were observed. School-based interventions are crucial to promote oral hygiene in rural children.

INTRODUCTION

Medically, oral health is extremely vital to happiness and quality of life [1]. It affects the well-being and quality of life of every individual and is critical to overall health. The health of the mouth affects the oral functions and the social interactions of an individual and is closely connected with the overall health and the quality of life [2]. Moreover, failure to brush and floss teeth may lead to cavities, tooth decay, and gum disease. Most individuals in the world are affected by periodontal diseases (gingivitis and periodontitis) and caries (tooth decay), and health systems have to bear the huge burden of treatment. Low self-esteem, pain, difficulty talking and eating, and even losing teeth and undergoing surgery can be the results of gum disease and decay [3]. In addition, dental caries is a widespread chronic infectious pediatric disease, as well as one of the preventable oral health complications. Dental caries is a serious global health issue that adversely affects the quality of life of children and is unbelievably widespread [4]. Additionally, worldwide, oral illnesses are a major public health concern. Oral diseases are becoming more common, especially among those from lower socioeconomic backgrounds. It has recently been acknowledged that several systemic disorders, including diabetes mellitus, bacterial pneumonia, cardiovascular

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disease, and low birth weight, may be impacted by mouth infections, particularly periodontitis [5]. In this regard, poor oral hygiene habits, smoking, drinking alcohol, and eating improperly are all significant risk factors for an increase in several oral diseases. In addition to causing dental cavities and periodontitis, poor oral hygiene has been connected to diabetes, cancer, and heart disease [6]. Research consistently indicates that parental education plays a crucial role in shaping children's oral health behaviors and outcomes. Specifically, children whose parents have attained higher levels of education tend to experience significantly better health outcomes compared to those with less-educated parents [7]. Research has also demonstrated that by monitoring and assessing children's oral hygiene habits and practices, oral illnesses can be readily prevented by adopting appropriate preventative measures earlier [5]. However, this preventive potential is often hindered by a lack of basic awareness among children. In this regard, a study from Pakistan shows that both genders of our respondents lacked a fundamental understanding of oral hygiene [8]. In addition, a study from India shows that just 62.96% of people use brushes to brush their teeth [9]. Another study from Bangladesh shows that the children's understanding of oral hygiene practices and oral health is lacking [5]. Also, a study from Saudi Arabia shows that the majority of students knew enough about oral health, but they didn't practice good oral hygiene [10]. According to the results of Croatian university students who were tested, they had good oral health knowledge. In addition to this understanding, oral health is a basic requirement for good behavior, enabling people to take precautions for their general well-being [2]. Children in rural areas should be taught about oral hygiene in order to provide them with the necessary knowledge and abilities to maintain better oral hygiene. In light of the dearth of comprehensive oral health education initiatives and treatment facilities, among other obstacles to oral health, oral health education will be helpful in lowering mortality, morbidity, and their financial effects [5]. By increasing awareness and promoting healthy habits, the aim was to advance oral health [11]. However, there is a lack of data from rural areas like Swat, Pakistan, where socioeconomic and educational constraints may exacerbate the problem. This study aims to fill this gap by assessing the awareness and practices of oral hygiene among schoolchildren in a rural district of Swat.

METHODS

This study adopted a cross-sectional study design, which means data were collected at a single point in time. It was conducted in the Government Primary School, Shakaro Manglawar, Swat. Children between the ages of 9 and 14 who were enrolled in Government Primary School Shakaro Manglawar Swat, who participated in the study, and were present on the day of data collection. Children who were known to have cognitive or physical disabilities that would affect their capacity to react in a meaningful way were not included. The sample size for this study was determined based on feasibility and accessibility. Data were collected from a single class, and all students present during the data collection period were included. The study duration was three months from May to July 2025. This study employed a convenience sampling technique, selecting participants from a single government primary school in the Swat District. While this approach was practical and feasible within the available timeframe and resources, it may introduce sampling bias. Therefore, the findings cannot be generalized to all school-going children in Swat. To maintain ethical standards, formal permission from the school administration was requested in advance of data collection with Ref No (147/DCNS/25). As parents were not present during school hours, verbal assent was obtained from the students, and formal consent was taken from their class teacher. A standardized questionnaire was adopted from an earlier validated study [5], which was conducted in Bangladesh among school-going children. The questionnaire was originally prepared in English; however, each question was explained orally in Pashto to ensure clear understanding, rather than being formally translated.. The questionnaire was adapted from Bhuiyan et al. which was originally validated among rural Bangladeshi schoolchildren, a population demographically and culturally similar to our study group [5]. While the original study did not report detailed psychometric properties, the tool was deemed appropriate for age and context. To ensure clarity, the questionnaire was reviewed by subject experts for cultural appropriateness and pilot tested with five students (excluded from the final analysis). Minor adjustments were made during the explanation in Pashto to enhance comprehension. The survey tool was divided into two sections: the first collected demographic information, including age and sex, and the second evaluated students' awareness of dental problems, brushing habits, and preventative measures. However, the validity and reliability of the tool were not reported in the original study. Despite this drawback, subject matter experts thoroughly examined the questionnaire to ensure clarity. On scheduled days, the research team visited the school with prior approval from the administration. Students were gathered in a classroom setting where the objectives of the study were clearly explained in simple language. After obtaining consent from the class teacher and verbal assent from the students, the questionnaire was administered. Each question was read aloud, and its meaning was explained in Pashto to ensure clarity. Students then marked their responses on the provided forms. The process was conducted in a respectful and non-

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intimidating environment to encourage honest responses. The average time for completion was approximately 20–30 minutes per group. Due to the small sample size and descriptive nature of this study, formal reliability testing (e.g., Cronbach's alpha) was not conducted for the Pashto version. However, clarity and comprehension were ensured through expert review and pilot testing. We acknowledge this as a limitation and recommend internal consistency assessment in future larger-scale studies. After data collection, the responses were coded and entered into SPSS version 25.0 for analysis. The data were summarised in terms of descriptive statistics: frequency and percentage. It was a purely descriptive study that was not attempting to determine statistical relationships between awareness and practice. Because of time limitations and the narrowness of the project, no inferential analysis was done. Future studies should incorporate appropriate statistical tests to examine these relationships and better understand the factors driving healthy behavior.

RESULTS

This study shows the result of demographic variables, in which ages between 9-11 are 40% and ages between 11-14 are 60%. Regarding gender, male are 66% and female are 34%. The education of the household parents was 74% no education, 16% at the primary level, and 10% at the secondary level. Out of the occupations of the parents, 6% were Agriculture, 80% were daily labor, 2% were Rickshaw/van pullers, and 12% were Business/ shopkeepers(Table 1).

Table 1: Demographic Data of the Participants(n=50)

Variables	Frequency (%)
Age	
9-11	20 (40.0%)
11-14	30 (60.0%)
Gender	
Male	33 (66.0%)
Female	17 (34.0%)
Education of the Household Parents	
No Education	37 (74.0%)
Primary Level	8 (16.0%)
Secondary Level	5 (10.0%)
Occupation of the Parents (Father)	
Agriculture	3 (6.0%)
Daily Laborer	40 (80.0%)
Rickshaw/Van Puller	1 (2.0%)
Business/Shopkeepers	6 (12.0%)

Results show that brushing frequency once daily was 66%, twice daily was 22% and none was 12%. Using toothbrush and toothpaste, Toothpaste + Toothbrush are 34%, Toothpowder + Finger are 26% and Others (Salt Finger and Meshwak) are 40%. Types of toothpaste/powder used: 38% were Branded Toothpaste, 14% were Local toothpaste, 24% were Toothpowder, 18% were Coal, and 6% were Salt. Brushing time: 62% brush in the morning before the meal, 34% brush in the morning after the meal, and 4% Brush at night after the meal. When it comes to brushing techniques, 26% were Horizontal stroke, 22% were Vertical stroke, 6% were Circular, and 46% were Mixed. Rinsing of the mouth after eating: 60% of children are doing it, and 40% of children are not doing it. Toothbrush types include 20% Soft bristle brush,22% Don't know,14% Finger users,18% Meshwak users, and 26% Medium or Hard brush users. Inter-dental cleaning 12% is Toothpick/ pick/stick, 64% Don't use, 10% is Dental floss/dental thread, 8% is Regular thread, and 6% was Others. How frequently do they replace their toothbrush 4% every month, 14% every 3 months, 16% every 6 months, 36% when broken, and 30% do not know how often to change it. Tongue cleaning/brushing: 20% of them do it, 30% do not, and 50% do not know. Clean their tongue using a standard toothbrush; 24% of them do, 66% do not, and 10% do not know. Do you go to the dentist to have your teeth checked? (If Yes) 26% of them visit the dentist, 70% of them don't visit, and 4% of them don't even know the dentist. If yes, then how often? 6% of them visit the dentist yearly, 36% of them visit the dentist when there is a problem, e.g., on pain/if any problem, and 58% of them never visit (Table 2).

Table 2: Awareness and Oral Hygiene Practices

Statements	Frequency (%)
Frequency of Brushing	
Once Daily	33 (66%)
Twice Daily	11 (22.0%)
None	6 (12.0%)
Employing Toothpaste and Toothbrush	
Toothpaste + Toothbrush	17 (34.0%)
Toothpowder + Finger	13 (26.0%)
Others (Salt + Finger and Meshwak)	20 (40.0%)
Different Types of Toothpaste and Powder	
Branded Toothpaste	19 (38.0%)
Local toothpaste	7 (14.0%)
Tooth powder	12 (24.0%)
Coal	9 (18.0%)
Salt	3 (6.0%)
Time of Brushing	
Morning Before A Meal	31 (62.0%)
Morning After A Meal	17 (34.0%)
Night After A Meal	2 (4.0%)
Brushing Technique	
Horizontal Stroke	13 (26.0%)
Vertical Stroke	11 (22.0%)
Circular	3 (6.0%)
Mixed	23 (46.0%)
Washing Your Mouth After Eating	
Yes	30 (60%)

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No	20 (40%)
Types of Toothbrushes	
Soft Bristle Brush	10 (20.0%)
Don't Know	11 (22.0%)
Finger	7 (14.0%)
Meshwak	9 (18.0%)
Medium or Hard	13 (26.0%)
Cleaning Between Teeth	
Toothpick/Stick Toothpick/Stick	6 (12.0%)
Don't Use	32 (64.0%)
Dental Floss/Dental Thread	5 (10.0%)
Regular Thread	4 (8.0%)
Others	3 (6.0%)
How Often Should the Toothbrush	
Monthly	2 (4.0%)
3 monthly	7 (14.0%)
6 monthly	8 (16.0%)
Change when broken	18 (36.0%)
Not sure if it will change	15 (30.0%)
Brushing and Cleansing the Tongue	
Yes	10 (20.0%)
No	15 (30.0%)
Don't know	25 (50.0%)
Uses A Common Toothbrush to Brush the Tongue	
Yes	12 (24.0%)
No	33 (66.0%)
Don't know	5 (10.0%)
Do You Get Regular Dental Checkups at the Dentist?	
Yes	13 (26.0%)
No	35 (70.0%)
Don't know	2 (4.0%)
If Yes, Then How Often?	
Yearly	3 (6.0%)
On Pain/If Any Problem	18 (36.0%)
Never	29 (58.0%)

DISCUSSION

One of the most important guidelines for preserving dental health is practicing regular oral hygiene. The US Department of Health and Human Services says that no individual can be considered truly healthy until he or she is relieved of the weight of oral and craniofacial diseases and health problems. The detrimental effects of poor oral health on day-to-day functioning include decreased chewing ability, restricted food choices, weight loss, gastrointestinal disorders, communication difficulties, low self-esteem, and general health issues [5]. Therefore, this study aims to assess the awareness and practice regarding oral hygiene among school-going children. The current findings show that ages between 9 and 11 are 40% and above 11 are 60%. A study conducted in Bangladesh reported that 68% of participants were 9–12 years old [5]. In the present study, 16% of household parents had a primary level of education, whereas a study in India reported 40% [12]. Current results show that there were 50 children in total (33 male, 17 female), while Mishra, reported 210 children (133 male, 77 female) in India [13]. Regarding brushing practices, 66% of our participants reported brushing once daily, whereas an Indian study found 52% [12]. In the present study, 38% of children used branded toothpaste, while in Nigeria, 92% reported using fluoride toothpaste [14]. Furthermore, 26% of children in our study had visited a dentist, which is comparable to the 20% reported in an earlier investigation in Nepal [15]. Notably, 36% of our participants reported visiting a dentist only when in pain, whereas a comparable study in Pakistan reported 20% [16]. Tongue cleaning was reported by 20% of our participants, while Mlenga *et al.* found 70.2% in Indian children [17]. In terms of brushing tools, 34% of our participants used a toothbrush and toothpaste, compared to 89.4% in a study from Punjab [18]. The most common brushing technique reported was horizontal strokes (26%), whereas Ibrahim *et al.* found 42.9% [19]. Our study highlights important aspects of oral hygiene practices among schoolchildren in Swat. This study found that 36% of participants replaced their toothbrush only when it broke, which is lower than the 47.2% reported by Ibrahim *et al.* in Omdurman, Sudan [19]. Only 20% of children used soft-bristle brushes, compared to 53.8% in Chandigarh, India [20]. Mouth rinsing after meals was practiced by 60% of participants, lower than the 87.6% reported by Priyanka *et al.* in India [21]. Interdental cleaning using toothpicks or sticks was reported by only 12% of children, markedly lower than the 62% observed in rural Bangladesh [5]. These findings indicate gaps in basic oral hygiene knowledge and practices, particularly in toothbrush maintenance, brushing tools, and interdental care. The use of convenience sampling from a single school limits the generalizability of our results. Future studies with larger, randomly selected samples are needed to provide more representative insights and guide effective school-based oral health interventions.

CONCLUSIONS

Poor awareness and inconsistent oral hygiene practices were evident. Only a minority of students used toothbrushes correctly or visited dentists regularly. Schools should integrate regular oral health education. Moreover, the parents should be engaged through community awareness programs.

Authors Contribution

Conceptualization: HK, AB, SK
Methodology: HK, AB, SK, BR, MY, HU, MI, MW
Formal analysis: HK, AB, SK, MN
Writing review and editing: HK, AB, SK, BR, MY, HU, MW, SMJ

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Stress and Coping Strategies Among Parents of Children Admitted to the Isolation Unit

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ABSTRACT

Hospitalization of a child in isolation units often heightens parental stress, forcing reliance on culturally, religiously, and socially rooted coping mechanisms. **Objectives:** To explore stressors and coping strategies among parents caring for children in pediatric isolation units. **Methods:** A qualitative case study design was employed in the Pediatric Isolation Departments of major government hospitals in Peshawar, KP. Purposive sampling recruited 12 parents (7 mothers, 5 fathers) whose children had stayed at least one week. Data were collected through semi-structured interviews, audio-recorded, and transcribed verbatim. Thematic analysis was conducted using open, axial, and selective coding. **Results:** Four themes emerged: (1) Emotional distress parents experienced intense anxiety, helplessness, and sleep disturbance due to uncertainty and restricted caregiving roles; (2) Social and financial strain loss of income, disruption of daily life, and social isolation intensified stress; (3) Trust and reassurance in healthcare professionals clear communication from doctors and nurses reduced fear and enhanced confidence; and (4) Coping through faith and mutual support religious practices, prayer, spousal communication, and sharing comfort with other parents emerged as dominant coping strategies. Parents emphasized spirituality (Tasbih, supplications) as their primary source of resilience, alongside emotional reassurance from family and peers. **Conclusions:** Parents of children in isolation units face severe psychological, social, and financial stress. Coping strategies centered on faith, family communication, peer reassurance, and medical assurance were vital in maintaining resilience. Culturally sensitive, family-centred interventions are essential to strengthen parental coping and reduce distress.

INTRODUCTION

Stress is described as a psychological and physiological reaction to apparent problems or threats that are above the coping capacity of an individual [1]. Coping mechanisms are behavioral or cognitive actions that are consciously employed in order to deal with stressors [2]. Parents are nurturers who are critical in the physical, emotional, and social support of their offspring [3]. Isolation units: These are special hospital sections that house patients infected with contagious illnesses or those with low immunity as a way of isolation and preventing infection spread to the rest. The knowledge of stress and coping mechanisms in parents whose children work in isolation units is critical to holistic care in a family [4]. Stress levels of parents whose children are in the hospital are so high that there has been a record of a high rate of up to 70 % stress among parents of these children. It has been found that parents whose children are admitted to isolation units tend to have an even greater level of stress than parents whose children are in general and non-isolation wards. The most common ones include anxiety, depression, and helplessness [5]. According to studies that have been done in Asian nations, it has been noted that 60 - 80% of mothers and 40-60% of fathers who have children in the isolation units of hospitals are highly psychologically distressed. This prevalence is so

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high that systematic evaluation and support systems are necessary to reduce parental stress within hospital settings [6]. Children being kept in isolation units due to hospitalization lead to emotional stress because of the critical state of the child, fear of infection, as well as minimal access to a parent. Visitation policies and lack of direct involvement are some of the factors that make parents feel powerless. These emotional issues add up to the psychological burden and may harm the parent-child relationship and the process of child recovery [7]. Parental adaptation revolves around coping strategies. Problem-focused coping involves the pursuit of medical information, the continued participation in child care, and bargaining with the medical staff [8]. Emotion-oriented coping involves spiritual coping, denial, avoidance, or social support. The combination of both strategies is common among parents, as some tend to rely on their cultural, social, and personal backgrounds. The success of coping mechanisms would be a major determinant of the psychological outcomes and resilience of parents in the long run [9]. Parental stress and coping are greatly affected by social and cultural contexts. In collectivist societies, it is more likely that extended family support and religious coping are the more likely approaches, whilst in individualistic societies, it might be more likely to focus on self-reliance and psychological counseling [10]. This knowledge of these differences is of utmost importance to the healthcare workers in designing interventions that are sensitive to culture and parental preferences [11]. The role of healthcare givers in alleviating the stress of parents cannot be underestimated. Physicians and nurses can reduce suffering through providing timely information, including parents in care planning, and psychological support [12]. The involvement of parents in teaching on infection control also boosts confidence and lessens doubt. The holistic care of the supportive services in the isolation units has to therefore offer a holistic care which is beyond the patient and to the well-being. The literature on stress and coping techniques of parents in isolation units is also insufficient, especially in the low- and middle-income countries. Previously discussed factors, such as limited resources, the cultural stigmatization of infectious diseases, and the lack of support systems at a hospital, are unique to the challenges of parents in such situations and should be investigated more thoroughly.

This study aims to investigate the stress and coping behavior of parents of children admitted to isolation units to provide evidence on interventions that enhance the mental health of parents and child care outcomes.

METHODS

The approach used to conduct a qualitative study involved the investigation of the stress and coping mechanisms of parents of children who were admitted to isolation units. This design permitted a deep comprehension of the personal experiences of parents, and at the same time selected different views of various cases. It was carried out in Peshawar, Khyber Pakhtunkhwa, pediatric isolation units of the large state-owned hospitals, where children with contagious diseases are treated. The experiment was conducted from December 2023 to May 2024, to include the changes in parental stress and coping during various medical conditions. The study was initiated with the help of ethical approval. The participants were told about the objective of the research, the right to withdraw at any point, and the confidentiality. The pseudonyms were used in transcripts and reports in order to create anonymity. Data storage was done securely and was only accessible to the research team. Written informed consent was obtained after explaining the study in Urdu or Pashto. Participation was voluntary, with the right to withdraw anytime. Confidentiality was ensured through pseudonyms and secure data storage. The purposive sampling technique was employed to sample 12 parents, and the sample was finally arrived at due to data saturation. Eligible parents were identified with the help of healthcare staff in pediatric isolation units. Those who met the inclusion criteria were approached individually, informed about the study, and invited to participate. From these, 12 parents who provided written consent were enrolled until data saturation was achieved. The sample size of 12 was considered sufficient as qualitative research emphasizes depth rather than breadth. Data saturation was reached when no new themes emerged, making the number appropriate for capturing diverse parental experiences in this context. They were included based on the exclusion criteria that included a patient having stayed in the isolation unit for at least one week, being 18 years and older, and needing to speak Urdu or Pashto. Neither mothers nor fathers were left out in having different viewpoints. Parents who were not willing to take part were locked out. Informed consent was written with the help of healthcare professionals, and eligible participants were identified. Interviews lasted 30–45 minutes in a private hospital room, using an open-ended guide to ensure consistency across participants while allowing flexibility for personal experiences. Data were collected through face-to-face semi-structured interviews using an interview guide with open-ended questions exploring stressors, coping strategies, and their effectiveness. Interviews were audio-recorded with consent and later transcribed for analysis. Interpretation of the interview transcripts was done using thematic analysis. Data were open-coded in order to identify the key ideas, and then there was an axial coding process to narrow down the categories and a selective coding process to come up with overarching themes on stress and coping. Transcripts were first open-coded line by line, then

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grouped into categories through axial coding, and finally refined into overarching themes using selective coding. Illustrative quotes were linked to each theme to maintain a clear connection with the raw data.

RESULTS

The study included 12 parents (P1–P12) of children admitted to pediatric isolation units. Their ages ranged from 28 to 45 years, with most participants between 30 and 40 years. Seven participants were mothers, and five were fathers, ensuring both maternal and paternal perspectives. Education levels varied, with some having no formal education while others were graduates, reflecting diverse literacy backgrounds. Occupations ranged from housewives and farmers to teachers, drivers, and healthcare workers, showing socioeconomic diversity. Monthly household income ranged between PKR 15,000 and 60,000, highlighting financial strain in lower-income families. Mothers (n=7) were primarily housewives, while fathers (n=5) contributed through varied employment. This demographic diversity provided a broad understanding of parental stress and coping strategies across different social and economic contexts (Table 1).

Table 1: Demographic Characteristics of Participants (P1–P12)

Participants	Age (Years)	Gender	Education Level	Occupation	Monthly Income (PKR)	Relation to Child
P1	28	Female	Secondary	Housewife	25,000	Mother
P2	35	Male	Graduate	Teacher	55,000	Father
P3	32	Female	Primary	Housewife	20,000	Mother
P4	41	Male	Higher Secondary	Shopkeeper	40,000	Father
P5	39	Female	No Formal Education	Housewife	15,000	Mother
P6	30	Female	Graduate	Nurse	50,000	Mother
P7	45	Male	Secondary	Farmer	30,000	Father
P8	33	Female	Higher Secondary	Housewife	35,000	Mother
P9	37	Male	Graduate	Office Worker	60,000	Father
P10	29	Female	Secondary	Housewife	28,000	Mother
P11	42	Female	Primary	Housewife	22,000	Mother
P12	36	Male	Graduate	Driver	45,000	Father

Theme 1: Faith and Spirituality as an Arc of Resilience: Parents were in a state of strong emotional distress after their child lived in the isolation unit, and these feelings were revealed through feelings of anxiety and fear. The fact that they could not be certain about what was wrong with the child and that there was no control over the process of treatment made them vulnerable and emotionally exhausted. This psychological burden of the situation was manifested in many parents who were constantly worried about the outcome and spent sleepless nights. The feeling of helplessness was frequent in parents, who did not feel any power to alleviate suffering in their child or accelerate the healing process. These emotions were exacerbated by the limited surroundings of the isolation unit because parents could not carry out regular caregiving duties and activities. One of the participants confessed that at night, he would weep without saying words, as he did not know how long his child was going to remain in the isolation room, and he could do nothing but see how his child was suffering. This line describes the agony that parents had to go through when in the hospital. These feelings were further enhanced by the alienation of family life and regular social life. Parents explained that because they were so concerned about the hospitalized child, the rest of the family members were unable to connect with them, which resulted in an emotional imbalance. The mixture of anxiety, fear, and distance created a mood of constant anxiety, highlighting how isolated care had taken its psychological toll on them. Theme 2: Mutual Support and Open Communication: parents have become significantly faced with social and financial problems when the child stays in the isolation unit. A lot had to forego work or their day-to-day duties, and this further burdened the family. The long-term care in hospitals affected the routine, poor relationship, and their reliance on others to manage the household, further worsening their already stressful condition. The financial problems were more pronounced for the parents who depended on the wages they earn daily or from small companies as their main source of income. The fact that they had to stay in the hospital resulted in the total loss of income, which directly affected their capacity to cover household costs and costs related to medicine. One of the parents said that she lost her daily income as she had to stay with the child, and even close relatives shunned us due to fear of infection. This is an indicator of the joint impact of economic instability and loss of social support. The social isolation was an additional source of stress, and friends and extended relatives tended to keep a distance because of being scared of getting infected. Parents reported their feelings of being abandoned or stigmatized because they were no longer able to be supported by the support networks they normally depended on. The financial

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insecurity, coupled with a lack of social interaction, created a loop of tension, and parents had to grapple with a series of other issues in addition to the sickness of child. Theme 3: Relationship of Trust and Reassurance by Healthcare Workers: Thousands of parents got strength by faith, spirituality, and prayer, even though their child was in a hospital bed at a time when most parents found hope and support in these three areas. The belief in divine intervention soothed their emotional pain, and they could cope in the face of the uncertainty of being isolated. When parents could not cope with the situation and had to endure numerous stresses, they often resorted to religious measures, i.e., reciting verses or consulting a religious leader to gain some strength. Although little, the support systems were effective in reducing the burden. Certain parents pointed out the emotional support of spouses, siblings, or close friends who would visit frequently. One of them told me, when I prayed, I felt better, and when my husband consoled me, I felt that I was not all alone. This underscores the combined role of both faith and supportive relationships in sustaining parents' emotional well-being during a difficult period. Healthcare staff were also mentioned as a crucial source of support, particularly when they showed empathy and communicated effectively. Parents valued the reassurance given by nurses and doctors, as it reduced fear and strengthened their ability to cope. Together, faith, family, and healthcare providers created a buffer against the stressors of isolation, enabling parents to maintain hope and resilience despite adversity. Theme 4: Sharing Comfort and Hope with Others: Parents expressed that supporting other families in similar situations became an important coping mechanism during their child's hospitalization. Sharing personal experiences and encouraging words helped them create a sense of solidarity with others facing the same struggles. By exchanging stories of recovery and resilience, they cultivated collective strength and eased the isolation that many felt within the hospital setting. Providing reassurance to others also gave parents a sense of purpose and agency amidst their own uncertainty. One parent said, *"In this way, I also give comfort to other parents. We believe that Allah is the one who gives health."* This reflects how faith was not only a personal coping strategy but also a foundation for uplifting others. Encouraging fellow parents reinforced their own hope and helped them focus on positive outcomes. Through these interactions, parents built small but meaningful support networks, turning individual suffering into shared resilience. As one participant shared, *"We reassure others that our child was in a perilous condition, but now, thankfully, he has recovered."* Such exchanges reduced feelings of helplessness, fostered hope, and highlighted the power of compassion in coping with the challenges of caring for a child in isolation (Table 2).

Table 2: Thematic Analysis of Parental Stress and Coping Strategies

Theme	Description	Illustrative Quotes
Faith and Spirituality as a Pillar of Strength	Parents relied on religious practices, prayer, and belief in Allah as key coping mechanisms that provided hope, peace, and emotional strength.	"We mention Allah in tasbih to reduce our anxiety, and because of this, we get peace." "Engaging in prayers and supplications, and regularly visiting the mosque, helps alleviate our stress." "We believe that Allah is the one who gives health."
Mutual Support and Open Communication	Open communication within families, particularly between spouses, reduced stress and fostered emotional support.	"We talk to each other, which reduces our stress to a great extent." "She talks to her husband on the phone to reduce her stress." "She is very worried, so I tell her that the baby is getting better, now drink it, and we will know."
Trust and Reassurance from Healthcare Workers	Clear communication and reassurance from doctors and nurses provided confidence and reduced parental anxiety.	"The doctors reassure us that the baby will be fine, and hence our stress is reduced." "The doctor was telling me that he has measles and that it is not that dangerous... which has reduced our worries to a great extent." "We are just awaiting the results of this test."
Sharing Comfort and Hope with Others	Parents supported other families in similar situations, sharing experiences and reassurance to build collective resilience.	"In this way, I also give comfort to other parents... We believe that Allah is the one who gives health." "We reassure others that our child was in a perilous condition, but now, thankfully, he has recovered." "We tell other parents that there is nothing wrong with their isolated child because your child suffers; other children suffer."

DISCUSSION

The results of this research were that there was great emotional distress to the parents who were full of anxiety, fear, and helplessness about their child being in isolation units. Similar findings have been reported in earlier studies, which showed that hospitalization of children, especially under isolation, causes significant psychological distress among caregivers due to uncertainty and disruption of family life [13]. Nevertheless, in comparison with the studies carried out in high-resource environments where psychosocial support programs are

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more accessible, the present study pointed out that the lack of external support added to the emotional burden. This highlights that the background of coping resources is highly context-specific, depending on the healthcare setting. The social and financial strain is yet another reason for stress in parents that was identified in the study. According to the respondents, the shortage of income, work-life imbalance, and the decline of social support were caused by stigma and fear of infection. This is in line with the results of [14], who further indicated that families where children were isolated had financial problems and were socially isolated. On the contrary, research in European countries showed that financial pressure was less pronounced due to the state-financed medical care system [15]. This analogy reinforces the thesis, which is that the socioeconomic and healthcare situations determine the level and nature of parental stress. In this study, religion and spirituality turned out to be among the primary coping mechanisms because they provided the parents with hope and emotional support. This finding concurs with earlier studies in the highly religious societies, e.g., [16], where prayer and belief in divine intervention played a vital role in alleviating caregiver stress. Conversely, studies conducted in secular contexts emphasized problem-solving and cognitive restructuring as dominant coping strategies [17]. These differences underscore how cultural and religious values shape coping mechanisms, with faith serving as a powerful source of resilience in religious societies. The other significant observation was the need to live by supporting each other and maintaining contact in families. Parents who talked about their fears with their spouses and close family members reported feeling more relieved and connected. This finding supports the work of Kasat *et al.* [18], who emphasized the protective role of family cohesion in pediatric hospitalizations. Nevertheless, whereas in Western contexts professional counseling services are often integrated as part of communication-based coping [19], the present study revealed little evidence of such institutionalized support. This gap highlights the limited availability of psychosocial care provisions in the local healthcare system. Healthcare professionals' trust and reassurance were found to be vital in the management of parental stress. Parents appreciated effective communication and frequent updates, which led to a decrease in uncertainty and enhanced trust in treatment. This finding is consistent with [20], who reported that parental stress was significantly reduced when medical staff maintained clear and empathetic communication. Conversely, studies conducted in overburdened healthcare systems have shown that poor communication contributes to heightened stress and dissatisfaction. Thus, the present results reinforce the critical role of empathetic provider-parent interactions in parental coping. The issue of comforting other parents and offering hope expressed the role played by peer support in resilience. Parents reported feeling stronger when sharing experiences, inspiring others, and narrating success stories. This highlights the therapeutic value of community-based peer support in mitigating parental stress. On the whole, the results of the present research confirm and extend existing literature by demonstrating both universal and context-specific aspects of parental stress. Emotional distress, economic pressure, and reliance on support systems were consistent with global findings, while the prominence of faith and spirituality made the present context distinctive. Therefore, interventions must not only address financial and psychological stressors but also integrate culturally grounded coping strategies such as faith-based counseling and peer support programs. These insights can guide healthcare practitioners and international scholars in developing holistic and culturally appropriate support systems for parents of children in isolation units

CONCLUSIONS

Parents of children in isolation units' experience profound emotional, social, and financial stress, often fearing for their child's recovery. Despite these challenges, coping mechanisms such as faith, spirituality, family support, trust in healthcare providers, and reassurance from peers help sustain resilience. Stress levels are shaped by cultural, social, and healthcare contexts, emphasizing the need for holistic interventions. Healthcare systems should address not only the medical needs of isolated children but also the psychosocial well-being of their caregivers.

Authors Contribution

Conceptualization: UU
Methodology: UU, HK, FK, AAK
Formal analysis: FK
Writing review and editing: AU, FK, MK

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

Conflicts of Interest

All the authors declare no conflict of interest.

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Original Article

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Factors Affecting Medication Adherence in Patients with Coronary Artery Disease: A Multicenter Analytical Cross-Sectional Study

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ABSTRACT

Coronary artery disease (CAD) is one of the major causes of mortality and morbidity in the world. Adherence to medication regimens is essential for the long-term management of CAD. **Objectives:** To examine the medication adherence rate and factors associated with it in CAD patients visiting secondary or tertiary care hospitals in Peshawar. **Methods:** An analytical cross-sectional study was conducted in three tertiary care hospitals, Peshawar Institute of Cardiology, LRH, and Hayatabad Medical Complex. Data were collected from 246 patients aged 19–80 who had CAD for at least a year and were taking anti-anginals, anticoagulants, and/or antihypertensive agents directly or indirectly related to blood pressure control. Information was collected using a self-structured questionnaire and the 4-item Morisky Medication Adherence Scale. **Results:** Among the 246 participants, 52% were male, and the mean age was 56.9 ± 12 years. The majority of patients were illiterate (74%) and belonged to the middle class (55.7%). According to the MMAS-4, 40.2% of patients were observed to have great adherence; 41.1%, moderate adherence, 15% very poor adherence; and 3.7% did not comply at all. Chi-square analysis showed that there was no statistically significant association between adherence and gender (p=0.883), economic status (p=0.689), the cost of drugs (p=0.4394), and medication supply (p=0.710). **Conclusions:** Medication adherence among CAD patients in Peshawar was suboptimal, with less than half demonstrating good adherence. Financial difficulties, lack of disease awareness, side effects, and treatment complexity appeared to influence adherence trends.

INTRODUCTION

Coronary artery disease refers to a state in which insufficient blood and oxygen are supplied to the heart muscle. It is due to the narrowing of the coronary arteries, which leads to an imbalance between O2 supply and demand in the body. It usually occurs as a result of the development of plaque in one or both of these orifices, resulting in narrowed blood flow. It is the mother of all causes of death for people in the United States and worldwide [1, 2]. Coronary artery disease is a complex chronic disease with a variety of etiologies, like overeating or lack of exercise. Non-modifiable factors are such things as sex, age, and family history; modifiable factors include cigarettes, but also obesity and high cholesterol levels. Actual smoking is still the main risk factor in the development and deterioration of cardiovascular diseases [3, 4]. According to a 2019 study, although the proportion of predictive performance arising from modifiable risk factors was relatively low in the range of 63% to 80%, age, gender, and race provided the most predictive performance. But still changing modifiable risk factors

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reduced the incidence of CAD events significantly [5, 6]. Compared with female gender, the male is more susceptible to coronary artery disease. Modifiable risk factors, like hypertension, persisted in having a major role in coronary artery disease. High-density lipoprotein (HDL) cholesterol showed a fairly consistent negative correlation with coronary artery disease occurrence. Low-density lipoprotein (LDL) showed a fairly consistent positive association with coronary artery disease occurrence. Furthermore, important risk factors for coronary artery disease include other indicators of inflammation. The role of high-sensitivity C-reactive protein (CRP) has caused much controversy in practice. However, some studies have shown it to be the best indicator in this respect [7, 8].

This study aims to examine the medication adherence rate and factors associated with it in CAD patients visiting secondary or tertiary care hospitals in Peshawar.

METHODS

This analytical cross-sectional study was conducted using consecutive sampling to recruit 246 patients aged 19–80 years with coronary artery disease on cardiovascular medications for ≥1 year. The study duration was from September 2023 to February 2024. Data were collected from the Outpatient Department of three public sector tertiary care hospitals, including Lady Reading Hospital (LRH), Hayatabad Medical Complex (HMC), Peshawar, and Peshawar Institute of Cardiology (PIC), Peshawar. The ethical approval was taken from the Medical Teaching Institute, Hayatabad Medical Complex, Peshawar (1456). The sample size of 246 was calculated using the formula: n = Z2. P. (1-P)/d2 with 95% confidence, 5% margin of error, and 20.2% prevalence of high medication adherence [9]. Although this was not exclusively a CAD-specific population, it was deemed the most appropriate estimate due to the lack of a published local prevalence rate for medication adherence specifically in CAD patients, and it ensured a conservative sample size estimate. Participants were included based on a defined selection criterion, including patients aged 19 to 80 years who had been using cardiovascular medicines for at least one year and patients with coronary artery disease, including stable and unstable angina, non-ST elevation myocardial infarction, ST elevation myocardial infarction, and post-PCI or post-CABG patients. Written informed consent was taken. Participants excluded from the study were those who were uncooperative or unwilling (to ensure reliable responses and complete data collection), patients with certain bleeding disorders, and participants with co-morbidities such as dementia and Alzheimer's disease (to avoid potential complications during treatment and assessment). Data were collected using a self-structured questionnaire and patients' medication charts. The self-structured questionnaire was developed based on a comprehensive literature review and was pretested on a pilot sample of 20 patients (not included in the main study) to assess clarity, comprehensibility, and face validity. The tool was refined based on the feedback received from this pilot. Medication adherence was assessed using the 4-item Morisky Medication Adherence Scale (MMAS-4), which has demonstrated good reliability and validity in cardiovascular populations (Cronbach's α = 0.61–0.83; Morisky & DiMatteo, 2011). The MMAS-4 includes four questions with scores ranging from 0 to 4, where 0 = non-adherence, 1 = poor adherence, 2–3 = moderate adherence, and 4 = good adherence. high adherence (score = 4), medium adherence (score = 2 to 3), and low adherence (score = 0 to 1). SPSS version 22.0 was used to analyze the data. All variables were calculated using descriptive statistics. Continuous variables (age) were represented in the form of the mean and standard deviation (SD); a test of normality was performed with the Shapiro-Wilk test. Frequency and percentages were used to summarize categorical variables. The Chi-square test was used to test associations between categorical demographic/clinical variables and the level of medication adherence (high, medium, and low). All tests had a p-value of less than 0.05, which was statistically significant.

RESULTS

In this study total of 246 (100%) patients fulfilled our inclusion criteria, which were recruited from the tertiary care hospitals of KPK, a province of Pakistan. The male ratio was high, 128 (52%) of the total sample size, and female ratio was 118 (48%). The mean age of the participants was 56. 91 ± 12 SD. Participants having an invasive procedure were 179 (72.8%), and those without an invasive procedure were 67 (27.7%). Participants having a history of Coronary Artery Bypass Grafting were 24 (9.8%), and those without a history of Coronary Artery Bypass Grafting were 222 (90.2%). Participants having Percutaneous Coronary Intervention were 160 (65%), and those without a history of Percutaneous Coronary intervention were 86 (35%). In this study, the education level of participants was: 82 (74%) were illiterate, 22 (8.9%) were primary, 28 (11.4%) were middle, 2 (0.8%) were SSC, 5 (2.0%) were HSSC, 4 (1.6%) were Bachelor, and 2 (0.8%) were Master. In this study, participants with having history of medication availability at local areas were 194 (78.9%), and medication not available at local areas were 52 (35%). Participants having an adverse drug reaction were 43 (17.5%), and participants with no adverse drug reaction were 203 (82.5%). Marital status of the participants was included: 235 (95.5%) were married, and 11 (4.5%) were widowed. In this study, participants with having history of coronary artery diseases were 241 (98%), and those patients having no history of coronary artery diseases were

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5 (2%). Socioeconomic level of participants was categorized as 106 (43.1%) were lower class, 137 (55.7%) were middle class, and 3 (1.2%) were upper class. Less than 50,000 = lower class, middle class = 100,000, and upper class more than 100,000. In the study, 210 (85.4%) were participants having previous hospitalization were and participants having no history of hospitalization were 36 (14.6%). Occupation of participants: 73 (29.7%) were Jobless, 41 (16.7%) were Workers, 19 (7.7%) were Farmers, 6 (2.4%) were Staff members, 4 (1.6%) were Business persons, and 103 (41.9%) were housewives (Table 1).

Table 1: Demographic Characteristics of Participants

Variables		Frequency (%)
Gender	Male	128 (52%)
	Female	118 (48%)
Education Level	Illiterate	182 (74.0%)
	Primary	22 (8.9%)
	Middle	28 (11.4%)
	SSC	2 (0.8%)
	HSSC	5 (2.0%)
	Bachelor	4 (1.6%)
	Master	2 (0.8%)
Marital Status	Married	235 (95.5%)
	Widowed	11 (4.5%)
History of Coronary Artery Disease	Yes	241 (98%)
	No	5 (2%)
Socioeconomic Level	Lower	106 (43.1%)
	Middle	137 (55.7%)
	upper	3 (1.2%)
Occupation	Jobless	73 (29.7%)
	Worker	41 (16.7%)
	Farmer	19 (7.7%)
	Staff	6 (2.4%)
	Business	4 (1.6%)
	Housewife	103 (41.9%)
Previous Hospitalization	Yes	210 (85.4%)
	No	36 (14.6%)
Invasive Treatment	Yes	179 (72.8%)
	No	67 (27.2%)
Coronary Artery Bypass Grafting	Yes	24 (9.8%)
	No	222 (90.2%)
Percutaneous Coronary Intervention	Yes	160 (65.0%)
	No	86 (35.0%)
Medication Availability in Local Areas	Yes	194 (78.9%)
	No	52 (21.1%)
Side Effects of Drugs	Yes	43 (17.5%)
	No	203 (82.5%)
Complex Treatment	Yes	94 (38.2%)
	No	152 (61.8%)

The Morisky Medication Adherence scale was used to measure medication adherence; The MMAS is composed of four questions: (1) Have you ever left without taking medication? (2) Have you ever had difficulties remembering to take your medicine? (3) Sometimes, do you discontinue medication when you are feeling better? (4) Sometimes, when you feel worse when you take your medicine, you do not take it. Having a scoring scale of YES = 0 and NO = 1. MMAS=1: poor MMAS=2 or 3: Moderate MMAS=4: Good. The items are added up to get a total of 0 to 4 (Figure 1). Medication adherence was assessed using the Morisky Medication Adherence Scale (MMAS-4). Based on the standardized scoring, 99 (40.2%) patients demonstrated high adherence, 101 (41.1%) demonstrated medium adherence, and 46 (18.7%) demonstrated low adherence (Figure 1).

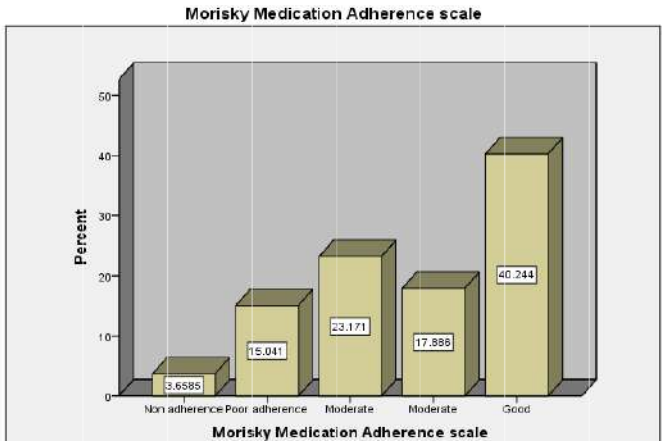

Figure 1: Morisky Medication Adherence Scale

The affiliation between medication adherence and its factors affecting medication compliance chi square test. Chi-square test showed no significant affiliation between the gender of the participant and medication adherence of the participant (X^2= 0.02, p=0.883). Similarly, there was no significant relation found between medication availability (X^2=0.138, p=0.710), cost of medication (x^2=1.644, p=0.439), and occupation of participant (X^2=1.519, p=0.911) and medication adherence of the participant. Socio-economic level of participant (X^2=0.744, p=0.689) as shown in, complexity of the treatment (X^2=2.830, p=0.092), and complementary treatment also showed no significant association with medication adherence of the participant (X^2=0.03, p=0.863), respectively (Table 2).

Table 2: Frequency of Medication Adherence Across Participant Characteristics

Risk Factors		n (%)	Chi-Square Test, x^2	p-Value
Gender	Male	128 (52%)	0.02	0.883
	Female	118 (48%)		
Cost of Medication	Own Money	74 (59.2%)	1.644	0.439
	Social Resources	50 (40%)		
	Family Support	68 (27.6%)		
Medication Availability	Yes	194 (78.9%)	0.138	0.911
	No	52 (21.1%)		

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Occupation	Jobless	73 (29.7%)	1.519	0.911
	Worker	41 (16.7%)		
	Farmer	19 (7.7%)		
	Staff	6 (2.4%)		
	Business	4 (1.6%)		
	House Wife	103 (41.9%)		
Socioeconomic Level	Lower	106 (43.1%)	0.744	0.689
	Middle	137 (55.7%)		
	upper	3 (1.2%)		
Complex Treatment	Yes	94 (38.2%)	2.830	0.092
	No	152 (61.8%)		
Complementary Treatment	Yes	44 (17.9%)	0.030	0.863
	No	202 (82.1%)		

DISCUSSION

The aim of the study was to ascertain the level of medication adherence and determinants of non-adherence to anti-hypertensive treatment in patients diagnosed with coronary artery disease (CAD) at tertiary care hospitals in Peshawar. The study comprised 246 patients, generally aged 57 years (with a similar proportion of men and women). According to our results, only 40.2% of patients had a good adherence level with medications, while 41.1%, 15% and the remaining (3.7%) were moderately adherent, poorly adherent, and non-adherent without any reported drug intake, respectively. Our findings suggest that well under half of CAD patients in our cohort attained optimal adherence, as has been reported elsewhere in other LMICs. No significant association was observed between adherence and sociodemographic/clinical data (Age, Gender, Occupational Classifying Groups, Socioeconomic Level, and cost/availability of drugs), level of complexity of treatment, or receiving complementary treatment. while p-values were reported to test for significance, effect sizes such as odds ratios were not calculated. This limits the interpretability of the findings, as we cannot quantify the strength or direction of the potential associations, even those that approached significance (e.g., treatment complexity, p=0.092). Future studies would benefit from employing regression analyses to provide effect size estimates, which offer a more nuanced understanding of factors influencing adherence." This indicates that adherence in our study sample depends on a more extended set of situational events and individuals' reasons, which are not completely covered by our variables. Similar studies in other areas have yielded different rates of adherence. An Ethiopian study of 384 patients had a compliance rate of 64.6% with co-morbidities, gender, knowledge on treatment, and proximity to hospital as predictors [10]. One study from Uzbekistan reported that 36.8% of patients were noncompliant to treatment, which was most closely associated with insufficient knowledge of the disease [11]. In India, poor adherence was found even in conditions like congestive cardiac failure and ischemic heart disease [12, 13], where it varied between 28.37% and 32%. Likewise, studies from the United States and the UK have reported cultural and linguistic barriers and social support to be significant features of adherence [14, 15]. In Pakistan, adherence levels are also variable [16-18]. A study from Abbottabad found that 68.14% of patients were non-adherent, significantly associated with socioeconomic class and gender [19]. Conversely, a Karachi-based study reported 77% adherence, with patient regularity in medication intake as the strongest determinant [20]. Although our study did not find statistically significant associations, certain patterns were observed. Patients from lower socioeconomic backgrounds, those reporting medication unavailability, and those with treatment side effects tended to have lower adherence, although these trends did not reach significance. Factors such as forgetfulness, complex regimens, financial burden, and fear of side effects are commonly cited in the literature and were reflected in patient responses. Overall, our findings suggest that medication adherence among CAD patients in Peshawar is suboptimal, and while no single factor emerged as statistically significant, multiple personal and system-level challenges may contribute. Further research with larger sample sizes and qualitative approaches is needed to better understand barriers and develop targeted interventions.

CONCLUSIONS

This research examined the level of adherence to pharmaceutical medication and compared it with several factors for patients suffering to coronary arteriosclerosis who were being treated in Peshawar city tertiary-level hospitals. Less than half of all patients have good compliance while a substantial portion counts off and calls themselves moderate or poor compliance. And although there was no statistically significant association between any of the above factors and adherence quality, such patterns as mounting financial pressure, the compound nature of treatment, and side effects from medicines might impair one's ability to be adherent.

Authors Contribution

Conceptualization: SA
Methodology: SA, QUA, MA
Formal analysis: MS, BU
Writing review and editing: QUA, AU

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

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Conflicts of Interest

All the authors declare no conflict of interest.

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Association Between Social Support and Psychological Distress of Parents Having Children with Congenital Heart Disease

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ABSTRACT

Congenital heart diseases are prevailing around the globe in terms of their morbidity and mortality, which need special attention to address them appropriately. Congenital Heart Diseases not only affect the affected children but it drastically traumatizes their parents as well. **Objectives:** To determine the association between social support and psychological distress among parents having children with congenital heart disease in Peshawar. **Methods:** This analytical cross-sectional conducted at the Peshawar Institute of Cardiology over span of six-month period using convenience sampling; data were collected at one time without changing factors. Families with children were the sole focus. SPSS version 22.0 was utilised for data analysis after the DASS-13 and MSPSS questionnaires were used to collect the data. **Results:** The survey identified significant ($p<0.05$) predictors of psychological distress. Joint families had lower anxiety (14.9 ± 6.6 vs 11.0 ± 7.2, $p<0.001$) and depression scores (15.8 ± 8.3 vs 13.1 ± 7.4, $p=0.002$ A strong, statistically significant association was found between higher levels of social support and lower severity of depression (Fisher's Exact Test, $p<0.001$). Across all three psychological distress indicators. No significant gender differences in distress levels were observed. Parents in nuclear families reported significantly higher anxiety (14.9 ± 6.6) and depression (15.8 ± 8.3) compared to those in joint families (anxiety: 11.0 ± 7.2, $p<0.001$; depression: 13.1 ± 7.4, $p=0.002$). **Conclusions:** This study underlines how crucial social support is for mental health, in addition to age, education, and familial relationships.

INTRODUCTION

Congenital Heart Disease (CHD) refers to structural or functional abnormalities of the heart that are present at birth and interfere with normal cardiac physiology. It is classified into cyanotic CHD, where oxygen-poor blood enters systemic circulation, and a cyanotic CHD, where oxygenated blood is abnormally shunted but cyanosis is absent [1]. Psychological distress refers to emotional distress that is typified by stress, anxiety, and depression symptoms [2]. Income, education, and occupation are among the socioeconomic factors that shape access to healthcare and coping mechanisms. Social support refers to emotional, instrumental, and informational support given to individuals by family members, friends, and the community to reduce the burden of illness [3]. These aspects, psychological suffering, socioeconomic status, and social support, are inextricably linked to the family of CHD children. Emotional distress may be worsened by financial strain, low education, and caregiving responsibilities, and buffered by an adequate social structure of family, friends, and community and improve

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coping. The method of interaction is fundamental to assessing the outcomes of the mental health of parents and developing specific interventions. CHD is one of the most prevalent congenital abnormalities globally, with a prevalence of 9 to 10 out of 1000 live births. The prevalence of the disease is 8 to 12 cases per 1,000 live births in the Asian countries, and it is estimated to be between 10 and 15 cases per 1,000 live births in South Asia [4]. In Pakistan, CHD has been estimated to have 10-12 cases out of 1,000 live births, but due to underdiagnoses in rural and underserved areas there could be more cases than that. Peshawar Institute of Cardiology (PIC) is one of the facilities that offer specialized treatment, although due to limited resources and large patient numbers, the burden falls to families and healthcare systems [5, 6]. CHD is a significant cause of infant morbidity and mortality. Severe defects like Tetralogy of Fallot (TOF) and Transposition of the Great Arteries (TGA) require complex surgeries, while milder conditions such as atrial septal defect (ASD) and ventricular septal defect (VSD) may need less intervention [7]. Survival rates have improved through prenatal screening and surgical advancements, yet many patients face long-term complications, including arrhythmias, heart failure, and recurrent hospitalizations. Families must adapt to lifelong care needs, creating a sustained physical, emotional, and financial burden [8, 9]. Parents of children with CHD frequently experience heightened psychological distress due to constant uncertainty, repeated hospitalizations, and the threat of life-threatening emergencies. Anxiety and depression are common, particularly among mothers who carry the primary caregiving role [10, 11]. Financial challenges and caregiving responsibilities interfere with parents' daily living, professional commitments, and social relationships. Studies in Pakistan have shown that over half of parents of CHD children report significant dysphoria that limits social and occupational functioning [12]. Low income and poor education exacerbate the challenges of managing CHD. In Pakistan, where healthcare is costly and insurance coverage is limited, families rely on out-of-pocket payments, loans, or selling property to finance surgeries and treatments. Geographic barriers in Khyber Pakhtunkhwa (KPK) further restrict access, forcing families to travel long distances to urban centers like Peshawar. Limited parental literacy, particularly among women, restricts comprehension of medical advice and hinders timely health-seeking behavior [13, 14]. Social support is an important determinant of parental psychological well-being. Emotional support provides reassurance and reduces isolation, instrumental support helps in managing financial and practical needs, while informational support empowers parents to make informed decisions [12]. In South Asian cultures, extended families often share caregiving responsibilities, providing both emotional and financial help. However, the availability of such support is inconsistent, and in some cases, cultural norms increase pressure on mothers, who may face blame for the child's condition [13]. While congenital heart disease (CHD) is recognized globally as a leading cause of morbidity and mortality in children, evidence on the psychological impact on parents in Pakistan remains limited. Most existing studies focus on clinical outcomes or are conducted in high-income countries, which may not reflect the sociocultural and healthcare realities of Pakistani families.

This study aims to explore the association between perceived social support and psychological distress among parents of children with CHD in Pakistan.

METHODS

The present study used an analytical cross-sectional design to examine the association of psychological distress and perceived social support in parents of children with congenital heart disease (CHD). This is the type of design that is most suitable for determining associations and correlational relationships amongst variables that do not involve long-term follow-up and experimental control. The research was done in the Peshawar Institute of Cardiology (PIC), a tertiary care facility in Khyber Pakhtunkhwa, Pakistan, offering diagnostic, operating, and follow-up services to children with congenital heart issues. The research was carried out from September 2024 to January 2025, which included planning, recruitment, data collection, and analysis. Informed written consent of all the participants was obtained after receiving ethical approvals of the Institutional Review Board (IRB) of Khyber Medical University with ref no: IRC/24/92, PIC administration, and other regulatory authorities. Data collection was done by the principal investigator himself to ensure consistency and the confidentiality of the participants. Face-to-face structured interviews in an intimate environment were used to gather data in the pediatric cardiology outpatient clinic so as to achieve privacy and comfort. Sessions were approximately 20 minutes long, and the participants had been briefed on the objectives of the study and confidentiality. The investigator was present to clarify queries and ensure accurate responses. The study population comprised parents of children aged 1–10 years who were diagnosed with congenital heart disease, including ventricular septal defect (VSD), atrial septal defect (ASD), and patent ductus arteriosus (PDA). Parents with acquired heart conditions in their children, or those with pre-existing anxiety or depression, were excluded. Using Raosoft's sample size calculator with a 95% confidence interval, 5% margin of error, and a population size of 3000, the estimated sample size was 341 participants. This yielded a minimum required sample size of 341 participants. Stating a 50% response

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distribution ensures maximum variability and produces the most conservative (largest) sample estimate, enhancing representativeness. A convenience sampling technique was applied, recruiting parents who visited the PIC outpatient department for follow-ups or consultations. Data were collected through a structured questionnaire with three sections: (1) demographic details, (2) the Urdu-validated Depression, Anxiety, and Stress Scale-21 (DASS-21), and (3) the Urdu-validated Multidimensional Scale of Perceived Social Support (MSPSS). Both tools demonstrated strong psychometric reliability and cultural relevance in prior studies conducted in Pakistan. All analyses were performed using SPSS version 22.0. Before applying the Pearson Chi-square test, assumptions of expected cell counts (>5 in at least 80% of cells) were verified to ensure statistical validity. In cases where assumptions were borderline, Fisher's Exact Test was applied as an alternative for categorical comparisons. Additionally, correlation analyses were performed to assess the strength and direction of associations between perceived social support and continuous psychological distress scores. A p-value of <0.05 was considered statistically significant.

RESULTS

The demographic findings show that most parents were aged 31–40 years (40.5%), with nearly equal representation of males (50.4%) and females (49.6%). An independent samples t-test revealed no statistically significant differences in depression, anxiety, or stress scores between male and female participants (p>0.05 for all comparisons. indicating that psychological distress levels were similar across genders. Education levels varied, with 37% having primary to secondary education, while 32% were illiterate. More than half of the respondents (56.3%) lived in nuclear families, and 43.7% belonged to joint families. These characteristics highlight a diverse parental background relevant to understanding their psychological and social support needs (Table 1).

Table 1: Demographic Characteristics of Participants (n=341)

Variables	Category	n (%)
Age (Years)	20–30	103 (30.2%)
	31–40	138 (40.5%)
	41–50	100 (29.3%)
Gender	Male	172 (50.4%)
	Female	169 (49.6%)
Education Level	Illiterate	109 (32.0%)
	Primary–Secondary	126 (37.0%)
	Higher Secondary+	106 (31.0%)
Family Structure	Nuclear	192 (56.3%)
	Joint	149 (43.7%)

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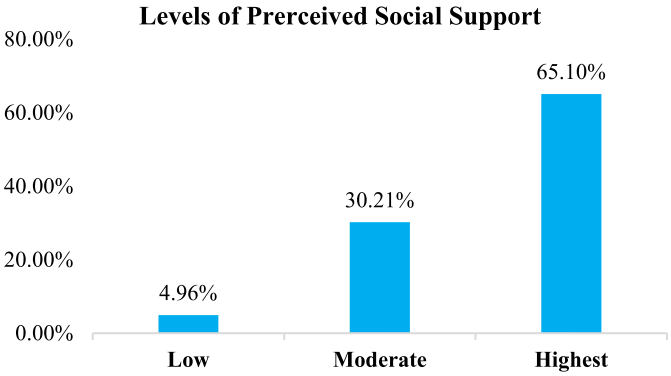

Figure 1: Percentage Distribution of MSPSS Social Support Categories

The DASS-21 depression scores show that most participants (140) report moderate depression. A comparatively smaller portion (119 participants) reports mild depression, and the smallest group (82 participants) reports severe depression. The box plot representing depression scores will illustrate the distribution across mild, moderate, and severe depression categories, highlighting the greater spread of scores in the mild and moderate categories compared to the severe category (Figure 2).

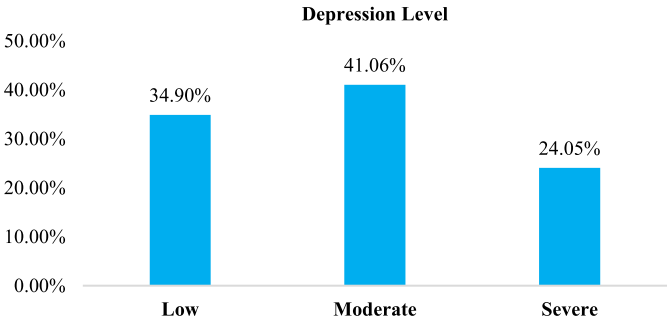

Figure 2: DASS-21 Depression Score Distribution

Anxiety scores, as measured by the DASS-21, out of the total participants, 96 report mild anxiety, another 109 report moderate anxiety, and 136 report severe anxiety. The box plot for anxiety scores will show the distribution of scores in each category (Figure 3).

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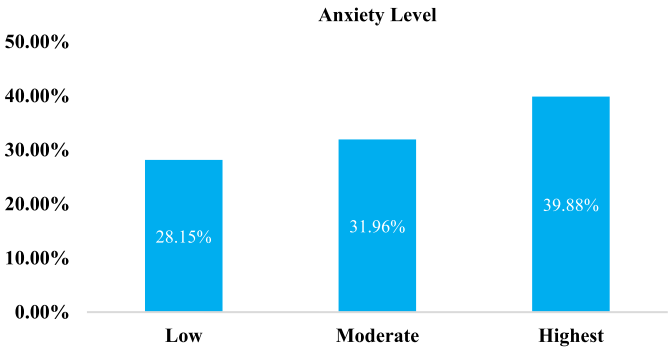

Figure 3: DASS-21 Anxiety Score Distribution

Three age categories were examined for variations in psychological distress: Category I (18–28 years; n = 107), Category II (29–38 years; n = 165), and Category III (39–55 years; n = 69). One-way analysis of variance revealed statistically significant differences between age groups for stress, depression, and anxiety ($p<0.001$ for all). Post-hoc analysis using the Games-Howell test indicated that the youngest parents (Category I, 18-28 years) reported significantly higher levels of stress, depression, and anxiety compared to both older age groups (Categories II and III). The differences between Category II and Category III were not statistically significant for any of the distress measures. These results indicate that younger age is associated with higher psychological distress in this population (Table 2).

Table 2: Age Group Differences in Psychological Distress Measures

Variables Categories	Age Category 1 (18-28)	Age Category II (29-38)	Age Category III (39-55)	Statistical Test	Effect Size
Stress	19.07 ± 3.84	16.23 ± 6.57	13.57 ± 7.05	F=18.39, p<0.001	η^2=0.098
Depression	16.77 ± 6.29	14.58 ± 8.81	10.81 ± 7.06	F=12.39, p<.001	η^2=0.068
Anxiety	15.27 ± 5.89	12.52 ± 7.47	11.04 ± 7.35	F=8.71, p<.001	η^2=0.049

Across all three psychological distress indicators—depression, anxiety, and stress— Fisher's Exact Tests demonstrated statistically significant associations with social support. The Pearson Chi-Square tests demonstrated statistically significant associations with social support. All p-values were below 0.05, confirming the rejection of the null hypothesis and the acceptance of the alternative hypothesis that social support significantly influences psychological well-being. The data consistently show a negative relationship between social support and psychological distress. Parents who receive high levels of support are substantially less likely to experience severe depression, anxiety, or stress, while those with minimal support are more vulnerable to these conditions. These findings highlight the protective role of social support in coping with the psychological challenges of raising a child with a serious health condition such as congenital heart disease. Interventions aimed at enhancing social support structures could therefore play a critical role in improving mental health outcomes for these parents (Table 3).

Table 3: Association Between Social Support and Psychological Distress Severity

Psychological Distress Measure	Social Support Level	Distress Severity, n (%)				p-Value
		Mild	Moderate	Severe	Total (n)	
Depression	Low	0 (0.0%)	42 (35.3%)	77 (64.7%)	119	<0.001*
	Moderate	0 (0.0%)	29 (20.7%)	111 (79.3%)	140	
	High	16 (19.5%)	32 (39.0%)	34 (41.5%)	82	
Anxiety	Low	0 (0.0%)	23 (24.0%)	73 (76.0%)	96	0.012*
	Moderate	9 (8.3%)	38 (34.9%)	62 (56.9%)	109	
	High	7 (5.1%)	42 (30.9%)	87 (64.0%)	136	
Stress	Low	0 (0.0%)	66 (32.0%)	140 (68.0%)	206	<0.001*
	Moderate	16 (14.0%)	23 (20.2%)	75 (65.8%)	114	
	High	0 (0.0%)	14 (66.7%)	7 (33.3%)	21	

DISCUSSION

The present study explored the relationship between social support and psychological distress in parents of children with congenital heart disease (CHD) and revealed important insights into the caregiving experience in a South Asian context. Findings demonstrated that anxiety was the most prevalent psychological concern among parents, followed by stress and depression, which aligns with international evidence indicating that uncertainty regarding the prognosis of children with chronic illnesses often amplifies parental anxiety [14]. Contrary to some earlier research in Pakistan, which concluded depression to be the most important issue, the study indicates otherwise in relation to the patterns of psychology, which may be a product of the sociocultural interaction and processes in the family [15]. The research also found that there were no significant differences between the genders as regards psychological distress, which is contrary to the evidence of other parts of the world where mothers tend to be more distressed because of their traditional caregiving responsibility. This finding may indicate the change in cultural norms in the South Asian region, where fathers are more involved in caregiving roles. This gender equality indicates the changing care-giving patterns, which tend towards the approaches of shared parenting when providing care to children with CHD. These transformations point to the necessity to re-examine traditional beliefs about gendered caregiving within this cultural context [16]. Age was found to be a major factor which is related to psychological distress. However, contrary to what some may have assumed, the older parents (18-28 years) experienced less stress, anxiety, and depression with the levels of distress tending to decline as the age of the parents increased. The result is in line with previous

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reports that younger parents might be more susceptible to disparate caregiving experiences, financial instability, and lower established coping practices. It can be assumed that the reduced distress levels in older parents may be explained by more substantial life experiences, advanced coping skills, and more stable socioeconomic status. These results underscore the need to support psychosocial interventions with the age-specific needs of caregivers [17]. Social support emerged as a critical protective factor against psychological distress. Family support was identified as the most significant source of assistance, consistent with previous research highlighting the centrality of extended family networks in South Asian cultures. However, an innovative finding of this study was that parents from nuclear families reported better psychological outcomes than those in joint family systems. This challenges the conventional belief that joint families always provide a supportive safety net, suggesting that interpersonal conflicts and lack of privacy within larger family structures may exacerbate caregiver stress [18]. Community and peer support were found to be less significant compared to family support, though still beneficial. This reflects cultural realities in South Asia where reliance on familial networks remains strong and peer-support structures are less developed compared to Western contexts. Previous literature from Western countries suggests that structured peer-support programs can significantly alleviate caregiver burden. The current findings suggest that while such programs may not replace familial support, they could be developed as complementary resources in South Asian societies to further reduce caregiver distress [19, 20]. The comparative analysis with broader literature reinforces that while global patterns of caregiver burden, such as stigma, financial stress, and emotional exhaustion, are consistent, the cultural context shapes the way social support moderates these burdens. The unique findings regarding gender equality in caregiving and the unexpected psychological outcomes of joint family systems provide new directions for research and interventions. These findings challenge assumptions rooted in cultural stereotypes and highlight the need for nuanced, context-specific approaches to supporting families of children with CHD [21]. Overall, this study makes a valuable contribution by situating the psychological experiences of parents within their sociocultural environment. It highlights the importance of recognizing shifting caregiving roles, addressing the vulnerabilities of older parents, and reassessing the effectiveness of traditional family structures in providing support. The results suggest that healthcare systems and policymakers should focus on culturally sensitive interventions, including gender-inclusive programs, resources tailored for older caregivers, and the development of peer-support initiatives. By integrating these findings into practice, more effective strategies can be designed to alleviate caregiver distress and improve the quality of care for children with CHD and their families.

CONCLUSIONS

In conclusion, this study highlights the critical role of social support from family, friends, and significant others in promoting psychological well-being among parents of children with congenital heart disease. Age, education, and family structure also influence mental health outcomes. Future research should further explore these relationships to develop personalized strategies that address the diverse needs of parents based on demographic and social factors.

Authors Contribution

Conceptualization: HU
Methodology: HU, SA, HA, SA, ID
Formal analysis: ID
Writing review and editing: DM, HA, SH

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

Conflicts of Interest

All the authors declare no conflict of interest.

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