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

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

ACKNOWLEDGEMENT

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TABLE OF CONTENTS

Editorial

Original Articles

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TABLE OF CONTENTS

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Confronting the Challenges of Nursing in Pakistan

OPEN ACCESS

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The healthcare system of Pakistan is silently in a state of crisis, which is an under-supported and under-valued nursing workforce. The system is perilously doctor-centric, with only 5.2 nurses per 10 000 people and a ratio of nurses to doctors of only 0.4. Thousands of nurses quit their jobs because of low wages, high workloads, and opportunities, leaving hospitals with no choice but to employ underqualified workers. Although the stigma attached to the profession is slowly disappearing-which has attracted more men into the profession-lack of nurses in leadership and decision making positions has continued to hamper progress.

The world market is experiencing a surge in demand of nurses. The world is going to experience a lack of more than 4 million nurses by the year 2030. Nations such as Qatar and the UAE already rely on foreign nurses to do more than 98 percent of their jobs. Pakistan has meanwhile made little headway. Although the number of nurses registering overseas is expected to increase by 33 percent yearly between 2014 and 2024, the proportion of nurses among highly qualified emigrants remains low at 5.8 percent. One of the reasons is the broken nursing education system in Pakistan.

Most of the nursing colleges particularly unregulated private colleges graduate nurses with no practical training. Graduates are not prepared because of theory-practice gaps, obsolete curricula, and a shortage of simulation equipment. The gap between the academic institutions and clinical practice is grim and not many faculty members have actual hospital experience. In addition, nurses face difficulties in international mobility because it is expensive, national curriculum are obsolete and there is little government support. Pakistan needs to take decisive action to alter this course. First, enhance retention: standardize compensation, decrease workloads, and provide tax advantage and career path. Second, transform nursing education through standardized testing, high-tech instructional materials, and specialization in accordance with the needs around the world. Third, reduce the clinical-academia divide by requiring faculty to be joint-appointed and immersed.

Lastly, in case of international placement, the government will have to redesign the national curriculum, obtain international accreditation, and promote nurses internationally. Exploitative private agents should be substituted with direct government-to-government recruitment models and the financial barriers should be minimized. Nurses are not mere support personnel they are the spine of the patient care. Nursing can no longer be a second thought in Pakistan, which is serious about developing a robust healthcare system and accessing the global demand. It is not only necessary, but it is overdue to face the challenges head on.

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Original Article

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Investigating Faculty to Student Incivility in Nursing Education: "Impact on Students' Learning Throughout Academic Journey "Khyber Pakhtunkhwa

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ABSTRACT

Faculty-to-student incivility is an evolving alarm in nursing education, undesirably influencing students' psychological well-being, academic performance, and professional development. Such behaviours, including impolite communication, favouritism, and lack of support, can delay students' learning environments and lead to long-term detachment from the profession. Despite its status, incivility remains underexplored in the context of nursing institutes in Khyber Pakhtunkhwa, Pakistan. **Objectives:** To explore the frequency and impact of faculty-to-student incivility on the academic journey of undergraduate nursing students in nursing colleges across different areas of Khyber Pakhtunkhwa. **Methods:** An analytical cross-sectional design was conducted. Data were collected through an online questionnaire using Google Forms. Verbal consent was obtained from participants, and the purpose of the study was clearly explained. The sample included undergraduate nursing students from various colleges across Khyber Pakhtunkhwa. Descriptive and inferential statistical analyses were conducted using SPSS version 26.0. Results: The findings revealed a high prevalence of incivility, with the most frequently reported behaviours being verbal discouragement, lack of constructive feedback, and favouritism. A significant negative correlation was found between faculty incivility and students' academic motivation, self-esteem, and classroom participation. Furthermore, female students reported experiencing higher levels of incivility compared to their male equals. **Conclusions:** Faculty incivility stances a serious challenge to student learning in nursing education. Promoting respectful faculty-student communication and implementing institutional policies against incivility can enhance educational outcomes and professional development.

INTRODUCTION

Being courteous and pleasant in demeanor and discourse is the definition of civility. Being civil is treating others with courtesy and making sure their dignity is upheld. Establishing and promoting a safe workplace is a crucial aspect of a nurse's employment. Research indicates that rudeness and other undesirable behaviors are not unusual in the nursing field [1]. It would appear that the adage "nurses eat their young" was used to describe nurses from a previous generation. As they learn to negotiate the complicated world of health care, many novice nurses encounter a harmful service route in their first employment [2]. Bullying, incivility, harassment, lateral/horizontal aggression, and disruptive behavior are some of the adjectives used to describe this detrimental behavior. In nursing education, faculty-to-student incivility is recognized as a universal issue that harmfully affects the learning environment and student outcomes [3]. In the dynamic site of academia, the relationship between faculty

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and students holds huge significance, shaping the educational journey of learners. On the other hand, rudeness between teachers and students is seen as a mutual problem that has a detrimental effect on the learning environment. Faculty members may have emotional effects such as lower work satisfaction, nervousness, and burnout, while students may experience lowered self-esteem, a feeling of community, and an overwhelming sense of belonging [4]. Additionally, rudeness harms the organization (lower student and teacher effectiveness and higher faculty and student attrition) [5]. Faculty-to-student incivility encompasses a spectrum of behaviours ranging from dismissive attitudes and disrespectful communication to overt hostility and unfair treatment exhibited by faculty members towards students. Classroom rudeness has grown to be a major problem at universities. An atmosphere of contempt is created in the classroom by both students and staff, which lowers the standard of academic services produced for the students' business [6]. Academicians' attempts to create welcoming and encouraging learning environments are harmed by uncivilized student behavior, which can also have an impact on the standard of education provided. Instances of incivility from faculty remain prevalent, posing significant challenges to the academic community. Every educational institute needs to focus on educating faculty and staff regarding civility [7]. Research studies have frequently demonstrated that rudeness is an interaction in which both the instructor and the students engage. Of them, 88% had encountered rude behavior from faculty members [8]. Unfortunately, compared to other disciplines, nursing education appears to be seeing an increase in the occurrence of students acting rudely toward instructors. Nurse educators are concerned about this situation because a lot of Canadian nursing students reported experiencing rude behaviours like being late for class, talking in class, leaving early, general taunts or disregard for faculty, employing a computer for non-class purposes, or making disapproving groans. They concluded that an unruly student is more probability to turn into an unruly nurse, which could endanger patient safety and the atmosphere of work [9]. Even though schools try to create friendly environments, some teachers still behave badly toward students, which makes learning hard [10]. According to Zhu, more than 40% of participants reported experiencing various types of rudeness, such as disrespect, being ill-prepared for class, and abruptly canceling planned events. According to the research, rudeness is caused by several important elements [11]. Faculty-to-student incivility disrupts the transformative academic journey, fostering an atmosphere of distrust and hindering students' intellectual and personal growth, as well as their academic performance and motivation to succeed [12]. In nursing education, students learn professional culture from their instructors, but often encounter aggression and hostility instead of support, leading to negative outcomes like dropout rates and dissension. Understanding the root causes of academic incivility is crucial for improving student experiences and patient care [13]. Addressing faculty-to-student incivility necessitates a comprehensive strategy involving both individual and institutional actions. Faculty development programs emphasizing communication skills, conflict resolution, and cultural sensitivity are essential for fostering positive faculty-student relationships. Additionally, institutions should implement policies and support systems to promptly address incivility and foster a culture of respect and professionalism in academic settings [14].

This study aims to examine the impact of faculty-to-student incivility on student learning throughout the academic year, exploring its prevalence, manifestations, consequences, and potential interventions.

METHODS

An analytical cross-sectional study was conducted to investigate faculty-to-student incivility in nursing education and its impact on students' learning throughout their academic journey in Khyber Pakhtunkhwa, Pakistan. The study focused on nursing educational programs across various colleges in Khyber Pakhtunkhwa, including institutions in Swat, Buner, Dir, Mardan, Swabi, Charsadda, and Peshawar. The study population consisted of BSN (Bachelor of Science in Nursing) students enrolled in government, semi-government, and private institutions offering four-year nursing programs. Regular BSN students from these institutions were invited to participate. Data were collected through convenient sampling online using a Google Forms questionnaire. The link to the questionnaire was shared via WhatsApp and email with nursing colleges across the specified regions. A total of 117 students completed the survey. Participants included nursing students enrolled for more than one year in the nursing department and regularly attending classes. Exclusion criteria were students with less than one year of experience or those from non-nursing departments. and those unwilling to share information. The questionnaire, adapted and modified for this study, consisted of four sections: 1st section contains demographic data such as age, gender, GPA range, study year, and institution type. 2nd section contains yes or no questions assessing students' emotional impact on motivation, academic performance, and any support by friends or administration when experiencing faculty incivility. 3rd section consists of Measurement and Policy Implementation Suggestions that

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measure to address and evaluate incivility and make policy to alleviate incivility. The 4th section contains a Likert Scale questionnaire having 11 behaviours that was handed over to the students and asked to mark the behavior of each item through a civility extent to which they agree or disagree with each from "Strongly Agree=5. Agree=4, neither agree nor disagree=3, disagree=2, Strongly Disagree=1 to assess student perceptions of incivility and its impact on their learning throughout the academic journey. The sample size was calculated using Rao-Soft software, with a 95% confidence level, a 5% margin of error, and a response distribution of 50%. And calculated a sample size of 117. Cochran's formula includes a 5% margin of error, 50% response distribution, and a 95% confidence interval; then, a sample size of 117 is appropriate. Data were analyzed using SPSS version 26.0. Frequencies and percentages were calculated for demographic characteristics and responses, with results presented in tabular form. For assessing the reliability of the questionnaire, the Cronbach's alpha coefficient was calculated. A Cronbach's alpha of 0.8 indicates a high level of internal consistency among the items in the questionnaire. This suggests that the items effectively measure the same underlying construct—faculty-to-student incivility and its impact on students' learning outcomes.

RESULTS

The total number of participants was 117. where the number of male was 50% and 50% were female, while among the respondents, the number of Pashtun respondents was in the majority. The 71.2% participants responded that holding a GPA range was (2.6-3.0) mean that getting an average GPA indicated that their learning environment is good too much/or any factor responsible for triggering incivility that causes impairment in the academic journey while (20.3%) of participants strive to get a high GPA in any case and manage uncivil behavior of faculty and understand the reason of incivility. The participants involved in the research study were 5.1% from the government nursing institute, 22.0% from the Semi-government, and 71.2% from Private nursing institutes. The experiences of the different participants and uncivil behaviours faced by students from faculty during the academic journey (Table 1).

Table 1: Demographic Characteristics

Variables		n (%)
Age Group	17-19	6 (5.1%)
	20-22	110 (93.2%)
Gender	Male	50%
	Female	50%
Race	Pashtoon	112 (94.9%)
	Panjabi	2 (1.7%)
	Chitrali	2 (1.7%)
GPA Range	2.0 - 2.5	7 (5.9%)
	2.6 - 3.0	84 (71.2%)
	3.2 - 3.5	1 (20.8%)
	3.6 - 4.0	24 (20.3%)
Study Year	1st Year	12 (10.2%)
	2nd Year	36 (30.5%)
	3rd Year	10 (8.5%)
	4th Year	58 (49.2%)
Type of Institution	Government	6 (5.1%)
	Semi-Government	26 (22.0%)
	Private	84 (71.2%)
Total	117	117 (98.3%)

Results represent the response of incivility closed-ended question (15.3%) responses was yes mean that they facing incivility but cannot specify the form of incivility they faced. (36.2%) individual response was no and they did not notice any type of incivility from faculty they only focused on studying to get a high GPA and ignored uncivil behavior as they responded positively to each behavior (Table 2).

Table 2: Emotional Impact of Faculty Incivility on Motivation and Academic Performance: The Role of Peer and Administrative Support

Sr. No.	Variables	Response	n (%)
1	Have you ever experienced incivility from faculty members during your nursing education?	Yes	18 (15.3%)
		Ignoring Questions	11 (45.7%)
		Nothing	59 (96.6%)
		Disrespectful Language	24 (36.2%)
		No	4 (3.4%)
2	Did the emotional impact of faculty in-civility affect your motivation to learn?	Yes	86 (74.1%)
		No	30 (25.4%)
3	Do you believe that faculty incivility has affected your academic performance?	Yes	74 (63.8%)
		No	42 (36.2%)
4	Do you feel supported by your peers When experiencing faculty incivility?	Yes	60 (63.8%)
		No	54 (58%)
5	Do you feel supported by the administration or Academic staff, when experiencing faculty incivility?	Yes	56 (48.3%)
		No	60 (51.7%)

The table highlights the prevalence and impact of faculty incivility on nursing students. A majority (59.8%) reported experiencing incivility at least occasionally, with 35.0% encountering it occasionally and 24.8% frequently, while only 10.3% never experienced it. Regarding its impact, 70.1% stated that incivility hindered their learning, with 40.2% reporting it as somewhat hindering and 29.9% as significantly hindering. A smaller proportion (10.2%) perceived a positive impact, while 19.7% reported no effect. These findings emphasize the need for institutional strategies to address faculty incivility and create a more

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supportive learning environment for nursing students (Table 3).

Table 3: Prevalence and Impact of Faculty Incivility on Nursing Students' Learning Experience

Sr. No.	Variables	Response	n (%)
1	How frequently have you encountered Incivility from faculty members?	Rarely	23 (19.7%)
		Occasionally	41 (35.0%)
		Frequently	29 (24.8%)
		Always	12 (10.3%)
		Never	12 (10.3%)
2	How has faculty incivility affected Your learning experience?	Significantly Hindered	35 (29.9%)
		Somewhat Hindered	47 (40.2%)
		No Effect	23 (19.7%)
		Somewhat Enhanced	6 (5.1%)
		Significantly Enhanced	6 (5.1%)

In estimating observations of faculty dealing in nursing programs, varying points of agreement were described in several statements. For example, 4.3% of respondents strongly agreed that faculty members treat the students with respect, while 50.9% agreed. In disparity, 60.3% strongly agreed that faculty communicate clearly and efficiently. However, concerns were also manifest, with 4.3% strongly agreeing that the program unfairly fines students for minor mistakes and 4.3% representing that the experience of faculty incivility negatively impacts their learning capacity. A notable 6.9% believed the program's environment is hostile, while 2.6% felt supported by peers or administration when faced with faculty incivility. Generally, these results highlight both positive perceptions and important concerns about the faculty-student dynamic within nursing programs (Table 4).

Table 4: Please Indicate the Extent to Which You Agree or Disagree with Each of the Following Statements

Sr. No.	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Neither
		n (%)				
1	Faculty members in my nursing program treat student s with respect.	5 (4.3%)	54 (50.9%)	24 (71.6%)	28 (95.7%)	5 (4.3%)
2	Faculty members in my nursing program communicate clearly and effectively	70 (60.3%)	21 (78.4%)	22 (97.4%)	3 (2.6%))	0 (0)
3	Faculty members provide constructive feedback on student work	3 (2.6%)	60 (54.3%)	28 (78.4%)	23 (98.3%)	2 (1.7%)
4	Faculty members are approachable and open to students' concerns	2 (1.7%)	59 (52.6%)	29 (77.6%)	22 (96.6%)	4 (3.4%)
5	Faculty members in my nursing program show favoritism towards specific students	5 (4.3%)	39 (37.9%)	21 (56.0%)	50 (43.1%)	1 (0.9%)
6	Faculty members in my nursing program use appropriate language or tone toward students	6 (5.2%)	41 (40.5%)	43 (77.6%)	23 (97.4%)	3 (2.6%)
7	Faculty members in my nursing program unfairly fine students for minor mistakes	5 (4.3%)	48 (45.7%)	30 (71.6%)	28 (95.7%)	5 (4.3%)
8	Experiencing faculty incivility negatively impacts my ability to learn	5 (4.3%)	48 (45.7%)	31 (72.4%)	27 (95.7%)	5 (4.2%)
9	I believe my program's environment is hostile	8 (6.9%)	48 (48.3%)	31 (75.0%)	27 (98.3%)	2 (1.7%)
10	I feel supported by my peers when I experience faculty incivility.	3 (2.6%)	51 (46.6%)	29 (71.6%)	28 (95.7%)	5 (4.3%)
11	I feel supported by the administration or academic staff when I experience faculty incivility.	10 (8.5%)	20 (17.1%)	35 (29.9%)	22 (18.8%)	30 (25.6%)

Chi square test has been applied which show the result p-value: 1.62e-08 The p-value is significantly less than 0.05, indicating that there is a statistically significant association between the type of institution and the experience of faculty incivility. The observed frequencies of incivility differ from what would be expected under the null hypothesis of independence. Thus, the results suggest that the type of institution (government, semi-government, private) significantly influences the likelihood of experiencing faculty incivility in this study.

DISCUSSION

This study examined the impact of faculty-to-student incivility on nursing students' learning experiences in Khyber Pakhtunkhwa, Pakistan. Findings highlight widespread faculty incivility, negatively affecting students' motivation, academic performance, and well-being. Faculty-student incivility remains a significant challenge in academic interactions [15]. Understanding the scope and impact of faculty incivility is crucial for identifying challenges faced by nursing faculty and developing effective strategies to mitigate its negative effects [16]. Although some students could not identify specific instances, their acknowledgment of incivility highlights the need for greater focus on faculty-student dynamics in nursing education. Previous studies highlight faculty

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incivility, including ignoring questions, using disrespectful language, and favoritism, which can damage students' self-esteem and create a disengaged, mistrustful learning environment. These behaviors align with literature indicating that faculty incivility disrupts the academic experience, leading to anxiety, stress, and reduced motivation [4, 5]. Students' decision to drop out of the nursing program was linked to their categorization of certain rude behaviors, such bullying [17]. Furthermore, uncivil behavior might have detrimental effects that include both psychological and physical problems, such as emotional anguish and sleep disturbances [18]. According to earlier research, clinical faculty members have wrongfully accused, harassed, and intimidated nursing students. According to a study's findings, more than 70% of the 356 participants thought that rudeness in nursing school was a moderate to significant issue that had gotten worse over the previous five years [17]. According to Clark, more than 40% of participants had encountered rudeness in the form of disrespect, ill-preparedness, and abrupt cancellations. Additional instances of rudeness, including emotions of unwelcomeness, disregard, inequity, and a lack of professionalism, were brought to light by the meta-synthesis [17]. Incivility extends beyond specific behaviours, having wide-reaching implications. It adversely affects individual faculty members, strains faculty-student relationships, and negatively impacts the overall educational experience [19, 20]. Some variables, including conventional and dull teaching techniques and inadequate classroom management, contributed to ineffective teaching and learning. One of a teacher member's professional responsibilities is to possess sufficient information and the capacity to correctly impart it to pupils; failing to do so is regarded as impolite behaviour [21]. According to the current survey, faculty members' most common rude behaviours were being late for class, departing early or cancelling courses without warning, and using mobile phones in class [22, 23].

CONCLUSIONS

It was concluded that the results of this study highlight the significant impact of faculty-to-student incivility on students' learning experiences in nursing education. The emotional, psychological, and academic consequences negatively affect students' well-being and academic achievement. Nursing programs should prioritize addressing this issue through faculty development, effective communication, and policies that promote civility, respect, and professionalism. By fostering a supportive and respectful learning environment, institutions can enhance students' academic performance and contribute to the development of knowledgeable, empathetic, and resilient healthcare professionals.

Authors Contribution

Conceptualization: S
Methodology: S, SS, IAA. MN, TT, FR
Formal analysis: S
Writing review and editing: AR, SA, FR

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

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Cultural Competence among Nurses Working in Tertiary Care Hospitals of Peshawar

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ABSTRACT

The importance of cultural competency among nurses in diverse healthcare settings cannot be underestimated. Understanding cultural differences is essential for effective patient care. Cultural competence is vital globally, especially in places like Peshawar, Pakistan, with a growing migrant population. Despite a shortage of nurses, their role in fostering cultural understanding is crucial. Assessing nurses' knowledge of cultural competence in Peshawar's major hospitals is vital, offering insights for targeted training programs and improving healthcare. **Objective:** To assess the cultural competence levels of registered nurses in tertiary care hospitals of Peshawar and identify factors influencing their cultural awareness and sensitivity. **Methods**: A cross-sectional study in four major tertiary care hospitals in Peshawar, Pakistan, utilized a convenient sample of 268 registered nurses directly involved in patient care were surveyed using an adopted questionnaire of 11 questions on culture competencies. Data analyzed using SPSS version 21.0. Ethical approval was obtained from Rehman College of Nursing and hospital ethics boards while ensuring participant confidentiality, voluntary participation and informed consent. **Results:** Results showed 0.37% were adequately competent, 16.04% moderately competent, and 83.20% highly competent. The mean score was 17.65 with a standard deviation of 2.122. Participants' backgrounds, training attendance, and work experiences were considered in the analysis. **Conclusions:** The study revealed that elderly, veterans, especially those with extensive cross-cultural patient interactions, displayed greater cultural competence. This information is useful for tailoring culturally sensitive training programs to the nurses who will benefit the most from them.

INTRODUCTION

Cultural competency among nurses is essential for providing inclusive and effective healthcare in a diverse setting. The term "Cultural Competence" is composed of the words "Competence" and "Cultural." Some studies describe cultural competence as a spectrum or process, while others focus on culture and explore strategies to foster cultural competence [1]. Almutairi's Critical Cultural Competence (CCC) model, designed to guide healthcare professionals in delivering culturally competent care within multicultural healthcare environments. [2]. According to rural-to-urban migration trends, the population movement from rural regions to urban areas like Peshawar is expected to increase steadily. This shift brings together individuals from diverse cultural backgrounds, each with unique views on health, posing challenges for the healthcare sector especially for nurses. As ethnic and cultural diversity grows, so does the need for cultural competence in healthcare delivery [3]. Nurses who provide direct care on the frontlines must combine cultural sensitivity with patient safety awareness. This qualitative study explored how cultural differences impact clinical practice and communication between host and migrant registered

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nurses in New Zealand [4]. In nursing, cultural competence refers to the knowledge and understanding nurses have about the cultural backgrounds of their patients. Culture is a shared system of rules, meanings, values, and beliefs that significantly influence how people behave and think in the workplace [5]. Kersey-Matusiak (2012) emphasized that nurses must integrate and critically assess both their own values and those of their institutions to provide culturally sensitive, transcultural care [6]. Campinha-Bacote (2002) introduced a model highlighting cultural competence as an ongoing process crucial for effective healthcare delivery [7]. Glen (2015) explained convenience sampling as a non-probability sampling technique used for its ease of participant accessibility, often employed in practical research settings [8]. Due to globalization and international migration, nurses frequently care for individuals with varying cultural expectations and needs [1]. Cultural differences can significantly hinder the quality of care. Nurses lacking cultural knowledge and skills may struggle in cross-cultural interactions, which can result in unequal healthcare outcomes [9]. This study investigated how cultural competency, structural empowerment, and effective communication are interrelated among nurses in Saudi Arabia [10]. Today, cultural competence is globally recognized as a vital skill in nursing [1]. As nurses typically spend more time with patients than doctors do, they are in a unique position to prevent misunderstandings and promote positive outcomes [11]. The World Health Organization projects a global shortage of 9 million nurses by 2035, highlighting the urgent need to support and retain nursing staff. In Pakistan, the healthcare system currently requires about 60,000 more nurses to meet the growing demand [12, 13]. Cultural intelligence a concept introduced in the early 21st century within business and social psychology remains underutilized in healthcare [14, 15]. Though the importance of cultural competence in nursing was recognized over two decades ago and numerous theories were developed, gaps remain in its practical application and understanding [16]. Tools have since been designed to assess cultural competence and validated through psychometric testing [2]. Pakistan's five provinces—Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, and Gilgit Baltistan along with the Federally Administered Tribal Areas (FATA), are home to various ethnic groups and languages including Sindhi, Balochi, Pashto, Saraiki, Punjabi, and Hindko. These groups also differ in dietary habits, gender norms, and family structures. Understanding these variations is crucial for delivering effective and equitable care [9]. Andrews (1992) identified four major barriers that prevent nurses from delivering culturally competent care: disparities among ethnic groups, communication difficulties (including language and symbolism), religious ethical dilemmas, and a lack of trust or rapport between nurses and patients [3]. Such limitations hinder the delivery of holistic care, making it vital for nurses to understand the cultural contexts of their patients. While numerous international studies have explored nurses' cultural competence in terms of knowledge, attitudes, and practices, few have focused specifically on Pakistani nurses [9].

This study aimed to assess the level of cultural competence among nurses working in tertiary care hospitals in Peshawar, Pakistan. Its significance lies in identifying existing knowledge gaps and recommending areas for improvement. By analyzing nurses' cultural competency, the study seeks to inform training programs that enhance culturally sensitive nursing practices.

METHODS

A cross-sectional study was conducted from September 2024- December 2024 to assess the level of cultural competence among nurses. Ethical approval was obtained, and the IRB reference number was RCN/IRB/0071/2025. The study was carried out in four tertiary care hospitals two from the public sector and two from the private sector in Peshawar, Khyber Pakhtunkhwa, Pakistan. The target population included registered nurses affiliated with the Pakistan Nursing Council (PNC) who were directly involved in patient care. A convenience sampling technique was employed to recruit participants. This non-probability method allowed selection based on participants' availability, willingness to participate, and proximity to the researcher [8]. The sample size was calculated using Raosoft software, considering a known population of 876 registered nurses. With a 5% margin of error and a 95% confidence interval, the required sample size was determined to be 268 participants. An adopted questionnaire comprising 11 items was used to evaluate nurses' cultural competency. This tool assessed various dimensions of cultural awareness, knowledge, and interaction in healthcare settings. The total score was later categorized into three levels of competency: adequately, moderately, and highly culturally competent. Inclusion criteria included all registered nurses (BSN and General Nursing diploma holders) who were actively involved in direct patient care in the selected hospitals. Nurses in administrative roles or those not directly engaged in nursing care were excluded from the study. Data collection was followed by analysis using SPSS version 21.0. Descriptive statistics were employed to summarize demographic variables and cultural competency scores. Ethical approval for this study was obtained from the Ethical Review Board of Rehman College of Nursing and the respective hospitals. Written informed consent was taken from each participant. Participants were fully informed

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about the purpose of the study, and confidentiality and anonymity were assured. Any information provided was kept strictly confidential and disclosed only with the participant's consent.

RESULTS

The results of this research on cultural competency among nurses, conducted through comprehensive analysis using SPSS version 25, have yielded insightful findings. With a sample size of 268 nurses, the purpose of this study was to investigate and evaluate the degree of cultural competency in the Peshawar, KP and nursing profession. The qualification of most of the participants was BS in nursing (n=144, 53.7%). Among the 268 participants, (n=152, 56.7%) were unmarried. The age of most of the participants was 20-25 years (n=135, 50.4%). Most of the participants belonged to the Pashtun background (n=176, 65.7%) as shown in table 1.

Table 1: Demographic Characteristics of Participants (n = 268)

Characteristics	Frequency (%)
Age (Years)	
20-25 Years	135 (50.4%)
26-30 Years	94 (35.1%)
31-35 Years	27 (10.1%)
36-40 Years	9 (3.4%)
41 and above	3 (1.1%)
Marital Status	
Single	152 (56.7%)
Married	115 (42.9%)
Divorced	1 (4%)
Qualification	
BSN	144 (53.7%)
Post-RN	97 (36.2%)
Diploma (3 Years)	27 (10.1%)
Race/Ethnicity	
Pashtun	176 (65.7%)
Baloch	1 (4%)
Punjabi	6 (2.2%)
Chitrali	85 (31.7%)
Work Experience	
1-3 Years	178 (66.4%)
4-9 Years	63 (23.5%)
10-15 Years	19 (7.1%)
Above 15 Years	8 (3%)

The preponderance of the participants encountered patients from diverse cultural backgrounds in their work (n=168, 62.7%). The training session regarding cultural competency was attended by the participants (n=80, 29.9%) as shown in table 2.

Table 2: Assessment of Nurses' Exposure to Cultural Diversity and Training in Cultural Competency in Tertiary Care Hospitals of Peshawar

Sr. No.	Statements	Frequency (%)
1	How often do you encounter patients from diverse cultural backgrounds in your work?	
	Frequently	168 (62.7%)
	Occasionally	50 (18.7%)
	Rarely	36 (13.4%)
	Never	14 (5.2%)
2	Have you attended any training related to cultural competency before?	
	Yes	80 (29.9%)
	No	188 (70.1%)

The majority of the participants had 1-3 years of work experience (n=178, 68.4%) as shown in figure 1.

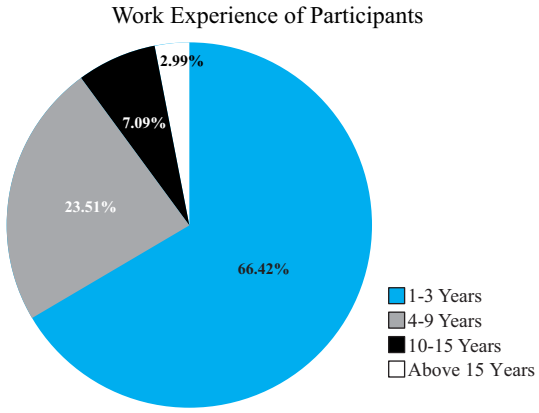

Figure 1: Distribution of Participants Based on Work Experience in Tertiary Care Hospitals

The questionnaire contained 11 questions with a total of 22 points. Three categories were made: (1 to 8) adequately culturally competent, (9 to 15) moderately culturally competent, and (16 to 22) highly culturally competent. The histogram revealed that only 0.37% were adequately culturally competent, 16.04% were moderately culturally competent, and 83.20% were highly culturally competent. The mean of the obtained number was 17.65, and the standard deviation was 2.122, as shown in figure 2.

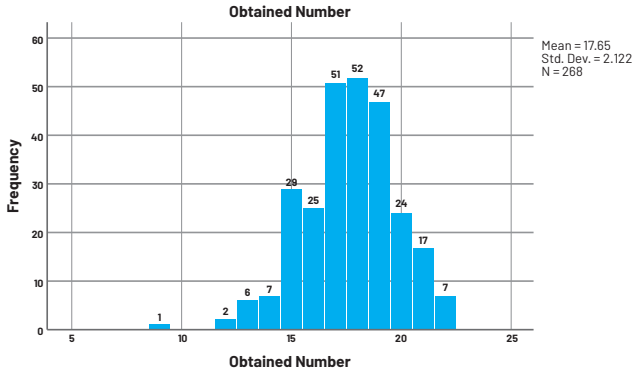

Figure 2: Distribution of Cultural Competence Scores Among Nurses (n = 268)

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DISCUSSION

The application of the present study was to measure cultural skills among nurses using a structured questionnaire consisting of 11 elements, each with three response options: never, sometimes, and always. The findings revealed that a significant majority of nurses were highly culturally competent, demonstrating an understanding of the importance of cultural competence in their practice. Comparing these findings with international studies, a cross-sectional study conducted among Chinese nurses reported an average cultural competence score of 101.7 out of 145, which corresponds to a 70.1% competency level, considered low to moderate [5]. This contrast may reflect differences in patient demographics, training infrastructure, or exposure to diverse populations. In contrast, a study conducted in the United Kingdom revealed a higher mean cultural competence score of 143.92 out of 205 with a standard deviation of 20.07, suggesting a broader awareness and perhaps more structured training in cultural care [18]. These findings align with the present study's conclusion that practical exposure significantly enhances nurses' cultural competence. The UK-based results may reflect the outcome of better integration of cultural education into the nursing curriculum and a multicultural healthcare system. A study conducted in Lahore, Pakistan, recorded an average cultural competency score of 24.31 ± 3.457, which, although measured using a different tool, also indicated awareness among nurses regarding culturally sensitive care [16]. Similar studies conducted across Punjab have shown consistent findings of moderate awareness but also highlighted a lack of formal training opportunities [16]. The results from the current study showed that only 0.37% of participants were adequately culturally competent, 16.04% moderately, and 83.20% highly culturally competent, with an overall mean score of 17.65 ± 2.122 out of 22. These findings are particularly interesting when considering that only 29.9% of the nurses had received any formal training on cultural competence. This indicates that the nurses' competence might be primarily derived from direct exposure to culturally diverse patients, especially given that 62.7% of the participants frequently cared for patients from different cultural backgrounds. This aligns with the work of Gallagher and Polanin (2015), who concluded through meta-analysis that cultural competence improves significantly with targeted educational interventions [10]. Moreover, the high levels of competence found among early-career nurses (68.4% having 1–3 years of experience) in the current study suggest that early exposure to a multicultural clinical setting may be just as critical as formal instruction. However, a lack of regular seminars and workshops related to cultural awareness was noted as a gap in the local healthcare system, consistent with observations from Saudi Arabia and Taiwan, where structured cultural training was shown to positively influence competence and communication [9, 13]. Despite a 100% response rate, generalizability of the findings is limited as the study was confined to four tertiary care hospitals in a single region. Future studies should include larger, more diverse samples from various provinces in Pakistan to provide broader insights. Based on the current results and literature comparison, it is recommended that the Pakistan Nursing Council and hospital administrations develop and implement regular workshops, simulation-based training, and continuous professional education programs to strengthen cultural competence among nurses nationwide. Such initiatives could significantly enhance culturally appropriate care delivery and bridge the existing gaps between theoretical knowledge and practical application. In addition to international studies, Turale *et al.*, (2020) emphasized the importance of international exposure in building cultural competence among undergraduate nursing students, arguing that real-world experiences in multicultural environments enrich future care practices [17]. This parallels the high cultural competence scores seen in the current study, where nurses were frequently exposed to diverse patient populations, despite the limited formal training. Zarzycka *et al.*, (2020) validated the Nurse Cultural Competence Scale in Polish, highlighting that structured evaluation tools can identify specific competence gaps and training needs among nurses [18]. The current study used a similar assessment strategy, though on a smaller scale, supporting the idea that such tools are valuable even in low-resource settings. Kaihlanen *et al.*, (2019) found that cultural competence training improved nurses' awareness and responsiveness to patients' diverse needs, but also noted that some training programs were too generic or theoretical [19]. This aligns with our finding that, despite limited formal training, practical exposure led to high competence suggesting that localized and experience-based learning might be more impactful than generic sessions. Finally, Loftin *et al.*, (2013) reviewed various tools and models used to measure nurses' cultural competence and concluded that integrating assessment with ongoing professional development leads to sustained competence improvements [20]. This reinforces the recommendation that the Pakistan Nursing Council and institutions should implement continuous, structured cultural training programs rather than one-time workshops.

CONCLUSIONS

It was found that nurses in this study demonstrated a high degree of cultural competency. Specifically, nurses with greater years of experience and age, who had extensive

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interaction with patients from different cultural backgrounds, demonstrated a deeper understanding of various cultures. These results can assist in identifying nurses who would benefit the most from cultural training and in creating training initiatives that are culturally sensitive.

Authors Contribution

Conceptualization: AZ
Methodology: AS, RA, KR, RU, AZ
Formal analysis: SS
Writing, review and editing: GR, RA, KR, AQ

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

Conflicts of Interest

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Explore Issues and Barriers to Internship among Graduating Students in Nursing Institutes in Khyber Pakhtunkhwa

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ABSTRACT

Internships are pivotal in shaping the professional course of graduating students, yet newly graduated nurses often confront a lack of confidence and preparedness for clinical roles, posing challenges as they transition from academia to practice. However, nursing students reportedly struggle to achieve the intended objectives of skill development, resulting in insufficient competence. **Objective:** To explore issues and barriers to internship placement among graduating students in nursing institutes in Khyber Pakhtunkhwa. **Methods:** A descriptive phenomenological qualitative design was used to explore participants' experiences. Ethical approval was obtained from the ERB of Khyber Medical University, Peshawar. Data were collected from seven purposively selected students through face-to-face, semi-structured interviews with open-ended questions. Interviews were conducted, recorded, transcribed, translated, and organized between October and December 2023. Colaizzi's seven-step framework guided the thematic content analysis. **Results:** Four main themes emerged from the study: institution-related problems, factors associated with regulatory bodies, issues linked to hospitals, and factors related to effects or outcomes. Nursing students encountered various barriers, including low motivation, inadequate monitoring of learning, lack of knowledge, improper rotation plans, absence of policies, insufficient supervision, inadequate stress-coping support, and challenges in managing time between theory and practical activities during their clinical internships. **Conclusion:** Graduating nursing students in Khyber Pakhtunkhwa face significant institutional, regulatory, and clinical barriers that hinder effective internship placement and skill development.

INTRODUCTION

A crucial component of nursing education is clinical training. Nursing students get the chance to make judgments, apply theories, prioritize interventions, learn to manage time, and put their clinical abilities into practice through clinical practice [1]. A study demonstrating that a structured educational program significantly improved the advanced nursing skills of internship students [2]. One of the key strategies in clinical education to close the knowledge gap between theory and practice is the internship. The last year of nursing school is when this strategy is applied into practice by offering internship [3]. An internship is a program that hires nursing students and graduates from authorized nursing institutes who practice nursing with a licensed working Registered Nurse (a preceptor) outside of any classes, courses, or curricula at nursing schools [3]. As the last clinical year and a prerequisite for the degree, the nursing internship exposes students to the hands-on practical experience of patient

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care in a healthcare context. One of the clinical experiences offered to nursing trainees is a 12-month rotation across several clinical settings [1]. Nursing internship programs reduce burnout and enhance professional commitment among nursing students [4]. A study reported that internship experiences positively impact students' satisfaction with their nursing education [5]. Learning how to give nursing care should not be the only thing interns do to prepare for clinical rotations. These rotations to cover external influences and techniques for handling difficult circumstances [6]. Nurses who have recently graduated from nursing school are in the process of changing from student nurses to registered nurses. They frequently experience what is known as "reality shock" or "transition shock" during this role transition process because of the gaps between what they have learned during nursing academic education and what they encounter in the practical environment, such as occupational stress and adaptation issues, as well as the gap between role expectations and real practice [7]. The relationship between nurse interns' satisfaction with their internship program and their perceived clinical competence, finding a positive correlation [8]. One important part of nursing education is clinical training, which is meant to help nursing interns gain the professional skills and attitudes that will improve the standard of care they provide to patients. The clinical learning environment, the quality of the clinical educator, and the technical proficiency of the nursing staff are all factors that affect clinical preparation. For nursing interns, clinical instruction and the clinical setting can be stressful [9]. For new nursing graduates, the internship experience is a demanding one that leads to anxiety on both an intrapersonal and interpersonal level. Furthermore, the majority of new graduates lack the necessary preparation and knowledge for handling critically ill patients and using contemporary medical technology and different areas of clinical practice [10]. Based on the available literature very few researches have been conducted in KPK about the difficulties nursing students face in getting internship placement after graduation.

This study aimed to explore such issues and barriers to internship placement among graduating nursing students in KPK.

METHODS

This qualitative study employed a descriptive phenomenological design to explore the issues and barriers encountered by graduating nursing students in Khyber Pakhtunkhwa during their internship placements. This approach enabled an in-depth understanding of the students' lived experiences, offering valuable insights into the challenges faced during this critical transition period [1]. This study carried out in selected nursing institute in Khyber Pakhtunkhwa who offer BS Nursing four-degree program. Graduates from three selected nursing colleges in a nursing institute in Khyber Pakhtunkhwa have completed their education are looking for internships at various hospitals, the selected institution: NCS-university system, North-west college of nursing and Farkhanda institute of nursing. Purposive sampling was used to select participants who have recently completed or are in the process of completing their nursing education in Khyber Pakhtunkhwa. Participants were chosen based on their experiences with internship placement to ensure the study's relevance. Purposive sampling aimed to choose a research sample that may give "information-rich cases" so that the study phenomenon's important topics can be explored [1]. The sample size was determined through data saturation, where data collection continues until no new themes or insights emerge from the interviews.7 participants were anticipated to achieve data saturation. A small number of participants were used in qualitative studies in order to conduct in-depth research. Based on data saturation, the study's sample size was determined. 7 participants from three nursing institutions participated in three focus group interviews, based on the following inclusion requirements: All nursing students were recent bachelor's degree recipients. Any student who had received an internship opportunity was excluded from the study. Semi-structured interviews were served as the primary data collection method in this study. A structured interview guide was adopted to ensure consistency in data from participants. The topic guide included a series of questions with probing questions to reduce the incidence of priming and errors. Interview guide developed, informed by the research questions, to facilitate open-ended discussions with participants. Interviews conducted face-to-face. Prior to each interview, participants provided with an informed consent form outlining the study's purpose, confidentiality assurances, and their rights as participants. Informed consent obtained from all participants before proceeding with interviews. The interviews were conducted in a quiet room and lasted between 15 and 25 min (mean time: 20 min), with no break. All interviews were conducted by a scholar (The audio recording, transcription and other supporting information were stored electronically on laptop. Thematic analysis was employed to analyze the qualitative data obtained from interviews. The process began with data familiarization, during which transcripts were reviewed multiple times to gain an in-depth understanding. Initial coding followed, with meaningful concepts and phrases assigned as codes. These codes were then grouped to develop potential themes and subthemes reflecting the issues and barriers

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to internship placement. Subsequently, the themes were reviewed, refined, and validated through collaborative discussions among the researchers. Finally, the findings were presented through narrative descriptions, supported by direct quotations from participants to enhance authenticity and depth. An interview guide was used to explore the views of participants. The guide was composed of 6 main questions. Each question was further explored with probing questions. The interview guide was evaluated by experts before conducting this study. **Rigor:** It was followed throughout conducting this study. Rigors is associated with trustworthiness in process of research and also to judge the value of qualitative studies [2, 3]. The classical criteria for rigor were maintained while handling this study, such as credibility, transferability, dependability, and conformability [4]. **Credibility:** It is the truthfulness of data after validating and conforming the result to the participants and expert to review that conclusion based on coding1. Credibility was maintained, check and review with an expert was done side by side while conducting this study. **Transferability:** It is the study outcome applicability and usefulness for other people with different context after providing the description1. This usefulness of this study is applicable in other context and the applicability is given in detailed later in chapter six of this study. **Dependability:** Also, call auditability, it is the way by which the researcher can follow the actual research and give similar results 1. In other words, study reflection with the same participants in the same context will give same outcome2. In this study the aspect of dependability was followed throughout, the responses and experience of most of the individuals were much similar and interrelated. **Conformability:** It is the neutrality and lack of bias in the researcher's point of view. The researcher idea can be identified from proposal 1. In other words, there is no discrepancy between study outcome and conclusion based on information gathered2. Upon completion of this study, no contradiction and bias were existed among the outcome, conclusion and information gathered [2]. Ethical considerations were included ensuring informed consent, confidentiality, and the right to withdraw from the study without consequences. A latter was sent to select nursing colleges principal for data collection Ethical approval was sought from the relevant ethical review board.

RESULTS

The findings derived from the thematic analysis of barriers faced by fresh graduate nurses' regarding paid internship", challenges to fresh graduate in internship. The data were thematically analyzed, and key themes emerged, providing insights into the various aspects of internship-related problems faced by the graduating students.

Thematic Analysis

Theme-1

Table 1: Themes, Categories, Codes, and Participant Narrations Highlighting Institutional Challenges to Nursing Internship Placement

Themes	Categories	Codes	Narrations/Verbatim
Institutional Challenges	Hospital associated	Requirements compromises	"Our internship requirement does not meet at the given hospital" **(P-7)**
		Non-qualified supervision	"LHV are teaching us at the bedside in hospitals" **(P-1)**
		Non-qualified supervision	"Many of the clinical staff working in the given hospitals are LHV" **(P-2)**
		Lower standard hospitals	"ICUs are not standard as per requirements" **(P-2)**
	Rotation plan	Complete rotation plan	"Institute has not made nor shared with us a complete plan for rotation" **(P-2)**
		No proper orientation	"No proper orientation in the hospital has given us" **(P-3)**
		Lack of policy implementation	"No proper implementation of existing policy" **(P-2)**
		Need for Proper orientation	"I would suggest that incoming students can be properly guided first" **(P-4)**
		No clinical rotations	"There are many colleges who don't give require clinical rotations to their student" **(P-2)**
	Barriers to objective achievements	Clinical objectives	"Our course objectives could not be achieved at the allocated hospitals" **(P-2)**
		Lack of internship objectives	"We have no internship objectives, we don't know how well we utilize our time in the hospital" **(P-3)**
		Need of qualified clinical staff	"We expect qualified preceptors who can guide us in our clinical rotations" **(P-2)**
		Need of qualified staff	"LHVs should not teach the nursing students in the hospitals" **(P-2)**
		Knowledge gap	"The hospital staff are not up to the standards who can teach nursing students as many of them are LHV's" **(P-2)**
		Lack of specialties	"Our hospital has no specific unit for psychiatric patients" **(P-2)**
		Cannot achieve all clinical objectives	"No proper unit for cardiology patient which can affect our learning" **(P-2)**
		Knowledge barrier	"Nursing staff are not well qualified and trained to teach nursing internee, many are diploma holders" **(P-7)**

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	Poor Monitoring	No attendance monitoring	"Many students lack attendance during internship but they are not properly monitored" **(P-2)**
		No check and balance	"Teacher just fine absent student but there is no check and balance" **(P-3)**

Theme-1: Institutional Issues and Challenges

Participants express frustration over the institute's failure to communicate effectively, particularly regarding hospital allocations for internships. This lack of transparency adds a layer of uncertainty, hindering students' preparedness for their internship experiences. A significant challenge lies in the absence of a well-defined rotation plan. These challenges collectively impede the comprehensive fulfillment of course and internship objectives.

Some of the participants share their experiences, reflecting the pervasive challenges within the institutional framework:

"Our internship requirement does not meet at the given hospital"(Participant-7).

"There was no proper orientation in the hospital given to us"(Participant 3).

"The hospital staff are not up to the standards, many are LHVs"(Participant 2).

Participants' voices shed light on the intricate issues affecting the holistic learning experience within the institution.

Theme 2

Table 2: Themes, Categories, Codes, and Participant Narrations Highlighting Regulatory Body Challenges to Nursing Internship Placement

Themes	Categories	Codes	Narrations/Verbatim
Regulatory bodies problems	Policy	Policy development	"Regulatory bodies should make a complete plan for internship" **(P-2)**
		Written policy	"Our internship and its placement has verbally communicated with us no documented policy made" **(P-7)**
		Documented plan	"Regulatory bodies shall provide us a documented internship plan" **(P-7)**
		Communication of policy with students	"The institute should share the internship policy with the student" **(P-7)**
		Implementation of policy	"the policy for an internship is made but unfortunately does not implement" **(P-2)**
		Lack of policy	"University has no proper policy for internship" **(P-3)** "Our institute has no written proper policy internship" **(P-4)**
		Role fulfillment	"The council does not properly fulfill their responsibilities regarding internship" **(P-2)**
		Effect of policy	"The policy can affect the health care system and the care workers" **(P-5)**
		Existence of policy	"No existence of a clear policy is affecting the health care provider, health care system, and the patient" **(P-5)**
		Effect of policy on students	"If there is no clear policy and no proper allocation of internship seats, then the student will join nonstandard hospitals just to fulfill formalities their learning will be affected. The regulatory bodies shall increase the number of allocated seats" **(P-5)**
		Enhancement policy	"The ratio of graduated students and graduated students is greatly different, there is no policy to adjust the extra students" **(P-6)**
		Focus on policy implementation	"regulatory bodies should strengthen and implement the developed policy" **(P-6)**
	Poor Monitoring	Defected Monitoring	"responsible bodies are blaming each other the counsel makes the university responsible and the university makes the institute responsible for internship" **(P-6)**
		Regular check-in balance	"Regulatory bodies do not instruct the responsible authorities nor the maintain check-in balance" **(P-5)**
		Need of monitoring	"Only two faculty members run the whole college, they are teachers, clinical instructors, and principals" **(P-5)**
		Regular visits	"regulatory bodies have made plans only they don't visit physically to see maintain check-in balance" **(P-2)** "I request PNC to pay regular visits to all registered institutes" **(P-1)**
		Over affiliations	"more than 150 institutes have granted registration so far, that is a huge problem" **(P-1)**
		Overproduction	"the institute and graduating students number is very much high" **(P-1)**
		Limited seats	"There are limited 100 seats available from the university which is very less in comparison to production" **(P-1)**
	Quality control	Disproportionate	"the graduating students are much more than available seat for internship" **(P-2)**
		Resources increase	"If I have given authority I will give 1000 seats to university for internship" **(P-1)**
		Monitor quality regularly	"I request PNC to pay regular visits to these institutes to check the quality" **(P-3)**

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		Quality control	"the regulatory bodies should check who is teaching these students" **(P-2)**
		Hurdles in quality maintenance	"the big problem is more than 150 institutes are registered, maintaining quality and regulation become harder for regulatory bodies" **(P-4)**
	Wastage of student time	Timely provision	"they should provide us internship on time" **(P-3)**
		Wasting of time	"Our three or four months are wasted in each semester every year and some exceed to year" **(P-2)** "The biggest issue is time. It takes a lot of time to start our internship" **(P-3)**
		PNC should regulate the timing	"PNC also has a big role in this, so they should see all the colleges, timing, their hospitals, and all the things, and they should inspect it" **(P-3)**
		Prolong wait	"When we graduate, we wait three to four months for the internship" **(P-3)**
		Wastage of time	"Now they are waiting for the result and after that will wait for the transcript because the KMU takes a lot of time thus our internship starts to be too late" **(P-4)**
		Lose of opportunities	"We receive our PNC license later than kmu graduates then we can not avail the good opportunities that will come later" **(P-3)**

Theme: 2 Regulatory Bodies Problems

The theme revolves around the challenges regarding the regulatory bodies overseeing the internship process. Participants express the need for regulatory bodies to establish a comprehensive and documented plan for internships. The absence of clear, implemented policies is a recurring issue, affecting the learning experience and overall healthcare system. Delays in obtaining licenses and transcripts affect opportunities and contribute to frustration among students.

Some of the participants share their experiences, reflecting the Regulatory Bodies Problems:

"I request PNC to pay regular visits to all registered institutes"(P-1)

"The biggest issue is time. It takes a lot of time to start our internship"(P-3)

"Regulatory bodies shall provide us a documented internship plan"(P-7)

"The policy for an internship is made but unfortunately does not implement"(P-2)

"Our institute has no written proper policy internship"(P-4)

"The policy can affect the health care system and the care workers"(P-5)

These challenges collectively underscore the importance of regulatory bodies in shaping a more effective and streamlined internship process within the healthcare education system.

Theme-3

Table 3: Themes, Categories, Codes, and Participant Narrations Highlighting Hospital-Related Factors Affecting Nursing Internship Experience

Themes	Categories	Codes	Narrations/Verbatim
Hospital factors	Knowledge barrier	Knowledge gap	"LHVs are teaching us who have a big knowledge gap" **(P-1)**
		Non-qualified hospital staff	"overall hospital staff are not adequately qualified" **(P-2)**
		Communication barrier	"If we ask a question they reply that they can't answer our question because they do not have that qualification" **(P-2)**
		Effect of lower standards on learning	"When we saw most of the staff are inadequately qualified our expectations reduced" **(P-2)**
		Knowledge difference	"hospital is not of our level in knowledge because they are not graduated" **(P-2)**
		Seniors as guide	"Seniors are mostly cooperative but some seniors are such that they cannot guide us properly" **(P-4)**
		Low knowledge level of hospital staff supervising internship	"the nurses working in the hospital have low knowledge level" **(P-7)**
	Facilitating factors	The internship will improve my critical thinking and practical skills	"We can enhance our skill, critical thinking and professional development in the hospitals" **(P-7)**
		Internship as a route to professionalism	"internship is a stage where we can learn professionalism" **(P-7)**
		Improves confidence	"with hospital duty, our confidence level will be increased" **(P-5)**
		Psychomotor development	"we will learn practical skills in the hospital duty and strengthen which we already learned" **(P-5)**
		Our cooperation and senior support can reduce stress	"we will try by cooperating with our seniors and getting their support, and can cope with these things and relieve our stress" **(P-4)**
		Improvement of communication skills	"Our communication will improve well" **(P-4)**
		Exploring the Hidden Capabilities	"we can explore our hidden capabilities in the hospital" **(P-2)**

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		Students have plans already shared	"Our hospital has developed a proper plan that the students are coming and also made a complete rotation plan" **(P-2)**
		Nursing rounds inward for internees should encouraged	"So there should be proper sessions related to nurses as it is for doctors from the hospital side" **(P-4)**
		Seniors as guides	"We have senior nurses in the hospital wards who teach us" **(P-1)**
	Hindering factors	Lack of Availability of equipment for training	"the equipment in the hospital is not according to the need or standard" **(P-2)**
		Language barrier	"Many supervisors in the hospital cannot speak proper English or Urdu they talk in their mother language which is hard to understand" **(P-2)**
		Non-availability of all specialties in the hospital	"if we see in our allocated hospital there is no proper ward/unit for psychiatric patient" **(P-2)**
		Low learning facilitation	"I believe that we will not learn effectively in the hospitals as they not facilitating us" **(P-2)**
		Non-learning conducive environment	"the environment of the hospital is not learning conducive" **(P-2)**
		Lack of skills development	"This will affect our clinical skills, but their taught skills are also not up to the standards" **(P-2)**
		Lack of guidance	"if we got a question or issue in the hospital we search that on YouTube or study through other means" **(P-2)**
		No proper orientation	"I would suggest that as many incoming students can be properly guided first " **(P-3)** "There is no proper orientation for us" **(P-1)**
		Lack of service acknowledgment	"Meaning we go there and we are not getting the importance of the way these students did because they came before us" **(P-3)**
		Lack of SOP's	"And we expect to see the wards related to all protocols ahead" **(P-3)**
		Staff shortage	"Hospital is, that they take work from internee as a staff nurse because there is a shortage of staff in the hospital and they don't recruit new staff" **(P-3)**
		Workload effects learning	"the time in which the internee should learn is missed because of work overload" **(P-3)**
		Night duties may affect the learning	"Apart from this, they also give night shift, a major drawback is that since it is the first exposure of the internet, this problem should also be solved" **(P-3)**
		Low patient flow affects learning	"North West which has very little patient setup" **(P-4)**
		Far away internship provision	"The internship placement should not be very far away from home" **(P-6)**

Theme 3: Hospital Factors

The theme of hospital factors encompasses various dimensions that significantly impact the internship experience for nursing students.

Participants express concerns about a knowledge gap among hospital staff, including Lady Health Visitors (LHVs), and note that the overall qualification of hospital staff falls short of expectations. Instances of staff being unable to answer questions due to qualifications pose challenges for learning

Some experiences shared by Participants:

"Our communication will improve well"(P-4)

"We can explore our hidden capabilities in the hospital"(P-2)

"We have senior nurses in the hospital wards who teach us"(P-1)

"I would suggest that as many incoming students can be properly guided first"(P-3)

"The internship placement should not be very far away from home"(P-6)

"We will learn practical skills in the hospital duty and strengthen which we already learned"(P-5)

"Internship is a stage where we can learn professionalism"(P-7)

In short, the hospital factors theme encapsulates a complex interplay of challenges and opportunities, highlighting knowledge barriers, facilitating factors for professional growth, and hindering factors that affect the overall learning environment for nursing students during their internships.

Theme-4

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Table 4: Themes, Categories, Codes, and Participant Narrations Highlighting Effects and Coping Outcomes of Internship Challenges among Nursing Student

Themes	Categories	Codes	Narrations/Verbatim
Effect / Outcome	Stress	Stress	"The student got stressed due to problems in internship" **(P-1)**
		Depression	"a student four years in completing his degree and by fifth year if he came to know that there is no hospital allocated to complete his internship and receive the degree, ultimately he will be getting depression" **(P-6)**
		Novice stress	"The internship is new starting that is why it is very stressful for the students" **(P-1)**
		Stress of uncertainty	"the student is uncertain about the place they will be getting their internship, it is a tough time for them" **(P-2)**
		Workload effects learning	"The time in which the internee should learn is missed because of work overload" **(P-3)**
		Stressor	"if the hospital has a huge work burden the internee will face multiple stressors" **(P-3)**
		Stress due to no practical exposure	"We have studied only theory has no clinical exposure and the hospital environment is very different for us, which pushes us into stress" **(P-4)**
		Environment is stressful	"We have the stress of getting an internship as well as the stress of going into practical life and environment will be intolerable for us" **(P-4)**
	Coping	Need for compromise to cope	"we will have to adjust ourselves with these occurring stressors" **(P-2)**
		Compromise as a coping strategy	"we should have to cope because there is no way out for us at all" **(P-2)**
		Self-coping focused	"The internees themselves will try to cope with these hurdles" **(P-3)**
		Coping by collaboration	"We will be cooperating with our seniors and getting their support, and can cope with these things and relieve our stress" **(P-4)**
		Reduction of stress	"We expect the hospital will compromise with us and we will be working collaboratively to reduce the hurdle" **(P-5)**
		Coping strengthening	"if we face challenges now, we will be ready for upcoming challenges and our coping will become stronger" **(P-5)**
		Exposure therapy	"we will be mentally ready as if we face these challenges in the present we will be ready to tolerate these types of situation in future as well" **(P-5)**

Theme 4: Effect/Outcome

The Effect/Outcome theme sheds light on the psychological impact and coping strategies adopted by graduating nursing students in response to challenges and barriers associated with internship placement.

"The student got stressed due to problems in internship"(P-1)

"The time in which the internee should learn is missed because of work overload"(P-3)

"We will have to adjust ourselves with these occurring stressors"(P-2)

"The internees themselves will try to cope with these hurdles"(P-3)

"We will be cooperating with our seniors and getting their support and can cope with these things and relieve our stress"(P-4)

"We expect the hospital will compromise with us and we will be working collaboratively to reduce the hurdle"(P-5)

In short, the Effect/Outcome theme illuminates the stressors experienced by nursing students during the internship phase and the coping mechanisms employed to navigate these challenges.

In exploring issues and barriers to internship placement among nursing students in Khyber Pakhtunkhwa, four prominent themes emerge. Institutional Issues and Challenges highlight communication gaps, unclear rotation plans, and inadequate monitoring, impacting the comprehensive learning experience. Regulatory Bodies Problems shed light on the need for documented internship plans, policy implementation, and increased oversight to ensure quality education and timely internships. Hospital Factors reveal knowledge gaps among staff, hindering clinical skills development, while Effect/Outcome delves into the psychological impact, stress, and coping strategies adopted by students facing challenges. Together, these themes provide a comprehensive understanding of the multifaceted issues within the internship process.

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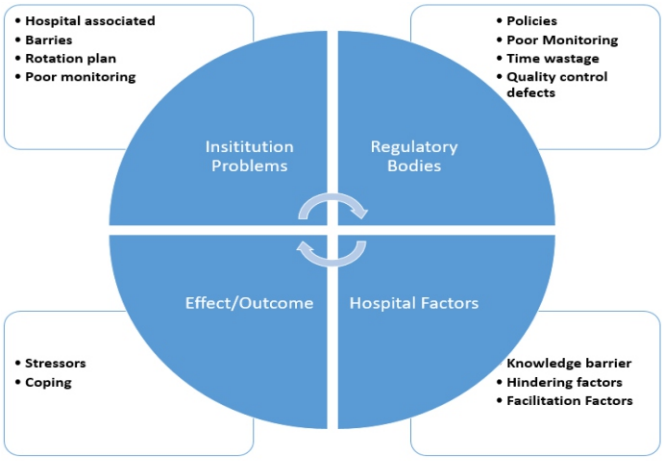

Figure 1: Thematic Representation of Barriers to Nursing Internship Placement among Graduating Students in Khyber Pakhtunkhwa

DISCUSSION

The exploration of issues and barriers to internship placement among graduating students in nursing institutes in Khyber Pakhtunkhwa revealed four main themes. This qualitative study explored into the distinctions of institutional challenges, regulatory body's problems, hospital factors, and the effects/outcomes of the internship. A qualitative study revealing that nursing students in top Ethiopian institutions face significant challenges during internships, including lack of supervision, heavy workload, and resource limitations [11]. **Institutional Challenges (Hospital-Associated Challenges)**: The first theme highlighted institutional challenges faced by graduating nursing students, with hospital-associated issues emerging as a prominent concern. The literature underscores the importance of a conducive clinical learning environment for nursing students [5, 6]. The inadequacy of facilities and a support system identified in this study aligns with findings in other contexts, indicating a global challenge in providing an optimal learning setting for nursing students [11, 7]. **Rotation Plan:** The rotation plan emerged as a critical aspect of institutional challenges. The literature emphasizes the significance of structured internship programs, and the study findings resonate with global concerns about the lack of clarity and support in the rotation plan [8]. Clear guidelines and effective communication channels are essential components that warrant attention in the planning and execution of nursing internships [11, 8]. **Barriers to Objective Achievements:** The barriers to objective achievements identified in this theme parallel the theory-practice divide observed in nursing education globally [2]. The study brings attention to the need for a comprehensive approach to bridge this gap and ensure that graduating nursing students can effectively apply theoretical knowledge in practical settings [9].

Poor Monitoring: Poor monitoring emerged as a sub-theme, emphasizing the importance of effective oversight during internship programs [10]. Monitoring is crucial for ensuring that nursing graduates meet national standards and develop the necessary competencies for professional practice [10]. **Regulatory Bodies Problems (Policy Issues):** Regulatory bodies play a pivotal role in shaping nursing education policies [11]. The identified policy issues align with existing literature emphasizing the need for robust policies that guide internship programs and ensure their alignment with professional standards. **Quality Control:** Quality control emerged as a significant concern in regulatory bodies' involvement in internship programs. This resonates with the broader discourse on maintaining high standards in nursing education and ensuring that internships contribute to the overall quality of nursing care [11]. **Wastage of Student Time:** The wastage of student time emerged as a critical issue. This finding is consistent with the broader literature highlighting the importance of optimizing learning opportunities during internships to maximize the professional development of nursing graduates [12]. **Hospital Factors (Facilitating Factors):** Facilitating factors identified in the hospital environment are consistent with the literature emphasizing the importance of supportive clinical settings for nursing students [11]. Creating an environment that fosters learning and professional growth is essential for the successful transition of graduates into the healthcare workforce. **Knowledge Barrier:** The knowledge barrier identified in this theme aligns with existing research indicating that insufficient information and skills hinder the learning and patient caregiving processes [2]. Addressing knowledge gaps is crucial for enhancing the confidence and competence of nursing graduates. Hindering Factors: Hindering factors in the hospital environment highlight challenges that impede the effective integration of nursing students into the healthcare system. This aligns with broader discussions on the need for proactive measures to address challenges and create a supportive environment for nursing interns [11]. **Effect/Outcome (Coping):** Coping mechanisms were identified as a crucial aspect of the outcomes of internship programs. The stress experienced by nursing students during internships is a common concern [9]. Implementing effective coping strategies is essential to mitigate stress and foster the mental well-being of nursing graduates. **Stress:** Stress emerged as a prominent outcome, emphasizing the need for interventions to address the psychological challenges faced by nursing students during internships. The findings align with global discussions on the mental preparedness required for effective clinical practice [2]. AlThiga *et al.*, highlighted discrepancies between theoretical knowledge and clinical expectations, noting that both interns and

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faculty often feel unprepared for practical realities [12]. This mismatch contributes to confusion and anxiety during clinical rotations. Similarly, Bahari *et al.*, identified lack of supervision, poor evaluation mechanisms, and unclear guidance as major barriers to effective internship training [13]. Shahzeydi *et al.*, emphasized the importance of coordination between educational institutions and clinical settings [14]. Misalignment in expectations and communication between stakeholders often leads to disorganized experiences, which was also reflected in this study. During the COVID-19 pandemic, students globally faced restricted clinical exposure and heightened stress, as reported by Ghanbari *et al.*, [15], limiting opportunities to meet clinical learning objectives. Alotaibi *et al.*, examined internship challenges in emergency departments, where resource limitations and inadequate mentorship created suboptimal learning conditions [16]. Similar factors such as lack of access to senior guidance and unclear role expectations—were found to hinder learning outcomes in the current context. According to Al Najjar and Rawas, the quality of clinical training is heavily dependent on structured plans, supervision, and mutual understanding between academia and practice settings [17]. Deficiencies in these areas compromise student learning and preparedness. Albloushi *et al.*, found that many interns lacked confidence in their clinical competence by the end of their training, a concern echoed across similar studies [18]. Aghaei *et al.*, (2021) identified key barriers and facilitators influencing nursing students' adjustment to internships, highlighting issues such as lack of support, role ambiguity, and inadequate clinical preparedness [19]. Furthermore, Jahromi *et al.*, emphasized the critical role of mentorship, feedback, and emotional safety in ensuring that students gain the intended competencies during their internship [20]. Overall, the findings from this study reflect a consistent pattern of challenges documented in diverse settings. Addressing these barriers requires multi-level reforms including standardized internship policies, improved faculty-preceptor coordination, emotional and supervisory support, and the establishment of inclusive learning environments to optimize nursing students' clinical preparedness.

CONCLUSIONS

Hospital factors, institutional obstacles, regulatory body problems, and effect/outcome were the four main topics that emerged from the inquiry. Each of these themes had a number of subcategories that collectively captured the complex issues that nursing students faced during their internships. This study offers insightful information on the problems and obstacles that graduating nursing students faced in Khyber Pakhtunkhwa throughout their internship assignments. The themes and categories that have been established provide a comprehensive knowledge of the difficulties that exist in the institutional, legal, and medical contexts. These findings have implications for the creation of focused interventions, improved policies, and institutional reforms that can enhance nursing students' internship placements. It is critical to address these issues as the healthcare landscape changes in order to protect the competence, confidence, and health of upcoming nursing professionals. The study adds to the continuing conversation on internship programs optimization by setting the stage for more investigation and initiatives targeted at improving the nursing education system in Khyber Pakhtunkhwa and elsewhere.

Authors Contribution

Conceptualization: IA
Methodology: SA[1], SN, SA[2]
Formal analysis: IA
Writing, review and editing: KA, NA

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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Role of Clinical Instructor in Supervision of Pre-Licensure Nursing Students: A Qualitative Enquiry

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ABSTRACT

The clinical education is vital to ensure clinical competence of nursing professionals and gradually train the nursing students. The role of clinical instructors considered to be crucial in clinical supervision of students. Thus, they have various responsibilities that must be identified. **Objective:** The study aims to identify the roles and responsibilities of the clinical instructors who help supervise nursing students' training in educational institutions in Rawalpindi and Islamabad. **Methods:** A descriptive exploratory design was used to identify the role of clinical instructors working in private and public institutions. The purposive sampling technique was used to recruit twelve clinical instructors in the study. For data collection, open-ended questionnaires and question guides were employed since they provide the utmost accuracy. Conventional content analysis was used for data analysis. **Results:** It also identified the roles, nature and factors that influence clinical instructors and their supervision of the students. Specific means accounted for were implementing links between theory and practice, controlling and guiding students, demonstrating professional behavior, being proactive in delivering feedback about the students, and prompt patient care. Moreover, the teaching competence; professional and ethical practices; and clinical expertise were identified as important characteristics of clinical instructors. **Conclusions:** Therefore, it has been realized that several facilitating and constraining factors affect clinical instructors in the course of their work in the working organization or their own personal factors related to student factors. The study findings may be utilized to strengthen the role of clinical instructors, and to improve the quality of clinical education.

INTRODUCTION

Clinical education is the act of imparting advice to students on personal, educational and professional growth as well as patient care delivery [1]. The challenges faced in clinical education within a baccalaureate nursing program in Ghana. Using qualitative methods, the authors identified issues such as limited resources, inadequate clinical supervision, and gaps in collaboration between academic and clinical staff. The findings emphasized the need for curriculum revision, better communication, and increased support for clinical educators to enhance nursing students' clinical learning experiences [2]. This cross-sectional study investigated perceptions of effective clinical teaching behaviors from the perspectives of both nursing students and instructors in Ethiopia. It highlighted essential teaching behaviors, including clinical competence, effective communication, approachability, and constructive feedback. The study recommended continuous training and evaluation of instructors to improve the quality of clinical education [3]. It is also another important component of the nursing education process. It is aimed at preparing nursing students to discover how they can gradually implement theoretical knowledge into practice. Hence, they have several functions and duties. Nursing skills are one of their primary duties because they are largely charged with developing the related aptitudes of the nursing student. They needed

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to ensure that the climate was conducive to learning. They delivered constructive feedback so the students could learn, improve understanding, and be motivated and encouraged to care for patients. The students are from different cultural backgrounds, meaning the clinical instructors should observe the student's levels and learning styles. In that way, they can assess the learning needs of the students and aid them in a manner that can enhance the learning process to better mold graduates [4]. The effective mentorship improves nursing students' confidence, learning, and clinical integration, while poor mentorship hinders development. It emphasizes the need for structured mentorship and mentor training [5]. Al-Hussami *et al.,* (2020) emphasized the role of supportive supervision and communication in Jordan [6]. Dağ *et al.,* (2019) noted heavy workloads, unprepared students, and limited resources as key barriers for instructors [7]. There are some of the characteristics, factors, or qualities that clinical instructors should have to carry out their responsibilities effectively. Besides, they must have updated knowledge of the nursing profession, listen to the students actively, and demonstrate effective teaching and assessment skills among students. Another possible limitation to the role performance of clinical instructors is a non-conducive environment characterized by factors such as a lack of infrastructure, low nurse-patient ratio, and so on, which negatively impact student learning. Also, the learning resources, such as equipment for procedures, internet access, and any other issues within the clinical environment, may present some difficulties to the clinical instructors. These constraints could pose a great challenge to their capacity to ensure that students are trained in compliance with the institution's SOPs [8-10]. Consequently, it became apparent to identify and describe the research questions on the role and responsibilities of the clinical instructors whereby qualitative descriptive exploratory design was used. Consequently, this study aimed to determine clinical instructors' roles in supervising their students in nursing institutions of Rawalpindi, Islamabad.

To this end, this multicenter research was done with a view of acquiring valid information and response to the following research questions.

METHODS

A descriptive exploratory qualitative study was carried out with approval from Shifa Tamer E. Millat University's research ethics committee (IRB#112-602-2019). Over the course of three months, from 1-06-2019 to 31-08-2019, conducted at four significant nursing institutions (PIMS, Rawal, Shifa, and Holy Family) in the public and private sectors in the twin cities of Pakistan, Rawalpindi and Islamabad. The study participants were chosen through the use of purposive sampling. In qualitative research, sample size is determined by the principle of data saturation. In this study, saturation was achieved after interviewing twelve clinical instructors, as no new themes emerged. The interview guide was reviewed by three experts in nursing education to ensure content validity. Reliability was ensured through consistent application of the tool across all interviews. A total of twelve samples were obtained. The teachers who had two years of experience overseeing the students in the clinical care were included in the inclusion criteria and clinical instructors or faculty who were currently involved in nursing students' clinical supervision and the clinical instructors who weren't present when the data was being collected made up the exclusion criterion. Section three describes the steps taken in the study to inform the participants of the purpose of the research study. This aimed at ensuring the participants understood that they could also decline to participate in the study and that their withdrawal from the study at any time would not attract any punishment. Also, the possible consequences and advantages of the study were explained, and consent was sought through the consent forms. In addition to the interviews, self-completed questionnaires were used to collect demographic data, including age, gender, qualifications, and years of experience and place of work. Conventional content analysis was used to manually analyze the data. Each participant's response to each question was compiled independently. As this was a qualitative exploratory study, no statistical formula was used for sample size estimation. Sample size was guided by data saturation, as supported by Bradshaw et al [4]. The questionnaire used was self-developed based on literature review and expert consultation. Face and content validity were established through review by a panel of nursing education experts who assessed the relevance and clarity of the questions. Data were analyzed manually using conventional content analysis. NVivo software (version XX) was considered but not used due to manual coding sufficiency. As this study is qualitative, no statistical tests were applied. Thematic coding was used for analysis. Conventional content analysis was selected to allow themes to emerge naturally from participant narratives without preconceived categories, which is suitable for exploratory designs. Since this is a qualitative study, descriptive statistics were not applicable. However, participant demographics were summarized using percentages. Data were analyzed using conventional content analysis. Interview transcripts were read repeatedly for familiarization, then coded line-by-line. Codes were grouped into categories and themes, which were validated through peer discussion.

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RESULTS

Demographic data such as age, gender, qualifications, and experience were analyzed using descriptive statistics and are presented in Table 1 as frequencies and percentages. Table 1 presented the demographic characteristics of the participants in the research. Twelve participants were selected from the private and public health care sectors. Majority of them (66.67%) were female and most of them were belong to age group 28 to 34 years (58.33%). Regarding qualification of subjects 41.67% have Post RN, Generic BSN (33.333%), MSN (25%) respectively and having teaching and clinical expertise of 2-6 years (75%) (Table 1).

Table 1: Characteristics of the Participants

Variable	Frequency (%)
Gender	
Male	4 (33.33)
Female	8 (66.67)
Age	
28–34	7 (58.33)
35–40	5 (41.67)
Qualifications	
Post RN	5 (41.67)
Generic BSN	4 (33.33)
MSN	3 (25.00)
Teaching/Clinical Experience	
2–6 years	9 (75.00)
7–11 years	2 (16.70)
≥11 years	1 (8.33)
Clinical Experience	
2–6 years	9 (75.00)
7–11 years	2 (16.67)
≥11 years	1 (8.33)

The study's findings are based on the participants' narratives and are placed in four categories that will address the study's research questions. These are the categories of clinical instructors' responsibilities, characteristics, preparation for a clinical instructor's role and influence factors on a clinical instructor's role. Some of the subcategories of each category are shown in the table below (Table 2).

Table 2: Role of Clinical Instructors

Categories	Subcategories
Responsibilities	Link theory into practice
	Assessment of student's competence level
	Supervision and facilitation
	Role Modeling
	Provision of feedback
	Ensuring patient safety
	Communication and collaboration
Characteristics	Clinical expertise
	Teaching competence
	professionalism and ethical practices
Preparation of Role	Experiential learning
	Formal training and workshops
Factors affecting the role	Organizational factor
	Personal factors
	Students factors

Most participants concluded that their main task is to assist the students in applying their theoretical concepts in the clinical area. Some participants felt that they were already carrying out this responsibility, while others thought it should be the executives' key duty. As one of the clinical instructors mentioned, Clinical instructors are supposed to smooth out the difference between knowledge and practice so that the students can use the two while practicing nursing. In the same regard, one of the participants went on to state, "The role is to determine if they [students] have the right attitude to practice that [theoretical] knowledge in the clinical area of practice." Several participants said that they used intelligence levels to rate students and observe their study habits. This is to determine the student's clinical skills and performance ability level. One participant said, "The clinical instructors should know the level and competence of the students and whether the students are competent to perform skills on the clinical or not." One of the participants believed that clinical nursing instructors are involved in posting students to different units in certain departments by estimating the needs of the courses, whether they are at a lower or higher course level. A few participants contributed that they had the duty of supervision and facilitation. In regards to the training requirement of the students, they assess the needs of the students and oversee them. Of all the participants, some emphasized assessment and supervision and were involved in these practices. On the other hand, some of them feel they should prepare for the task. From this argument, one of the clinical instructors provided the following comment: "The clinical instructor's role is to manage and monitor the students when they are on the clinical and should not let the students operate without supervision." Many participants opined that they must practice whatever they expect from the students in this context, as the learners can learn by observation from their teachers. This role modeling can be done by dressing and speaking during training sessions or talking to junior members. Participants also offered examples of role modeling and how it is considered in the clinical area. One of the participants said: "As student teachers, one must emulate some attributes such as dressing neatly in uniform arriving on the clinical on time. Poli retaining ones grooming, tidiness, beginning by offering a smile to the students/staff, have time wishing, accompany the students to observe their patient teachings, to talk with the

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patients, to visit the patients and to introduce sessions with the team leaders. In other words, the point the author is making is, as teachers are role modeling all the time then it was expecting from the students to do all". Conte outlined that some of the participants focused on feedback to the students. They believe that feedback is crucial for the student's clinical learning experiences and that peer feedback is adequate. Also, the feedback can prevent clinical errors and enhance their functioning level. Moreover, they also pinpointed some modalities of feedback. This leads to the conclusion that they do have some characteristics. This is how one participant reasons his or her use of the technology: 'I used to give my students feedback to cover the paths taken to reinforce learning.' I always gave [feedback] both in writing and orally since one student is different from the other. It also reveals that some leaned through word of mouth while others grasped through written words. Most participants said this is because they have a safety and quality assurance responsibility, requiring the patients to know what the students do. They should also be aware of safety policies and care. One said, "According to the clinical instructor job description, one of the accountability is to educate and supervise on evidence-based practices which incorporate research and culture." The clinical instructor should know about current practices and keep abreast of new developments in the literature and evidence. One of the important roles highlighted was that the clinical instructors were also expected to exchange information regarding clinical practice training with hospital employees, directors, and students. Participants' information also included communication aspects following the interactions with the students, such as the student's clinical plan, learning objectives/teaching horizon, academic ability, clinical calendar, and the assignment of clinical mentors. For details, the following participant stated: "Regarding clinical area managers always talk about the students' needs in the areas of skills learning, duty hours and the faculties who will supervise in clinical." Clinical instructors need to subscribe to a number of behaviors that help them foster students in clinical environments, as highlighted by participants. The following were taken as a clinical specialty: teaching performance, interpersonal communication, professionalism, and ethical behavior. Each of these characteristics is also described in the following headings. Most participants noted that it would be reasonable to state that the clinical instructors must have specialization and knowledge about clinical skills. They should also be confident and have the right experience to practice in every area of the hospital, specifically in ICUs. For example, one said, "A clinical instructor should be skilled on clinical practices and demonstration, have clinical knowledge, and clinical experience". Some professionals stated that the roles and responsibilities of clinical instructors include abilities related to knowledge of clinical teaching and content mastery, content knowledge and competency training. They also emphasized the need to practice and demonstrate interpersonal and communication skills in syllabi formulation, course planning and development, and different assessment forms for diverse students. In order to trace the features of this domain, several examples of this domain were given. Concerning the set of competencies for a clinical instructor, one participant wrote: Firstly, one should have adequate knowledge of the theoretical framework and the ability to share this knowledge. In this regard, some respondents said that professionalism and ethical practice are core competencies for a clinical instructor. Thus, useful interpersonal behavior in the context of teaching consists of honesty, equal standing, cooperation, friendliness, punctuality, social manners and patience. These attributes were appreciated for facilitating professionalism in clinical education to ethical levels. One of the participants expressed it in the following words: "They should be respectable, should not lie and should be good communicators, and should take responsibility for teaching the students. Regarding the participants' understanding of their role preparation as a clinical instructor, they claimed to have acquired the same through either learning by experience or training/meetings. The following is the elaboration of the role preparation section: All participants reported that they only gained their role as a clinical instructor through the learning they encountered in their working experience, which included observation, experience and education. One of the participants stated, "In this country, there is no such type of set-up to prepare the teachers properly for the clinical role but during my education tenure I have learned my role as a clinical instructor from my teachers and seniors by observing them". Most participants said they never went through any training or workshop concerning their readiness to play the doctor role. Among them, a few expressed that their institute organizes some workshops and academic certifications that can be beneficial to them in fulfilling their roles. Nevertheless, they did not complete any program or course related to their clinical instructor position. Further, one of the clinical instructors said, "Honestly, looking at everything regarding that, I have nothing to say that there has been any meeting of clinical instructors to give them an orientation or perhaps a workshop on what their role is of a clinical instructor." He replied that he had never encountered this role preparation strategy in his last five years of working."

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DISCUSSION

The purpose of this research study was to identify and respond to the following three questions: 1) The role or the duties of clinical instructors managing pre-licensure nursing students; 2) Most of the study's participants, similar to participants This qualitative study explored clinical instructors' views on factors affecting teaching in nursing education, identifying barriers such as time constraints and enablers like institutional support and faculty development [11]. This study examined the transition from clinical nurse to nursing faculty, highlighting challenges like role adjustment and the need for mentorship and institutional guidance [12]. Here, a clear segregation was noted in how the two groups of instructors managed their responsibilities in private and public sector institutions. In private institutions, faculty members who teach clinical and supervise students' clinical practices do those activities most of the time. They are very useful in assisting students in bridging the gap between classroom work and the real work environment and, more importantly, assessing the student's strengths and weaknesses in relation to their intended fields of practice and offering constructive feedback that could add value to the student's learning. According to the studies conducted by Heydari, A [13]. In the public sector, each teacher was 50 to 60 students at a time, below the ratio that should be maintained per PNC. The Pakistan Nursing Council's recommendation for personnel ratio in clinical teaching is 1 10. Thus, they could not spend enough time on each student. In this case, the students practice clinically by trial and error, which does not allow them to get the quality education they are supposed to receive. In the private sector, institutions provided BSN degrees, and the facilities were granted to BSN students as supernumerary. The clinical instructors can thus determine students' competency through the supernumerary status, improving the process. These findings are consistent with the work of Chan et al., who highlighted that effective clinical teaching relies heavily on the quality of instructor-student interactions and institutional support, particularly in high-density learning environments [14]. Additionally, as noted by Pimmer et al., incorporating mobile and technology-enhanced learning methods in clinical education can significantly improve nursing students' engagement and knowledge retention, particularly when traditional resources are lacking [15]. A study explored nursing faculty perceptions of written feedback practices, revealing variability in feedback quality and emphasizing the need for clear, constructive, and student-centered feedback to enhance learning [16]. Nevertheless, in the present study, the students in the public sector did not enjoy the perks associated with supernumerary status because they were on a scholarship that closely resembled the remuneration of a registered nurse. Consequently, student reception and training are affected, and the safety of patients may be compromised. Moreover, there is strong hope because supernumerary status negatively affects students' high participation and learning processes. Hence, supernumerary status should be advocated in the clinical setting to guarantee the safety of learners, and students should not be regarded as staff nurses [17]. The disruption caused by the COVID-19 pandemic further exposed challenges in clinical practice, including reduced supervision and limited hands-on opportunities, as observed by Fernández-García *et al.*, in their mixed methods study on nursing education during the pandemic [18]. Thus, there is a need for clinical instructors to be competent and well-equipped with the knowledge to produce professional nurses who can manage and function in future healthcare systems. Because competition and qualifications are standard in clinical fields, practicing is a crucial factor that ought to be embraced by instructors in clinical facilities. It allows the faculty members to update their knowledge in practice, have practical experience with the current practices, and develop good working relationships with clinical staff, as noted by Joolaee, S et al. These findings suggest that public sector students treated more like staff nurses due to scholarship obligations—are deprived of these benefits, leading to compromised learning experiences faculty practice in private institutions enhanced clinical instructors' competency and rapport with staff, a factor notably absent in public settings. [19]. While all the patient participants interviewed in this study claimed to practice evidence-based patient education, 75% of them had only an undergraduate education level and did not know whether they could have any further education or advanced studies. Therefore, in this type of learning, the instructors may experience some problems in helping learners apply their learning practically. It also came across the fact that all of the institutions of the study had none of the higher education and continued faculty development programs except one. Sources of learning such as procedure-related equipment, demonstration rooms or skill labs were cited as lacking in the participant's institutions across the public sectors. They also lacked a general meeting point or any other clinical area in a clinical area where they could meet to deliberate on clinical cases with the students. A supportive clinical learning environment plays a critical role in enhancing students' professional competence, as emphasized by Alzayyat and Al-Gamal in their cross-sectional study [20]. Padagas emphasized that meeting nursing students' expectations regarding clinical instructor support and guidance significantly influences their satisfaction and learning outcomes during clinical placements [21]. Hence, they should endeavor to provide learning materials and other

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related resources within the institution to improve clinical education quality. According to the participants of the current study, students have certain undesirable behaviors that include: truancy, lateness, and unwillingness to do particular tasks, among others, as stated by Rezaei et al. These findings underscore the urgent need for policy-level reforms to enforce recommended teacher-student ratios, ensure supernumerary status for students, and promote ongoing clinical practice among instructors to enhance the effectiveness of nursing education [22]. They voted the clinical environment the hardest and the most demanding one. Such behaviors may be attributed to the fact that not all students get into this profession of their own free will. Therefore, changing this attitude takes considerable time in counseling, and this affects the time devoted to teaching and supervising the students in a clinical environment. Therefore, as per the guidelines recommended by the Pakistan Nursing Council, the right proportion of the teacher-student ratio should be maintained. This will, therefore, improve the quality of clinical education. The public sector ought to consider making students supernumerary, as this would enhance the learning environment. For instance, they could be given scholarships equivalent to the basic salary of the staff nurses, but they would only be given a pocket allowance. Applying faculty practice in the public setting is recommended since it increases instructors' psychomotor skill levels. In this connection, the healthcare industry job description and the job responsibilities of clinical instructors should be clearly defined. This requires a system that is used to provide for these responsibilities.

CONCLUSIONS

This research aimed to determine the role and functions of clinical instructors, their personal attributes, and the variables influencing their role. The results of this study make it clear that the instructors have defined their roles and factors well. Still, they are applied differently in the private and public organizational structures. From the conclusion of the current study, several factors may hinder or enhance the role performance of the clinical instructors; these include the following general working organization, personal and student factors.

Authors Contribution

Conceptualization: YA
Methodology: YA
Formal analysis: RG, AK
Writing, review and editing: YA, NI, RG, 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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The Impact of Nurses Clinical Decisions on Patient Safety and Quality of Care

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ABSTRACT

Patient safety (PS) and quality of care are central to healthcare delivery, with clinical decisions playing a pivotal role in influencing outcomes. **Objective:** To assess the impact of clinical decisions on PS culture and the quality of care in tertiary care hospitals of Khyber Pakhtunkhwa, Pakistan, and to identify key predictors influencing these outcomes. **Methods:** A cross-sectional analytical study was conducted from January to April 2025 in three tertiary care hospitals of KPK. A total of 384 participants (192 healthcare providers and 192 patients) were enrolled. PS culture was assessed using the Hospital Survey on Patient Safety Culture (HSOPSC), and patient satisfaction was evaluated using the PSQ-18. An audit of 450 clinical decisions was also conducted. Descriptive statistics and inferential statistics were employed for data analysis using SPSS version 26.0. **Results:** Experienced staff (>5 years) reported significantly higher PS scores (3.96 ± 0.49, p<0.001). ICU/Emergency Departments had higher safety perceptions compared to medical and surgical units (p=0.041). Teamwork climate (4.15 ± 0.47) and supervisor expectations (3.96 ± 0.59) were rated highest among safety dimensions. Guideline non-adherence was significantly associated with adverse events (12.3% vs. 4.5%, p=0.018). Teamwork score (OR: 1.78) and experience (OR: 2.33) emerged as strong predictors of high safety culture. **Conclusions:** It was concluded that clinical decisions significantly affect PS and quality of care. Enhancing teamwork and experience-based leadership can strengthen safety culture, reduce adverse events, and improve patient satisfaction.

INTRODUCTION

It was in the twenty-first World Health Assembly in 2002 that the issue of PS was first given serious international significance. The annual report published by the World Health Organization (WHO) reveals that one out of every ten cases of hospitalized patients reported medication-related harm because of adverse events. The incidences of these events are between 3.7 to 17% in different countries. For instance, 10.1% of hospital admissions in Australia were associated with adverse events, and in Portugal, 11.1% of such incidents occurred in acute care hospitals, with 53.2% deemed preventable [1, 2]. Studies have shown that many patients suffer injuries during clinical procedures, resulting in infections, long-term disability, or even death. These alarming findings have prompted numerous global initiatives prioritizing PS across healthcare systems [3, 4]. In 2006, the European Network for Patient Safety (EUNetPaS) defined PS culture as a merged element of organizational and entity behaviour grounded in combined values and beliefs, with a continuous goal of minimizing harm to patients resulting from healthcare processes [5]. Essentially, the PS culture within healthcare institutions reflects hospital management's commitment to both PS and the delivery of high-quality care. For ongoing improvement in PS, it is therefore essential to regularly assess this culture [6]. One widely adopted tool for evaluating healthcare staff perceptions of PS culture is the

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Safety Attitudes Questionnaire (SAQ) [7, 8]. The SAQ, which was initially created by Sexton et al., [9], has six scales of PS culture: the teamwork environment, the safety climate, job satisfaction, stress recognition, perception of management, and the working conditions. The subsequent translations of the SAQ consist in a Chinese version that the Joint Commission of Taiwan (JCT) translated into their local realities in 2007 to match the healthcare conditions in Taiwan [10]. By the end of 2014, two other scales, that is, emotional exhaustion and work-life balance, were added to the CSAQ to provide a broader measure of staff well-being [11, 12]. During the implementation of the CSAQ, valuable results have been established about the issues that improve PS culture. Several factors have been uncovered to affect a sense of safety culture, which have been revealed by Huang et al., [11] and include emotional exhaustion, managerial attitudes and teamwork climate. Nurses were also observed to be mostly stressed than the physicians owing to the engagements they had to perform simultaneously. Moreover, the other possible implicating demographic factors related to safety perception are age, gender and work experience. Male staff members generally reported higher satisfaction with safety climate, working conditions, and job satisfaction, whereas female staff were more attuned to stress [12]. Managerial roles were associated with more favourable perceptions of safety, teamwork, and job satisfaction.

This study aims to investigate the impact of clinical decisions on PS and quality of care, with a specific focus on the mediating role of PS culture as assessed through the CSAQ.

METHODS

The cross-sectional analytical study was carried out in three major tertiary care hospitals of Khyber Pakhtunkhwa, Pakistan, I.e Lady Reading Hospital, Hayatabad Medical Complex Hospital and Saidu group of Teaching Group. These hospitals were selected due to their high patient turnover, diverse Clinical Departments, and established infrastructure for healthcare delivery, making them ideal for assessing the correlation between clinical decisions, safety protocols, and quality care outcomes. The duration of the study was four months, from January to April 2025. All participants were briefed about the nature of the study, and informed written consent was obtained before participation. Ethical approval was granted by the Ethical Review Committee of the Institute of Nursing Sciences, DIR/KMU/INS/24/215. The study adhered strictly to the principles of the Declaration of Helsinki and maintained the confidentiality of all collected data. The target population included healthcare professionals directly involved in patient management, including physicians, nurses, and allied health staff, as well as hospitalized patients from general medicine and surgical wards who had received treatment decisions during their hospital stay. The sample size was calculated using the online sample size calculator, Open Epi software version 3.01, by using total nurses working in the hospitals as the population, then using a confidence level of 95%, a margin of error of 5%, and an anticipated population proportion of 50% to ensure maximum variability. This yielded a sample size of 384 participants. To ensure representatives, the sample was stratified across the three hospitals proportionally according to the average patient and staff volume reported monthly. A non-probability purposive sampling technique was adopted to recruit healthcare providers involved in direct clinical decision-making, and a systematic random sampling technique was used to select patient participants. Inclusion criteria for healthcare providers included physicians and nurses with at least one year of clinical experience in a tertiary care setting, currently employed in departments where decisions about patient care were routinely made (e.g., internal medicine, surgery, ICU, and emergency). Inclusion criteria for patients included those aged 18 years and above, admitted for at least 48 hours, and having undergone at least one clinical decision intervention (e.g., diagnostic or therapeutic). Exclusion criteria for both groups included those unwilling to participate, interns or students, and patients discharged against medical advice or admitted for less than 48 hours. The study investigated two core parameters: PS and quality of care, both of which were evaluated through validated tools. For assessing clinical decision impact on PS, the HSOPSC tool, developed by the Agency for Healthcare Research and Quality (AHRQ), was adapted. This tool was administered to healthcare providers and focused on domains such as teamwork, handoff communication, non-inflicting response to errors, and the overall concept of PS. Each item was scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating better PS practices. Moreover, the scoring system is based on the two upper responses of agree and strongly agree as good score, while the two lower responses of not-agree and strongly disagree are poor culture, while the response of neither agree nor disagree is average culture. To measure the quality of care from the patient's perspective, the Patient Satisfaction Questionnaire Short-Form (PSQ-18) was used. It included seven dimensions: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility of care. This tool was translated into Urdu and back-translated for consistency. Data were collected through structured interviews conducted by trained research assistants to ensure uniformity. The Cronbach alpha score ranged from

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0.67 to 0.89 [13]. Furthermore, a brief audit of documented clinical decisions in the selected departments was conducted to assess alignment with established clinical guidelines and their subsequent outcomes. This involved reviewing 150 randomly selected patient files from each hospital to trace the rationale behind key decisions, timeliness, and follow-up documentation. This component provided a triangulated view of how decision-making patterns influenced real-world safety and care outcomes. The data were entered and analyzed in the use of IBM SPSS version 26.0. Demographic characteristics and professional characteristics were summarized using descriptive statistics. Continuous variables were expressed as the mean and standard deviations, whereas categorical variables as frequencies and percentages. To interpret the relationships between PS or quality scores and clinical decision parameters, chi-square and independent t-tests were performed in inferential analysis. A multivariable logistic regression model was adopted to identify the factors that predict having high PS scores by controlling for confounders, including hospital, department, staff experience and workload. The p-value of less than 0.05 was judged as significant.

RESULTS

A total of 384 participants were enrolled in the study, comprising 192 healthcare providers and 192 patients. The distribution was proportional across the three tertiary care hospitals: Lady Reading Hospital (n=128), Khyber Teaching Hospital (n=128), and Hayatabad Medical Complex (n=128). The study presents the demographic and professional characteristics of the participating healthcare providers (n = 192). The mean age of the respondents was 34.6 ± 7.8 years. Among the participants, 112 (58.3%) were female and 80 (41.7%) were male. Regarding professional experience, 129 (67.2%) had more than five years of clinical experience, while 63 (32.8%) had between one and five years of experience. The majority of healthcare providers were working in the Medicine Department, 70 (36.5%) or the Surgical Department [63 (32.8%)], followed by ICU/Emergency [35 (18.2%)] and other departments, 24 (12.5%) (Table 1).

Table 1: Demographic Data of enrolled Health Professionals

Characteristics	n (%)
Gender	
Male	80 (41.7%)
Female	112 (58.3%)
Age (Mean ± SD)	34.6 ± 7.8 Years
Experience	
1–5 Years	63 (32.8%)
>5 Years	129 (67.2%)
Departments	
Medicine	70 (36.5%)
Surgery	63 (32.8%)
ICU/Emergency	35 (18.2%)
Other	24 (12.5%)

Results illustrated that the mean composite HSOPSC score was 3.82 ± 0.56. The highest mean scores were observed in the "Teamwork within Units" (4.15 ± 0.47) and "Supervisor Expectations" (3.96 ± 0.59) domains, while the lowest scores were noted for "Non-Punitive Response to Errors" (3.21 ± 0.64). Patient satisfaction scores measured using the PSQ-18 indicated that the highest satisfaction was observed for "Technical Quality" (4.29 ± 0.41) and "Interpersonal Manner" (4.19 ± 0.49), while the lowest satisfaction was for "Accessibility" (3.37 ± 0.63) (Table 2).

Table 2: PS Culture Scores Among enrolled Nurses

PS Culture Scores	Mean Score ± SD
HSOPSC Dimension	
Collaboration in the unit	4.15 ± 0.47
Manger anticipation	3.96 ± 0.59
Continuous Learning for Improvement	3.87 ± 0.62
Communication Openness	3.72 ± 0.58
Feedback and Communication About Error	3.54 ± 0.66
Non-Punitive Response to Errors	3.21 ± 0.64
Overall Perception of Patient Safety	3.78 ± 0.61
Composite Patient Safety Score	3.82 ± 0.56
PSQ-18 Dimension	
Overall Satisfaction	4.01 ± 0.48
Practical Quality	4.29 ± 0.41
Interactive Manner	4.19 ± 0.49
Communication	4.02 ± 0.53
Economical Aspects	3.45 ± 0.60
Time with Doctor	3.76 ± 0.58
Availability	3.37 ± 0.63
Composite Quality Score	3.87 ± 0.51

The study presents the demographic characteristics of the patient participants (n = 192). The mean age of patients was 49.3 ± 13.2 years. Among the participants, 105 (54.7%) were male and 87 (45.3%) were female. The majority of the patients were admitted to the general medicine ward [79 (41.1%)] and the general surgery ward was 73 (38.0%), followed by the ICU was 25 (13.0%), and the emergency ward was 15 (7.8%) (Table 3).

Table 3: Demographic profile of enrolled Patients (n = 192)

Characteristics	n (%)
Gender	
Male	105 (54.7%)
Female	87 (45.3%)
Age (Mean ± SD)	49.3 ± 13.2 years
Admission Ward	
General Medicine	79 (41.1%)

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General Surgery	73 (38.0%)
ICU	25 (13.0%)
Emergency	15 (7.8%)

Independent t-tests were applied to evaluate differences between the groups regarding experience level, department, and safety scores. Healthcare providers with more than 5 years of experience had significantly higher PS scores (3.96 ± 0.49) compared to those with 1–5 years (3.51 ± 0.64), $p<0.001$, which shows significant differences. Moreover, ANOVA was used between the departments also showed significant differences. ICU/Emergency Departments scored higher (3.95 ± 0.52) compared to medicine (3.81 ± 0.58) and surgery (3.70 ± 0.61), $p=0.041$ (Table 4).

Table 4: Differences Between Groups of Experiences, Departments and Composite Patient Safety Scores

Variables	Mean ± SD	p-value
Experience Groups		
1–5 Years	3.51 ± 0.64	<0.001*
>5 Years	3.96 ± 0.49	
Departments		
Medicine	3.81 ± 0.58	0.041*
Surgery	3.70 ± 0.61	
ICU/Emergency	3.95 ± 0.52	

As a result of a clinical audit, a review of 450 clinical records revealed that 84.4% of decisions aligned with clinical guidelines. However, in 15.6% of the cases, deviation from guidelines was noted, most commonly in emergency settings due to time constraints or undocumented rationale. Among these deviations, the adverse outcome rate was significantly higher (12.3%) compared to the guideline-adherent group (4.5%), p=0.018, as a result of a chi-square test (Table 5).

Table 5: Association of Guideline Adherence with Adverse Events (n=450)

Adherence to Guidelines	Adverse Event	No Adverse Event	Total	Adverse Rate (%)
Yes (n=380)	17	363	380	4.5%
No (n=70)	11	59	70	12.3%
Chi-square p-value	–	–	–	0.018*

Multivariable logistic regression revealed that clinical experience (95% CI: 1.41–3.86, $p=0.001$) and teamwork score (95% CI: 1.21–2.63, p=0.004) were significant independent predictors of higher PS culture scores. Similarly, patient satisfaction was independently associated with technical quality ($p<0.001$) and interactive manner (p=0.006).Years of experience and teamwork scores were statistically significant independent predictors of high PS culture.Other variables showed positive trends but did not reach significance (Table 6).

Table 6: Multivariate Logistic Regression Analysis of Predictors of High Patient Safety Culture Score

Predictor Variables	β (Coefficient)	SE	OR (95% CI)	p-value
Years of Experience (>5 Years)	0.847	0.255	2.33 (1.41 – 3.86)	0.001*
Teamwork Score	0.578	0.201	1.78 (1.21 – 2.63)	0.004*
Supervisor Expectations Score	0.213	0.188	1.24 (0.85 – 1.80)	0.247
Communication Openness Score	0.119	0.168	1.13 (0.81 – 1.59)	0.482
Department (ICU/Emergency)	0.329	0.221	1.39 (0.91 – 2.12)	0.129

DISCUSSION

This study explored how clinical decisions, as influenced by healthcare provider characteristics and organizational dynamics, impact PS culture and the quality of care. The findings confirm that both individual and systemic factors significantly shape perceptions and outcomes related to safety and quality, aligning with a growing body of literature emphasizing the multidimensional nature of PS culture. The demographic profile of the healthcare providers revealed that a majority were female (58.3%) and had over five years of experience (67.2%). The findings are in line with the work of Huang *et al.*, who also reported a predominance of experienced female staff in safety culture research [11]. Our findings support prior conclusions that demographic variables, especially clinical experience and gender, may shape perceptions of PS, with female staff more attuned to stress-related indicators and male staff expressing greater satisfaction with job and safety climate [12, 13]. The highest scores among the PS culture domains were found in "Teamwork within Units" (4.15 ± 0.47) and "Supervisor Expectations" (3.96 ± 0.59), while "Non-Punitive Answer to Errors" received the lowest score (3.21 ± 0.64). This mirrors findings by Wu *et al.*, where staff consistently rated teamwork and supervisor support highly, while expressing concerns about a culture of blame [12]. The low score on non-punitive response indicates a persistent fear of punitive consequences, which has been identified as a barrier to error reporting and open communication in multiple studies [14, 15].The patient demographic data showed a balanced gender distribution and a mean age of 49.3 ± 13.2 years, with most patients admitted to medical (41.1%) and surgical (38.0%) units. These findings reflect standard tertiary care admissions and do not deviate significantly from other hospital-based PS studies.However, the stratified sampling method ensured inclusion from departments where critical clinical decisions are frequently made, enhancing the relevance of our results. Patient satisfaction was highest in the domains of "Technical Quality" (4.29 ± 0.41) and "Interpersonal Manner" (4.19 ± 0.49), reinforcing previous study by Wang *et*

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al., [16] and Huang *et al.*, [11], who emphasized that perceptions of staff competence and respect are central to quality-of-care evaluations. Conversely, lower satisfaction with "Accessibility" (3.37 ± 0.63) and "Financial Aspects" (3.45 ± 0.60) highlights ongoing systemic constraints in care delivery, especially in resource-limited settings.A statistically significant difference was observed between providers with more than five years of experience and those with less experience regarding PS culture ($p<0.001$). This supports the conclusions of Kim and Weng, who noted that experienced staff members are more likely to perceive a stronger safety climate due to their confidence, exposure, and familiarity with institutional protocols [17].The high odds ratio in our regression analysis (OR: 2.33) further affirms experience as a critical predictor of safety culture. Departmental differences were also significant, with ICU/Emergency staff reporting the highest safety scores (3.95 ± 0.52; $p=0.041$).This can be attributed to heightened risk awareness and team coordination in high-acuity environments. Similar trends have been reported by Lee *et al.*, [18], who emphasized the necessity of inter-unit collaboration, especially in emergency settings where the margin for error is slim. Our review of 450 clinical decision records revealed that guideline non-adherence was significantly associated with higher rates of adverse events (12.3% vs. 4.5%; $p=0.018$). This reinforces prior assertions that standardization of care through evidence-based guidelines directly enhances PS and reduces preventable harm [19].In our logistic regression model, teamwork scores emerged as a strong independent predictor of high safety culture (OR: 1.78, $p=0.004$), consistent with previous findings from Salas *et al.*, [20], which established teamwork climate as the most influential domain in promoting safety. Similarly, Huang *et al.*, [11] identified teamwork and perceptions of management as central to fostering a robust safety culture. Although "Supervisor Expectations" and "Communication Openness" were not statistically significant in our model, their directional alignment with prior research suggests they play supportive, if indirect, roles in shaping safety perceptions [10, 18]. Interestingly, our findings align with the mediation analysis by Huang *et al.*, [11], which emphasized that the teamwork environment, working conditions, and stress recognition fully mediate the effect of management leadership on the safety climate. Our study affirms that years of experience and team dynamics, not direct managerial input alone, drive safety culture outcomes. As such, merely improving perceptions of leadership is insufficient unless accompanied by enhanced working conditions and reduced stress environments [14].

CONCLUSIONS

Clinical decisions significantly influence PS and quality of care, particularly when shaped by experience, teamwork, and guideline adherence. Comparisons with prior literature validate our results while also emphasizing the need for targeted leadership strategies that improve team-based functioning and structural conditions within hospitals. Advancing safety culture is contingent not solely on leadership perception but on its tangible impact through mediated organizational dimensions.

Authors Contribution

Conceptualization: ZP
Methodology: ZP, AZ, AP, SY
Formal analysis: ZP
Writing review and editing: BA, AP, AS, US

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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Knowledge and Practice of Nurses Regarding Central Venous Catheter (CVC) Associated Infection Prevention

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ABSTRACT

Central venous catheters (CVCs) are frequently utilized in intensive care units (ICUs) for the administration of fluids, medications, nutrition, and intravascular monitoring. A central venous catheter (CVC) is inserted into a major central vein, typically the internal jugular, subclavian, or femoral vein, with its lumen positioned within the inferior vena cava, superior vena cava, or right atrium. **Objective:** This study aimed to evaluate nurses' knowledge and practices concerning the prevention of infections associated with central venous catheters (CVCs). **Methods:** A descriptive cross- sectional research study was conducted from March 2023 to December 2023 at Jinnah Hospital, Lahore. Purposive sampling was done to recruit the participating nurses. A well-designed questionnaire was used for data collection after the validation. **Results:** The study was descriptive cross-sectional, so descriptive statistics were applied, frequency distribution was calculated, data normality was checked. The study reported that the knowledge participants with poor knowledge were 61(41.2%), the participant with low practice were 53(35.8 %). **Conclusion:** The study concluded that many nurses have poor knowledge, and bad practices regarding central venous catheter (CVC) associated infection prevention. Future research should focus on providing education to nurses regarding the standard protocol and precaution for maintaining central venous catheter.

INTRODUCTION

A central venous catheter (CVC) is pushed into a major, central vein (usually the internal jugular, subclavian, or femoral) and its lumen is situated within the inferior vena cava, superior vena cava, or right atrium [1]. The placement of a central venous catheter (CVC) is among the most prevalent invasive procedures in critical care, emergency medicine, and cancer treatment. These devices are everywhere, and prolonged use may make people forget about the side effects over time. However, significant morbidity and mortality can be attributed to the device or the insertion procedure, and the overall complication rate for CVCs is approximately 20% [2]. Central line-associated bloodstream infections (CLABSIs) occur at a rate of 4.1 per 1000 central line days, making them the most prevalent complications associated with central venous catheters (CVCs)[3]. Higher rates of morbidity, mortality, and medical expenses are linked to CLABSIs. Patients with CLABSI are 2.75 times more likely to die in the hospital than those without the condition, according to a meta-analysis [4]. Central venous puncture complications are estimated to occur at 15%. These complications fall into two categories: infectious and mechanical. Pneumothorax, blood vessel cut, and hematoma are the most well-known mechanical problems [5]. A hematoma, a cardiac tamponade, a guidewire embolism, an air embolism, an arrhythmia, a thoracic duct injury, or an air embolism are less common but may be more serious. If the procedure is done correctly, some of these problems can be avoided [6]. Knowledge is

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considered a crucial element in the prevention of central line-associated bloodstream. It has been observed that nurses in the intensive care unit care for and spend most time with CVC-infected patients [7]. Implementing evidence-based best practices also contributes significantly to primary infection prevention. [8]. In addition to possessing sufficient knowledge and training in the prevention of CVC-BSI, health professionals are required to adhere to up-to-date CVC care guidelines, as per Centers for Disease Control and Prevention-CDC [9]. The literature emphasizes that nurses can avoid CVC-associated infections if they possess a thorough understanding of CVC-BSI and are mindful of evidence-based protocols and procedures [10, 11]. The proper practice of nurses is increasing the recovery of patients quickly. Several international organizations have published clinical practice guidelines for the prevention of CLABSIs. These guidelines typically include specific steps that healthcare workers who insert and handle CVCs should take [12]. The research studies investigate the fact that the infection rate is still high, and the nurses have limited knowledge regarding CVC-associated infection prevention [13, 14]. The central venous catheter CVC-associated infection is the ultimate cause of nosocomial infection and is responsible for high mortality and increased hospital stay.That ultimately burdens the healthcare system, so there is an intense need to highlight these issues. The established Central Venous Catheter (CVC) care and infection prevention guidelines fail to prevent nurses from keeping up with the protocols, which results in high Central Line-Associated Bloodstream Infection (CLABSI) rates. The lack of region-specific research about CVC-associated infections stands out since Pakistan specifically requires study because its healthcare infrastructure presents distinct differences compared to other countries regarding nursing practices, available resources, and institutional policies. Research has previously concentrated on generic infection control measures instead of investigating CVC-associated infection prevention methods in critical care areas. A tertiary care hospital needs this research because it will evaluate the existing knowledge processes of nurses about preventing infections related to central venous catheters. The assessment of such gaps allows healthcare professionals to develop specific training approaches that enhance both patient security and minimize hospital-acquired infections.

This study aimed to evaluate nurses' practices and knowledge in preventing infections linked to central venous catheterization.

METHODS

A descriptive cross-sectional study was carried out at Jinnah Hospital Lahore from March 2023 to December 2023. The purposive sampling technique was used in the study. The study population was staff nurses in the surgical ward and ICU of Jinnah Hospital Lahore. At least six months of clinical experience in handling CVCs was the requirement for registered nurses. The study did not include nurses on leave or worked in outpatient departments. The sample size of 147 was determined using Slovin's formula, assuming a total population of 233 and a 95% confidence level and a 5% margin of error. Data were obtained from all staff nurses working in the surgical ward, medical ward, and ICU. An adopted questionnaire of knowledge and practice was used to gather the information from the study sample. The survey comprised various multiple-choice and closed-ended questions that addressed essential elements of CVC management, including sterilization procedures, personal hygiene, and catheter treatment processes. The questionnaire maintained English language usage to achieve maximum understanding by participants in the study. The instrument achieved validity through the expert review conducted by professionals who specialize in both infection control and nursing practice. The instrument obtained validity confirmation from panels of nursing professionals. A small nurse sample participated in the questionnaire reliability test, which produced a Cronbach's alpha value of 0.82, demonstrating adequate internal consistency. The survey examined nurse responses regarding both their understanding of catheter care frequency and their actual procedures. All participants received the questionnaire as a paper document with guarantees of anonymous response collection for confidentiality purposes. After collecting data, the data were computed using SPSS version 23.0, and frequency was determined. Ethical consideration was followed, which was organized by the superior university department of nursing. All confidentiality was ensured. Any participant who was not willing to participate was withdrawn from the study at any time, and there would be no potential harm or potential benefits for the study.

RESULTS

This demographic table shows that majority of age group with 26-30 years as depicted in Table 1. Majority population were female. The Majority with married marital status. Majority of nurses with 10-15 years' experience. Majority with Post RN in Nursing. Majority of nurses working were in ICUs.

Table 1: Demographic Characteristics of participants

Variables	Category	Frequency (%)
Age	21-25 Years	30 (20.3%)
	26-30 Years	55 (37.2%)
	31-35 Years	51 (34.5%)
	36-40 Years	12 (8.1%)

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Gender	Male	71(48.0%)
	Female	77(52.0%)
Marital Status	Single	73(49.3%)
	Married	75(50.7%)
Experience	1-5 Years	19(12.8%)
	6-10 Years	56(37.8%)
	10-15 Years	69(46.6%)
Qualification	Diploma in Nursing	25(16.9%)
	Post RN	80(54.1%)
	BSN (Generic)	43(29.9%)
Department	ICU	67(45.3%)
	Medical Wards	48(32.4%)
	Surgical Wards	33(22.3%)

Most of the nurses have good knowledge regarding "Is changing the bandage at the catheter insertion site advised?" Majority of the Participants have average knowledge regarding "Routine replacement of Central Venous Catheters is advised?". The majority of participants possess mediocre levels of knowledge. regarding "It is advisable to disinfect the catheter insertion site with?" Majority of the Participants have average knowledge regarding "It is advisable to position the administration set while administering blood, blood products, or lipid emulsions via a Central Venous Catheter?'. The responses are shown in Table 2.

Table 2: Knowledge Questionnaires

Questions	Respond	Frequency (%)
Is changing the bandage at the catheter insertion site advised?	Every 2 Days	100(67.6%)
	Every 7 Days	39(26.4%)
	No, Because.....	9(6.1%)
Is Routine replacement of Central Venous Catheters is advised?	Every 7 Days	30(20.3%)
	Yes, Every 3 Weeks	21(14.2%)
	No, Only When Indicated	97(65.5%)
Is it advisable to disinfect the catheter insertion site with?	70% Alcohol	35(23.6%)
	2% Chlorhexidine Gluconates with Alcohol	84(56.8%)
	Povidone-Iodine	28(18.9%)
	I Do Not Know	1(7%)
Is it advisable to position the administration set while administering blood, blood products, or lipid emulsions via a Central Venous Catheter?	Within 24 H	25(16.9%)
	Every 72 H	38(25.7)
	Every 96 H	81(54.7&)
	I Don't Know	4(2.7&)

The response regarding practice questionnaires is presented in Table 3. Majority of the participants were high practice regarding "Do you provide the patient with information about the surgery when communication is possible?'. Majority of the participants were good practice regarding "Do you obtain consent from the patient and/or their relatives?' Majority of the participants were moderate practice regarding, "Do you place the patient in the proper anatomical position?'. Majority of the participants were poor practice regarding "Do you use gloves, a cap, a mask, a gown, and a field as part of sterile technique?'.

Table 3: Practice Questionnaires

Questions	Respond	Frequency (%)
Do you provide the patient with information about the surgery when communication is possible?	Never	26(17.6%)
	Seldom	20(13.5%)
	Always	102(98.9%)
Do you obtain consent from the patient and/or their relatives?	Never	21(14.2%)
	Seldom	25(16.9%)
	Always	102(98.9%)
Do You Place the Patient in The Proper Anatomical Position?	Never	16(10.8%)
	Seldom	49(33.1%)
	Always	83(56.1%)
Do you use gloves, a cap, a mask, a gown, and a field as part of sterile technique?	Never	37(25.0%)
	Seldom	52(35.1%)
	Always	59(39.3%)

DISCUSSION

Majority of Participants respond to every 2-day option to the question that the "Is changing the bandage at the catheter insertion site advised?" were 100(67.6%). Majority of Participants respond to No when indicted option to the question that is the routine replacement of Central Venous Catheters advised? Were 97(65.5%). Majority of Participants responded to 2% chlorhexidine gluconate with alcohol option to the question that it is advisable to disinfect the catheter insertion site with? was 84(56.8%). Majority of Participants respond to every 96-h option to the question that the When blood, blood derivatives, or lipid emulsions are infused by a Central Venous Catheter, it is recommended to place the administration set?'. were 81(54.7%). Majority of Participants respond to always option to the question that Do you provide the patient with information about the surgery when communication is possible? Were 102(98.9%). Majority of the nurses were Always 102(98.9%) to the question "Do you obtain consent from the patient and/or their relatives? Majority of the nurses were strongly always 83(56.1%) to the question Do you place the patient in the proper anatomical position?". Majority of the nurses were always 59(39.3%), to the question "Do you use gloves, a cap, a mask, a gown, and a field as part of sterile technique? Findings were compared to the existing literature on infection prevention associated with the CVC.The studies highlight the importance of knowledge and adherence to infection protocols to minimize the risk of infections, like the findings of this study [15, 16]. Furthermore, as in the current study, it was observed that ICU nurses' knowledge of infection prevention protocols was suboptimal just like current research [17]. However, the study suggests that education programs can increase nurses' knowledge and practice toward the prevention of CVC-associated

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infection and suggests different types of interventions. For improving the skills of nurses in a critical care setting, workshops, simulation training for correct sterile techniques, and interactive case studies are some of the types that will be effective strategies, for instance. Previous studies have demonstrated that simulation-based training leads to significant improvements in healthcare workers following infection control protocols [18]. A more detailed comparison with previous studies has been made. For instance, it has been found to be a similar lag in nursing knowledge as in this study, but this study accounts for the additional gap inventory via the nursing practice's part. In line with these recommendations, studies agree with the need for increased training and protocol compliance, which is supported by these studies [19, 20]. The majority of participants have mediocre knowledge.The current investigation identified inadequate knowledge and practice for the prevention of infections associated with central venous catheters using a cross-sectional study methodology. The present study examines the degree of central venous catheter-related infection prevention knowledge and practice. The future research can work on enhancement of knowledge and practice by conducting experimental studies through which they can assess knowledge and practice to give the intervention for improving the expertise and conduct by nurses related to central venous catheter associated infection prevention .Future research can provide education to nurses regarding the standard protocol and precaution for maintaining central venous catheter.

CONCLUSIONS

The current study concluded that the knowledge and practice regarding central venous catheter-associated infection prevention is poor. This is the need for time to work on nurses' knowledge and practice regarding infection prevention of central venous catheters. This can reduce the infection, which is related to central venous catheters, and improve the patient's condition. There is a high need to better nurse knowledge and practice through conducting education programs regarding central venous catheters.

Authors Contribution

Conceptualization: WS, HS
Methodology: WS, HS
Formal analysis: WS, RJ, ST
Writing review and editing: WS, HS, RJ
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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Assessment of Knowledge and Practices of Nosocomial Infection among Nurses of Jinnah Hospital Lahore, Punjab- Pakistan

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ABSTRACT

Nosocomial infection is an infection originating in a patient within a hospital. The infection was not present at the time of admission to the healthcare facility but develops after 48 hours stay within the healthcare facility. **Objective:** To assess the knowledge of staff nurses regarding the prevention of nosocomial infections and to identify the factors influencing the knowledge deficit of staff nurses. **Methods:** The current study followed a quantitative research approach using a descriptive, cross-sectional research design. A purposive, non-probability sampling technique was utilized. The sample was selected from a population of medical, surgical, and Intensive Care Units (ICUs) with a sample size of 70. The data collection tool used for this study was a modified questionnaire. **Results:** The knowledge and practice regarding nosocomial infection among nurses aged 30-35 years was higher compared with nurses aged 26-30 years and 21-25 years. **Conclusions:** The results of this study indicate that nurses with more than 10 years of work experience have greater knowledge and practice regarding nosocomial infection and its control. The study further suggests that the knowledge and practice of nurses towards infection control measures may be improved by providing health education.

INTRODUCTION

Several studies have highlighted the importance of knowledge and practices among healthcare professionals, especially nurses, in preventing nosocomial infections. Nazeer et al. reported that nurses have varying levels of understanding regarding the spread of these infections, suggesting a need for improved training [1]. Similarly, Parveen et al. found significant gaps in nurses' knowledge and practices related to infection prevention in burn patients at tertiary care hospitals [2]. Salman et al. emphasized that despite positive attitudes towards hand hygiene, compliance among Pakistani health professionals remains suboptimal [3]. Uzair et al. observed moderate knowledge and practices of infection control among healthcare providers in tertiary care settings [4]. The findings of Buksh et al. further support the need for targeted education, as nurses demonstrated insufficient knowledge and practices in preventing infections in burn patients [5]. Lastly, Mustafa and Nasir concluded that

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health professionals generally lack adequate knowledge and practices regarding nosocomial infection control, underscoring the urgency for enhanced awareness programs [6]. Sax et al. in 2020 conducted a national survey in Switzerland that highlighted strategies for preventing healthcare-associated infections [7]. According to the study conducted in Europe, the prevalence rate was 2.9%. The primary causes of nosocomial infection included medical intervention, poor environmental conditions, inadequate personal hygiene among staff and patients and poor practice of routine duties. However, while it is not possible to completely eradicate nosocomial infections even in advanced healthcare facilities, standards and guidelines can be implemented to reduce their occurrence. To prevent or reduce the incidence of nosocomial infection, it is important to understand prevalence rates so that infection control programs can be implemented and effective plans developed [8]. Nosocomial infections have a significant impact in healthcare facilities due to compromised patient and healthcare worker safety and diminished quality of care. Preventive measures should be taken to control the transmission of nosocomial infections in healthcare settings, such as the use of disinfectants and antiseptics, strengthened institutional controls, and regular microbiological testing. Moreover, assigning single rooms to patients can reduce the risk of nosocomial infection through person-to-person surface contact. In addition, assessing patients' initial risk of infection through a detailed study of disease severity and making appropriate adjustments to care can further reduce infection rates. By implementing such strategies, healthcare facilities can combat and prevent the occurrence of nosocomial infections, benefiting both healthcare workers and patient safety [9]. In the 19th century, Dr. Semmelweis first integrated the practice of hand hygiene in healthcare settings to prevent and control nosocomial infection. Implementation of proper hand hygiene can have a profound impact on minimizing the incidence of hospital acquired infections. The World Health Organization (WHO) emphasizes hand hygiene as a core strategy for preventing nosocomial infections and the spread of multi drug-resistant microorganisms. Such preventive measures reduce the risk of nosocomial infections and associated costs. The WHO suggests that the risk of hospital-acquired infections can be minimized by proper hand washing with soap and water and the use of alcohol-based sanitizers (WHO, 2023). Nurses are highly susceptible to acquiring nosocomial infections while providing nursing care; therefore, they must possess adequate knowledge and skills to control the spread of infection. Implementation of standard protective measures is a vital part of nursing care to prevent transmission. This study aimed to evaluate the knowledge related to the prevention of nosocomial infections among staff nurses at Jinnah hospital Lahore and to identify the factors influencing knowledge deficits among them [10, 11].

METHODS

A descriptive cross-sectional study was conducted from July to December 2019 at Jinnah Hospital, Lahore among the nurses of this hospital using a convenience sampling technique. The sample size was calculated using online software, with a confidence interval of 5% and an additional 5% to account for potential dropouts or nonparticipation; hence, the final sample size was 70. The reference number for the ethical approval or data collection permission letter for the study is 32327/Admn/JHL. An open-access, structured, closed ended questionnaire was used, which had also been utilized in multiple prior studies and was considered reliable and validated. Data were collected from nurses working in the Medical, Surgical, and ICU units. Authorization for data collection was obtained from the Medical Superintendent of Jinnah Hospital, Lahore and consent forms were signed by eligible participants. Autonomy, confidentiality, and privacy were maintained and participants were informed about the study's purpose. The data were analyzed using SPSS Version 25.

RESULTS

Table 1 shows that a total of 70 individuals participated in the study. Among them, 25 (35.7%) were aged 21-25 years, 23 (32.9%) were aged 26-30 years, and 22 (31.4%) were aged 31-35 years. The number of participants with 0-5 years of experience was higher (52.9%) while the proportion of participants with 5-10 years, of experience was lower (21.4%).

Table1: Demographic Profile of Respondents

S. No.	Demographic Profile of Respondents	Wards	Frequency (%)
1	Unit	Medical Unit	32 (45.7)
		Surgical Unit	23 (32.9)
		ICU	15 (21.4)
2	Age	21-25Years	25 (35.7)
		26-30Years	23 (32.9)
		31-35Years	22 (31.4)
3	Education	M.Sc. Nursing	8 (11.4)
		Nursing Degree	18 (25.71)
		Nursing Diploma	44 (62.86)
4	Gender	Male	1 (1.4)
		Female	69 (98.6)
5	Working Experience	0-5Years	37 (52.9)
		5-10Years	15 (21.4)
		>10Years	18 (25.7)

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6	Marital Status	Married	44 (62.9)
		Unmarried	26 (37.1)

Table 2 shows nurses' knowledge and practices regarding nosocomial infection. The study indicates that all participants were aware of nosocomial infection. A majority of participants (85.7%) reported performing hand hygiene between patient care. In the study, a total of 59 participants (84.3%) followed the recommended protocols for alcohol-based solutions or other antiseptic use.

Table 2: Questionnaire Related to Knowledge and Practice

S. No.	Questions	Variables	Frequency (%)
1	Knowledge about nosocomial infection	Yes	70 (100)
		No	0 (0)
2	Attending any workshop to enhance knowledge regarding nosocomial infection?	Yes	27 (38.6)
		No	43 (61.4)
3	Healthcare providers follow correct hand washing in clinical setting	Yes	41 (58.6)
		No	29 (41.4)
4	Performing of hand hygiene in between patients care	Yes	60 (85.7)
		No	10 (14.3)
5	Environment is a major source of nosocomial infection	Yes	64 (91.4)
		No	6 (8.6)
6	Cleaning of walls and floors of hospitals with disinfectants	Yes	48 (68.6)
		No	22 (31.4)
7	Invasive procedure increases the risk of nosocomial infection	Yes	62 (88.6)
		No	8 (11.4)
8	Nosocomial infection is transmitted via medical equipment	Yes	57 (81.4)
		No	13 (18.6)
9	Isolation of patients with communicable diseases	Yes	62 (88.6)
		No	8 (11.4)
10	Observation of precaution standards in practice at your workplace	Yes	32 (45.7)
		No	38 (54.3)
11	Following recommended guidelines for use of alcohol -based solutions or other antiseptics during any surgical procedure	Yes	59 (84.3)
		No	11 (15.7)
12	Standard operative procedures (SOPs) for nosocomial infection control are present in your department	Yes	50 (71.4)
		No	20 (28.6)

Table 3 shows that 65 participants (92.9%) reported that nosocomial infection is caused by bacteria. The 42 participants (60%) indicated that airborne droplets are a common source of infection. Nurses demonstrated good knowledge regarding hand hygiene as 49 participants (70%) reported taking adequate time for proper handwashing. The 45 participants (64.3%) indicated that immunocompromised patients are at greater risk of infection, while indoor and outdoor patients (4.3%) were considered at lower risk of acquiring nosocomial infection.

Table3: Questionnaire Related to Knowledge Assessment

S. No.	MCQs	Variables	Frequency (%)
1	Hospital-acquired infections	Nosocomial	70 (100)
		Nosocongenial	0 (0)
		Notsocomial	0 (0)
2	First person to inform you about nosocomial infection	Books	39 (55.7)
		Media	6 (8.6)
		Workshops	8 (11.4)
		Hospital Coworkers	17 (24.3)
3	Infectious agents	Humans	1 (1.4)
		Animals	1 (1.4)
		Bacteria, Viruses	65 (92.9)
		Persons who are not immunized	3 (4.3)
4	Person at high risk for acquiring nosocomial infection	Indoor Patients	3 (4.3)
		Outdoor Patients	3 (4.3)
		VAP	19 (27.1)
		Immunocompromised Patients	45 (64.3)
5	First thing to know about infection control	Biohazards	2 (2.9)
		Hand Washing	57 (81.4)
		Disinfection	5 (7.1)
		Sterilization	6 (8.6)
6	Most common source of nosocomial infection	Contaminated equipment	12 (17.1)
		Bed Linen	5 (7.1)
		Indwelling catheter	11 (15.7)
		Air droplet	42 (60)
7	Most frequent mode of transmission of nosocomial infection	Direct contact	24 (34.3)
		Airborne	30 (42.9)
		Vehicle transmission	8 (11.4)
		Vector borne transmission	8 (11.4)
8	All are portals of bacterial entry except	Eye	29 (41.4)
		Nose	3 (4.3)
		Intact skin	37 (52.9)
		Mouth	1 (1.4)
9	Proper hand washing	40–60 seconds	49 (70)
		20–30 seconds	12 (17.1)
		10 seconds	3 (4.3)
		2 minutes	6 (8.6)
10	Preferred solution for hand washing	Water	25 (35.7)
		Sanitizer	30 (42.9)
		Scrub	15 (21.4)
		Spirit	0 (0)
11	Predisposing factor for nosocomial infection	Disinfecting floors in hospital	3 (4.3)
		Filtering air	18 (25.7)
		Sterilizing surgical equipment	4 (5.7)
		Having open wound in hospital	45 (64.3)

Figure 1 illustrates key demographic and occupational characteristics of healthcare workers at heightened risk for nosocomial (hospital-acquired) infections. The data reveal that inexperienced staff (0–5 years of tenure, 52.9%)

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and workers in high-exposure units, particularly the Medical (45.7%) and Surgical (32.9%) departments face elevated risks. Younger age groups (21–30 years, 68.6% combined) and those with diploma-level education (62.86%) may also be vulnerable due to less advanced training or limited familiarity with infection-control protocols. Notably, the cohort is overwhelmingly female (98.6%) and married (62.9%), suggesting that these demographics warrant targeted preventive measures. These insights highlight critical intersections between work environment, experience level, and intrinsic factors in infection susceptibility.

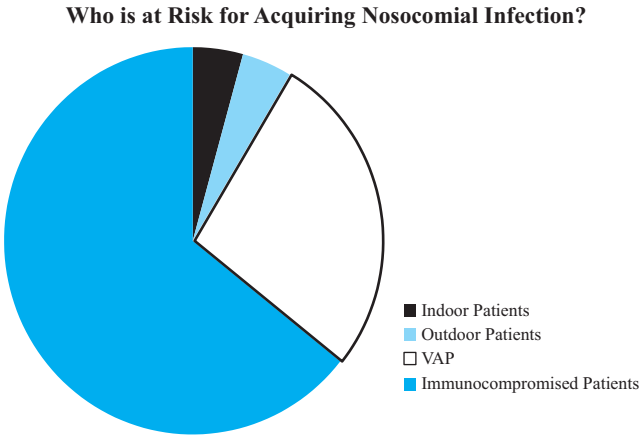

Figure 1: Demographic and Occupational Risk Factors for Nosocomial Infections among Healthcare Workers

DISCUSSION

Participants were evenly distributed across age group (21-25 years, 35.7%; 26-30 years 32.9%; and 31-35 years 31.4%). However, no significant correlation was found between knowledge and demographic factors such as age or qualification. The results of this study align with the findings of a study conducted at Narayana Medical College, Nellore, by Sebastian. The current study indicates that, out of 70 participants, more than three-fourths reported performing hand hygiene, while the remaining participants did not perform hand hygiene between patients care. These findings are supported by a study conducted in Lahore, Pakistan by Maria Jahangir ...which reported similar results because both studies were conducted in regions sharing similar cultures and values Jahangir *et al.* in 2017 [11]. Findings also reveal that out of 70 participants, ninety percent participants believed that environment is a major source of Nosocomial infection, while the remaining participants did not. These results are supported by a study conducted in Muscat, Oman by Labrague *et al.* in 2012 [13]. Both studies highlight that standard Precautions are an essential component of the nursing curriculum in both countries. The findings of the current study show that more than two-thirds of the participants were aware that invasive procedures elevate the risk of nosocomial infection, while one-third lacked this knowledge. This was also demonstrated by the findings of a study conducted by J. Labrague *et al,* 2012 [13]. Both studies emphasize this content as a significant part of nursing curricula as well as clinical practice in healthcare settings. There are no contradictory findings regarding knowledge, as infection-prevention content is a core component of all medical curricula; there is a noted lack of practice in various healthcare settings. The findings of the current study also show that over 80% of participants recognized that nosocomial infection can be transmitted via medical equipment, while the remaining participants lacked this knowledge. This finding is supported by a study conducted in Lahore, Pakistan by Jahangir *et al,* in 2017 [11]. However these findings contrast with those of Angelillo *et al,* who studied nurses in 16 randomly selected hospitals in Calabria, Italy [14]. The results differ because of a lack of broad procedural knowledge. The current study also revealed that nearly 90% of participants agreed that patients with communicable disease should be kept in isolation rooms, while the remaining participants disagreed [14]. The study contrasts with the findings of a study conducted in eight hospitals of Jordan by Mohammad Suliman, where differing results were attributed to inadequate education regarding isolation strategies Suliman *et al.* in 2018 [15]. Additionally, 84.3% of participants in the present study reported following recommended guidelines for the use of alcohol-based solutions, while 15.7% did not. These results differ from findings reported by Marie Pierre Tavolacci *et al.* In 2008 at Rouen University, France, where traditional soap was commonly used due to limited knowledge about alcohol-based hand rubs [16]. The current study also shows that more than two-third of participants agreed that Standard Operative Procedures (SOPs) were present in the departments, while the remaining participants disagreed. This finding contrasts with study conducted in Shebin El Kom district, Egypt by Salam *et al.* [17]. Where written SOPs and infection control guidelines were present in every section of each department Salam *et al,* in 2021 [17]. Kollef *et al.* (2021) emphasize that modern intensive care units (ICUs)face increasing nosocomial infection complexity due to aging populations, rising immunosuppression, and antimicrobial resistance. They note a shift in etiological pathogens and stress that virulence and resistance patterns demand more robust prevention strategies [18]. Khan *et al.* in 2015 complement these observations by underscoring systematic interventions such as antibiotic stewardship and environmental hygiene in reducing transmission [19]. Inweregbu *et al.* in 2005 provide foundational context, revealing that ICUs exhibit the highest prevalence of nosocomial infections (20.6%) among hospital units, largely due to invasive procedures

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and immunocompromised patients, with Staphylococcus aureus identified as the predominant pathogen [20].

CONCLUSIONS

As morbidity and mortality rates continue to rise globally among patients with nosocomial infections, this study was conducted to examine the impact of such infections on these rates. The results may inform the planning and implementing of standard protocols for preventing and controlling morbidity and mortality among patients with nosocomial infections. The findings of the current study revealed that most nurse's demonstrated satisfactory knowledge and practices regarding the prevention of hospital-acquired infections. However, the study was limited by its small sample size and being conducted at a single hospital, which restricts the generalizability of the findings to the broader population.

Authors Contribution

Conceptualization: RL
Methodology: AS, SB, NP
Formal analysis: AS, NP
Writing, review and editing: RL, MS

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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Assessment of the Personal Hygiene Practices among Primary School Children in Swat

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ABSTRACT

Personal hygiene plays a pivotal role in maintaining and promoting health, especially among school-going children. Inadequate hygiene practices contribute significantly to the global burden of infectious diseases and school absenteeism. **Objective:** To assess the personal hygiene practices among Class 3 students of a government primary school in Shakari, Manglawar. **Methods:** A cross-sectional study was conducted from February to April 2025 among 50 students aged 8–10 years. A structured questionnaire was used to gather data on demoFigureic details and hygiene practices. The responses were analyzed using SPSS version 27.0, with results presented in frequencies and percentages. **Results:** Findings revealed that 78% of children always brushed their teeth, 44% always cut their nails, 56% wore clean clothes daily, and 44% bathed daily. Handwashing habits were strong, with 88% always washing hands before eating and after using the toilet. Maternal education was low, with 48% illiterate and 40% having only basic education. Household unemployment was 56%, and 46% of families had more than six members. **Conclusions:** While hand hygiene was well-practiced, other aspects like nail trimming and daily bathing showed room for improvement. Findings highlight the need for reinforced hygiene education and parental involvement to instill lifelong healthy habits in children.

INTRODUCTION

Everything that supports a healthy life is included in hygiene, which is the study of health. The factors that impact health and well-being are included in personal hygiene, which also enhances health [1, 2]. In the same way, the ancient Greek goddess of healthy living, Hygeia, is the source of the word hygiene. The term "hygiene" describes the behaviors related to maintaining good health and leading a healthy lifestyle [3]. Moreover, body cleaning and bathing, clothing washing, tooth brushing, hair and nail trimming, hand washing before meals and after using the restroom, and other practices are all part of daily personal hygiene. The development of children is harmed by a high incidence of infectious illnesses brought on by poor personal cleanliness [1]. According to studies, there is a greater risk of diarrhea in slum environments because of the near proximity of sanitary facilities to dwellings, the sharing of sanitary facilities, and the unsanitary conditions of the housing compounds and sanitation facilities [4]. One of the main issues facing the world today is sanitation, and hygiene [5]. In addition, poor personal hygiene adds to the burden of disease worldwide. Better hand and face hygiene may help avoid respiratory infections like influenza and pneumonia, ocular diseases like trachoma, and enteric infections including shigellosis, cryptosporidiosis, and soil-transmitted helminthiases [6]. Furthermore, teachers, who are the first people schoolchildren interact

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with, can promote hygienic practices and provide appropriate health information to help prevent the majority of health issues that impact schoolchildren [7]. Additionally, developing a habit of personal hygiene is one of the finest strategies to preserve children's health [8]. Furthermore, ill health may hinder elementary school students' cognitive and physical development Children [9]. Furthermore, practicing good personal hygiene, such as washing your hands and face, can help lower the worldwide burden of infectious diseases [10]. Additionally, gastrointestinal and respiratory tract infections the two main causes of childhood morbidity and mortality worldwide have been successfully decreased by up to 50% as a result of increased knowledge and hand hygiene habits, particularly among youngsters. Also, research has demonstrated that students who practice and understand personal hygiene better receive higher scores and miss fewer sick days [11, 12]. Food-borne infections can have a variety of causes. The main causes of food-borne illnesses include a lack of public knowledge, food contamination, cross-contamination, incorrect storage and preparation temperatures, inappropriate food handling, and poor personal hygiene [13, 14]. Therefore this study aims to assess the practices of personal hygiene among school-going children.

METHODS

This cross-sectional study was conducted among 50 students in govt primary school Shakari in Manglawar from 1st Feb 2025 to 30th April 2025. Sample size was calculated using online software for sample size calculation.The study was conducted at a Government Primary School in Shakari, an area renowned for its diverse socioeconomic population.The entire study period ran from February 1st until May 30th. Children in Class 3 at a government primary school in Shakari made up the study's target population. In order to guarantee gender representation in the study, participants included both male and female students. Participants ranged in age from 8 to 10 years old. The eligibility criteria were carefully established to ensure that only appropriate participants both cognitively and ethically suitable for the research were included in the study. The inclusion criteria they were enrolled in Shakari's Government Primary School's third grade. They were in the age range selected for this study, which was 8 to 10 years old. Also after being given a basic explanation of the study, they expressed curiosity and willingness to participate. The exclusion criteria were those who didn't understand the questions, even after the researcher tried to explain and they refused to participate or were unwilling to complete the questionnaire. The questionnaire had two main parts: 1st DemoFigureic Information including the education of the mother, Occupation of the household, and Number of family members 2nd Knowledge-Based Questions. The second part of the questionnaire has 8 questions about the main topic of the study. Such as daily brushing, cutting nails, Daily bathing, cleaning hair, washing hands before eating, Washing hands after toilet, and Wearing clean clothes. Researchers were present to help explain any part that the students did not understand so that every child could answer confidently and correctly. Before the data collection formal approval was secured from the appropriate school authorities, REF.No: (146/DCNS/25) to ensure institutional support and access. Moreover, researchers visited classrooms and provided an introduction their self and to the study. They explained the purpose and objectives to students. In addition, informed consent was obtained from all participating students. The participants were assured that their participation was voluntary and confidential. After that, the hard-copy questionnaires were then distributed to the students. Along with that, clear instructions were provided, and assistance was given to help students understand any difficult questions. Besides, completed questionnaires were collected on the same day to maintain consistency and minimize data loss. Moreover, Participants were fully informed about the purpose, procedures, risks, and benefits of the research. Researchers protected participants' identities and personal information. In addition, data is stored securely and anonymized where possible. Furthermore, researchers have minimized any physical, psychological, or emotional harm to participants. Participants have been informed that they can withdraw from the study at any time without penalty. For the data analysis SPSS version 27.0 was used. Responses of each participant were measured through frequency and percentage.

RESULTS

Figure 1 shows the result of the age of the participants in which the majority 95% were aged 8-10.

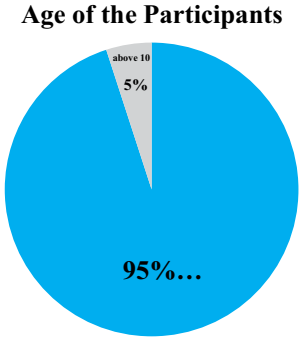

Figure 1: Age of the participants

Figure 2 shows the result of the education of child mothers in which 10 (20%) are graduates, 20(40%) are basic/ secondary school and 24(48%)are illiterate.

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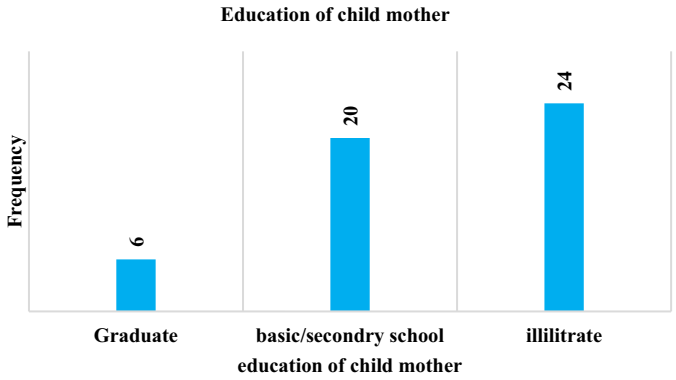

Figure 2: Education of Child Mother

Figure 3 shows the findings of family members number in which 26% have family members less than 6, 10% have 6 members in their family and more than 6 members are 46%.

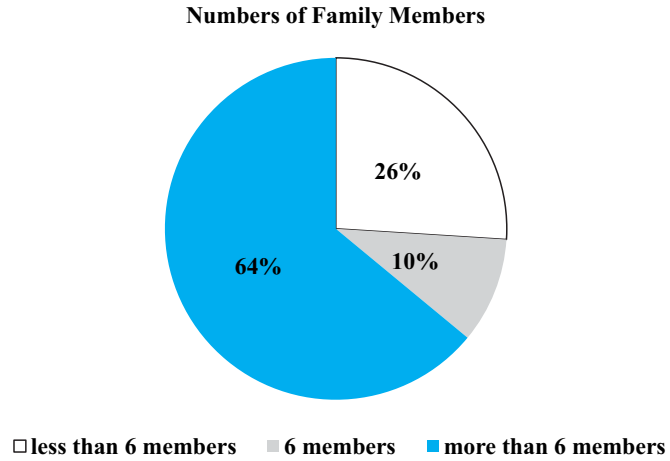

Figure 3: Numbers of Family Members

Figure 4 shows the distribution of household occupation status among the respondents. According to the data, 22 individuals (44%) are engaged in various forms of employment or income-generating activities. On the other hand, 28 individuals (56%) are not involved in any formal occupation or are unemployed.

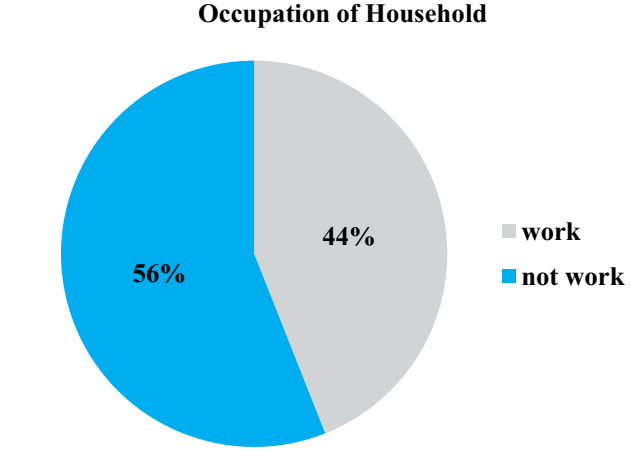

Figure 4: Occupation of Household

The table 1 presents data on personal hygiene practices among the participants. Regarding daily brushing, a significant majority, 78%, reported that they always brush their teeth, 2% do so frequently, 18% sometimes, and 2% never brush their teeth. In terms of cutting nails, 44% of respondents always maintain this hygiene practice, 14% do so frequently, 40% sometimes, and 2% never. When it comes to wearing clean clothes, 56% always wear clean clothes, 22% do so frequently, another 22% sometimes, and none reported never doing so. For daily bathing, 44% of individuals always take a bath daily, 24% bathe frequently, 32% sometimes, and none reported never bathing. In terms of hair cleaning, 64% always clean their hair, 20% frequently, 16% sometimes, and none reported never cleaning their hair. With regard to washing hands after using the toilet, 88% of respondents always follow this essential hygiene practice, while 12% reported doing so sometimes; no one indicated doing it frequently or never. Finally, 88% of participants always wash their hands before and after eating, 6% frequently, 6% sometimes, and again, none reported never practicing this habit.

Table 1: Personal Hygiene Practices

Statement	Always Frequency (%)	Frequently Frequency (%)	Sometimes Frequency (%)	Never Frequency (%)
Daily Brushing	39 (78)	1 (2)	9 (18)	1 (2)
cutting nails	22 (44)	7 (14)	20 (40)	1 (2)
wear clean clothes	28 (56)	11 (22)	11 (22)	0 (0)
daily bathing	22 (44)	12 (24)	16 (32)	0 (0)
cleaning hair	32 (64)	10 (20)	8 (16)	0 (0)
washing hands after toilets	44 (88)	0 (0)	6 (12)	0 (0)
washing hands before and after eating	44 (88)	3 (6)	3 (6)	0 (0)

DISCUSSION

The importance of personal hygiene, particularly among school-aged children, cannot be overstated, as it plays a crucial role in preventing the spread of infectious diseases. A cross-sectional study conducted in Sudan revealed that while most primary school children demonstrated some awareness of personal hygiene practices, many still lacked proper knowledge and consistent behavior, indicating a need for improved hygiene education stated by Tamomh *et al.*, 2021 [15]. More broadly, hygiene interventions have shown considerable potential in enhancing public health outcomes.Curtis *et al.*, 2011 emphasized that hygiene promotion offers new hopes for controlling infectious diseases, especially in low-resource settings where infrastructural improvements may be slow to implement [16]. This is supported by findings from Aiello *et al.*, in 2008, who conducted a meta-analysis revealing that effective

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hand hygiene can significantly reduce the incidence of infectious diseases in community settings, underscoring its critical role in public health strategies [17]. Similarly, Freeman *et al.*, in 2014 provided a global perspective through a systematic review, demonstrating that handwashing with soap is associated with substantial health benefits, particularly in reducing diarrheal and respiratory diseases [18]. The quantitative analysis by Rabie and Curtis in 2006 further confirmed this association, reporting that regular handwashing can lead to a marked reduction in respiratory infections [19]. In addition to general hygiene, food handling practices within households also contribute to the transmission of diseases.Scott and Herbold in 2010 highlighted through video analysis and surveys that many individuals do not consistently follow safe food-handling procedures during meal preparation, potentially increasing the risk of foodborne illness [20].Following this the study presents this finding among the families surveyed, 26% have fewer than 6 members, 10% have exactly 6 members, and 46% have more than 6 members another finding shows that no. of family members 3 Persons 108 (43.2%),4 Persons 48 (19.2%)5 Persons 49(19.6%)6 Persons 39(15.6%)7 Persons (6 2.4%)[1]. According to an additional study, it is evident that 53.1% have 1 to 4 members,37.9% have 5 to 7 members, and only 9% have above 8 members[4]. Through this study, we observed that the occupations of household members vary significantly.22 individuals representing 44% are engaged in various forms of employment or income-generating activities.On the other hand, 28 individuals, accounting for 56% of the total, are not involved in any formal occupation or salaried employment. According to an additional study, it is evident that 68% of individuals are unemployed, 15% are skilled workers, 7% individual are unskilled workers and the remaining 10% [5]. Collectively, these studies highlight that while hygiene awareness is increasing, especially in educational and community contexts, there remains a substantial gap between knowledge and practice.Continued efforts in hygiene education, behavior change strategies, and infrastructure development are necessary to maximize the health benefits of these simple yet effective practices.

CONCLUSIONS

While hand hygiene was well-practiced, other aspects like nail trimming and daily bathing showed room for improvement. Findings highlight the need for reinforced hygiene education and parental involvement to instill lifelong healthy habits in children.

Authors Contribution

Conceptualization: AB
Methodology: SK
Formal analysis: AB, SB, K
Writing, review and editing: MS, AB, SB, K

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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Assessment of Readiness and Perception toward Artificial Intelligence Integration in Nursing Education: A Quantitative Study in Sindh, Pakistan

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing healthcare systems worldwide. However, its effective integration into nursing education, particularly in Low and Middle-Income Countries (LMICs), remains underexplored. **Objective:** To assess the readiness, awareness, and perceived barriers regarding AI integration among nursing students in Sindh using a structured quantitative approach. **Methods:** A descriptive cross-sectional study was conducted among 230 students using a stratified non-probability random sampling method. Data were collected via a validated Likert-scale questionnaire and analyzed using SPSS version 26. **Results:** 90% of students reported conceptual awareness of AI, and 92% expressed excitement about using AI tools in nursing education. However, only 43% had formal AI training. Perceived barriers included data privacy concerns (86%), lack of infrastructure (77%), and fear of job displacement (71%). **Conclusion:** The study findings demonstrated that it is necessary to have a regular systematic AI-oriented training in the nursing curriculum to better equip students in working with a relevant technology.

INTRODUCTION

The healthcare sector is undergoing a paradigm shift driven by the integration of Artificial Intelligence (AI) in diagnostics, clinical decision support, patient monitoring, and personalized care delivery [1, 2]. As frontline healthcare providers, nurses are expected to function not only as compassionate caregivers but also as digitally literate professionals equipped to interact with AI systems [3]. Therefore, nursing education must evolve to incorporate digital competencies that reflect this new reality. Globally, AI is being progressively introduced into nursing curricula, particularly in high-income countries where digital infrastructure, faculty development, and institutional frameworks are more established [4]. In contrast, Low- and Middle-Income Countries (LMICs) like Pakistan are still in the exploratory phase, with most nursing programs lacking formal AI instruction or ethical frameworks for its application [5]. Moreover, although students increasingly interact with AI-powered platforms like clinical chatbots and ChatGPT, their use is still disconnected from structured teaching methods [6].

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Infrastructural constraints, such as inadequate training resources and unprepared teachers, and ethical issues, such as algorithmic prejudice, data misuse, and the perceived dehumanization of care, further exacerbate this disparity [7-10]. Assessing nursing students' AI preparedness is crucial and timely as Pakistan speeds up its digital health ambitions. Across Sindh's varied institutional landscape, this study investigates students' awareness, willingness, and perceived impediments to AI incorporation in nursing school. The objective is to provide information for evidence-based curriculum changes and national policy suggestions that reflect the technological future of healthcare [11-15].

This study aimed to assess awareness, readiness, and perceived barriers toward AI integration among undergraduate medical students in Sindh Pakistan, and to analyze correlations between these variables.

METHODS

This descriptive cross-sectional study was conducted among nursing students enrolled in public and private institutions across Sindh, Pakistan, to assess their readiness and perceptions toward AI in nursing education. This study was conducted between January and May 2025. A total of 230 participants were selected using stratified non-probability random sampling to ensure representation across academic years and institution types. Students were eligible to participate if they were enrolled in their second year or higher and had prior exposure to at least one course involving digital technology. Students who had not completed at least one semester of clinical education or lacked any formal or informal digital learning experience were excluded. Descriptive statistics (frequencies, percentages, means) summarized participant demographics and Likert-scale responses. Inferential statistics (independent t-tests, ANOVA, Chi-square) were applied to compare groups, with significance set at a 95% confidence level ($\alpha = 0.05$). The Shapiro-Wilk test confirmed normality for parametric tests. Results were considered statistically significant at $p < 0.05$."Data were collected using a self-developed structured questionnaire comprising four components: demographic information, an AI Awareness Scale, an AI Readiness Scale (adapted from the Technology Readiness Index 2.0, developed by Parasuraman and Colby), and a Perceived Barriers Scale [16-19]. All the sections in the questionnaires had a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The level of AI awareness (8 items; 20-40, the range of scores used was divided into low (8-20), moderate (21-29), and high (30-40). The questionnaire on AI Readiness Scale (10 items; range, 10-50) was coded low (10-25), moderate (26-39), and high (40-50). The Perceived Barriers Scale (9 items; range: 9-45) was measured, indicating low (9-20), moderate (21-35), and high (36-45). There was a definition of categories according to the tertile distribution of pilot data. The instrument demonstrated strong internal consistency, with Cronbach's alpha values of 0.83 for the AI Awareness Scale, 0.88 for the AI Readiness Scale, and 0.86 for the Perceived Barriers Scale. The questionnaire was validated by subject experts, and a pilot study ensured internal consistency, yielding a Cronbach's alpha above 0.80. The survey was administered electronically via Google Forms, and informed digital consent was obtained from all participants. Ethical clearance was granted by a recognized institutional review board. Data were analyzed using SPSS version 26.0, applying descriptive statistics, inferential tests such as independent t-tests, Chi-square tests to examine relationships between AI awareness, readiness, and perceived barriers.

RESULTS

This study presented a clear snapshot of AI awareness, readiness, and challenges among 230 nursing students in Pakistan. The majority were female (62.6%), enrolled in 3rd year (45.7%), and from private institutions (53%). Most students had access to digital devices (94.3%) and had used AI tools (95.2%), though only 43% received formal AI training. The results reveal high levels of AI awareness and positive attitudes, especially among female students and those in private colleges. However, institutional support is lacking, infrastructure gaps, untrained faculty, and privacy concerns remain significant barriers. This contrast highlights a critical paradox: students are ready for AI, but educational institutions are not yet equipped to support its integration effectively. Table 1 shows that female students (80%) and students from private institutions (75%) demonstrated significantly higher AI awareness than their counterparts ($p < 0.05$ and $p < 0.01$, respectively), suggesting better access or support. The year of study had no significant effect, with awareness levels remaining consistent across all years. This indicates that AI exposure is likely informal rather than curriculum-driven. Overall, gender and institution type are key factors in awareness, highlighting the need for equitable AI education across all groups.

Table 1: Association between Demographic Factors and AI Awareness (% Agree/Strongly Agree)

Demographic Factor	Category	AI Awareness (%)	Significance
Gender	Male	65	*p < 0.05
	Female	80*	
Institution Type	Public	60	**p < 0.01
	Private	75**	
Year of Study	2nd Year	68	NS (Not Significant)
	3rd Year	72	
	4th Year	70	

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Figure 1 showed that most nursing students demonstrate a strong awareness of AI, especially in understanding its role in healthcare and identifying its applications in clinical settings. A significant proportion have also used AI tools for educational purposes, reflecting informal exposure. These results indicate a high baseline familiarity with AI among students, even without formal instruction.

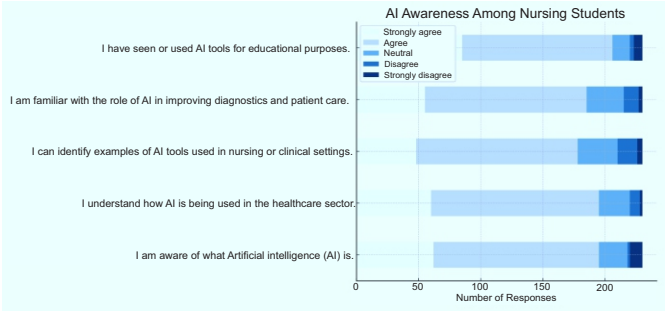

Figure 1: AI Awareness Levels across Key Concepts in Nursing Education

Figure 2 reflected that nursing students are highly optimistic and confident about integrating AI into their education. Most respondents agreed that AI can enhance learning and clinical decision-making, and felt ready and capable of using AI tools. This positive attitude indicates a strong foundation for implementing AI-driven learning, provided institutional support is strengthened.

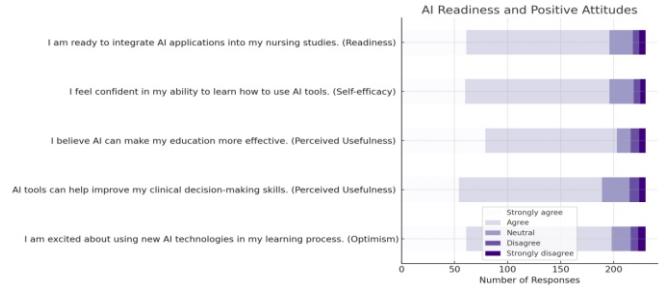

Figure 2: AI Readiness and Positive Attitudes among Nursing Students

Figure 3 highlighted that while students are eager to embrace AI, they face significant institutional barriers. The most common concerns include data privacy (86%), poor infrastructure (77%), and lack of AI training (67%). These findings emphasize the need for systemic reforms in training, resources, and policy to support effective AI integration in nursing education.

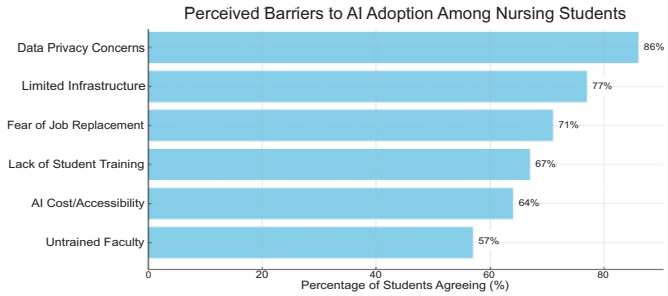

Figure 3: Perceived Barriers to AI Adoption among Nursing Students

Figure 4 revealed that students from public institutions face greater challenges than those in private colleges, particularly regarding data privacy (89%) and infrastructure (82%). Concerns about AI replacing nursing roles are also higher in public settings. These differences underscore the need for targeted investment in public institutions to reduce the digital readiness gap.

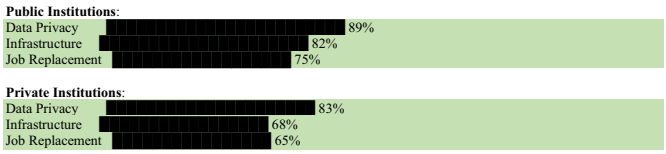

Figure 4: Comparison of Perceived AI Barriers in Public vs. Private Institutions

Table 2 showed that while most students believe in AI's importance (80%) and understand its role (75%), fewer feel ready to use AI (65%) or can identify specific tools (65%). Only 60% report AI being covered in their curriculum, revealing a gap between perception and formal education. These results suggest strong interest but underscore the need for structured AI integration in nursing programs.

Table 2: Key Perception Metrics on AI among Nursing Students

Key Metric	Agree	Disagree
Believe in AI's importance	80%	20%
Understand AI's role	75%	25%
Ready to use AI	65%	35%
Identify AI tools	65%	35%
AI in curriculum	60%	40%

DISCUSSION

Significant obstacles still exist, nevertheless, especially in the areas of curriculum alignment, digital infrastructure, and teacher training. These gaps run the risk of compromising the potential of a highly motivated and attentive student body in the absence of proactive action [20]. This study offers timely insight into AI readiness among nursing students in Sindh, Pakistan, where digital integration in education remains limited. Findings show high awareness (90%) and enthusiasm (92%) toward AI, consistent with global trends [7, 10, 2]. However, a major challenge remains: a gap between student readiness and institutional preparedness. While students exhibit digital

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fluency, 57% cited untrained faculty as a key barrier supporting Rony *et al.*,'s findings that educators often lack AI-specific training [2]. Similarly, Salama *et al.*, reported strong student interest in Palestine despite minimal structured exposure, echoing the local context [6]. Top barriers data privacy concerns, limited infrastructure, and fear of job loss were consistent with studies in the Gulf and Southeast Asia [15, 11, 18]. Micah *et al.*, (2021) conducted a comprehensive review tracking global health spending —including development assistance, government , and private expenditures across 204 countries from 1990 to projected trends in 2050 [12]. It's crucial to distinguish between structured academic teaching and unstructured AI use, such as ChatGPT. True competence necessitates educational reform rather than only tool familiarity, as Ghimire and Qiu pointed out [1]. Clinical judgment may be compromised by unstructured use, which runs the risk of shallow comprehension and excessive dependence on AI outputs [13]. These insights suggest urgent action: integrating AI into nursing curricula, investing in faculty development, and embedding ethical and psychological preparedness. AI education must go beyond technical training to include ethical, legal, and emotional dimensions.

CONCLUSIONS

This study demonstrates that Pakistani nursing students are highly aware of and prepared for the incorporation of AI into healthcare education. The implementation of AI in nursing education programs through approved curriculum modules, ongoing professional development for teachers in AI and digital pedagogy, and investments in bolstering technology infrastructure, particularly in public institutions, are all necessary to meet these issues. In order to prepare students for the rapidly changing digital landscape in healthcare, it is also important to focus on the early integration of AI ethics, data protection, and responsible use.

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Authors Contribution

Conceptualization: ZA, JR
Methodology: IGK
Formal analysis: ZHC, JAZ
Writing, review and editing: ZA, JAZ, AK

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

Conflicts of Interest

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