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Knowledge and Attitude Regarding Nosocomial Infections among Nursing Students in Private Institute in Khyber Pakhtunkhwa

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ABSTRACT

Nosocomial infections are a severe global health challenge with the worst happening in low- and middle-income countries. It contributes to morbidity, mortality, and healthcare costs. Prevention education among healthcare professionals, most especially nurses and nursing students, is the backbone of reducing their prevalence. **Objective:** To assess nursing students' knowledge and attitudes toward HIAs to bridges that gap by improving training with effective infection control practices within the health care setting. **Methods:** A cross-sectional descriptive study was carried out on 80 nursing students with simple random sampling from a private nursing institute in Pakistan. Their knowledge and attitudes toward Healthcare-Associated Infections (HAIs) were assessed through structured, validated questionnaire. **Results:** The knowledge assessment showed 63% had poor knowledge regarding HAI, 30% had fair knowledge, and 7% showed good knowledge. Among the questions, the question that elicited the highest correct response was for the general definition of HAI at 78%, while prevention strategies elicited only 27% correct responses. Regarding attitudes, 70% students gave a negative attitude toward HAI, and 27% gave a fair attitude, while only 3% reflected a positive attitude. **Conclusions:** Nursing students lacked knowledge and have negative attitudes toward HIAs. The study highlighted targeted educational interventions to build nurses' knowledge and attitudes toward HAIs. Better adherence of infection control protocols can be ensured by improving training programs, leading to a reduced burden of HAIs in healthcare settings.

INTRODUCTION

A nosocomial infection or Healthcare-Associated Infections (HAI) is an infection acquired in a healthcare facility that was not present at the time of a patient's admission. These infections are also called "hospital-acquired infections"[1]. A HIA is an infection or illness one acquires after spending 48 hours or more in the hospital following admission. HIAs lead to prolonged hospital stay, long-term incapacity, increased resistance of pathogens to antimicrobials, enormous additional costs for health systems, huge costs to patients and their families, and unnecessary deaths [2]. HIAs are one of the most important problems of the health care system, and one of the top goals of a hospital's quality management system is the efficient control of hospital infections. The list of possible adverse events for which adequate corrective and preventive measures are elaborated should include hospital infections, considering concern about the safety of patients and the quality of the services reduced [3]. HIAs are one of the most significant causes of many health problems and expenditures among patients and hospitals. Hand hygiene compliance acts as an important tool for the effective control and prevention of transmission of HIAs. It remains unfortunate that unestablished knowledge and attitude towards hand hygiene among students and unavailability of some basic facilities for hand hygiene pose a risk in the transmission of HIAs [4]. One of the studies

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showed that one of the main reasons of HAI are the lack of knowledge, attitudes, and behavioral intention regarding hand hygiene among medical and nursing students [5]. HIAs prevalence rates in developed countries are 7%, and in underdeveloped countries 10% and, in Iranian hospitals, 4.6% [6, 7]. Moreover, a study revealed that knowledge and performance of nursing students, as future nurses, play a great role in controlling HIAs [6]. However, it would also be important to identify their level of knowledge to correct any deficiencies they face [8]. A research study concluded that the sum of the average score of student nurses' awareness on the HIA knowledge level was beyond the moderate level [9]. Another study highlighted that there is a need for frequent education and training programs in primary training time to retain knowledge about HIAs and reinforce the principles of standard precautions and hand hygiene [10]. It is observed in a study that knowledge regarding HIAs among students of health care and control measures has been adequate. However, more practical components of hand hygiene and standard precautions in future educational approaches would be better effective [11]. Knowledge and practices of nursing staff were also good beside nursing students, according to facility types, participants knowledge level in private hospitals was better compared to public hospitals, but practice levels are higher among the participants from public hospitals [12]. Nursing and health care professionals in general possess good knowledge and a positive attitude towards HIAs, as well as infection control practices. However, scarcity of literature has been found in the local Pakistani context on this topic.

The study bridged that gap by assessing nursing students' knowledge and attitudes toward HIAs for improved training with effective infection control practices within the health care setting.

METHODS

A descriptive cross-sectional study was conducted in a private nursing institute, in Khyber Pakhtunkhwa Pakistan, among nursing students. The study period for this study was three months, spanning from August to October 2024. During this time, data were collected, analyzed, and findings were documented. The structured questionnaire was distributed via Google Forms, ensuring ease of access and cost-effectiveness. Participants completed the survey after providing informed consent. This study focused on the knowledge and attitudes regarding nosocomial infections among nursing students in a private institute in Khyber Pakhtunkhwa. The selection of a private institute allowed for an in-depth analysis within a specific academic and training environment, offering valuable insights into the educational standards and awareness levels in such settings. The simple random sampling technique was utilized and finally 80 participants were recruited. A structured, and validated questionnaire was used for assessing knowledge and attitude of nursing students toward HIAs. The questionnaire has two main components the first, part is about demographic information, and the second part is about the knowledge and attitude regarding HAI. Those questions included some topics on the aspect of HIA. Every question holds two choices of false and true that is, 0 and 1 respectively. The knowledge level had been divided into three categories that are poor, fair, and good. Scores less than 50% represented inadequate knowledge, 50-75% fair knowledge, and above 75% good knowledge. Then, the questionnaire had five attitude statements regarding HIA. The answer scale used was Likert-type, with five points, which the scale was running as "Strongly Agree (5) to Strongly Disagree (1)". Attitudes were ranked to be one of three levels based on score. A score of 12 or less indicated poor attitude, scores from 13-18 represented fair attitude, and scores from 19-25 signified good attitude. The sample size of 80 participants, determined using OpenEpi software and eligibility criteria, may limit the generalizability of the findings. A larger sample size could provide more robust and representative data. The study was conducted at a single private nursing institute in Khyber Pakhtunkhwa, which may not fully capture the diversity of nursing students' knowledge and attitudes in other institutions or regions. As nursing students only from selected institute were approached, nursing from other institutes were not considered. Google Forms was chosen for data collection due to its accessibility, cost-effectiveness, and ease of distribution across geographically dispersed participants. A Google Forms online questionnaire was distributed through WhatsApp. Information about the study, its aims, and guidelines for answering the questionnaire were given to participants. The respondents were taken through a completed online questionnaire upon seeking consents. This study took three months from September to November 2024. Repetition of responses was an issue controlled by the number of times a participant took the survey. Data were analyzed with SPSS version 26.0. For all of the above-mentioned study variables which are approximately normally distributed, mean and standard deviation were calculated. For those variables that were not normally distributed, median along with Interquartile Range (IQR) was calculated. For categorical variables, frequencies with percentages were calculated for them. Chi-square or Fisher's exact test was applied to assess association with demographic variables.

RESULTS

It had 80 nursing students, of which 45% (n=36) were the second years, and the rest 55% (n=44) were third years. Gender distribution was according to a few female students, since 85% (n=68) were males and only 15% (n=12) were females. Age ranged from 17 to 25 years. More specifically, 25% (n=20) were aged 17 to 19 years, 55% (n=44)

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were aged 20 to 22 years, and the rest 20% (n=16) were aged 23 to 25 years.

Table 1: Demographic Data of participants

Category	N (%)
Year of Study	
2nd Year	44 (55%)
3rd Year	55 (45%)
Gender	
Male	68 (85%)
Female	12 (15%)
Age Range	
17 to 19	20 (25%)
20 to 22	44 (55%)
23 to 25	16 (20%)

The knowledge score on the assessment scale ranged from 1 to 10. The percentage of correct responses for each knowledge question varied, with the highest (78%) correct answer for the general definition of HIA; however, other topics, such as the prevention strategies of HIA, received very low (27%) correct response rates. The vast number of students demonstrated poor knowledge of HIA, as 63% (n=50) fell in poor knowledge, 30% (n=24) had fair knowledge, and only 7% (n=6) showed good knowledge which is shown in the table 02.

Table 2: Level of Knowledge among study participants

Level of Knowledge	N (%)
Good Knowledge	6 (7%)
Fair Knowledge	24 (30%)
Poor Knowledge	50 (63%)

Table 03 showed the attitude of students toward HIA, which is generally negative. In fact, among the students, 70% (n=56) demonstrated a negative attitude about HIA, while 27% (n=22) had a fair attitude, and only 3% (n=2) held a positive attitude toward HIA. The questionnaire used in this study was adopted and validated from the study by Hamukonda, S., Emvula, O., and Mbapaha, C. (2024), titled "Undergraduate Nursing Students' Knowledge and Practices Towards the Prevention of Nosocomial Infections," published in the Indiana Journal of Agriculture and Life Sciences, 4(1), 21-26. The references for this validated questionnaire have been cited in the article to ensure transparency and acknowledgment of the original source. The sample size of 80 participants was determined using OpenEpi software based on a rigorous statistical technique, ensuring representativeness and reliability. The selection of private nursing colleges in KPK was justified by the presence of over 150 such institutes, making it a relevant and diverse population for the study.

Table 3: Level of Attitude among study participants

Level of Attitude	N (%)
Positive Attitude	2 (3%)
Fair Attitude	22 (27%)
Negative Attitude	56 (70%)

DISCUSSION

This study broadly assesses the knowledge and attitudes of nursing students toward nosocomial infections and stresses areas of strength and gaps that need to be improved in the prevention and management of hospital-acquired infections. In comparison with the research carried out globally, many fantastic insights can be seen regarding a strong point of view regarding both prevailing methods and areas open for the development of infection control in healthcare settings. In contrast to earlier research suggesting that participant's knowledge related to HIAs was satisfactory and well accepted learning infection control procedures, this study has found an evident gap: the participants had limited knowledge and a bad attitude toward infection control measures [2, 13]. This difference may indicate some barriers in the present educational approach or in the environment that hinders the understanding and perception of these students about practices in infection prevention. However, another the study found that although 55.7% of the nurses had satisfactory knowledge, general knowledge levels remained suboptimal even at higher qualifications. Nurses in bachelor degrees scored higher knowledge, comprehended the risks of infections and display positive attitudes. Although the participants showed positive attitudes and their general knowledge did not reach satisfactory levels [14, 15]. Similarly in the current study, 63% nursing students portrayed poor knowledge and 63% had negative attitude regarding HIAs. These alignments across both studies point out a critical gap in education, indicating the need for enhanced training efforts to improve knowledge and attitudes both among practicing nurses and nursing students. Another study showed that most of the respondents showed moderate levels of knowledge and practice with nominal variance; attitude, however, was seen to have a remarkably higher level, and the difference was statistically significant, but these findings indicate poor knowledge and negative attitudes among students [16]. This disparity underscores the need to target educational improvement of knowledge and attitudes at clinical standards. Furthermore, this study established that there were significant knowledge and practice gaps of HAI among the students. Contrary to this, previous studies reported that students on undergraduate training in nursing students presented with knowledge and practice of hand hygiene-a critical prevention measure for

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HIAs, which was attributed to appropriate exposure to relevant information [17]. This therefore means that such interventions reinforcing fundamental infection control practices, such as hand hygiene, can better improve students' composite infection control practices and fill the gaps established in the current study. In addition, a study indicates that participants generally have good knowledge and attitudes toward HAI control, with room for improvement through educational seminars and awareness programs to strengthen adherence to barrier measures, while this study contrasts sharply in which observed poor knowledge and negative attitudes among students about HAI underscoring a critical need for targeted education to address these gaps [18]. Unlike the results of this study, which indicated poor knowledge and a negative attitude towards HIA among students, a study in the Tehran hospitals on the paramedical staff reported good levels of knowledge, attitude, and performance with respect to nosocomial infections [19]. Furthermore, a study regarding Central Line-Associated Bloodstream Infection (CLABSI), a form of HAI, which shows that out of 54.9% with poor knowledge, 74% practiced according to the standard and 85% had positive attitudes toward infection prevention. This shows that despite their unawareness, nurses have practiced the principles and were hopeful, probably owing to in-service training and professional experience, Conversely, in this present study, the students proved ignorant and continued to be careless with adverse psychological attitudes towards HAI, which is a need for proper education and training so that they can better understand and enforce infection control measures [20]. Strengthening a comprehensive infection-control training program in nursing curricula can have a significant impact on the greater facilitation of students' understanding and attitudes toward HIAs. Thus, the more skilled and knowledgeable the nursing students become, the more the patient safety improves and the quality of care in hospitals increases, therefore contributing to fewer cases of hospital-acquired infections. This study identifies a crucial gap in nursing students' knowledge and attitudes around Hospital-Acquired Infections (HAIs). Most students had poor understanding (63%) and negative attitudes (70%) on infection prevention and control. Addressing these inadequacies will better educate nursing students for clinical practice, ultimately increasing patient safety and lowering the prevalence of HAIs in healthcare settings.

CONCLUSIONS

This study highlighted significant gaps in nursing students' knowledge and attitudes toward Healthcare-Associated Infections (HAIs) in a private nursing institute in Khyber Pakhtunkhwa, Pakistan. Most participants demonstrated poor knowledge (63%) and negative attitudes (70%) toward HAIs, despite their critical role in infection prevention and control. These findings emphasize the urgent need for targeted educational interventions and practical training to enhance knowledge and foster positive attitudes among nursing students. Improving these aspects is crucial for effective infection control practices and reducing the burden of HAIs in healthcare settings. However, potential limitations include reliance on participants' internet access and digital literacy, which may affect response rates and data accuracy. The findings may have limited generalizability due to the unique characteristics of private institutions, such as differences in resources, curriculum, and student demographics. Future research involving diverse institutions, including public and private settings across various regions, is recommended to provide a more comprehensive understanding and enhance the applicability of the results. In conclusion, addressing the gaps in nursing students' knowledge and attitudes about nosocomial infections requires integrating targeted modules, hands-on training, and continuous assessments into the curriculum. Policy interventions such as mandatory infection control certifications, standardized guidelines, and partnerships with healthcare institutions can further enhance their preparedness. These steps will ensure nursing students are better equipped to prevent and manage nosocomial infections effectively.

Authors Contribution

Conceptualization: AAA
Methodology: TA
Formal analysis: AAA, AA, S
Writing, review and editing: SUF, AD, KZ, NS

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

Conflicts of Interest

The authors declare no conflict of interest.

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