



Exploring the Knowledge and Practices of Standard Infection Control Precautions among BSc Nursing Students

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ABSTRACT

Background: Infection control is an essential for protecting both patient & healthcare provider. Infections among healthcare personnel range from 7.6% in advanced economies to 10% in underdeveloped countries, with World Health Organization estimating that up to 3 million professionals are at risk annually for hepatitis B, C, and HIV. Studies highlight significant gaps in knowledge and adherence to infection control practices worldwide, including low compliance with hand hygiene and use of sterile gloves, underscoring the critical need for improved awareness and practice of standard precautions among health professionals, particularly in Pakistan where infection rates remain high.

Objective: To assess the knowledge & practices of standard precautions for infection control among generic BSC Nursing students.

Methods: This cross-sectional descriptive study used an adopted questionnaire to collect and analyze the data from 64 participants selected through convenient sampling technique.

Result: The study In the abstract results section, you can summarize the knowledge and practices with key statistics as follows:

Overall, 91% of nursing students correctly acknowledged the importance of hand washing after each patient contact, and 86% recognized the need for Standard Precautions when caring for HCV-positive patients. However, 63% mistakenly believed that Standard Precautions are only necessary for infected patients. In practice, 89% reported washing hands after contact with blood or body fluids, and 82% wore gloves when collecting blood samples. Notably, only 72% used protective eye goggles during procedures, and just 75% were vaccinated against infectious diseases, indicating critical areas for improvement.

Conclusion: The study reveals significant gaps in infection control knowledge and practices among BSN students, emphasizing the urgent need for targeted education and training to improve compliance with protocols, ensure patient and healthcare personnel safety, and enhance overall health outcomes. Implementing comprehensive educational programs is crucial for developing a more informed and safer nursing workforce.



Background

There are several microorganisms present in hospital care settings that cause life-threatening infection. Medical personnel are vulnerable to illness due to these microorganisms (Ather et al., 2020). In healthcare settings, nurses are more prone to infection due to patient-centered interaction. Therefore, knowledge about infection control methods is essential for clinical staff (Hammoud et al., 2021).

Medical Personnel are manifested with infection in advanced economies of 7.6% while in Underdeveloped countries it is about 10% (WHO). According to WHO, up to 3 million medical professionals are vulnerable to hepatitis C, hepatitis B & HIV every year. Many studies revealed that up to 2.5% HIV, 40% HBV & 40% HCV cases investigated among medical professionals from the entire world (Al-Ahmari et al., 2021). One of the Iran studies revealed that 21% nurses and 30% doctors are unfamiliar with the needle stick injuries can cause Hepatitis B and C. Moreover, another study disclosed that approximately 50% Nurses and 51% Doctors neglected to wear sterile gloves during interaction with patients which can lead to the ultimate cause of infection. According to one Pakistani study only 4.7% clinical staff follows the hand washing techniques (Ather et al., 2020; Akram et al., 2025). According to National the Report on Right Diagnosis from Health Grade up to 1 million cases of infection due to patient-centered care are reported in Pakistan. Standard precautions can alleviate the propagation of infection. Therefore, knowledge and practice about standard precautions are essential for health professionals (Yasmeen et al., 2022).

According WHO, up to 2.6 million deaths are counted due to noncompliance toward standard precautions. Knowledge of standard precautions is cornerstone of infection control, while on the other hand practice is a vital component of infection control. Education on precautionary measures and proper implementation of these guidelines can reduce the mortality and morbidity rate in healthcare setting approximately 70% (Adhlkari et al., 2021).

In 2022, WHO published a technical document titled “Standard precautions for the Prevention and Control of infection: Aid Memorial”. Which highlights the brief note about compliance with standard precautions guidelines and the implementation of these guidelines at all times in all healthcare settings. According to Center for Disease control and prevention, precautionary measures are very essential in healthcare settings not only for healthcare recipients but also mandatory for medical staff. Most of the studies disclosed that student nurses are more vulnerable to infection as compared to staff nurses due to lack of knowledge and practices about precautionary measures (Hammoud et al., 2021; Zahid et al., 2025).

In Pakistan, healthcare workers such as doctors and nurses especially Students nurses, cannot follow the proper guidelines of standard precautions due to heavy workload, patient ratio, and lack of knowledge and practices (Yasmeen et al., 2022).

Objectives

- To assess the level of knowledge regarding standard precautions for infection control among BSc Nursing students.

Null Hypothesis (H₀): Knowledge of precautionary measures among BSN students does not considerable influence their practices of standard precautions in health care settings.

Alternative Hypothesis: Understanding of standard precautions among BSN student considerable effect their practices of precautionary measure in health care settings.

Material and Methods

The study employed a cross-sectional descriptive design to evaluate nursing students' knowledge of standard precautions, collecting data at a single time point. Participants were selected through convenience sampling from a larger BS Nursing student population at a private nursing college in Lahore, comprising 64 students with a 95% confidence interval. Data were collected via an online survey administered through Google Forms, utilizing a validated questionnaire with a content validity index of 0.86. The design was chosen for its simplicity, cost-effectiveness, and rapid data collection. Data analysis was performed using SPSS version 23, with descriptive statistics—including means and percentages—presented through tables and graphs to interpret the responses.

Results

Table 1: Demographic Information

Category	Frequency (n)	Percentage (%)
Gender		
Male	31	48%
Female	33	52%
Total	64	100%
Age Group		
20 years or below	10	16%
21–25 years	53	83%
26–30 years	1	2%
30 years or above	0	0%
Total	64	100%

Table 1 shows that there are 64 responses in all for this research study, of which 31 are male accounting for 48% of the total, and 33 are female accounting for 52% of the total, as shown in table 1. This demonstrates that the majority of the sample is female. There are 64 respondents overall, according to the age distribution. Of those in this category, 10 (16) are under the age of 20, while the bulk, 53 (83%), are between the ages of 21 and 25. (2%) are between the ages of 26 and 30. The largest proportion of participants in this age distribution fall within the 21–25 age range, indicating an adult person sample.

Table 2: Knowledge and Practices on Standard Precautions for Infection Control among Nursing Students

Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
1: Are Standard Precautions only necessary for infected patients?	25	38	5	25	8
2: Is hand washing necessary after contact with every patient?	53	38	5	5	0.0
3: Do you believe Standard Precautions are required when	46	40	11	5	0.0

caring for HCV-positive patients?					
4: Is it necessary to use Standard Precautions during oral care of patients?	47	34	9	8	2
5: Do you wash your hands after contacting blood or body fluids?	56	33	8	3	0.0
6: Do you wear gloves when collecting blood samples?	48	34	13	5	0.0
7: Do you wear a face mask during operations?	47	34	9	9	0.0
8: Do you wear protective eye goggles during procedures?	38	34	14	9	5
9: In case of injury with a sharp object, do you report to the infection control department?	44	41	13	3	0.0
10: Does your hospital provide sufficient resources for infection control (e.g., gloves, masks, hand sanitizers)?	19	50	25		3
11: Have you undergone any training or refresher course on Standard Precautions?	30	46	13	9	3
12: Would you like additional training on infection control practices?	46	33	14	6	2
Questions	Yes (2)		No (1)		Don't Know (0)
13: Are hand washing areas available in different units of your hospital?	78		9		13
14: Are you vaccinated against infectious diseases?	75		17		8

Knowledge on Standard Precautions for Infection Control

The findings from the knowledge-related questions reveal varying levels of understanding among nursing students regarding Standard Precautions for infection control. A significant misconception was noted in Question 1, where 63% of students either strongly agreed or agreed that Standard Precautions are only necessary for infected patients, indicating a critical gap in foundational knowledge. In contrast, Question 2 showed strong awareness, with 91% of students acknowledging the necessity of hand washing after every patient contact. Similarly, in Question 3, 86% recognized the importance of using Standard Precautions when caring for patients with Hepatitis C Virus (HCV), reflecting adequate knowledge regarding blood-borne pathogens. In Question 4, 81% agreed on the need for precautions during oral care, although a small percentage expressed uncertainty or disagreement. Regarding institutional support, only 69% of students felt that sufficient infection control resources were available (Question 10), with 25% remaining neutral—highlighting potential variability in access. In terms of training (Question 11), 76% reported having

received formal instruction on Standard Precautions, while 79% (Question 12) expressed a desire for further training, suggesting a positive attitude toward continuous learning and professional development. Overall, while basic knowledge on several aspects of Standard Precautions is evident, targeted education is necessary to address persistent misconceptions and reinforce proper understanding among nursing students (table 2).

Practices on Standard Precautions for Infection Control among Nursing Students

The responses to the practice-related questions reflect generally positive but somewhat inconsistent adherence to Standard Precautions among nursing students. Most participants demonstrated good hand hygiene practices, with 89% affirming that they wash their hands after contact with blood or body fluids (Question 5), and 82% reported wearing gloves while collecting blood samples (Question 6). Similarly, 81% indicated that they wear face masks during operations (Question 7), although the remaining respondents either disagreed or were neutral, suggesting occasional lapses in protective practices. Notably, the use of protective eye goggles during procedures (Question 8) showed weaker compliance, with only 72% affirming usage, while 23% disagreed or strongly disagreed—highlighting a potentially overlooked area of infection control. In terms of sharps injury protocol (Question 9), 85% reported compliance with the requirement to notify the infection control department, though 13% were neutral, implying uncertainty about institutional procedures. The availability of handwashing stations across hospital units (Question 13) was acknowledged by 78% of respondents, suggesting that infrastructure is generally adequate. However, only 75% reported being vaccinated against infectious diseases (Question 14), with 17% unvaccinated and 8% unsure of their status—raising concerns about personal protection and immunization awareness. Overall, while core practices such as hand hygiene and glove use are well-integrated, areas like eye protection, injury reporting clarity, and vaccination uptake require further attention to ensure comprehensive infection control compliance among nursing students (table 2).

Discussion

This chapter compares the findings of this research with the outcomes of other studies on infection control in healthcare settings. This chapter highlights the overall conclusion of this research study. In this chapter strength and limitation of this study are briefly explained. The one segment of this chapter also includes the recommendation for nursing students to enhance their knowledge regarding infection control and also provide a pathway for future researcher to use this study.

This cross-sectional study was conducted on BSN students to evaluate the knowledge and practices of standard precaution for infection control. The finding of this study showed that 64% of participants from the study are well aware about standard precaution guidelines regarding infection control. Knowledge about standard precaution in this study compared with the study was conducted in Northwest Ethiopia. The finding of this study revealed that 56.3% participants of this study have adequate knowledge about infection control measures in health care settings. This comparison showed that most of the participants related to both research studies having good knowledge about standard precaution guidelines recommended by WHO and CDC for infection control (Ayele et al., 2022).

The study was conducted in Cameroon on health care worker to explore the level on understanding about standard precautions. The finding of this study expresses that the participant those who have enough knowledge about infection control measures can attend the training programmed conducting in health care settings for infection prevention and control. On the other hand, the participants who do not take part in any educational and training programmed regarding standard

precaution have poor awareness toward infection control. The finding of current study correlates with the results of this study due to participant's level of knowledge regarding standard precautions (Takougang et al., 2024).

The finding of current study was compared with the study conducted on nursing staff in Public University Hospital. The revealed that hand hygiene is a major aspect for infection control measures. Hand washing is a most inexpensive methods in standard precaution guidelines. The current study expresses that up to 53% of nursing students have enough knowledge to perform hand washing techniques before and after contact with every patient. In clinical settings, area for hand washing is present in everywhere for health care worker. The finding of this study evaluates that majority of participants performing hand washing techniques but there still lacking in performing hand hygiene practices in health care settings which lead to spread of infection from patients to health care worker (Diniz et al., 2023).

Nursing students in this study reported their awareness regarding PPE was only 37 to 48% which totally correlate with the finding of study conducted in Thailand to explore the level of understanding regarding standard precaution for nursing students. The study also expressed that only 42.8% students have adequate knowledge about PPE. The finding of this study revealed that most of the participants expressed that they reuse surgical mask while contacting with patients during clinical settings (van Gulik et al., 2021).

The study was conducting to explore knowledge about needle stick injury among health care workers. Study showed that needle stick injury is a serious hazard during clinical practice for health care provider. NSI can cause serious diseases such as Hepatitis B, Hepatitis C and HIV when pierced by contaminated patients. The current study findings explore that only 43% participants are well aware that it is necessary to put sharp articles such as needles, Scalpels, Scissors, Razors, Glass ampoule etc. into sharp boxes which prevent from NSI that promote infection prevention and control (Suksatan et al., 2022).

Another cross-sectional study was conducting in Saudia Arabia on health care workers to explore incidence and prevalence rate regarding NSI. The study revealed that most of the NSI was reported by nurses when they are providing care to patients. This study highlights that only 47% participants report the NSI to appropriate authorities which revealed that most of the health care workers did not know that how to report an NSI. In contrast the current study expressed that up to 80% students have good knowledge about NSI and how to report it to infection control authorities (Alsabaaniet al., 2022).

The study was conducted on health care worker to highlights the factor associated with the knowledge and practices regarding standard precautions. Study revealed that several factors in clinical settings which effect the practices of infection control measures. Study highlights that on major factor is a lack of availability if resources such as limited PPE to all staff member, less availability of hand washing areas, sharp bins and sharp boxes for disposal in clinical settings Can cause in difficulty in practicing standard precautions. The study showed that health care workers specially nurses face the sort of challenges which increase the risk to patients as well as themselves. The findings of current study also discuss that nursing student also face these challenges during their clinical practices. Hence both studies showed that limited resources affect the practices of standard precautions in spite low level of compliance to standard precautions (Zeb & Ali, 2021).

The study was conducted to explore the reason and consequences about low level of knowledge regarding standard precaution in Health care workers (HCW) by analyzing up to 30 articles. The study analysis revealed that unsatisfactory compliance to standard precaution is due to working system, organizational management, work overload, alternative shifting schedule, nurse patient's ratio, limited resources as well as poor quality of resources. The study highlights that most of the articles detect the consequences about low level of understanding regarding standard infection control measures but few ones are focused on intervention which indicate that educational training and practices in work place ad essential strategies to enhance the compliance regarding standard precautions. The current study also focused on intervention that overcome the consequences related to SP by providing awareness to nursing student (Porto & Marziale, 2016).

The current study revealed that nursing students are well aware about vaccination because up to 75% participants are vaccinated from preventable infectious diseases. In 2011-2020 global vaccine action plan proposed by WHO that recommended vaccine to children, adolescence and adults. The study was conducted in Spain to evaluate the percentage of vaccination WHO recommendation. This study revealed that percentage of vaccination were below the recommended level. Approximately 75% individuals are vaccinated from influenza vaccine over the world. The vaccination coverage regarding others infectious disease which are preventable by vaccination strategies should be low in percentage. The study revealed that most of the HCW are vaccinated due to adherence toward infectious diseases. The current study also evaluates that most of the nursing students to perform clinical duty are vaccinated (Plans-Rubió., 2022).

Strength

- Nursing students are future generation to play a vital role in clinical settings. Study can positively impact on nursing student because it enhances their understanding and knowledge about standard precautions which minimize the occupational as well as biological hazards in clinical settings.
- The study focuses on importance of education and training programmed regarding SP for infection control which promotes the awareness among nursing students.
- If nursing student are fully aware about infectious disease, they provide quality of care to patients in workplace by follow the WHO guidelines about SP.
- This research study identifies the existing gaps during clinical practicing that experienced by nursing students related to SP.
- The study focused that when the nursing students are well aware about SP, they must be understanding the risk of infectious diseases such as hepatitis B, hepatitis C, HIV, TB, Influenza, malaria etc. which are transmitted to person to person. Nursing students takes step to prevent themselves as well as patients.

Limitation

- The sample size of BSN students from specified area may not fully represent the entire population impacting the generalized ability if the findings.
- Reeling on self-reported data introduced the possibility of bias as participants may provide response influence by social desired ability rather than accuracy.
- The cross sectional designed limit the study ability to capture changes over time or established causality.
- Low response rate could introduce non response bias effecting the validity of results.

Recommendation

- Based on the findings several recommendations can be proposed to enhance the knowledge and practices about SP for infection control among BSN students.
- Develop and implement educational and training programmed where students understand the rationale behind each practice to improve their knowledge and practical skills regarding SP.
- Motivate the students to observe and participate in infection control practices under supervision of experienced health care professional during clinical rotation.
- Monitor student progress by regular assessment and feedback to identify the area of lacking which need for improvement.
- Integrated the detailed infection control education into the nursing curriculum during every year of their education enhance the knowledge and skills regarding SP.

Conclusion

Assessing the knowledge and practices of BSN students regarding infection control is a major aspect of nursing practices essential for patient health and preventing the spread of infectious diseases. The data gather from BSN students enroll in Rashid Latif Nursing College to evaluate their knowledge and practices for infection control measures. The findings reveled that most of the students demonstrate that higher level of understanding on key concepts about SP while some of students from the participants exhibits gaps in their knowledge about infection control measures. Notable percentage of students expressed incorrect answer regarding infection control practices using PPE when caring for patients with blood borne diseases like Aids hepatitis B, hepatitis C. Addressing these this parties require education and training strategies that cover all aspect of infection control.

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