

PERCEPTIONS AND PRACTICES OF NURSING STUDENTS IN THE
PREVENTION OF HEALTHCARE ASSOCIATED INFECTIONSBushra Keerio^{*1}, Munwar-Us-Salam², Rubina Parveen³, Nazia Jabeen⁴, Rehana Kanwal⁵,
Muqadas Umar⁶^{*1,4,5,6}BSN Student, Begum Bilquees Sultana Institute of Nursing, People's University of Medical and Health
Sciences of Medical and Health Sciences SBA²Associate Professor, Begum Bilquees Sultana Institute of Nursing, Peoples University of Medical & Health
Sciences for Women Nawabshah, SBA³Assistant Professor, Begum Bilquees Sultana Institute of Nursing, Peoples University of Medical & Health
Sciences for Women Nawabshah, SBA^{*1}bushrapunhal@gmail.comDOI: <https://doi.org/10.5281/zenodo.18797888>

Keywords

Nursing Students, Healthcare-
Associated Infections, Infection
Prevention, Standard Precautions,
Hand Hygiene

Article History

Received: 28 December 2025

Accepted: 13 February 2026

Published: 27 February 2026

Copyright @Author

Corresponding Author: *

Bushra Keerio

Abstract

Background: Healthcare-associated infections (HAIs) have remained a major public health concern worldwide, as they increase morbidity, mortality, length of hospital stay, and healthcare costs. Nursing students, as part of the healthcare workforce during their clinical training, are frequently exposed to hospital environments and invasive procedures, placing them at a higher risk of acquiring and transmitting infections. Assessing their perceptions and practices regarding infection prevention is therefore justified to identify gaps and to strengthen infection control measures, ultimately ensuring patient safety and improving the quality of healthcare services.

Objective: The study aimed to assess the perceptions and practices of nursing students in the prevention of healthcare-associated infections.

Methodology: A descriptive cross-sectional study was conducted among 151 BSN(G) students of 2nd, 3rd, and 4th year at Begum Bilquees Sultana Institute of Nursing, PUMHSW, Shaheed Benazirabad. Data were collected using a structured questionnaire, which included sections on demographic information, knowledge of HAIs, standard precautions, and hand hygiene practices. Data were analyzed using SPSS version 26, applying descriptive and inferential statistics.

Results: The results showed that the majority of nursing students demonstrated a moderate level of knowledge regarding healthcare-associated infections and infection prevention measures. Approximately two-thirds of the participants were aware of common types of HAIs and standard precautions. However, less than half of the students consistently adhered to proper hand hygiene practices during clinical exposure. Gaps were also identified in the correct use of personal protective equipment and compliance with standard precautions, indicating a discrepancy between knowledge and actual practice.

Conclusion: Although nursing students are aware of infection prevention principles, their actual practices require improvement. Strengthening infection prevention education, supervision, and continuous monitoring during clinical

INTRODUCTION

Healthcare-associated infections (HAIs), also known as hospital-acquired or nosocomial infections, remain a significant concern for patient safety and quality of care. These infections usually develop after 48 hours of hospital admission and are not present or incubating at the time of admission. In addition to patients, healthcare workers and nursing students are also at risk of acquiring HAIs because of their frequent exposure to clinical environments and invasive procedures.

The burden of HAIs is more prominent in developing countries, where factors such as limited resources, weak infection control programs, and overcrowded hospitals contribute to poor infection prevention outcomes. Common types of HAIs include urinary tract infections, surgical site infections, pneumonia, and bloodstream infection. Effective preventive strategies, particularly hand hygiene, proper use of personal protective equipment, and maintenance of a clean environment, are widely recognized as essential measures to reduce these risks.

Nursing students, as future frontline healthcare professionals, play a vital role in infection prevention and control (IPC). Although theoretical knowledge about infection control is included in nursing curricula, gaps remain in their practical compliance with standard precautions. Several studies have highlighted inconsistencies between knowledge and practice among nursing students, which increases the likelihood of transmitting multidrug-resistant organisms.

Global health authorities, including the World Health Organization (WHO), emphasize the importance of strengthening IPC programs by promoting hand hygiene, appropriate use of protective equipment, and adherence to standardized guidelines. Evidence suggests that training sessions, workshops, and continuous monitoring significantly improve compliance among healthcare workers and students. However, despite the availability of guidelines,

actual adherence often remains inadequate in many healthcare facilities.

Research from countries such as Pakistan, Egypt, Ethiopia, and China reveals that nursing students generally demonstrate moderate levels of knowledge but face challenges in applying infection prevention measures consistently in clinical practice. This highlights the importance of continuous education and awareness programs in bridging the knowledge–practice gap.

HAIs not only prolong hospital stays but also increase healthcare costs, contribute to complications, and cause distress for patients and families. Therefore, assessing the knowledge and practices of nursing students regarding infection prevention and control is essential to identify deficiencies and design effective interventions that can reduce the burden of HAIs.

MATERIALS & METHODS

This study is a descriptive cross-sectional design conducted to assess the knowledge and practices of nursing students regarding the prevention of healthcare-associated infections (HAIs). Data collection was carried out over a three-month period from 17 November 2025 to 17 February 2026 after approval from the Ethical Review Committee (ERC). The sample size was 151, calculated using the Raosoft calculator based on a 95% confidence level and a 5% margin of error. A purposive non-probability sampling technique was used to select participants from BSN(G) students of 2nd, 3rd, and 4th years enrolled at Begum Bilquees Sultana Institute of Nursing, PUMHSW, Nawabshah. Inclusion criteria comprised students enrolled in 2nd, 3rd, and 4th year BSN(G) who were willing to participate and provided written informed consent, whereas students of 1st year, those absent during data collection, unwilling participants, and students enrolled in other programs such as DPT, D Pharmacy, MBBS, or Allied Health Sciences were excluded. Data were collected using a structured questionnaire designed to assess demographic characteristics, knowledge of HAIs, standard

precautions, and hand hygiene practices. The questionnaire was administered in English and explained in the local language (Sindhi/Urdu) if needed. Data were analyzed using SPSS version 26; descriptive statistics including mean, frequency, and percentage summarized knowledge and practice levels, while inferential statistics such as Chi-square tests and correlation

assessed the association between knowledge and practices. A p -value < 0.05 was considered statistically significant. Ethical approval was obtained from the institutional ERC, written informed consent was secured from all participants, and confidentiality and anonymity were maintained. Participation was voluntary, with the right to withdraw at any stage.

RESULTS

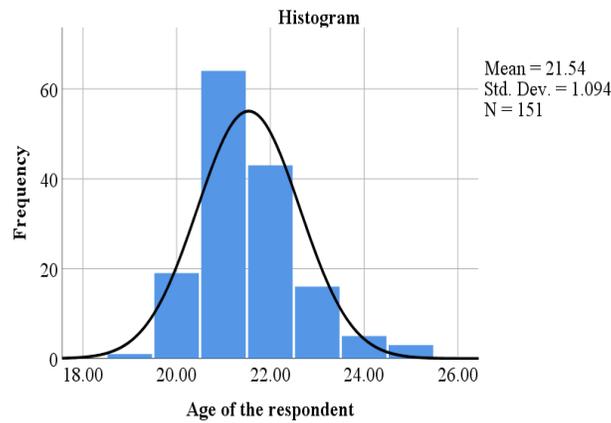


Figure No 1: Age of the Respondent

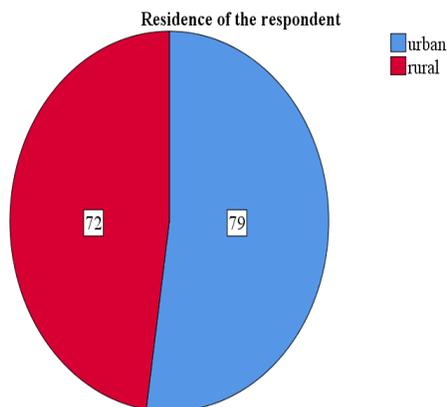


Figure No 2: Residence of the Respondent

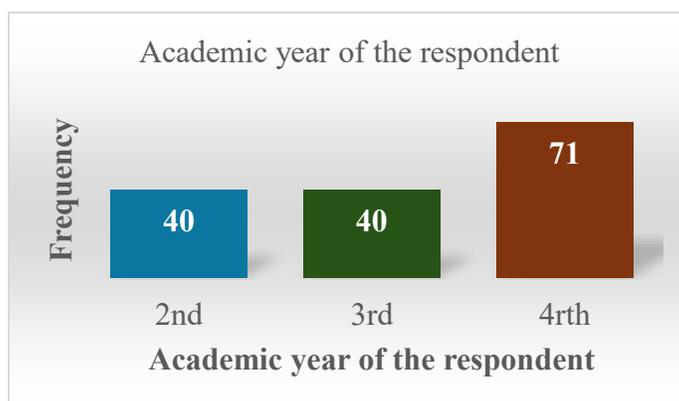


Figure No 3: Academic Year of the Respondent

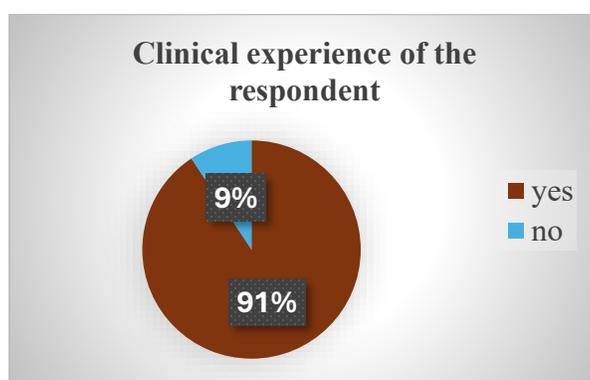


Figure No 4: Clinical Experience of the Respondent

Table No 1: Marital status, Religion and Ethnicity of the Participants

Category	Frequency	Percent
Marital status of the Respondent		
Single	145	96.0%
Married	6	4.0%
Religion of the Respondent		
Islam	143	94.7%
Hindu	7	4.6%
Ethnicity of the Respondent		
Sindhi	136	90.1%
Punjabi	5	3.3%
Siraiki	5	3.3%

Table No 2: Perceptions And Practices Of Nursing Students In The Prevention Of Healthcare Associated Infections

	True	False
HAI's are infections acquired 48 hours or more after hospital admission.	136(90.1%)	15(9.9%)
HAI's can affect both patients and healthcare workers.	138(91.4%)	13(8.6%)
The most common HAI site is the urinary tract.	113(74.8%)	38(25.2%)
Advanced age and very young age increase the risk of HAI's.	117(77.5%)	34 (22.5%)
The environment can be a source of HAI's.	130 (86.1%)	21 (13.9%)
Standard precautions protect only the patient.	94 (62.3%)	57 (37.7%)
Standard precautions protect both patient and healthcare workers.	114 (75.5%)	37 (24.5%)
Standard precautions should be applied to all patients, regardless of diagnosis.	112 (74.2%)	39 (25.8%)
Gloves must be worn for every patient contact.	117 (77.5%)	34 (22.5%)
Gloves are only needed if there is a risk of contact with blood and body fluids.	107 (70.9%)	44 (29.1%)
Hands should be washed before and after every patient contact.	140 (92.7%)	11 (7.3%)
Hand hygiene is required after removing gloves.	130 (86.1%)	21 (13.9%)
Alcohol based hand rub can replace traditional hand washing in most cases.	118 (78.1%)	33 (21.9%)
Hand hygiene should be performed between patient contacts.	122 (80.8%)	29 (19.2%)
Hand hygiene is unnecessary if gloves are worn.	100 (66.2%)	51 (33.8%)

DISCUSSION

Regarding the demographic characteristics of the participants in this study, the majority of

respondents were nursing students enrolled in 2nd, 3rd, and 4th year at Begum Bilquees Sultana Institute of Nursing. The findings demonstrated

that most students possessed moderate knowledge regarding healthcare-associated infections (HAIs), including their definition, sources, and preventive measures. These findings are consistent with previous studies which reported that nursing students generally have satisfactory theoretical knowledge of infection prevention but may lack consistent practical adherence during clinical exposure.

The results further indicated that knowledge regarding standard precautions and hand hygiene was generally adequate among the participants. However, gaps were observed in the practical implementation of infection prevention measures, particularly during clinical rotations. This supports earlier research suggesting that although students are aware of infection control guidelines, compliance may be affected by workload, limited supervision, and clinical environmental factors.

An association was observed between knowledge levels and practice scores, indicating that students with higher knowledge were more likely to demonstrate better infection prevention practices. Similar findings have been reported in previous cross-sectional studies, which highlighted that increased awareness and proper training significantly improve adherence to hand hygiene and standard precautions.

Institutional support and clinical supervision were identified as important influencing factors. Studies have shown that regular monitoring, feedback, and refresher training sessions enhance compliance with infection prevention protocols. In the present study, students who reported receiving guidance and mentorship during clinical practice demonstrated better adherence to infection control measures.

The findings also emphasized the importance of incorporating infection prevention and control (IPC) guidelines into nursing curricula. Continuous professional development, simulation-based training, and interactive educational sessions have been shown to improve both confidence and practical compliance among nursing students.

Overall, the discussion of the present study indicates that while nursing students have

acceptable theoretical knowledge regarding HAIs and standard precautions, improvement is required in practical compliance. Strengthening educational interventions, clinical supervision, and institutional monitoring systems may significantly enhance infection prevention practices among future nurses.

CONCLUSION

This study concludes that healthcare-associated infections (HAIs) continue to pose a significant risk in clinical settings, and nursing students play a crucial role in preventing these infections. The demographic characteristics of the participants indicate that undergraduate nursing students represent a critical group for targeted infection prevention education, as their knowledge and practices directly impact patient safety. Although the majority of students demonstrated moderate to good theoretical knowledge regarding HAIs, standard precautions, and hand hygiene, a noticeable proportion still showed gaps in the practical implementation of these preventive measures during clinical training. These gaps can increase the risk of cross-infection and compromise patient care quality. Overall, the findings highlight that knowledge, practical compliance, institutional support, and continuous supervision significantly influence nursing students' ability to adhere to infection prevention protocols. Strengthening educational interventions, providing ongoing mentorship, and reinforcing adherence to standard precautions are essential strategies to enhance safe clinical practices among future nurses.

REFERENCE

- Elfateh Salim DM, Farrag AB, Fotouh AA, El Gohary M. Knowledge and practices of infection control among physicians and nurses in a military fevers hospital in Egypt. *Egypt J Hosp Med*. 2025;99(1).
- Akter R, Moni MR, Rahman MM. Knowledge and practice on infection prevention among nurses at a selected tertiary hospital in Bangladesh. *J Intern Med Public Health*. 2025;4(2):7-22.

- Yates S, Regan P. Effective methods of promoting hand hygiene to reduce hospital acquired infections: A literature review. *J Nurs Theory Pract.* 2025;1(1):53-60.
- Bakare OG, Bayraktar N. Nurses' hand hygiene beliefs and practices: A cross-sectional study. *Glob Nurs Insights.* 2025;12(2):141-147.
- Liaqat R, Satara A, Bibi S, Shameem M, Perveen N. Assessment of knowledge and practices of nosocomial infection among nurses of Jinnah Hospital Lahore, Punjab-Pakistan. *NURSEARCHER J Nurs Midwifery Sci.* 2025:42-47.
- Rostamnia L, Ghanbari L, Goodarzi A, Ghanbari V. Healthcare-associated infection case finding: Nursing students' knowledge about HAIs signs and symptoms. *J Clin Res Paramed Sci.* 2025;14(14).
- World Health Organization (WHO). *Infection prevention and control.* Geneva: WHO; 2021.
- Yang R, Yan W, Wang X, Li W, Xue S, Wang T, et al. Knowledge, attitudes and practices towards risk of basic nosocomial infection control among pediatric healthcare workers: A cross-sectional study in Nanjing, China. *Front Public Health.* 2025;13:1599686.
- Rizwan A, Afzal K, Nadeem F, Nisa WT, Zahid J. Understanding nurses' knowledge, attitudes, and practices for nosocomial infections at a tertiary hospital in Lahore. *J Health Wellness Community Res.* 2025:e241.
- Alhaddad O, Shneshah T, Alzuwawi S, Alkuawylidi S, Mafa L. Assessment of hand hygiene knowledge among undergraduate medical students and intern doctors in Misurata University, Libya: A cross-sectional study. *Razi Med J.* 2025:194-202.
- Arooj A, Mukhtar M, Jamil S, Bibi Q. Assess the knowledge of nursing students about preventive measures of urinary tract infection. *Insights J Health Rehabil.* 2025;3(1):692-699.
- Sula A, Hammoud S, Biberaj P, Gaxhja E, Dybeli E, Drizaj E, et al. Knowledge, attitudes, and practices (KAP) of nurses related to nosocomial infections: A narrative literature review. *Multidiscip Rev.* 2025;8(2):2025042.
- Shrestha GDN, Thapa B. Knowledge and practice on infection prevention among nurses of Bir Hospital, Kathmandu. *J Nurs Health Stud.* 2018;3(2):45-52.
- Parreira P, Santos-Costa P, Pardal J, Neves T, Bernardes RA, Serambeque B, et al. Nursing students' perceptions on healthcare-associated infection control and prevention teaching and learning experience in Portugal. *J Pers Med.* 2022;12(2):180.
- Gholizad Gougjehyaran H, Motaarefi H, Sakhaei S, Ashrafi M, Zeinalpoor S. The effect of an educational program on hand hygiene compliance among nursing students. *BMC Nurs.* 2025;24(1):411.
- Linnik L, Turan N, Polat Dünya C, Lahtinen K, Franck T, Valta M, et al. Association between hand hygiene knowledge and self-efficacy in nursing students: A multicenter cross-sectional study within the Erasmus Project. *Nurs Rep.* 2024;14(3):1973-1986.
- Shrestha GDN, Thapa B. Knowledge and practice on infection prevention among nurses of Bir Hospital, Kathmandu. *J Nurs Health Stud.* 2018;3(2):45-52.
- Liaqat R, Satara A, Bibi S, Shameem M, Perveen N. Assessment of knowledge and practices of nosocomial infection among nurses of Jinnah Hospital Lahore, Punjab-Pakistan. *NURSEARCHER J Nurs Midwifery Sci.* 2025:42-47.
- Bakare OG, Bayraktar N. Nurses' hand hygiene beliefs and practices: A cross-sectional study. *Glob Nurs Insights.* 2025;12(2):141-147.
- Yates S, Regan P. Effective methods of promoting hand hygiene to reduce hospital-acquired infections: A literature review. *J Nurs Theory Pract.* 2025;1(1):53-60.

- Shrestha GDN, Thapa B. Knowledge and practice on infection prevention among nurses of Bir Hospital, Kathmandu. *J Nurs Health Stud.* 2018;3(2):45-52.
- Sula A, Hammoud S, Biberaj P, Gaxhja E, Dybeli E, Drizaj E, et al. Knowledge, attitudes, and practices (KAP) of nurses related to nosocomial infections: A narrative literature review. *Multidiscip Rev.* 2025;8(2):2025042.
- Parreira P, Santos-Costa P, Pardal J, Neves T, Bernardes RA, Serambeque B, et al. Nursing students' perceptions on healthcare-associated infection control and prevention teaching and learning experience in Portugal. *J Pers Med.* 2022;12(2):180.
- Gholizad Gougjehyaran H, Motaarefi H, Sakhaei S, Ashrafi M, Zeinalpoor S. The effect of an educational program on hand hygiene compliance among nursing students. *BMC Nurs.* 2025;24(1):411.
- Rostamnia L, Ghanbari L, Goodarzi A, Ghanbari V. Healthcare-associated infection case finding: Nursing students' knowledge about HAIs signs and symptoms. *J Clin Res Paramed Sci.* 2025;14(14).