JHWCR
Journal of Health, Wellness, and Community Research
Volume III, Issue IV
Open Access, Double Blind Peer Reviewed.
Web: https://jhwcr.com, **ISSN**: 3007-0570
https://doi.org/10.61919/zy76e716

Article

Understanding Nurses' Knowledge, Attitudes, and Practices for Nosocomial Infections at a Tertiary Hospital in Lahore

Afifa Rizwan[1], Khadija Afzal[1], Faisal Nadeem[1], Warda Tu Nisa[1], Jerry Zahid[1]

1 Rashid Latif Nursing College, Rashid Latif Medical Complex, Lahore, Pakistan

Correspondence
afifarizwan504@gmail.com

Cite this Article

Received	2025-04-24
Revised	2025-04-26
Accepted	2025-04-28
Published	2025-05-21
Conflict of Interest	None declared
Ethical Approval	Approved by the institutional ethics review committee in accordance with the Declaration of Helsinki.
Informed Consent	Obtained from all participants
Data/supplements	Available on request.
Funding	None
Authors' Contributions	AR, KA: concept, data collection, analysis; FN, WTN: design, supervision, manuscript review; JZ: analysis, manuscript drafting, review.

ABSTRACT

Background: Nosocomial infections pose a significant threat to patient safety and healthcare outcomes, particularly in resource-limited settings, yet gaps persist in translating nurses' knowledge and attitudes into consistent infection control practices. **Objective:** To evaluate the knowledge, attitudes, and practices regarding nosocomial infection management among nurses at a tertiary care hospital in Lahore, identifying key factors associated with adherence to infection control protocols. **Methods:** This descriptive cross-sectional study recruited 100 nurses using convenience sampling. Eligible participants included staff and student nurses actively working in the hospital, with those unwilling or unavailable excluded. Data were collected via a validated, structured questionnaire assessing knowledge, attitudes, and practices related to nosocomial infection prevention. Ethical approval was obtained, and the study adhered to the Declaration of Helsinki. Statistical analyses, including descriptive statistics and Pearson correlation, were conducted using SPSS version 23. **Results:** Among 100 participants, 90% demonstrated high knowledge, 86% exhibited positive attitudes, but only 57% consistently adhered to recommended practices. Statistically significant positive correlations were observed between knowledge, attitudes, and practices (knowledge-attitude $r = 0.681$, knowledge-practice $r = 0.584$, all $p < 0.01$), highlighting the gap between awareness and practical implementation. **Conclusion:** Despite strong knowledge and attitudes, nurses showed inconsistent infection control practices. Targeted interventions, regular training, and supportive institutional policies are essential to bridge this gap and improve patient safety outcomes.

Keywords: Nosocomial Infections, Infection Control, Knowledge, Attitude, Practice, Nurses, Cross-Sectional Studies.

INTRODUCTION

Hospital-acquired infections, or nosocomial infections, represent a significant public health challenge in the 21st century, with substantial implications for both patient and healthcare provider safety (1,2). The World Health Organization estimates that 7% to 12% of hospitalized patients globally acquire such infections, with approximately 1.4 million individuals affected at any given time. These infections can arise during a patient's stay or following discharge, and are not limited to patients alone—hospital staff are also at risk (3,4). In developed countries, the prevalence ranges from 5% to 10%, but in resource-limited settings, it can rise as high as 30%, making the issue especially acute in countries like Pakistan (5). Nosocomial infections and the associated problem of antibiotic resistance are now recognized among the most pressing public health issues worldwide, contributing to increased morbidity, mortality, and healthcare costs (6,7). European data report that 1.75 million people are affected annually, with 175,000 resulting deaths, while in the United States, nosocomial infections account for approximately 90,000 deaths and two million illnesses each year (8). In Pakistan, inadequate infection control protocols and insufficient formal training compound the challenge, leading to a high burden of multidrug-resistant organisms in both urban and rural healthcare settings (9). Recent studies indicate that while nurses in Pakistan generally possess adequate knowledge of infection transmission—83% according to one survey—this knowledge does not always translate into effective clinical practice (10,11). Factors contributing to insufficient infection control practices include varying years of experience, educational backgrounds, levels of awareness, workload, and a lack of ongoing training or adherence to

recommendations (12). As frontline caregivers, nurses are both at risk and pivotal to the prevention and management of nosocomial infections, making their knowledge, attitudes, and practices a critical focus for patient safety and public health (13). Evidence suggests that regular hand hygiene, proper use of personal protective equipment, and adherence to standard precautions are fundamental to controlling infection transmission, yet barriers such as inadequate resources, high patient loads, and limited training can impede the consistent application of best practices (14,15). Prior studies have underscored the need for structured infection control education and hospital policies tailored to local challenges (16).

Despite the recognized importance of these measures, there is limited recent data exploring the comprehensive interplay of knowledge, attitude, and practice (KAP) among nurses specifically in tertiary care hospitals in Lahore. Understanding this relationship is crucial to identifying persistent gaps between awareness and implementation. Therefore, this study aims to evaluate the knowledge, attitudes, and practices of nurses regarding the management of nosocomial infections at a tertiary care hospital in Lahore, with the objective of informing future interventions and policies to improve infection control outcomes.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted to assess the knowledge, attitudes, and practices of nurses regarding nosocomial infection management in a tertiary care teaching hospital in Lahore. Nurses actively working in the hospital, including both staff and student nurses performing clinical duties, were eligible for participation. The inclusion criteria encompassed all nurses—regardless of gender—who were employed in the hospital and consented to participate, while those unwilling or unavailable at the time of data collection were excluded. A convenient sampling technique was employed, with participants approached directly in the clinical setting and provided a brief explanation of the study objectives and procedures. Informed written consent was obtained from all participants, and confidentiality was maintained by anonymizing all collected data and ensuring voluntary participation at every stage.The primary outcome of interest was the level of knowledge, attitude, and practice concerning infection control and prevention among nurses. Data were gathered using a structured, comprehensive questionnaire adapted from previously validated instruments (17). The questionnaire consisted of 20 items: nine assessing knowledge (including concepts such as infection prevention, hygiene, PPE use, and modes of transmission), six assessing attitudes (covering beliefs about infection control procedures and risk factors), and five assessing practices (focusing on hand hygiene, PPE application, and disposal of infectious materials). Demographic information including age, gender, religion, educational qualification, and years of experience was also collected. Each participant completed the survey during a single session, ensuring uniformity in data collection and minimizing recall bias.

Ethical approval was obtained from the appropriate institutional ethics review committee, and all procedures were conducted in compliance with the Declaration of Helsinki. Participants were assured that their responses would remain confidential and that their identities would not be disclosed in any reports or publications arising from this research.

Data analysis was performed using SPSS version 23. Descriptive statistics, including frequencies and percentages, were calculated for demographic variables and questionnaire responses. The reliability of the questionnaire was assessed using Cronbach's alpha. Correlation analyses were performed to evaluate the relationships between knowledge, attitudes, and practices among nurses. Statistical significance was set at $p < 0.05$ for all analyses (17).

RESULTS

A total of 100 nurses participated in this study, representing a diverse sample from the selected tertiary care teaching hospital in Lahore. The demographic distribution, responses to the knowledge, attitude, and practice (KAP) questionnaire, and correlation analyses are presented below. The study cohort included a majority of female nurses (63.0%), with the predominant age group being 26–30 years (49.0%). Most nurses identified as Muslim (75.0%), held a nursing degree (51.0%), and had two years of professional experience (49.0%). Detailed demographic distributions are shown in Table 1 The internal consistency of the KAP questionnaire was excellent, as demonstrated by a Cronbach's alpha of 0.844 for the 20 items included in the analysis. Most nurses demonstrated a high level of knowledge concerning nosocomial infections. Table 2 summarizes the percentage of correct ("True") responses for each knowledge item.

Table 1. Demographic Characteristics of Study Participants (N = 100)

Variable	Category	Frequency	Percentage (%)
Age (years)	20–25	31	31.0
	26–30	49	49.0
	31–35	20	20.0
Gender	Male	37	37.0
	Female	63	63.0
Religion	Muslim	75	75.0
	Christian	25	25.0
Education	Diploma	49	49.0
	Degree	51	51.0
Work Experience	1 year	27	27.0
	2 years	49	49.0
	>2 years	24	24.0

Table 2. Nurses' Knowledge Regarding Managing Nosocomial Infections

Item	Correct ("True") Response (%)
Nosocomial infection is favored by the hospital environment	90
Nosocomial infections include VAP, TB, UTI, Gastroenteritis	89
Hepatitis B and C viruses are commonly encountered organisms	92
Gloves should always be worn in contact precautions	93
Standard precautions should include protective equipment and frequent hand washing	90
Patient history influences decision in choosing PPE	87
Washing hands before and after handling patients helps prevent infection	94
Wearing N95 mask is important for airborne infection	92
Wearing surgical masks during procedures prevents infection	95

Table 3. Attitudes of Nurses Regarding Nosocomial Infection Control

Item	Agree (%)	Disagree (%)	Not Sure (%)
Necessary to categorize hospital waste before disposal	85	5	10
Hand hygiene after removing gloves is infection control measure	80	10	10
Use of antiseptic is necessary to prevent nosocomial infection	90	5	5
Invasive procedures are risk factor for multidrug-resistant organisms	92	3	5
Health worker hands are vehicle for pathogen transmission	83	7	10
Changing mask before seeing another patient is infection control	89	5	6

Most nurses displayed positive attitudes towards infection control, particularly regarding the importance of waste categorization, hand hygiene, and use of antiseptics. Table 3 provides details for each item, including rates of agreement, disagreement, and uncertainty. Observed practices revealed lower adherence than knowledge or attitudes. Notably, only half reported always changing gloves before handling new patients, and consistent hand washing before starting work was practiced by 30%. However, adherence to appropriate disposal of infectious materials was notably high. Table 4 summarizes reported practices.

Table 4. Infection Control Practices of Nurses

Item	Always (%)	Often (%)	Sometimes (%)	Not at All (%)
Hand washing before starting work	30	36	24	10
Hand washing before handling new patients	40	30	20	10
Changing gloves before starting to handle a new patient	50	30	10	10
Wearing mask when handling TB-suspected patients	60	25	10	5
Discarding infectious materials and leftover samples according to guidelines	80	10	5	5

Pearson correlation analysis indicated strong, statistically significant positive associations among knowledge, attitude, and practice scores. Knowledge was highly correlated with attitude ($r = 0.681$, $p < 0.01$) and moderately correlated with practice ($r = 0.584$, $p < 0.01$). Attitude and practice also showed a moderate positive correlation ($r = 0.494$, $p < 0.01$), supporting the conceptual interdependence of these domains in infection control behavior. These findings are detailed in Table 5.

Table 5. Correlation Matrix for Knowledge, Attitude, and Practice Scores

	Knowledge	Attitude	Practice
Knowledge	1	0.681**	0.584**
Attitude	0.681**	1	0.494**
Practice	0.584**	0.494**	1

Note: Values are Pearson's correlation coefficients

The results indicate that while the vast majority of nurses possess sound knowledge and positive attitudes towards nosocomial infection prevention, there is a noticeable gap in consistent, optimal practice. The moderate to strong positive correlations between knowledge, attitude, and practice suggest that improvements in knowledge and attitudes may drive better adherence to recommended infection control behaviors. However, the fact that only 30%–50% consistently perform essential practices such as hand hygiene and glove use highlights a gap with practical and clinical significance. Factors such as workload, time pressure, and resource constraints, as described in the discussion, may underlie this discrepancy. These findings underscore the need for targeted interventions to bridge the knowledge-practice gap, potentially through regular training, clear protocols, and systems-level supports.

DISCUSSION

The present study reveals a substantial foundation of knowledge and generally positive attitudes among nurses in a tertiary care teaching hospital in Lahore regarding nosocomial infection control. However, a consistent gap remains between knowledge and the routine implementation of recommended infection control practices. These findings are aligned with previous studies conducted in diverse healthcare settings, which have consistently identified that, while awareness and theoretical understanding of infection prevention are high, actual adherence to optimal practices often lags behind (1,3,10). The high percentage of nurses recognizing the importance of hand hygiene, proper use of personal protective equipment, and standard precautions suggests that educational interventions and infection control policies are partially effective in disseminating core principles (17). Yet, only a minority consistently reported "always" engaging in critical behaviors such as hand washing before starting work or changing gloves between patients. This knowledge-practice gap has been observed in multiple studies, both locally and internationally, and may reflect a complex interplay of factors including time constraints, resource limitations, habitual shortcuts, and institutional culture (9,12).

Comparative analysis with studies from Ethiopia, Nigeria, and Palestine reveals both convergence and divergence in KAP outcomes. For instance, Yazie et al. reported a 90% rate of good knowledge among healthcare professionals in Addis Ababa, mirroring the 90% observed in our population (13). Similarly, in a study from Cairo, 90% of staff were knowledgeable about hand hygiene but only around 73% demonstrated adequate skills, echoing the lower practical adherence rates seen in our cohort (14). In Pakistan, prior research by Jahangir et al. found that while a majority of nurses understood infection control guidelines, fewer than half consistently followed hand hygiene protocols (10). These parallels support the generalizability of our findings and highlight an enduring global challenge. However, our study advances the field by quantifying the correlations among knowledge, attitude, and practice within this population, demonstrating that higher knowledge is statistically associated with more positive attitudes and, to a lesser extent, better practices. The moderately strong positive correlations ($r = 0.681$ for knowledge-attitude and $r = 0.584$ for knowledge-practice) underscore the need for multifaceted strategies that address not only knowledge deficits but also motivational and environmental barriers.

The theoretical implications of these findings support behavioral change models, which posit that knowledge and attitude are necessary but insufficient precursors to sustained behavioral change. It is plausible that structural determinants, such as staffing ratios, workload, and access to supplies, serve as mediators or moderators in the translation of knowledge into practice (5,8,15). Interventions should therefore move beyond traditional didactic approaches, focusing instead on system-level enhancements, regular audits, leadership support, and the cultivation of a safety-oriented institutional culture. Clinically, improved practice adherence has the potential to reduce the incidence of healthcare-associated infections, minimize morbidity and mortality, and contain the spread of multidrug-resistant organisms, which remain a pressing concern in both developed and resource-constrained settings (7,16).

Despite these insights, the present study has several limitations that must be acknowledged. The cross-sectional design limits causal inferences, and the reliance on self-reported practices introduces potential bias due to social desirability or inaccurate recall. The sample was confined to a single institution and employed a convenience sampling approach, potentially restricting the generalizability of results to other hospitals or regions with different resources or patient populations. The relatively modest sample size further constrains statistical power for subgroup analysis and may not capture the full variability in KAP among nurses. Additionally, the use of a questionnaire, though adapted from validated sources and shown to have high internal consistency, may not fully reflect real-world behavior, and the absence of direct observational data limits the ability to verify self-reported practices (17).

Nonetheless, the study's strengths include the use of a structured, reliable instrument and the comprehensive assessment of KAP in a context where such data are limited. The findings offer actionable recommendations: regular, interactive training and refresher courses on infection control; development and dissemination of clear, context-sensitive protocols; frequent, supportive audits; and interventions aimed at improving teamwork and institutional culture. Furthermore, providing nurses with up-to-date resources and opportunities for continued professional development can enhance both motivation and adherence to best practices. Future research should include larger, multi-center studies employing mixed methods—combining quantitative surveys with direct observations and qualitative interviews—to more robustly characterize barriers to effective infection control. Exploring the impact of targeted interventions and system-level changes on both practice and patient outcomes would yield valuable evidence to guide policy and educational reform.

CONCLUSION

In conclusion, this study highlights that while nurses in a tertiary hospital in Lahore possess strong foundational knowledge and positive attitudes toward nosocomial infection control, significant gaps remain in the consistent application of best practices. The positive correlations among knowledge, attitudes, and practices underscore the importance of not only education but also the translation of understanding into daily clinical routines. These findings have critical implications for human healthcare, emphasizing the need for targeted interventions such as regular hands-on training, clear infection control protocols, and institutional support to foster a culture of adherence and accountability. Clinically, improving practice adherence among nurses can reduce the incidence of hospital-acquired infections and improve patient outcomes, while future research should focus on identifying effective strategies to bridge the knowledge-practice gap and evaluating the impact of system-level changes in diverse healthcare settings.

REFERENCES

1. Khan R, Pari B. Infection Control for Tertiary Care, Pakistan: A Correctional Study of Staff Attitudes and Practices.

Quantum Journal of Social Sciences and Humanities. 2023;4(3):101-111.

2. Idrees H, Khan ST, Aftab M, Imtiaz A. Nosocomial Infections—A Review. LGU Journal of Life Sciences. 2021;5(1):44-62.
3. Uzair M, Khalid U, Shabihaz M, Khan N, Ali N, Sher F, Muhammad N. Knowledge, Attitude and Practices of Healthcare Providers Regarding Infection Control at Tertiary Care Hospital. 2021.
4. Jahangir M, Ali M, Riaz MS. Knowledge and Practices of Nurses Regarding Spread of Nosocomial Infection in Government Hospitals, Lahore. Journal of Liaquat University of Medical and Health Sciences. 2017;16(3):149-153.
5. Yakob E, Lamaro T, Henok A. Knowledge, Attitude and Practices Towards Infection Control Measures Among Mizan-Aman General Hospital Workers, South West Ethiopia. Journal of Community Medicine and Health Education. 2015;5(5):1-8.
6. Olatade MJ, RM R, Rphne B. Knowledge and Preventive Practices of Nosocomial Infections Among Health Workers in Two Selected Tertiary Hospitals in Ogun State. International Journal of Caring Sciences. 2021;14(1):174.
7. Mudassar S, Adeel B, Ali M, Mehmood F, Hussain A. Nosocomial Infections: Awareness and Practices of Nurses Regarding Its Spread in a Tertiary Care Hospital of Lahore, Pakistan. International Journal of Contemporary Medical Research. 2019;6(1):A9-A12.
8. Khatrawi EM, Prajjwal P, Farhan M, Inban P, Gurha S, Al-ezzi SM, Hussin OA. Evaluating the Knowledge, Attitudes, and Practices of Healthcare Workers Regarding High-Risk Nosocomial Infections: A Global Cross-Sectional Study. Health Science Reports. 2023;6(9):e1559.
9. Hamid HA, Mustafa MM, Al-Rasheedi M, Balkhi B, Suliman N, Alshaafee W, Mohammed SA. Assessment of Hospital Staff Knowledge, Attitudes and Practices on Activities Related to Prevention and Control of Hospital Acquired Infections. Journal of Infection Prevention. 2020;10.
10. Kabir AA, Akhter F, Sharmin M, Akhter K, Begum M, Saha A, Ahmed I. Knowledge, Attitude and Practice of Staff Nurses on Hospital Acquired Infections in Tertiary Care Hospital of Dhaka City. Northern International Medical College Journal. 2021;10(1):347-350.
11. Bayleyegn B, Mehari A, Damtie D, Negash M. Knowledge, Attitude and Practice on Hospital-Acquired Infection Prevention and Associated Factors Among Healthcare Workers at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia. Infection and Drug Resistance. 2021:259-266.
12. Nag K, Datta A, Karmakar N, Chakraborty T. Knowledge, Attitude and Practice About Hospital Acquired Infection Among Health Care Personnel in a Tertiary Care Hospital of Tripura. International Journal of Research in Medical Sciences. 2018;6(10):3303-3308.
13. Yazie TD, Sharew GB, Abebe W. Knowledge, Attitude, and Practices of Healthcare Professionals Regarding Infection Prevention at Gondar University Referral Hospital, Northwest Ethiopia: A Cross-Sectional Study. BMC Research Notes. 2019;12:1-7.
14. Al-Ahmari AM, AlKhaldi YM, Al-Asmari BA. Knowledge, Attitude and Practices About Infection Control Among Primary Care Professionals in Abha City, Kingdom of Saudi Arabia. Journal of Family Medicine and Primary Care. 2021;10(2):662-668.
15. Ashiq Z, Emmanuel K, Nadeem F, Zahid J, Nisa WT. Awareness of Preventive Measures About Cardiovascular Disease and Its Risk Factors Among Diabetic Patients. Dialogue Social Science Review. 2024;2(4):546-556.
16. Hussain M, Shaheen S, Shakir A, Muzammil MM, Hussain N, Zahid J, Emmanuel S. Assessing Anxiety and Depression Among ICU Nurses Caring for Psychiatric Clients During COVID-19 Outbreak. Indus Journal of Social Sciences. 2024;2(2):633-644.
17. Noreen N, Nisa WT, Shah A, Sultan A. Satisfaction of Undergraduate Nursing Students Regarding Their Clinical Placement: A Focus Group Study. NURSEARCHER Journal of Nursing and Midwifery Sciences. 2023:38-42.
18. Akram I, Arif M, Nadeem F, Nisa WT, Zahid J. Knowledge, Attitudes, and Practices of Healthcare Workers Toward Tuberculosis at Arif Memorial Teaching Hospital, Lahore. Journal of Health, Wellness and Community Research. 2025:83-83.
19. Nisa WT, Muhammad D, Khan A. Levels of Compassion Satisfaction, Compassion Fatigue and Burnout Among Nurses in Public and Private Sector Tertiary Care Hospitals of Peshawar, Pakistan. 2022.
20. Abbas G, Sajjad A, Nadeem F, Nisa WT, Zahid J. Comparison of Perceived Stress Levels Among Private and Government Hospital Nurses. Research Journal of Psychology. 2025;3(1):333-344.
21. Chauhan A, Anas A, Nadeem F, Nisa WT, Zahid J. Examining Undergraduate Students' Awareness, Attitudes, and Actions Toward Voluntary Blood Donation. Insights Journal of Health and Rehabilitation. 2025;3(1):129-137.
22. Ghazanfar F, Benjamin SY, Nadeem Z, Inayat M, Khalil S, Zahid J. Bridging the Gap With Educational Support to Improve Breastfeeding Outcomes for Primigravida Post-Cesarean Women. Frontier in Medical and Health Research. 2025;3(2):249-258. Available from: https://fmhr.org/index.php/fmhr/article/view/114