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ASSESSMENT OF NURSES' KNOWLEDGE AND PRACTICE TOWARD HOSPITAL-ACQUIRED INFECTIONS IN KARACHI

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Abstract

Hospital-acquired infections (HAIs) continue to be a major public health problem worldwide, in terms of patient safety, quality of healthcare and healthcare costs . Nurses are key in preventing HAIs by following infection prevention and control practices. Therefore, this study was conducted to evaluate the knowledge and practice of nurses regarding prevention of hospital acquired infections in a tertiary care hospital of Karachi. This study was conducted using a descriptive cross sectional research design. A structured self-administered questionnaire was used to collect data on demographic data and knowledge and practice in the prevention of hospital acquired infections from 36 nurses. The participants were recruited using a non-probability convenience sampling method in which participants were available and willing to participate during the data collection period. The study was performed according to the ethical guidelines, after permission of the hospital administration and informed consent of the participants. Confidentiality, anonymity, and voluntary participation were assured. Data were analysed using Statistical Package for Social Sciences (SPSS) version 26. Data analysis was done using descriptive statistics such as frequencies, percentages, mean and standard deviation. The results showed that the majority of participants were aged between 23 and 30 years (88.9%) and male (91.7%). The majority of the participants had a BSN (50.0%) or RN (47.2%) credential. The mean knowledge score was 5.72±1.03 indicating moderate level of knowledge and the mean practice score was 7.81±3.12 indicating moderate level of practice regarding prevention of hospital acquired infections. The study showed that the nurses had moderate knowledge and practice about prevention of HAIs. The study suggests that regular infection prevention training programmes, continuous professional education, monitoring adherence to infection control guidelines and reinforcement of hospital infection prevention policies can improve nurses' knowledge and clinical practices.

INTRODUCTION

Infections that patients contract while undergoing treatment in medical institutions are referred to as hospital-acquired infections (HAIs) or healthcare-associated infections. Because they raise morbidity, mortality, duration of hospital stay, antimicrobial use, and healthcare costs, they continue to be a significant patient safety concern. Urinary tract infections linked to catheter use, bloodstream infections linked to central lines, surgical site infections, ventilator-associated infections, and hospital-acquired pneumonia are examples of prevalent HAIs. According to recent research, HAIs are avoidable adverse events that are associated with weak monitoring systems, insufficient resources, and poor adherence to infection prevention and control guidelines (Campo & Remon, 2025; Ilori et al., 2024). Because they offer ongoing bedside care and are directly involved in hand hygiene, catheter management, wound care, drug administration, aseptic technique, and patient education, nurses are at the forefront of prevention. In order to lower the risk of infection in hospital settings, nurses' knowledge and practice are crucial indications.

In tertiary care facilities, where patients are frequently severely ill, immunocompromised, or exposed to invasive procedures, infection prevention and control are particularly crucial. Standard precautions, including as hand hygiene, the use of personal protective equipment, safe injection techniques, appropriate disposal of biomedical waste, sterilization, disinfection, and isolation measures, must be followed by nurses in such environments. In order to safeguard patients and healthcare personnel, the Centers for Disease Control and Prevention (CDC, 2024) stressed that fundamental infection prevention techniques should be used in all healthcare settings. In a similar vein, the World Health Organization (WHO, 2025) recognized infection prevention and control as a workable, empirically supported strategy for reducing preventable infections in healthcare settings. Despite the availability of recommendations, research indicates that nurses may not always follow them because of factors like workload, staffing shortages, insufficient supplies, poor training, and a lack of supervision (Riaz et al., 2025; Shacho et al., 2024).

According to recent research, nurses typically have some awareness about healthcare-associated infections (HAIs), but there are frequently gaps between this information and real clinical practice. According to Campo and Remon (2025), nurses' general understanding of healthcare-acquired infection prevention and control was good, but there was still room for development in a few areas pertaining to basic measures. Studies carried out at tertiary care institutions in Pakistan have also revealed differences in nurses' understanding and application of infection control strategies. According to Kanwal et al. (2025), nurses are crucial in preventing infections, but there may be discrepancies between what they know and what they do in standard clinical care. Similar to this, Riaz et al. (2025) found that nurses in Punjab perceived difficulties in preventing and controlling hospital-acquired infections, such as a lack of resources, few opportunities for training, and obstacles at work. These results imply that without institutional rules, resources, and ongoing oversight, knowledge is insufficient on its own.

One of the best and most affordable ways to avoid HAIs is still to practice good hand hygiene. Before and after patient interaction, after coming into contact with bodily fluids, after touching the patient's surroundings, and before to aseptic operations, nurses are obliged to wash their hands. Nonetheless, reports of inadequate hand hygiene compliance in medical settings persist. Knowledge, attitude, and practice are significantly linked to infection control behavior, according to recent research on hand hygiene among clinical nurses in tertiary institutions (BMC Nursing, 2025). Additionally, hand cleanliness was recognized by the CDC (2024) as a fundamental infection prevention strategy for safe healthcare delivery. Poor hand hygiene can accelerate the spread of pathogens in tertiary care hospitals, as nurses regularly travel between patients, equipment, and procedures. Therefore, evaluating nurses' hand hygiene practices and knowledge is essential to enhancing infection control results.

Another significant issue in hospitals is infections linked to devices. Catheter-associated urinary tract infections and central line-associated bloodstream infections are largely preventable when nurses follow evidence-based practices. Muscat et al. (2025) found that effective prevention of catheter-associated urinary tract infections requires adequate knowledge, positive attitudes, and adherence to best practices among healthcare professionals. Qu et al. (2025) also reported that healthcare workers' knowledge, attitudes, and practices regarding catheter-associated urinary tract infection prevention were influenced by training frequency and leadership support. Similarly, Qtait et al. (2025) found that nurses' knowledge and behavior are important for preventing central line-associated bloodstream infections in intensive care and dialysis units. These studies show that nurses require regular training and supervision to maintain safe practices, especially when managing invasive devices.

The role of nurses in preventing HAIs is not limited to individual procedures but also includes participation in infection control programs, reporting, surveillance, patient education, and quality improvement activities. Ruiz-Zaldibar et al. (2025), in an umbrella review, highlighted that nurse-performed interventions can contribute to prevention of healthcare-associated infections in acute care settings. Nurse-led infection prevention strategies, including care bundles, education, audits, and feedback, have been associated with improved compliance and reduced infection risks. A review on nurse-led quality improvement initiatives also emphasized that continuous education, peer training, and care bundle implementation can reduce infection rates in high-risk units such as neonatal intensive care units (ScienceDirect, 2025). These findings support the importance of strengthening nurses' role in hospital infection prevention programs.

In Pakistan, the burden of HAIs is a serious concern due to overcrowded hospitals, limited resources, shortage of trained staff, and inconsistent implementation of infection control policies. Studies from Pakistani tertiary care hospitals have shown that nurses may have moderate knowledge and practice regarding infection control, but regular training and availability of protective supplies remain necessary. Kanwal et al. (2025) assessed nurses' knowledge and practice regarding infection control measures in Lahore and emphasized the need for targeted educational interventions. Riaz et al. (2025) similarly reported that nurses face challenges in preventing HAIs, including lack of administrative support and insufficient resources. These findings are relevant to tertiary care hospitals in Karachi, where large patient loads and busy clinical environments may increase the risk of infection transmission.

Therefore, assessing nurses' knowledge and practice regarding prevention of hospital-acquired infections is important for identifying gaps and improving patient safety. A descriptive cross-sectional study design is appropriate for measuring the current level of knowledge and practice among nurses at a specific point in time. The findings can help hospital administrators, nursing managers, and infection control committees design training programs, strengthen supervision, improve resource availability, and promote adherence to standard precautions. In the context of Karachi, this study is significant because limited local evidence is available regarding nurses' knowledge and practice toward prevention of HAIs in tertiary care hospitals. By identifying current knowledge and practice levels, the study may contribute to improving infection prevention strategies and reducing preventable infections among hospitalized patients.

Problem Statement

Hospital-acquired infections (HAIs) continue to be one of the biggest public health issues facing healthcare systems globally. By adhering to infection prevention measures like hand cleanliness, using personal protective equipment, sterilizing processes, and standard precautions, nurses—who are regarded as frontline healthcare professionals—play a crucial role in preventing and controlling healthcare-associated infections (HAIs). Recent research, however, has revealed that there are still gaps in nurses' understanding and application of infection prevention and

control. According to Campo and Remon (2025), despite nurses' strong knowledge of healthcare-acquired infection prevention, their real practices remained subpar due to workload, staffing constraints, and inadequate guideline dissemination. Similarly, Riaz et al. (2025) discovered that nurses in Punjab's tertiary care hospitals encountered a number of obstacles that affected their ability to avoid infections, such as a lack of administrative support, insufficient personal protective equipment, and insufficient ongoing training. Despite having modest levels of knowledge, a different study carried out in Lahore, Pakistan, found substantial gaps in nurses' adherence to infection control procedures (Kanwal et al., 2025). These results show that nurses' uneven infection prevention measures and lack of awareness continue to raise the risk of healthcare-associated infections (HAIs).

Due to overcrowding, scarce resources, a lack of medical personnel, and uneven application of infection control procedures, tertiary care institutions in developing nations like Pakistan are more vulnerable to hospital-acquired illnesses. According to recent research, reducing the spread of infections in hospitals requires ongoing education, monitoring, and evidence-based nursing practices. According to Qtait et al. (2025), patient safety outcomes in critical care and dialysis units are greatly enhanced when nurses follow evidence-based infection control techniques. Similarly, Aburayyan et al. (2025) showed that nurses' knowledge, attitudes, and practices surrounding healthcare-acquired infections were greatly enhanced by educational interventions. In order to guarantee high-quality patient care and lower preventable infections, infection prevention and control should continue to be a top priority in all healthcare facilities, according to the World Health Organization (WHO, 2025) and the CDC (2024). Despite the significance of infection prevention, little research has been done in Karachi to evaluate nurses' behaviors and understanding of preventing hospital-acquired infections in tertiary care facilities. Thus, this study was carried out in a tertiary care hospital in Karachi to evaluate the degree of nurses' knowledge and practice about hospital-acquired infection prevention.

Research Objective:

Research Hypothesis:

H0:There is no significant relationship between nurses' knowledge and their practice toward hospital-acquired infections.

H1:There is a significant relationship between nurses' knowledge and their practice toward hospital-acquired infections.

Literature Review:

The rise in patient morbidity, mortality, duration of hospital stay, and treatment costs, hospital-acquired infections—also known as healthcare-associated infections—remain a serious concern in hospitals. Because they offer ongoing bedside care and carry out tasks including hand cleanliness, catheter management, wound care, medicine administration, and the use of personal protective equipment, nurses are essential to infection control. According to recent data, infection prevention and control is a workable, evidence-based strategy intended to shield patients and medical personnel from preventable infections (World Health Organization (WHO, 2025). In a same vein, the Centers for Disease Control and control (CDC, 2024) stressed that in order to deliver safe and effective care, all healthcare venues must adhere to basic infection control policies. Because inadequate knowledge or noncompliance may directly raise the risk of hospital-acquired infections, evaluating nurses' knowledge and practice is crucial.

According to recent studies, nurses and other healthcare professionals frequently have a moderate understanding of hospital-acquired infection prevention; yet, there are still gaps in the implementation of basic safeguards. In a cross-sectional study of Ethiopian healthcare workers, Shacho et al. (2024) found that practice, attitude, and knowledge are critical components in reducing infections linked to healthcare, especially in low- and middle-income nations. In a similar vein, Ekakoro et al. (2025) identified deficiencies in healthcare workers' attitudes and understanding regarding nosocomial infection

prevention in Uganda and suggested frequent, focused training, PPE availability, and strict policy enforcement. These results are pertinent to Karachi's tertiary care institutions since nurses' infection prevention practices may be impacted by resource constraints, workload, and uneven training.

Knowledge by itself is insufficient unless it is applied in a safe clinical setting. Nurses are helpful in reducing healthcare-acquired infections, according to Campo and Remon (2025). However, new research indicates that certain nurses need to be better informed and integrate infection control guidelines into their work. In a different study, Qtait et al. (2025) evaluated nurses' behavior and knowledge regarding preventing bloodstream infections linked to central lines. They found that nurses who work in dialysis and intensive care units are essential in preventing infections by adhering to evidence-based practices. These results lend credence to the notion that nursing practice should be routinely evaluated, particularly in high-risk hospital settings where intrusive devices are frequently utilized.

One of the most crucial aspects of preventing hospital-acquired infections is practicing good hand hygiene. Hand hygiene knowledge, attitude, and practice are significant markers of infection control compliance, according to a recent cross-sectional study conducted among clinical nurses in a tertiary hospital in China (Knowledge, Attitude, and Practice of Hand Hygiene Among Clinical Nurses, 2025). The study emphasized the necessity of ongoing instruction and observation of hand hygiene practices. The CDC (2024), which lists hand cleanliness, environmental cleaning, safe injection techniques, respiratory hygiene, and the proper use of personal protective equipment as essential infection control practices, supports this. As a result, infection prevention in nursing practice should be observed in everyday clinical behavior rather than being restricted to theoretical knowledge.

Important categories of hospital-acquired infections include device-associated infections, such as urinary tract infections linked to catheters and bloodstream infections linked to central lines. Qu et al. (2025) conducted a cross-sectional study on healthcare workers' knowledge, attitudes, and practices regarding catheter-associated urinary tract infection prevention and found that training frequency and leadership emphasis were important factors influencing infection prevention practices. According to Muscat et al. (2025), healthcare providers must adhere to best practices, have good attitudes, and possess sufficient information in order to effectively prevent catheter-associated UTIs. According to these studies, hospitals should prioritize leadership support, supervision, and organized training programs in order to enhance nurses' preventive practices.

Additionally, recent research highlights how evidence-based and regularly applied nursing interventions might lower hospital-acquired infections. An umbrella review by Ruiz-Zaldibar et al. (2025) examined nurse-performed interventions for preventing healthcare-associated infections and highlighted the role of nurses in reducing infection risk through evidence-based care. Similarly, The Joint Commission (2025) stated that infection prevention and control is the responsibility of all levels of healthcare staff, including leadership, clinical teams, patients, and visitors. This means that prevention of hospital-acquired infections depends not only on individual nurses but also on hospital policies, resources, education, and monitoring systems.

In Pakistan and other low- and middle-income countries, infection prevention remains a serious challenge due to overcrowding, limited staffing, lack of resources, and inconsistent compliance with standard precautions. A Pakistani study on nurses' knowledge and practices regarding central line-associated bloodstream infection prevention reported that nurses' knowledge and practices are essential for reducing infection risk in tertiary care settings (Knowledge & Practice of Nurses Regarding Central Line-Associated Bloodstream Infection, 2025). These findings are relevant to the present study in Karachi because tertiary care hospitals manage large numbers of patients and have a higher risk of hospital-acquired infections. Therefore, assessing nurses' knowledge and

practice provides useful evidence for improving infection control training and patient safety.

Overall, the literature shows that nurses have a major role in preventing hospital-acquired infections, but knowledge and practice levels vary across settings. Most recent studies recommend continuous education, regular infection control audits, availability of PPE, standard protocols, leadership support, and monitoring of compliance. For a descriptive cross-sectional study in Karachi, these findings support the need to assess the current level of nurses' knowledge and practice regarding hospital-acquired infection prevention. Such assessment can help identify gaps and guide hospital management in planning training programs and strengthening infection control practices.

Research Methodology

Study Design:

This study evaluated nurses' knowledge and practices on preventing hospital-acquired infections in a tertiary care hospital in Karachi using a descriptive cross-sectional research methodology. Because it enabled the researchers to gather information from participants at a single moment in time and characterize the current state of nursing knowledge and practices, this design was deemed adequate. Additionally, the cross-sectional technique assisted in finding weaknesses in the hospital setting's infection prevention practices.

Sampling Technique:

The study participants were chosen using a non-probability convenience selection technique. The study comprised nurses who were willing to participate and available during the data collection period. The study involved 36 nurses from various hospital departments. Due to its practicality, affordability, and suitability for data collection within the constrained study period and available resources, this sample strategy was chosen

Inclusion Criteria

The professional healthcare providers (Nurses) of private tertiary care hospital karachi.

Exclusion Criteria:

Non-healthcare workers, non licensed health care worker & medical students will be excluded from the study.

Research Instrument

A standardized self-administered questionnaire that was created based on the study's goals and pertinent research on hospital-acquired infections was used to gather data. Demographic data and questions about nurses' knowledge and practices about hospital-acquired infection prevention made up the two sections of the questionnaire. Participants' comprehension of infection prevention strategies was evaluated in the knowledge section, and their regular infection control practices in clinical settings were examined in the practice section. To guarantee participants' comprehension and clarity, the questionnaire was written in plain English.

Ethical Consideration:

The investigation was conducted with scrupulous adherence to ethical norms. Prior to data collection, the relevant hospital administration granted permission to carry out the study. Prior to participation, each subject provided written or verbal informed consent after being told of the study's goals and purpose. By not include any personal information on the questionnaires, the participants' privacy and anonymity were preserved. Additionally, participants were made aware that their involvement in the study was entirely voluntary and that they might leave at any time without facing any consequences.

Data Analysis :

Frequency Table

Table 1:Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-22	1	2.8	2.8	2.8
	23-30	32	88.9	88.9	91.7
	31-40	3	8.3	8.3	100.0
	Total	36	100.0	100.0	

Table 1. Age distribution of the study participants. The results showed that most of the nurses belonged to the age group of 23–30 years. The total participants were 36 with 32 (88.9%) nurses aged 23 to 30 years. The majority of the nursing staff included in the study were young adults and probably at the beginning of their professional careers. There was very limited representation from younger nurses with only 1 participant (2.8%) in the age group 18–22 years. Furthermore, 3 participants (8.3%) belonged to the age group of 31–40 years. The cumulative percentage indicated that 91.7% of the participants were less than 30 years old. This shows that the nursing workforce in the selected tertiary care hospital was dominated by relatively young nurses. Younger nurses may have more recently been trained in nursing education on infection prevention and control guidelines. However, they may still need further on-the-job training and clinical experience to enhance their infection prevention practices in the hospital environment.

Table 2:Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	33	91.7	91.7	91.7
	Female	3	8.3	8.3	100.0
	Total	36	100.0	100.0	

The gender distribution of the study participants is shown in Table 2. The results indicated the majority of the participants were male nurses. Of the 36 participants, 33 (91.7%) were male nurses. In contrast, there were only 3 (8.3%) female nurses. The cumulative percentage revealed that the study sample was almost entirely composed of male participants. This finding suggests that the selected tertiary care hospital had a male predominant nursing workforce during the period of study. The low participation of female nurses could be a result of staffing patterns or the distribution of the workforce in the hospital setting. Gender differences may also impact workplace experiences, communication styles, and infection prevention practices in clinical settings. Male nurses were the main group that participated in the patient care and infection prevention activities in this study. The research results should be interpreted with the consideration of the unequal gender representation. In the overall sample, the predominance of male nurses over female nurses was clear.

Table 3:Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RN	17	47.2	47.2	47.2
	BSN	18	50.0	50.0	97.2
	Other	1	2.8	2.8	100.0
	Total	36	100.0	100.0	

Educational qualification of study participants is explained in Table 3. The results revealed that the majority of the nurses had a BSN or RN qualification. Of the 36 participants, 18 nurses (50.0%) held a Bachelor of Science in Nursing (BSN) degree. Likewise, 17 participants (47.2%) were Registered Nurses (RN). Only 1 participant (2.8%) was classified as having other qualifications. The total percentage indicated that 97.2% of the participants had RN or BSN qualifications. This above finding shows that majority of the nurses working in the selected tertiary care hospital had formal professional nursing education. Educational qualification plays a vital role in improving nurses' knowledge and clinical practices of infection prevention and patient safety. Nurses with higher educational qualification may have better understanding of evidence-based infection control guidelines and standard precautions. A high proportion of BSN-educated nurses may positively influence the quality of nursing care and prevention of hospital-acquired infections. The overall results of the study indicated that the nursing staff in the selected hospital were professionally qualified and academically prepared for clinical practice.

Table 4:Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
age	36	1	3	2.06	.333
Gender	36	1	2	1.08	.280
Qualification	36	1	4	1.58	.649
Knowledge	36	5.00	9.00	5.7222	1.03126
Practice	36	5.00	15.00	7.8056	3.11512
Valid N (listwise)	36				

The descriptive statistics revealed that data were gathered from 36 nurses. The mean age score was 2.06 ± 0.333, indicating that the majority of participants belonged to the 23–30 years age group. The mean gender score was 1.08 ± 0.280, indicating that the majority of participants were male. The mean qualification score was 1.58 ± 0.649, indicating that the majority of nurses had either moderate level of knowledge. Similarly, the mean practice score was 7.81 ± 3.12, with scores ranging from 5 to 15. With a mean age score of 2.06 ± 0.333, the majority of participants were in the 23–30 years age group. The majority of participants were male, as indicated by the mean gender score of 1.08 ± 0.280. The majority of nurses had either RN or qualification according to the mean qualification score of 1.58 ± 0.649. Nurses had a moderate degree of knowledge about preventing hospital-acquired infections, with a mean score of 5.72 ± 1.03 and values ranging from 5 to 9. Similarly, a moderate level of practice in preventing hospital-acquired infections was indicated by the mean practice score of 7.81 ± 3.12, with values ranging from 5 to 15. Overall, the results showed that nurses had moderate knowledge and practice when it came to preventing hospital-acquired infections.

Discussion : In a tertiary care hospital in Karachi, the current descriptive cross-sectional study evaluated nurses' knowledge and practices on hospital-acquired infection prevention. With a mean knowledge score of 5.72 ± 1.03, the results indicated that nurses possessed a modest level of knowledge. This result is in accordance with

current research that indicates nurses and other healthcare professionals frequently exhibit moderate to acceptable knowledge about infection prevention; yet, there are still gaps in certain areas, such as catheter care, standard precautions, hand cleanliness, and adherence to guidelines. While Qtait et al. (2025) observed that nurses had medium understanding of CLABSI prevention, Muscat et al. (2025) reported moderate to adequate knowledge, attitudes, and practices among healthcare workers addressing CAUTI prevention. In a similar vein, Qu et al. (2025) discovered that leadership emphasis and training frequency had a substantial impact on healthcare workers' knowledge and practice ratings. These results imply that while most nurses are aware of the fundamentals of infection prevention, ongoing education and frequent refresher training are still required to increase understanding and lower hospital-acquired infections.

A moderate level of practice in preventing hospital-acquired infections was indicated by the study's mean practice score of 7.81 ± 3.12. This outcome demonstrates that information may not always be fully applied in real-world situations. Similar results were observed by Qtait et al. (2025), who discovered a strong positive association between knowledge and preventative behavior as well as medium behavioral adherence among nurses. Additionally, Akpinar et al. (2025) found that nurses who had more positive attitudes toward evidence-based nursing practice also had higher knowledge and attitudes for catheter-related infection prevention. Njoku and Makata (2025), on the other hand, found that nurses in tertiary institutions in southeast Nigeria had excellent knowledge and a very high level of infection control practice. This suggests that institutional support, the availability of infection control guidelines, and supervision may raise practice levels. Thus, workload, a lack of resources, a lack of monitoring, or inconsistent infection control training could all be contributing factors to the current study's mediocre practice grade.

The study's overall conclusions emphasize the necessity of organized infection control initiatives in tertiary care facilities. Through hand hygiene, the use of personal protective equipment, safe injection techniques, sterilization, and adherence to established precautions, nurses play a crucial role in preventing transmission of hospital-acquired infections, which continue to be a major patient safety problem. The CDC continues to stress that while some healthcare-associated infections have been prevented, more work is still needed, and monitoring data is crucial for focusing prevention efforts. In a Pakistani study, Khan et al. (2025) also stressed how important it is for nurses to follow universal measures in order to prevent illnesses linked to healthcare. As a result, hospital administration should hold frequent training sessions, bolster infection control committees, supply sufficient resources, and keep an eye on compliance through audits and feedback. In tertiary care settings, increasing nurses' skills and expertise can improve patient safety and lower hospital-acquired infection rates.

Conclusion

The present study concluded that the nurses working at a tertiary care hospital, Karachi had a moderate level of knowledge and practice about prevention of hospital acquired infections. Nurses play an imperative role in infection prevention and control to reduce the spread of healthcare-associated infections and to enhance patient safety as nurses are frontline healthcare providers and spend the most time in direct patient care. Findings showed that most nurses possessed basic knowledge of infection prevention measures like hand hygiene, use of personal protective equipment and standard precautions, however gaps still remained between knowledge and actual clinical practice. Inconsistent adherence to infection control practices may be due to workload, staff shortages, limited training opportunities, inadequate monitoring and lack of continuous professional development. Hospital-acquired infections continue to be a major burden to healthcare systems due to increased patient morbidity, mortality, hospital stay, and healthcare costs. Therefore, improving nurses' knowledge and practices continues to be a major priority in tertiary care settings. The study emphasizes on the need for regular training

programs on infection prevention, evidence based nursing education, supervision, audits on infection control and availability of adequate resources for improving compliance with standard precautions. Moreover, hospital administration and infection control committees should promote a culture of patient safety by developing clear infection prevention policies and encouraging nurses to participate actively in infection control activities. Improving nurses' knowledge and practices on prevention of hospital-acquired infections can help improve the quality of healthcare services, reduce the transmission of infections and improve patient outcomes in tertiary care hospitals overall.

Recommendations

1. Regular infection prevention and control training programs should be conducted for nurses to improve their knowledge and clinical practices regarding prevention of hospital-acquired infections.
2. Hospital administration should ensure the availability of adequate infection control resources, including personal protective equipment, hand hygiene supplies, and sterilization materials in all hospital units.
3. Continuous monitoring, supervision, and infection control audits should be implemented to assess nurses' compliance with standard precautions and hospital infection prevention guidelines.
4. Nursing management should encourage evidence-based practice and organize workshops, seminars, and continuing education sessions related to hospital-acquired infection prevention and patient safety.

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