

Knowledge And Attitude Towards Preventing Hospital-Acquired Infections Among Nurses: a Cross Sectional Study Conducted In Lahore, Pakistan

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Article Details

ABSTRACT

Keywords: Hospital-Acquired Infections, Knowledge, Nurses

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Background: Hospital-acquired infections are most common in hospital setting especially in developing countries. Nurse's knowledge and attitude can play an important role in preventing Hospital-Acquired Infections. Objective: To assess the knowledge and attitudes of nurses towards preventing Hospital-Acquired Infections in a selected hospital setting. Methodology: A descriptive cross-sectional study was conducted in a tertiary care hospital using a survey based questionnaire (15-item) to assess knowledge and attitude of nurses. Descriptive analysis was used to calculate frequency, percentage, mean, p-value and correlation between variables. Result: A total 108 nurses (95% confidence interval) were included in this study with a 100% response rate. The average mean knowledge score among nurses was 53%, and the average mean attitude score was 57%, with $P > 0.05$. Mostly nurses' show poor level of knowledge towards hospital acquired infections. Conclusion: Study highlights a poor level of knowledge and attitude among nurses toward hospital-acquired infections prevention. Through proper education, regular training programs, and with institutional support nurses' competency in hospital-acquired infection prevention can be improved.

INTRODUCTION

Hospital-Acquired Infections (HAIs) are a major challenge in healthcare setting; occur during a patient's stay in hospitals or any other care setting and raise morbidity, mortality, and financial stress. As the primary healthcare providers, nurses are essential in avoiding these diseases via patient education, the use of personal protective equipment (PPE), and good hand hygiene. Despite obstacles including a lack of budget and manpower, efficient infection control procedures by nurses are essential to lowering the incidence of HAIs in resource-constrained environments, such as government hospitals in underdeveloped nations.

Healthcare-associated infections are infections occurring in patient during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission. These are also referred to as "nosocomial" or "hospital" infections. HAIs typically occur after 48 hours of hospital admission (WHO). HAIs pose a significant risk to both patients and healthcare workers, leading to high rates of morbidity and mortality. HAIs are a huge global health liability that have an enormous economic impact and affect a large number of people annually. In the United States alone, HAIs are predictable to cause from \$28 to \$45 billion in direct medical costs year after year. Higher readmission rates and increased length of hospital stays are the main outcomes of these expenses (Alayt et al., 2022).

The rate of HAIs in Europe remains alarmingly high, with an estimated 4.5 million cases taking place each year. This results in roughly 37,000 fatalities, prolonged hospital stays, and significant financial loads. Shockingly, according to World Health Organization statistics, 1 in 10 patients gain an infection while undergoing treatment. Approximately 20% of HAIs are surgical site infections, which are commonly reported. According to WHO assessments, post-operative infections affect roughly 32% of surgical patients. There is a deficit in the majority of unindustrialized Asian states of nationwide surveillance of hospital-acquired infections. About 25% of hospitalized patients in the Indo-Pacific area are thought to be affected by HAIs, which are predicted to be 2–20 times more common there than in wealthy nations (Michael & Nguyen, 2022).

Furthermore hospital infections are still a major issue in Saudi Arabia, as seen by monthly 2.2% hospital infection rate stated by several institutions. More HAI outbursts occurred in 2021 than the year earlier, according to the General Directorate of Infection Prevention and the Ministry of Health. One of the main ways that these diseases propagate is by unclean hands belonging to patients' family members or caregivers. Due to contact with bodily fluids like blood, healthcare workers particularly nurses are more susceptible to illnesses linked to healthcare. An extended hospital stay increases the risk of HAIs (Alrefaee, 2023).

Excessive patient loads, inadequate finances, and staffing shortages are some of the problems that government healthcare institutions frequently face which can affect application of infection control protocols. It is often acknowledged that one of the best ways to avoid HAIs is to practice good hand hygiene. By acting as a barrier between

medical personnel and infectious pathogens, PPE lowers the possibility of spread. Environmental disinfection is also essential for equipment and surfaces. Beyond these fundamental skills, nurses also need to have a thorough awareness of infection control concepts, be able to react quickly to infection symptoms, and monitor patient conditions closely. Research has demonstrated that even in environments with limited resources following of standard infection control procedures can result in notable drops in HAI rates by nursing personnel (Sagar et al., 2023).

However bloodstream infections, surgical site infections, and pneumonias are the most prevalent forms of hospital-acquired infections. Although it is not possible to avoid every HAI, the incidence of HAIs can be decreased with proper cleanliness and excellent hygiene practices. The largest group in the healthcare system is nurses. They interact closely with patients and offer services in hospitals seven days a week, in order to promote health and well-being. In order to prevent HAIs, nurses who work in many departments of a hospital are crucial (Kakkar et al., 2021).

In addition to their many other responsibilities, nurses are first and foremost the patient's advocate. Nurses achieve this by advocating and providing care that is focused on attaining the greatest possible results for the patient. Helping stop the transmission of HAIs, which can make curing and treatment more difficult, is a crucial part of patient advocacy. Mostly as infection control, nurses employ a range of techniques to shield patients from infections that are either developing or getting worse. All healthcare workers have everyday duties related to infection controller, which includes isolation precautions, waste management, environmental sanitation, and hand-washing (Juma, 2022).

OBJECTIVE

To evaluate nurses' knowledge and attitude in preventing hospital-acquired infections

HYPOTHESIS

NULL HYPOTHESIS (H_0)

There is no significant relation between knowledge and attitude of nurses towards prevention of hospital-acquired infections.

ALTERNATIVE HYPOTHESIS (H_1)

There is a significant relation between knowledge and attitude of nurses towards prevention of hospital-acquired infections.

METHODOLOGY

This descriptive cross-sectional study was conducted to assess the knowledge and role of registered nurses regarding hospital-acquired infections at a tertiary care facility that has expanded from a 20-bed maternity unit in 1992 to a 350-bed multispecialty teaching hospital. The study targeted registered nurses with a minimum of one year of clinical experience, excluding nursing interns, CNAs, and those unwilling to participate. A sample of 108 nurses was selected through convenience sampling, using a formula that considered population size, confidence level (95%), and other statistical parameters. Data was collected over approximately eight to nine months (September 2024 to April 2025)

using a structured questionnaire adopted from Barry et al. (2021), which covered demographic details and knowledge on hand hygiene, PPE, SSI, CLABSI, CAUTI, and VAP. The questionnaire demonstrated strong validity (0.98) and moderate reliability (0.69). Ethical approval was obtained, and participation was voluntary and anonymous, with the right to withdraw at any time. Data was gathered via a Google Docs link and later exported to Excel for coding and statistical analysis using SPSS version 23, where descriptive statistics and Spearman correlation tests were applied to evaluate infection prevention knowledge and attitudes among nurses.

Result

TABLE 1: DEMOGRAPHIC DATA OF NURSES

| Demographic data | Frequency(n) | Percentage (%) |
|------------------------------------|--------------|----------------|
| Age groups | | |
| 18 – 23 | 55 | 51% |
| 24 – 29 | 52 | 48% |
| 30 – 40 | 1 | 1% |
| Gender | | |
| Female | 68 | 63% |
| Male | 40 | 37% |
| Qualification | | |
| Diploma in Nursing | 36 | 33% |
| Post Basic Diploma in Nursing | 18 | 17% |
| BSN 4 Years / Post RN 2 Years | 54 | 50% |
| Current Working Department | | |
| Inpatient | 64 | 59% |
| Critical Care Areas | 44 | 41% |
| Year of Experience | | |
| less than 2 years | 61 | 57% |
| 2-5 years | 40 | 37% |
| 5-10 years | 7 | 6% |
| Training about IPC | | |
| Yes | 90 | 83% |
| No | 18 | 17% |
| Specific Training About IPC | | |
| Diploma in IPC | 14 | 13% |

| | | |
|--------------------|----|-----|
| Seminars | 36 | 33% |
| Certification | 17 | 16% |
| Hands on Workshops | 23 | 21% |
| Total | 90 | 83% |
| Missing | 18 | 17% |

Table no 1 exhibit complete details of demographic data which was gather from nursing through questionnaire. The majority of respondents were young, with 51% aged between 18–23 years and 48% between 24–29 years, while only 1% was aged 30–40. In terms of gender, 63% were female and 37% male. Regarding qualifications, half of the participants (50%) held a BSN or Post-RN degree, 33% had a Diploma in Nursing, and 17% had a Post Basic Diploma. Most respondents (59%) worked in inpatient departments, while 41% were from critical care areas. Experience levels were relatively low, with 57% having less than 2 years of experience, 37% with 2–5 years, and only 6% having 5–10 years. A significant majority (83%) had received some form of IPC training. Among these, 33% attended seminars, 21% participated in hands-on workshops, 16% had certifications, and 13% completed a diploma in IPC.

TABLE 2: KNOWLEDGE OF NURSES RELATED TO HAIS

| Knowledge related Questions | Right Answers | Frequency(n) | Percentage (%) |
|---|---|--------------|----------------|
| Hand Hygiene | | | |
| Nail length should be | Less than ¼ inch (approx. 0.5 cm) | 79 | 73% |
| Most effective product for reducing germs | Alcohol based hand Sanitizer | 70 | 65% |
| PPE | | | |
| Sequence for donning PPE | Gown, mask, face-shield, gloves | 73 | 68% |
| Where do remove PPE | At doorway before leaving the patient's room | 63 | 58% |
| SSI | | | |
| In the presence of hair precaution to prevent SSI | Remove hair using clippers outside the operating site | 64 | 59% |
| Prophylactic antibiotic given time | 30-60 minutes before the incision | 45 | 42% |
| CLABSI | | | |
| CLABSI appropriate management | antibiotic therapy and removal of the central line | 49 | 45% |

| | | | |
|---|--|----|-----|
| Type of central line prone to CLABSI | Femoral line | 43 | 40% |
| CAUTI | | | |
| Management of asymptomatic patient who has an indwelling urinary catheter | Nothing to be done | 37 | 34% |
| Indwelling urinary catheter removal post-operatively | As soon as there is no clinical indication | 47 | 44% |
| How frequently indwelling urinary catheter revised | Daily | 60 | 56% |
| VAP | | | |
| Oral hygiene of mechanically-ventilated patients | Use a toothbrush with a chlorhexidine solution to clean the oral mucosa at least twice daily | 47 | 44% |
| How to prevent aspiration of secretions to avoid VAP | Maintain elevation of the head of the bed at 30-45 degrees | 66 | 61% |

Table no 2 contains data related to knowledge-based questions related to infection prevention practices among healthcare workers. In the Hand Hygiene section, 73% knew that nails should be trimmed to less than ¼ inch, and 65% identified alcohol-based hand sanitizers as the most effective for reducing germs. For PPE, 68% correctly recognized the donning sequence as gown, mask, face shield, and gloves, while 58% knew PPE should be removed at the doorway before leaving the patient's room. In terms of SSI, 59% were aware that hair should be removed with clippers outside the operative site, and 42% knew prophylactic antibiotics should be administered 30–60 minutes before incision. Regarding CLABSI, 45% selected correct management (antibiotics and line removal), and 40% knew the femoral line is most prone to CLABSI. For CAUTI only 34% knew no intervention is needed for asymptomatic patients with catheters, 44% acknowledged the importance of early removal post-surgery, and 56% indicated the need for daily catheter review. Lastly, in VAP prevention, 44% knew to use a chlorhexidine toothbrush for oral care, and 61% understood the importance of keeping the head of the bed elevated to prevent aspiration. Overall, the data highlights areas of strong awareness and those needing further education. All percentage values were rounded to nearest whole number.

TABLE 3: KNOWLEDGE LEVEL ACCORDING TO SCORE

| Knowledge level | No of Nurses gain score | Percent% |
|--------------------------|-------------------------|----------|
| Good knowledge (10-13) | 36 | 34% |
| Moderate knowledge (7-9) | 6 | 6% |
| Poor knowledge (0-6) | 66 | 60% |

Total 3 questions were used for assessment of knowledge of nurses related to HAIs. Each right answer was score with 1 and wrong answer with 0. Most nurses' show poor knowledge level related to it.

TABLE 4 ATTITUDE AND FREQUENCY OF HAND WASHING AMONG NURSES

| | Frequency (n=107) | Percent% |
|--|-------------------|----------|
| Importance of hand washing for Yourself | | |
| Very important | 76 | 70% |
| Important | 26 | 24% |
| Somewhat important | 6 | 6% |
| Colleagues | | |
| Very important | 64 | 59% |
| Important | 38 | 35% |
| Somewhat important | 6 | 6% |
| Patient's visitors | | |
| Very important | 37 | 34% |
| Somewhat important | 71 | 66% |
| Frequency of hand washing | | |
| Before wearing gloves | | |
| Always | 54 | 50% |
| Sometimes | 45 | 42% |
| Rarely | 9 | 8% |
| Before aseptic procedures | | |
| Always | 79 | 73% |
| Sometimes | 24 | 22% |
| Rarely | 5 | 5% |
| Before touching a patient | | |
| Always | 60 | 56% |
| Sometimes | 39 | 36% |
| Rarely | 9 | 8% |
| After touching a patient's surroundings | | |
| Always | 61 | 57% |

| | | |
|----------------------------------|----|-----|
| Sometimes | 40 | 37% |
| Rarely | 7 | 6% |
| After taking off gloves | | |
| Always | 74 | 69% |
| Sometimes | 25 | 23% |
| Rarely | 9 | 8% |
| After touching a patient | | |
| Always | 73 | 68% |
| Sometimes | 29 | 27% |
| Rarely | 5 | 4% |
| Never | 1 | 1% |
| After opening the door | | |
| Always | 33 | 31% |
| Sometimes | 45 | 42% |
| Rarely | 26 | 24% |
| Never | 4 | 3% |
| After using a stethoscope | | |
| Always | 38 | 35% |
| Sometimes | 46 | 43% |
| Rarely | 19 | 17% |
| Never | 5 | 5% |
| After body fluid exposure | | |
| Always | 84 | 78% |
| Sometimes | 19 | 18% |
| Rarely | 4 | 3% |
| Never | 1 | 1% |

Table no 4 shows the attitude level of nurses about questions which were asked in questionnaire. A majority considers handwashing very important for themselves (70%) and their colleagues (59%), but fewer view it as very important for patient visitors (34%). Regarding hand hygiene practices, high compliance is seen before aseptic procedures (73% always), after body fluid exposure (78%), and after touching patients (68%). However, handwashing is less consistently practiced after actions like using a stethoscope (only 35% always) or opening doors (31% always). All percentage values were rounded to nearest whole number.

Data distribution was checked related to knowledge and attitude, which was not normal. On the basis of non-normal distribution of data, we apply Non-parametric test – Spearman.

CORRELATIONS

| | | | Knowledge | Attitude |
|----------------|-----------|-------------------------|-----------|----------|
| Spearman's rho | Knowledge | Correlation Coefficient | 1.000 | -.134 |
| | | Sig. (2-tailed) | . | .166 |

| | | | |
|----------|-------------------------|-------|-------|
| | N | 108 | 108 |
| Attitude | Correlation Coefficient | -.134 | 1.000 |
| | Sig. (2-tailed) | .166 | . |
| | N | 108 | 108 |

The result of correlation coefficient shows that there is very weak negative relationship between knowledge and attitude. P-value (0.166) which is higher from 0.05 shows not statistically significant relationship between knowledge and attitude which support **null hypothesis**.

DISCUSSION

DEMOGRAPHIC COMPARISON

In our study, the majority of respondents were young, with 51% aged 18–23 and 48% aged 24–29, whereas in Barry et al.'s (2021) study at King Saud University Hospital, most nurses were older, with 35% having 5–10 years of experience and 45.6% over 10 years. In contrast, our study found that 57% of nurses had less than 2 years of experience. This highlights a younger and less experienced nursing population in our setting. Gender distribution also differed, with our study showing 63% female and 37% male nurses, while other studies, such as Sham et al. (2021) in Malaysia, reported 84% female participants. Educational qualifications varied as well—50% of our nurses held BSN or Post-RN degrees, whereas in Sham et al.'s study, 93.1% of nurses had a diploma in nursing, and in Khatrawi et al.'s (2023) cross-country study, most were diploma holders with over two years of experience. Departmental placement also varied: in our study, 59% worked in inpatient departments and 41% in critical care, while Barry et al. (2021) had nurses more evenly distributed across ICU, outpatient, and inpatient departments. Studies like those by Sebro et al. (2021) in Ethiopia showed a higher proportion of degree holders (341 out of 398) and a slightly older participant profile with a mean age of 27.6 years.

This study found that 34% nurses had good level of knowledge about the prevention of hospital-acquired infections (HAIs) and 57% demonstrated a positive attitude toward hand hygiene practices. These findings are comparatively lower than those reported in a study by Mazin Barry at King Saud University Hospital, Saudi Arabia, where 71.2% of nurses had adequate knowledge, indicating a greater need for education and training in the current study setting (Barry et al., 2021). Similarly, a 2021 study conducted in Northwest Ethiopia, where 90.2% nurses had good knowledge and 57.2% had a favorable attitude towards HAI prevention—showing significantly higher knowledge levels and comparable attitude scores (Bayleyegn et al., 2021). In Malaysia, another 2021 study revealed that 85.3% of nurses had strong knowledge of surgical site infection (SSI) prevention, surpassing the 50.2% knowledge found in this study (Sham et al., 2021). A 2024 study at the National Hospital Abuja in Nigeria found that 50.4% of respondents had good knowledge and 71.0% had a good attitude toward HAI prevention, indicating higher knowledge and attitude score compared to this study (Ilori et al., 2024). Furthermore, a cross-country study conducted by Elham M. Khatrawi in 2023 reported that 74.1% of nurses had good knowledge, 73.07% had a positive attitude, and 88.7%

practiced appropriate HAI prevention—figures that are all higher than the results of the present study (Khatrawi et al., 2023). In comparison, a 2021 study by Sisay Foga Sebro in Southern Nations, Nationalities, and Peoples' Region of Ethiopia showed that 45.5% of nurses had good knowledge about HAI prevention, which is also higher than this study's findings (Sebro et al., 2021).

LIMITATIONS

- Research was conducted within a limited number of nurses (108), which may not fully represent the large population of nurses.
- Data was collected from single hospital.
- The data collection was done by self-reported questionnaires, which may cause bias.
- The study focused only on knowledge and attitude, without exploring the actual practices that may influence infection prevention.
- Institutional factor that may influence infection prevention was not measured in this study such as institutional policies, workload, and availability of infection control resources.

CONCLUSION

Finding of this study revealed that mostly nurses demonstrated poor level of knowledge and average attitude towards the prevention of hospital-acquired infections (HAIs). These results highlight a significant gap that requires attention. Healthcare organizations must take intervention for ongoing professional development, guarantee the steady supply of infection prevention materials, and foster an environment that highlight following evidence-based infection control procedures in order to close these gaps. Regular training sessions, continuous in-service education programs, and updated infection prevention standards can all help to enhance this. Last but not least, even though nurses play a significant role in preventing HAIs, more training, supportive resources, and policy enforcement are still essential to increase knowledge and attitude, which will eventually lead to safer clinical procedures and better patient outcomes.

RECOMMENDATIONS

- For more generalizability, future research should use a large and more diverse sample from several healthcare facilities.
- Qualitative method should be used to gain more thoughts of nurses regarding their experiences and challenges such as interviews.
- Promote longitudinal research to monitor how educational interventions and training programs affect knowledge, attitude, and practices.

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World

Health

Organization

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