

Role of Hospital Management in Reducing Hospital-Acquired Infections: A Case Study based Perspective

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Abstract

Infection problem has always been regarded as a major problem and threat to mankind. Hospital Acquired Infection is the healthcare associated infection and it is one of the most important issues in the world of healthcare. These infections (HAI) are typically not present at the time of admission but they are usually acquired after hospitalization within 48 hours after admission. Nurses play an important role in Hospital Acquired Infections hence assessment of nurse knowledge, attitude and practice can lead to provide solution to the management. This study aimed to assess the knowledge, attitude and practice of the nurses was. This study was a cross-sectional study among nurses in Global Health City in Chennai. The study population was all nurses working Global Health City in Chennai and hence 132 nurses participated in the study. Data gathering tool had a valid and reliable questionnaire in four sections which includes demographic characteristics, knowledge, attitude and practice. Considering the important role of nurses in hospitals, infection control is the necessary training provided to enhance the knowledge and develop appropriate behaviors in hospital infection control as proposed.

Keywords: Hospital-acquired infection , Nurses, Knowledge, Attitude, Practice.

1 Introduction

Hospital-acquired infections, also known as nosocomial infections, represent a critical global public health challenge, as they originate within healthcare facilities and significantly contribute to increased patient morbidity, mortality, and extended hospitalizations (Krishnananda Kamath K et al., 2023). These infections, manifesting at least 48 hours after admission, impose a substantial economic burden on healthcare systems while complicating the clinical course of patients undergoing invasive medical procedures (Costa et al., 2025). Effective infection management is therefore paramount, as it serves as the primary mechanism to mitigate the prevalence of pathogens such as *Klebsiella pneumoniae* and ensures adherence to safety frameworks designed to protect vulnerable populations (Kubde, Badge, Ugemuge, & Shahu, 2023; Parveen^{2*}, 2026). To evaluate these management frameworks within real-world clinical settings, this paper utilizes a case study approach, enabling a detailed examination of diagnostic protocols, epidemiological patterns, and the effectiveness of current intervention strategies (Bakri et al., 2022; Shree, Joshi, Kumar, & Biswas, 2025). By analyzing the specific operational workflows of a tertiary care facility, this methodology facilitates a granular assessment of existing prevention strategies, ranging from environmental sanitation to antimicrobial stewardship (Alinasab, Jahani, Mahmoudi, & Charati, 2025).

Various epidemiological studies show that HAI are induced by microorganisms which is located throughout which includes bacteria, virus and fungi. The healthcare professionals also in addition spreads infection either by using contaminated equipment, soiled linens or through air droplets. Nurses may be exposed to different infections while performing their duties (Kosgeroglu et al., 2004). Hospital organization should give importance on providing adequate training to improve patient care. Few studies have been conducted at 6 hospitals in few districts of Palestine, 55.4% of the participants are between 20 to 30 years. The results emphasized the need to protect this group of workers from hospital infections (Johnson *et al.*, 2013; Janjua *et al.*, 2007; Reda *et al.*, 2010). By measuring the Knowledge Attitude and Practice (KAP) of nurses, prevalence of HAI any in the hospital is known and the knowledge of nurses about nosocomial infection is studied. Measures on controlling infections like hand hygiene and few common precautions are uncomplicated and affordable method, but require workforce accountability, behavioral change, improvement in educating the staffs, proper reporting and surveillance systems (Bouallègue et al., 2013).

Due to greater awareness and preventive measures, there has been some progress in reduction in prevalence of some nosocomial infections. Even though healthcare professionals play some major role in spreading infection, nurses also in particular plays some prominent role in spreading infection. Hence awareness in nursing population is the initial step to control HAI. Knowledge Attitude and Practice of nurses should be measured and accordingly there should be awareness programs conducted in every hospital to prevent hospital acquired infections HAI. The main aim of the study is to assess the KAP of hospital-acquired infections among of nurses who works in Global Health City Chennai. The main objectives of the research are to study the demographic characteristics of nurses in Global Health City in Chennai and the knowledge of nurses in HAI. Further the study aims in understanding the attitude of nurses in HAI and identify the knowledge of practice in nurses about hospital acquired infection. the study also highlights the practices of nurses regarding the infection control procedures including hand hygiene, wearing person protective equipment, disinfection, sterilization, safe injections, patient preparation and waste disposal management. The present study looks into the consciousness and knowledge among the nurses regarding hospital acquired infections. Most of the existing works have concentrated on para medical staff as a whole. Since nurse interaction level is much more than other paramedical staffs, exclusive studies about their awareness and knowledge is essential and this work concentrates on that aspect.

2 Literature Review

Hospital-acquired infections (HAIs), also known as healthcare-associated infections (HAIs), remain a significant challenge to patient safety and healthcare quality. They contribute to increased morbidity and mortality, prolonged hospital stays, higher healthcare expenditure, and the emergence and transmission of antimicrobial-resistant organisms. The World Health Organization (WHO, 2024) emphasizes that HAIs are a persistent threat across healthcare settings and that a substantial proportion can be prevented through effective infection prevention and control (IPC) measures, adequate water, sanitation and hygiene (WASH), and appropriate healthcare practices

Current scholarly discourse emphasizes that while infection control programs are essential for reducing mortality and hospital expenditures, their systematic implementation remains inconsistent across diverse healthcare settings (Alfahmi et al., 2023). Hand hygiene remains the foundational global strategy for mitigating these risks, yet it often functions as only one component of broader, multi-faceted environmental maintenance and decontamination bundles (Haque et al., 2020). Evidence also indicates that the effectiveness of infection-control measures depends on implementation within the broader hospital system. Price et al. (2023) found stronger evidence for care bundles supported by implementation strategies than for some broader IPC programmes or regulatory interventions, although considerable heterogeneity and methodological limitations remain. Similarly, Teus et al. (2024) reported mixed effects of infection-control interventions during the COVID-19 period, demonstrating that individual measures may produce different outcomes across infection types and healthcare contexts.

Furthermore, recent evidence suggests that integrating advanced disinfection technologies, such as ultrasonic cleaning for medical equipment, can yield measurable improvements in decontamination efficacy beyond manual protocols alone (Wang, Xiang, Li, Bairwa, & Rodriguez-Morales, 2026). Additionally, antimicrobial stewardship programs have become central to managing the escalation of drug-resistant pathogens by optimizing the rational use of therapeutics and curbing unnecessary antibiotic exposure (Alharbi et al., 2025; Delicati et al., 2025). Despite these advancements, a significant gap remains in understanding how institutional-level adherence to these multi-modal bundles correlates with the actual prevalence of multidrug-resistant organisms (Bajaj & Bajaj, 2024; Dancer, 2014).

3 Methodology

The present study adopted a descriptive cross-sectional research design to assess the Knowledge, Attitude, and Practice of nurses regarding Hospital-Acquired Infections. The study was designed to assess the existing level of awareness and infection-prevention practices among nursing employees and to identify areas requiring improvement in the management and prevention of HAIs. The study was conducted at Gleneagles Global Health City, a tertiary-care hospital. The hospital provides a wide range of specialized and critical healthcare services, making effective infection prevention and control practices an essential component of patient care.

The study population comprised nursing employees working in the hospital. A total of 132 nurses participated in the study. Nurses were selected because they are directly involved in patient care and play a critical role in implementing infection-prevention and control measures, including hand hygiene, use of personal protective equipment, aseptic procedures, and safe handling of healthcare waste. A total sample of 132 nursing employees was selected using a stratified random sampling technique. The nursing staff were divided into relevant strata based on their work areas/departments, and participants were selected randomly from the respective strata. This approach was adopted to ensure adequate representation of nurses from different clinical areas of the hospital.

The study was conducted over a period of three months. The study period included the preparation and administration of the questionnaire, collection of responses, compilation of

data, analysis, and interpretation of findings. Data were collected using a self-structured questionnaire developed to assess the Knowledge, Attitude, and Practice of nurses concerning Hospital-Acquired Infections. The questionnaire consisted of items related to the nurses' knowledge of HAIs and their modes of transmission, attitudes towards infection prevention and control, and routine practices followed to minimize the risk of infection transmission within the hospital.

The questionnaire was designed in accordance with the objectives of the study and focused on relevant aspects of HAI prevention and management, including hand hygiene, use of personal protective equipment, standard precautions, aseptic techniques, environmental cleanliness, waste management, and other infection-control practices.

After obtaining the necessary institutional permission, the self-structured questionnaire was administered to the selected nursing employees. The purpose of the study was explained to the participants, and the required information was collected from the respondents. Participation was voluntary, and confidentiality of the information provided by the nurses was maintained.

The completed questionnaires were collected, checked for completeness, and systematically compiled for analysis. The information obtained was used to assess the existing Knowledge, Attitude, and Practice of nurses regarding the prevention and management of HAIs.

The collected data were systematically organized, tabulated, and analysed using descriptive statistical methods. The findings were presented in the form of frequencies and percentages using tables.

The findings of the study were intended to be submitted to the hospital management for consideration and further action. The identified gaps in Knowledge, Attitude, and Practice regarding HAIs may assist management and the infection-control team in developing or strengthening appropriate interventions, including targeted training programmes, awareness activities, monitoring mechanisms, and reinforcement of standard infection-prevention practices.

4 Results

The result section consists of four parts; the first section contains demographic details like age, sex, educational status, work experience and profession. The second section contains knowledge; the third part contains questions containing attitude and the final one contains practice assessment.

Table 1 Base Line Demographic Characteristics of the Sample

Profile		Frequency	Percentage
Age	Below 20	2	1.5
	20-30	80	60.6
	30-40	43	32.6
	Above 40	7	5.3
Sex	Male	24	18.2
	Female	108	81.8
	M.Sc.	60	45.5

Qualification	B.Sc.	71	53.7
	DGNM	1	0.8
Total Experience	Below 3	12	9.1
	3-6	42	31.8
	6-9	26	19.7
	9-12	23	17.4
	Above 12	29	22
Experience in Global Hospital	Below 3	43	32.6
	3-6	66	50
	6-9	14	10.6
	9-12	6	4.5
	Above 12	3	2.3
Designation	Staff nurse	100	75.8
	Nursing Supervisor	25	18.9
	Senior Staff Nurse	6	4.5
	Head Nurse	1	0.8

Source: Primary data

The age distribution showed that the majority of the participants, 80 (60.6%), were in the 20–30 years age group, followed by 43 (32.6%) participants aged 30–40 years. Only 7 (5.3%) participants were above 40 years, while 2 (1.5%) were below 20 years. Thus, the sample predominantly comprised young adult healthcare professionals. With regard to sex, the majority of the participants were female, 108 (81.8%), whereas 24 (18.2%) were male. This indicates that female participants constituted a substantially larger proportion of the study sample.

In terms of educational qualification, 71 (53.7%) participants were B.Sc. qualified, followed by 60 (45.5%) with an M.Sc. qualification. Only 1 (0.8%) participant had a DGNM qualification. Hence, most participants possessed graduate- or postgraduate-level nursing qualifications.

Regarding total professional experience, the largest proportion, 42 (31.8%), had 3–6 years of experience, followed by 29 (22.0%) with more than 12 years of experience and 26 (19.7%) with 6–9 years of experience. A further 23 (17.4%) participants had 9–12 years of experience, while 12 (9.1%) had less than 3 years of experience. This demonstrates that the sample included participants with varying levels of professional experience. With respect to experience in Global Hospital, half of the participants, 66 (50.0%), had 3–6 years of experience in the hospital. This was followed by 43 (32.6%) participants with less than 3 years of experience. Only 14 (10.6%) had 6–9 years, 6 (4.5%) had 9–12 years, and 3 (2.3%) had more than 12 years of experience in the institution. Regarding designation, the majority of participants were Staff Nurses, 100 (75.8%), followed by Nursing Supervisors, 25 (18.9%). Six (4.5%) participants were Senior Staff Nurses, while only 1 (0.8%) was a Head Nurse. Overall, the sample was predominantly composed of young, female, B.Sc.-qualified staff nurses, with moderate professional and institutional experience.

Table – 2 Base Line Knowledge of the Sample

Variables			Frequency	Percentage
Hospital Acquired Infection	Acquired	Hospital Acquired	105	79.5
		Food Service	0	0
		Nose	3	2.3
		Not aware	24	18.2
HAI are Commonly Seen in Hospital		Urinary tract infection	79	59.8
		Surgical wound infection	10	7.6
		Respiratory tract infection	22	16.7
		Blood stream infection	18	13.6
		Gastrointestinal tract infection	3	2.3
The increase of hospitalization days may cause hospital acquired infections		Never	10	7.6
		Rare	81	61.3
		Sometimes	12	9.1
		Always	29	22
Mask During Transfer/Transport out of Room for Investigations		Patients Suffering from Influenza	0	0
		Coughing Patients with Suspected Pulmonary Tuberculosis	56	42.4
		Patients Receiving Radiation Therapy for Colon Cancer	10	7.6
		All Patients Regardless of their Illness	0	0
		All of the above	66	50
Aware of Biomedical Waste Management		Yes	121	91.7
		No	11	8.3
Infectious Waste from Patients be Disposed		Yellow garbage bag	85	64.4
		Black Garbage Bag	0	0
		Red garbage bag	47	35.6

Source: Primary data

The baseline knowledge of the 132 participants regarding hospital-acquired infections, infection prevention, and biomedical waste management was assessed. The findings indicate that 105 (79.5%) participants correctly identified the term “hospital-acquired” in relation to HAI, while 24 (18.2%) reported that they were not aware. Regarding commonly occurring HAIs, 79 (59.8%) identified urinary tract infection as the most common, followed by respiratory tract infection (22, 16.7%), bloodstream infection (18, 13.6%), surgical wound infection (10, 7.6%), and gastrointestinal tract infection (3, 2.3%).

With respect to the association between duration of hospitalization and HAIs, 81 (61.3%) participants considered that increased hospitalization days *rarely* cause HAIs, while 29 (22.0%) reported *always*, 12 (9.1%) *sometimes*, and 10 (7.6%) *never*. Regarding the use of masks during patient transfer for investigations, 66 (50.0%) participants selected all of the above, while 56 (42.4%) identified coughing patients with suspected pulmonary tuberculosis. A smaller proportion selected patients receiving radiation therapy for colon cancer (7.6%). The findings further showed a relatively high level of awareness regarding biomedical waste management, with 121 (91.7%) participants reporting that they were aware of biomedical waste management,

compared with 11 (8.3%) who were not aware. Regarding disposal of infectious waste, 85 (64.4%) participants identified the yellow garbage bag, whereas 47 (35.6%) selected the red garbage bag

Table 3 Base Line Attitude of the Sample

Variables		Frequency	Percentage
Effective Method to Prevent HAI	Hand Washing Properly	31	23.5
	Wearing Caps, Masks, and Shoe Covers	0	0
	Regular Vaccination of Healthcare Workers	9	6.8
	Isolation of Infected/Colonized Patients	0	0
	Educating Healthcare Workers, Patients and Families	0	0
	Visitor Management	0	0
	All of the above	92	69.7
Recognized Sources of HAIs	White Coat	0	0
	Nurse Uniform	0	0
	Stethoscope	5	3.8
	Thermometer	5	3.8
	Wrist Watch	8	6.1
	Blood Pressure Cuff	0	0
	Mattresses and pillows	16	12.1
	All of the above	98	74.2
Patients Assume to be Infectious	Blood	8	6.1
	Nasal discharge	5	3.8
	Saliva	5	3.8
	Vomit	0	0
	Faeces	0	0
	Urine	0	0
	Mucous membrane	12	9.1
	All of the above	102	77.2
	Visitor Management	0	0
	All of the above	92	69.7
Recognized Sources of HAIs	White Coat	0	0
	Nurse Uniform	0	0
	Stethoscope	5	3.8
	Thermometer	5	3.8
	Wrist Watch	8	6.1
	Blood Pressure Cuff	0	0
	Mattresses and pillows	16	12.1
	All of the above	98	74.2

Source: Primary data

The findings presented in Table 3 indicate that the participants generally demonstrated a favorable baseline attitude towards the prevention and control of hospital-acquired infections.

Regarding effective methods for preventing HAIs, the majority of participants, 92 (69.7%), identified all of the listed measures as effective. This was followed by 31 (23.5%) participants who identified proper hand washing as an effective method, while 9 (6.8%) identified regular vaccination of healthcare workers. No participants selected wearing caps, masks, and shoe covers, isolation of infected or colonized patients, educating healthcare workers, patients and families, or visitor management as individual responses.

Regarding the sources of HAIs, the majority of participants, 98 (74.2%), recognized all of the listed sources, including healthcare-related equipment and environmental items, as potential sources of infection. Among the individual responses, mattresses and pillows were identified by 16 (12.1%) participants, followed by wrist watches (8, 6.1%), stethoscopes (5, 3.8%), and thermometers (5, 3.8%). This finding suggests that most participants had an understanding that HAIs may originate from multiple sources within the healthcare environment rather than from a single source.

With regard to patients and potentially infectious materials, the majority of participants, 102 (77.2%), recognized all of the listed materials as potentially infectious. Twelve participants (9.1%) identified mucous membranes, while 8 (6.1%) identified blood, and 5 (3.8%) each identified nasal discharge and saliva. No participants selected vomit, faeces, or urine individually.

Table 4 Infection Prevention Practices of the Sample

Variables		Frequency	Percentage
Patients Potentially Contagious	Yes	108	81.8
	No	24	18.2
Hand Washing Techniques	Seven Steps Hand Washing	110	83.3
	Six Steps Hand Washing	8	6.1
	Five Steps Hand Washing	0	0
	Four Steps Hand Washing	14	10.6
Think Seven Steps of Hand-Washing Techniques is Effective	Yes	132	100
	No	0	0
Clean your White Coat or Nursing Uniform Regularly after Hospital Duty	Yes	132	100
	No	0	0
Wash your White Coat or Nurse Uniform	Daily	55	41.7
	Three Times a Week	25	18.9
	Twice a Week	0	0
	Weekly Once	52	39.4
Splashed by Patient's Blood, Vomit or Other Bodily Fluids	Yes	37	28
	No	92	69.7
	Not aware	3	2.3
Think your Hospital has Good Infection Control Management and Practices	Yes	132	100
	No	0	0
	Hand wash	35	26.5
	Prevention	1	0.8

After Exposure to Patient Blood, Vomit or other Bodily Fluids	Wash with running water	2	1.5
	Not aware	94	71.2
Preferred Hand-Washing Method	Alcohol Hand Rub	81	61.4
	Water and Soap	51	38.6
	Iodine Solution	0	0
Hand Washing while ON DUTY	Running Water	32	24.2
	Running Water and Bar soap	5	3.8
	Running Water and Hand-Washing Liquid	55	41.7
	Running Water and Skin Disinfectant	13	9.8
Medical Utility Gloves	Alcohol Hand Rub	27	20.5
	Using the Computer Desk or Patient-Care Equipment in the Ward	23	17.4
	Prescribing Drugs	10	7.6
	Performing Physical Examination on Patients	96	72.7
	Making Clinical Rounds	3	2.3
	Never	0	0
Stethoscope with Antiseptic Cleaning	After Examining each Patient	35	26.5
	Daily	43	32.6
	Weekly Once	17	12.9
	Monthly Once	37	28
	Never	0	0
Habit of Touching the Eyes, Nose and mouth while Handling Patients	Yes	17	12.9
	No	115	87.1
Nurses Wash their Hands after handling every Patient	To prevent cross contamination	38	28.8
	To clean visible dirt	20	15.2
	To prevent infection to self	5	3.8
	To prevent HAI	9	6.8
	All of the above	57	43.2
	None of the above	3	2.3
Mask yourself before Approaching a Patient	Yes	94	71.2
	No	11	8.3
	Not aware	27	20.5
Use Reusable Instruments often in Hospital Duty	Yes	114	86.4
	No	18	13.6
Use Pre-Sterilized Instruments in Hospital Duty	Yes	116	87.9
	No	16	12.1

Source: Primary data

Table 4 presents the infection prevention practices reported by the 132 nursing personnel. A large majority (81.8%) considered patients to be potentially contagious, while 18.2% did not.

Regarding hand-washing technique, 83.3% reported following the seven-step hand-washing procedure, whereas 6.1% and 10.6% reported using six-step and four-step techniques, respectively. All respondents (100%) considered the seven-step hand-washing technique effective and reported regularly cleaning their white coat or nursing uniform after hospital duty. With respect to uniform-washing practices, 41.7% washed their uniform daily, 18.9% three times a week, and 39.4% once a week. About 28.0% reported having been splashed with patients' blood, vomit, or other bodily fluids, while 69.7% reported no such exposure and 2.3% were not aware. All respondents (100%) perceived their hospital as having good infection-control management and practices.

However, an important gap was observed in the response to exposure to blood, vomit, or other bodily fluids. Only 26.5% reported hand washing after exposure, while 71.2% were not aware of the appropriate response. Regarding the preferred hand-washing method, 61.4% preferred alcohol-based hand rub and 38.6% preferred soap and water. During duty, 41.7% used running water with hand-washing liquid, 24.2% used running water alone, 20.5% used alcohol hand rub, 9.8% used running water with skin disinfectant, and 3.8% used running water with bar soap. Hand washing was most commonly reported after performing physical examinations (72.7%), followed by handling computers or patient-care equipment (17.4%), prescribing drugs (7.6%), and clinical rounds (2.3%). No respondent reported never washing hands during these activities.

Stethoscope disinfection practices varied: 26.5% cleaned the stethoscope after examining each patient, 32.6% cleaned it daily, 12.9% weekly, and 28.0% monthly. Most respondents (87.1%) reported that they did not habitually touch their eyes, nose, or mouth while handling patients. Regarding the purpose of hand washing after handling patients, 43.2% identified all the listed reasons, including prevention of cross-contamination, removal of visible dirt, protection of self, and prevention of HAIs. Further, 71.2% reported wearing a mask before approaching a patient, while 8.3% did not and 20.5% were not aware. Most respondents reported using reusable instruments (86.4%) and pre-sterilized instruments (87.9%) during hospital duty.

5 Conclusion

The study concludes that the nursing personnel demonstrated a generally favorable level of knowledge, attitude, and infection-prevention practices regarding hospital-acquired infections. Most participants possessed basic knowledge of HAIs and showed positive attitudes toward preventive measures, with strong recognition of the importance of hand hygiene, biomedical waste management, and standard infection-control practices. The practice assessment also indicated good compliance with several preventive measures, including seven-step hand washing, uniform hygiene, mask use, and the use of pre-sterilized instruments. However, gaps were identified in specific areas, particularly awareness of appropriate actions following exposure to bodily fluids, consistency in stethoscope disinfection, and certain infection-control precautions. Therefore, regular training, practical demonstrations, periodic assessment, and continuous monitoring of infection-control practices are recommended to strengthen compliance and further reduce the risk of hospital-acquired infections

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