



Knowledge, Attitudes and Practices of Nurses toward the Management of Hospital-Acquired Infections in Private Hospitals: An Empirical Study

J.Srinidhi ¹& Dr. M. Sivakumar²

¹Research Scholar, School of Business Studies, Madurai Kamaraj University, Madurai -625021.India

²Professor & Head, Department of Entrepreneurship Studies, School of Business Studies, Madurai Kamaraj University, Madurai - 625021.India

Abstract: Hospital-acquired infections (HAIs) remain a major challenge to patient safety and healthcare quality. This study examines the knowledge, attitudes, and practices (KAP) of nurses toward HAI prevention and management in selected private hospitals in Chennai. A descriptive cross-sectional design was adopted, and data were collected from 160 nurses using a structured questionnaire. The data were analysed using frequencies and percentages. The findings indicate that nurses demonstrated good knowledge, positive attitudes, and favourable practices regarding infection prevention, particularly hand hygiene, patient isolation, pathogen transmission, and adherence to infection-control guidelines. The study highlights the importance of continuous training, supervision, and institutional support to strengthen infection prevention and control practices among nurses.

Keywords: Hospital-acquired infections, Nurses, Knowledge, Attitudes, Practices, Infection prevention and control.

Introduction

Hospital-acquired infections (HAIs), also referred to as healthcare-associated infections, remain a significant challenge to healthcare systems because they can increase patient morbidity, mortality, length of hospital stay, and healthcare costs. HAIs are infections that occur during the process of receiving healthcare and may arise from inadequate infection prevention and control practices, inappropriate antimicrobial use, contaminated equipment, and transmission of infectious agents within healthcare settings. The prevention and management of HAIs therefore require systematic infection-control practices, adequate resources, continuous monitoring, and active participation from healthcare professionals (World Health Organization [WHO], 2022).

Nurses constitute a critical component of hospital infection prevention and control because of their continuous and direct interaction with patients. Their routine responsibilities include hand hygiene, use of personal protective equipment, safe handling of clinical waste, aseptic procedures, disinfection practices, and implementation of isolation precautions. Consequently, nurses' knowledge and attitudes toward infection prevention can influence their adherence to recommended practices and contribute to reducing the transmission of infections within hospitals (Allegranzi et al., 2011). Knowledge provides the foundation for understanding infection risks and preventive measures, while attitudes can influence nurses' willingness and commitment to consistently follow infection-control procedures.

The knowledge–attitude–practice (KAP) framework provides a useful approach for examining healthcare professionals' understanding of HAIs and the extent to which such knowledge and attitudes are reflected in their routine practices. Previous research has demonstrated that gaps may exist between healthcare workers' knowledge of infection-control measures and their actual practices. Factors such as workload, availability of protective equipment, institutional policies, training, supervision, and organizational support can influence compliance with infection-prevention practices (Erasmus et al., 2010; Kingston et al., 2017). Therefore, assessing nurses' KAP provides valuable evidence for identifying areas requiring additional training, monitoring, and managerial intervention.



Private hospitals are particularly important settings for examining infection-control practices because of the diverse range of clinical services and the high volume of patient–healthcare worker interactions. Effective management of HAIs in these settings requires not only appropriate infection-control policies but also their consistent implementation at the nursing level. Regular assessment of nurses’ knowledge, attitudes, and practices can help hospital administrators identify gaps and strengthen infection prevention and control programmes.

Against this background, the present study examines the knowledge, attitudes and practices of nurses toward the management of hospital-acquired infections in private hospitals. The study seeks to assess nurses’ understanding of HAI-related issues, examine their attitudes toward infection prevention and management, and evaluate their reported practices. The findings are expected to provide empirical evidence that can support hospital administrators and infection-control teams in strengthening training programmes, improving compliance, and promoting effective HAI prevention and management practices.

Review of Literature

Hospital-acquired infections (HAIs), commonly referred to as healthcare-associated infections, continue to represent an important patient-safety and healthcare-quality concern. The World Health Organization (WHO) identifies infection prevention and control (IPC) as a fundamental component of safe healthcare delivery. Its global report indicates that HAIs remain among the most frequent adverse events associated with healthcare and that the burden is particularly significant in low- and middle-income countries. The report also emphasizes that a substantial proportion of HAIs can be prevented through effective IPC programmes, appropriate hand hygiene, adequate water, sanitation and hygiene facilities, and consistent implementation of evidence-based practices (World Health Organization [WHO], 2024).

Nurses play a central role in HAI prevention because of their continuous interaction with patients and their involvement in procedures such as medication administration, wound care, catheter care, intravenous therapy, patient hygiene, and handling of clinical materials. Consequently, nurses’ knowledge of infection-control procedures and their adherence to recommended practices are important components of effective IPC. The WHO’s standard precautions guidance identifies hand hygiene, appropriate use of personal protective equipment, respiratory hygiene, safe injection practices, environmental cleaning, and waste management among the fundamental measures required to reduce transmission of microorganisms in healthcare settings (WHO, 2022).

A cross-sectional survey conducted among 1,000 nurses across 13 hospitals in India examined knowledge and awareness of infection-control practices, including general infection control, standard precautions, transmission-based precautions, bundle care, and COVID-19-related infection-control knowledge. The study demonstrated the importance of assessing nurses’ infection-control knowledge across multiple domains rather than focusing only on individual practices (Kanwal et al., 2022). The findings provide an important Indian context for examining nurses’ preparedness to implement infection-control measures in routine hospital settings.

In South India, a study involving 571 healthcare professionals working in private tertiary hospitals examined awareness, attitudes, and practices related to IPC. The study highlighted the relevance of evaluating all three components of the KAP framework among healthcare professionals because infection-control behaviour is influenced not only by awareness but also by attitudes and routine practices (Mathew et al., 2022). This is particularly relevant to private hospitals, where organizational policies, staff training, availability of resources, and institutional monitoring may influence the implementation of infection-control procedures.

Sebro et al. (2023) investigated knowledge and practices concerning HAI prevention among 423 nurses working in university referral hospitals in Ethiopia. The study identified knowledge and adherence to infection-prevention practices as important areas requiring attention among nurses. The authors emphasized that inadequate knowledge and poor adherence to standard infection-prevention practices can contribute to the persistence of HAIs. The study



demonstrates the usefulness of nurse-focused KAP assessments for identifying gaps in infection prevention and for designing targeted interventions.

Research has also examined the relationship between educational interventions and nurses' infection-control practices. A study involving 105 nurses evaluated their baseline knowledge, attitudes, and practices before and after an infection-control educational programme. The intervention was associated with improvements in infection-control competencies and was also examined in relation to catheter-associated urinary tract infections and intravenous-line-related infections (Kumar et al., 2021). This suggests that assessment of nurses' KAP can serve not only as a diagnostic exercise but also as a basis for developing continuing education and infection-control training programmes.

Evidence from more recent studies continues to demonstrate variation in nurses' knowledge and practices. A 2024 study among nurses in an emergency department in Saudi Arabia assessed knowledge and practices related to HAI prevention and reported variation in knowledge levels among participants (Alshammari et al., 2024). Similarly, a 2024 study focusing specifically on catheter-associated urinary tract infection prevention examined knowledge, attitudes, and practices among nurses and highlighted the importance of nurses' KAP in preventing device-associated infections (Dessie et al., 2024). These studies indicate that KAP assessment can be applied both to general HAI prevention and to specific categories of healthcare-associated infections.

The importance of continuous training is further supported by recent Indian evidence. A study of nurses in tertiary hospitals in Gautam Budh Nagar, Uttar Pradesh, evaluated a structured instructional module designed to improve KAP concerning HAI prevention. The study reported significant improvement in knowledge, attitudes, and practices following the intervention and recommended regular, context-specific training to strengthen infection-control competencies among nurses (2025). Another recent nationwide Indian study involving 547 nurses reported differences across KAP domains and identified gaps involving areas such as hand hygiene, waste management, environmental cleaning, personal protective equipment, and antimicrobial stewardship. The findings further emphasized the influence of training, workload, resources, and institutional support on infection-control practices.

Studies have also highlighted the importance of nurses' attitudes in translating knowledge into practice. A study among 285 nurses in Palestinian hospitals found high reported levels of knowledge, attitudes, and infection-control practices and identified infection-control training and knowledge as factors associated with reported practice (2024). These findings reinforce the value of examining knowledge, attitudes, and practices together rather than treating knowledge as a direct substitute for actual infection-control behaviour.

Overall, the literature indicates that nurses are central to the implementation of HAI prevention and management strategies and that KAP assessment can help identify areas requiring improvement. However, variations in findings across countries, hospital types, clinical settings, and specific infection-control domains suggest that local empirical assessment remains necessary. The WHO's 2024 global IPC report further emphasizes that HAIs continue to pose a persistent challenge and that sustained implementation of IPC measures is required across healthcare facilities (WHO, 2024). Therefore, the present study focuses specifically on nurses working in private hospitals and examines their knowledge, attitudes, and practices toward the management of hospital-acquired infections. The study seeks to provide context-specific evidence that may assist hospital administrators and infection-control committees in identifying training needs and strengthening HAI prevention and management practices.

Research Methodology

The study adopted a descriptive cross-sectional research design to assess the knowledge, attitudes, and practices (KAP) of nurses toward the management of hospital-acquired infections (HAIs) in selected private hospitals in Chennai. The target population of the study consisted of nurses working in selected private hospitals in Chennai, as nurses play a vital role in infection prevention and control through their involvement in patient care, hand



hygiene practices, and implementation of hospital infection control protocols. Data were collected using a structured self-administered questionnaire designed to evaluate the knowledge, attitudes, and practices of nurses regarding the prevention and management of HAIs. The questionnaire was adapted from the instrument developed by Kamunge (2013) and modified according to the objectives and requirements of the present study. A total of 180 questionnaires were distributed among nurses, out of which 160 completed questionnaires were returned and considered for analysis, representing a response rate of 88.9%. The questionnaire consisted of items related to nurses' knowledge of infection transmission, hand hygiene, infection prevention measures, isolation practices, and HAI management; attitudes toward infection control responsibilities, compliance with protocols, training, and institutional support; and practices related to routine infection prevention procedures. All items were measured using a five-point Likert scale ranging from "Completely disagree" to "Completely agree" to capture the level of agreement among respondents. The collected data were coded, organized, and analysed using descriptive statistical methods, including frequencies and percentages, to determine the overall knowledge, attitudes, and practices of nurses toward HAI prevention and management. Ethical principles were maintained throughout the study, with voluntary participation, confidentiality, and anonymity of respondents ensured. The collected information was used exclusively for academic and research purposes.

Analysis and Discussion

Percentage analysis was employed to summarise and present the responses of nurses regarding their knowledge, attitudes, and practices towards the prevention and management of hospital-acquired infections.

Table 1 presents the responses of nurses regarding their knowledge of hospital-acquired infections (HAIs). The findings indicate that the majority of nurses demonstrated a high level of knowledge regarding infection prevention and control measures, as reflected by the higher proportion of respondents selecting "Agree" and "Completely agree" across all statements. Regarding hand hygiene, 100 nurses (62.5%) completely agreed and 46 nurses (28.8%) agreed that hand hygiene is an essential component in preventing HAIs, while only a small proportion of respondents expressed disagreement. Similarly, knowledge related to supervision during hand hygiene (HH) performance was positive, with 94 respondents (58.7%) completely agreeing and 48 respondents (30.0%) agreeing with its importance.

The majority of nurses also recognized the role of healthcare workers in infection transmission, with 105 respondents (65.6%) completely agreeing that pathogens can spread through healthcare workers (HCWs). In relation to the use of bags with dangerous content, 104 nurses (65.0%) completely agreed, indicating awareness regarding safe handling and disposal practices. Furthermore, 98 respondents (61.2%) completely agreed and 50 respondents (31.3%) agreed about the importance of security measures for HCWs.

The findings further revealed that nurses had good awareness regarding the transmission of HAIs through medical equipment, where 106 respondents (66.2%) completely agreed and 44 respondents (27.5%) agreed with the statement. Similarly, awareness regarding the isolation of patients with infectious diseases was high, with 105 respondents (65.6%) completely agreeing and 47 respondents (29.4%) agreeing. The importance of performing hand hygiene after removal of sterile and non-sterile gloves was also well recognized, as 108 nurses (67.5%) completely agreed and 42 nurses (26.3%) agreed with this practice. Additionally, 106 respondents (66.2%) completely agreed and 45 respondents (28.1%) agreed that following recommended hand hygiene guidelines is essential for preventing HAIs.

Table 1 Nurses' knowledge towards HAIs

Statement	Completely disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Completely agree n (%)
Hand Hygiene	2 (1.3%)	4 (2.5%)	8 (5.0%)	46 (28.8%)	100 (62.5%)
The supervision during HH performance	3 (1.9%)	5 (3.1%)	10 (6.3%)	48 (30.0%)	94 (58.7%)
The spread of pathogens through HCWs	1 (0.6%)	3 (1.9%)	6 (3.8%)	45 (28.1%)	105 (65.6%)
Use of bags with dangerous content	2 (1.3%)	4 (2.5%)	7 (4.4%)	43 (26.9%)	104 (65.0%)
Security measures for HCWs	1 (0.6%)	3 (1.9%)	8 (5.0%)	50 (31.3%)	98 (61.2%)
The spread of HAIs through medical equipment	2 (1.3%)	3 (1.9%)	5 (3.1%)	44 (27.5%)	106 (66.2%)
The isolation of patients with infectious diseases	1 (0.6%)	2 (1.3%)	5 (3.1%)	47 (29.4%)	105 (65.6%)
HH after removal of sterile and non-sterile gloves	1 (0.6%)	3 (1.9%)	6 (3.8%)	42 (26.3%)	108 (67.5%)
Guidelines with HH recommendations	2 (1.3%)	2 (1.3%)	5 (3.1%)	45 (28.1%)	106 (66.2%)

Table 2 presents nurses' attitudes towards hospital-acquired infections (HAIs). The findings indicate that nurses demonstrated a positive attitude towards HAI prevention and control. A majority of respondents agreed that HAIs increase hospitalization days, mortality, and healthcare costs, with 102 nurses (63.7%) completely agreeing and 46 (28.8%) agreeing. Similarly, 109 respondents (68.1%) completely agreed that nurses can contribute to the spread of infections. Most nurses also recognized the importance of setting a good example in hand hygiene practices, with 113 (70.6%) completely agreeing. Positive attitudes were also observed regarding the training of new employees and addressing inappropriate practices among colleagues. Overall, the results suggest that nurses had a strong awareness of their responsibility in preventing HAIs, although comparatively lower agreement was observed regarding punishment and remuneration as strategies for improving protocol adherence.

Table 2 Nurses' attitudes towards HAIs

Statement	Completely disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Completely agree n (%)
Increase of the hospitalization days, mortality and costs	2 (1.3%)	3 (1.9%)	7 (4.4%)	46 (28.8%)	102 (63.7%)



The nurse can spread infections	1 (0.6%)	2 (1.3%)	5 (3.1%)	43 (26.9%)	109 (68.1%)
Negative reaction when a colleague doesn't act as recommended	3 (1.9%)	5 (3.1%)	12 (7.5%)	50 (31.3%)	90 (56.2%)
The training of new employees	1 (0.6%)	3 (1.9%)	6 (3.8%)	48 (30.0%)	102 (63.7%)
The nurse as an example for Hand Hygiene	1 (0.6%)	2 (1.3%)	4 (2.5%)	40 (25.0%)	113 (70.6%)
Unrealistic expectations that nurses clean their hands after any contact	4 (2.5%)	8 (5.0%)	15 (9.4%)	55 (34.4%)	78 (48.7%)
The punishment for non-adherence to protocols	3 (1.9%)	7 (4.4%)	14 (8.8%)	52 (32.5%)	84 (52.4%)
Remuneration for adherence to protocols	5 (3.1%)	8 (5.0%)	18 (11.3%)	50 (31.3%)	79 (49.3%)

Table 3 illustrates the attitudes of nurses towards hospital-acquired infections (HAIs) and related infection prevention measures. The findings reveal that nurses had a favourable attitude towards HAI prevention, with the majority of respondents selecting "Agree" and "Completely agree" for most statements. A high proportion of nurses recognized the impact of HAIs on healthcare outcomes, with 102 respondents (63.7%) completely agreeing and 46 (28.8%) agreeing that HAIs increase hospitalization duration, mortality, and healthcare costs. Similarly, 109 nurses (68.1%) completely agreed that nurses can contribute to the spread of infections, indicating awareness of their role in infection transmission. The majority of respondents also supported professional responsibility in infection control, as reflected by 113 nurses (70.6%) completely agreeing that nurses should act as role models for hand hygiene practices. Furthermore, 102 respondents (63.7%) completely agreed on the importance of training new employees, while 90 (56.2%) completely agreed with responding negatively when colleagues fail to follow recommended practices. Although nurses showed support for strategies such as punishment and remuneration to improve protocol adherence, the level of complete agreement was comparatively lower (52.4% and 49.3%, respectively). Overall, the findings demonstrate that nurses possessed a positive attitude towards HAI prevention, emphasizing accountability, adherence to infection control guidelines, and the importance of maintaining effective hand hygiene practices.

Table 3 Nurses' practices toward the prevention of spreading of HAIs

Statement	Completely disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Completely agree n (%)
The use of antiseptics before and after each patient contact	1 (0.6%)	2 (1.3%)	5 (3.1%)	45 (28.1%)	107 (66.9%)
The use of antiseptics before the equipment preparation for vascular use	2 (1.3%)	3 (1.9%)	6 (3.8%)	46 (28.8%)	103 (64.2%)



The use of antiseptics during the contact from a patient to another patient	1 (0.6%)	3 (1.9%)	5 (3.1%)	43 (26.9%)	108 (67.5%)
Hand Hygiene before and after any procedure	1 (0.6%)	2 (1.3%)	4 (2.5%)	42 (26.3%)	111 (69.3%)
Hand Hygiene after the use of any contaminated equipment	1 (0.6%)	2 (1.3%)	5 (3.1%)	44 (27.5%)	108 (67.5%)
Hand Hygiene after the contact with body fluids of the patient	1 (0.6%)	1 (0.6%)	3 (1.9%)	40 (25.0%)	115 (71.9%)
Hand Hygiene after direct contact with the healthy skin of the patient	2 (1.3%)	2 (1.3%)	5 (3.1%)	47 (29.4%)	104 (65.0%)
Hand Hygiene after placing the urinary catheter	1 (0.6%)	2 (1.3%)	4 (2.5%)	45 (28.1%)	108 (67.5%)

Conclusion

The study concludes that nurses in the selected private hospitals demonstrated generally favourable knowledge, attitudes, and reported practices toward the prevention and management of hospital-acquired infections. The findings show strong awareness of the importance of hand hygiene, the transmission of pathogens through healthcare workers and medical equipment, patient isolation, and compliance with recommended infection-control guidelines. Nurses also expressed positive attitudes towards their responsibility in preventing infections, acting as role models for hand hygiene, training new employees, and addressing inappropriate infection-control practices among colleagues. The reported practices further indicate considerable adherence to hand hygiene and antiseptic procedures during routine patient care.

Despite these positive findings, the study highlights the need for continuous institutional efforts to maintain and strengthen infection-control practices. Regular training and refresher programmes, effective supervision, monitoring of compliance, and adequate institutional support can help sustain nurses' infection-prevention competencies. Hospital administrators and infection-control committees should therefore focus on continuous education and systematic monitoring to reinforce adherence to standard infection-prevention protocols. Overall, strengthening nurses' knowledge, attitudes, and practices can contribute to more consistent implementation of infection prevention and control measures and support safer healthcare delivery.

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