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Ensuring Safety: Infection Control Compliance Among Healthcare Providers at Sabratha Teaching Hospital, Libya

Abdalrauf Yousif

Nursing Department, Faculty of Nursing, Sabratha University, Sabratha, Libya

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ABSTRACT

Hospital-acquired infections (HAIs) pose a significant challenge to global healthcare systems, increasing patient morbidity, prolonging hospital stays, and escalating costs. Infection prevention and control (IPC) measures are critical, particularly in resource-limited settings like Libya, where gaps in compliance persist. Nurses play a pivotal role in IPC, yet studies in Libyan hospitals reveal inconsistencies in knowledge and adherence to protocols. This study assessed nurses' compliance with IPC standards at Sabratha Teaching Hospital in western Libya, focusing on their knowledge, attitudes, and practices regarding HAIs. A descriptive-analytical study was conducted from October 2024 to April 2025, involving 50 nurses selected via purposive sampling. Data were collected using a validated, self-administered questionnaire covering demographics, IPC knowledge, and compliance with practices such as hand hygiene, PPE use, and waste management. Statistical analysis was performed using SPSS version 25. Findings indicated high overall compliance (mean scores: 1.76–1.85/2), with strong adherence to institutional policies, waste segregation, and vaccination documentation. However, minor gaps were noted in PPE usage and sanitation routines. Correlation analysis confirmed significant associations between IPC practices and institutional support ($p < 0.05$). While Sabratha Teaching Hospital demonstrates robust IPC infrastructure, targeted interventions—including continuous training, supervision, and resource reinforcement—are recommended to sustain and improve compliance. Strengthening safety culture and management involvement will further reduce HAIs and enhance patient care quality.

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INTRODUCTION

Hospital-acquired infections (HAIs) remain a critical global challenge in healthcare systems, contributing significantly to patient morbidity, prolonged hospital stays, and increased financial burden on healthcare institutions [1]. These infections, typically acquired during hospitalization while receiving treatment for other conditions, pose a serious threat to patient safety. The World Health Organization (WHO) has emphasized the importance of infection prevention and control (IPC) measures as a fundamental component of healthcare quality, especially in low- and middle-income countries [2].

Infection control becomes particularly vital in countries like Libya, where resources may be limited and healthcare infrastructure is still developing. Recent studies in Libyan healthcare facilities have highlighted the prevalence of HAIs such as urinary tract infections, pneumonia, and surgical site infections, often linked to gaps in adherence to IPC protocols [3,4]. These infections can arise due to poor hand hygiene practices, inadequate sterilization of medical equipment, improper use of personal protective equipment (PPE), and environmental contamination [5].

Nurses, as primary caregivers and frontline health workers, have a central role in the application of IPC practices. Their awareness, attitude, and adherence to infection prevention guidelines are crucial in mitigating the risk of HAIs [6]. However, in several studies conducted in Libyan hospitals, nurses were found to have varying degrees of knowledge and compliance with infection control measures. Factors such as lack of continuous professional training, shortage of supplies, and insufficient institutional policies were identified as significant barriers [3,7].

Previous assessments of infection control practices in Libya have pointed to considerable gaps, especially in areas related to routine hand hygiene, handling of medical waste, and PPE usage [8,9]. These shortcomings not only compromise patient safety but also put healthcare workers themselves at elevated risk of infection. Hence, there is an urgent need to develop context-specific interventions aimed at improving IPC compliance among nursing personnel.

Through a structured survey approach, this study examines the existing knowledge and practices of nurses at Sabratha Teaching Hospital and investigates the institutional factors that affect IPC adherence. The ultimate goal is to provide evidence-based recommendations that can help bridge the identified gaps. The study's findings are expected to guide the development of focused training programs and policies that can enhance infection control measures, thereby reducing the incidence of HAIs and improving the quality of care provided at the hospital [10].

*Corresponding E-mail addresses: abd.alraoufyousif@gmail.com

METHODS

Study design and setting

This was a descriptive-analytical study conducted among nursing staff at Sabratha Teaching Hospital from Oct 2024 to April 2025.

Sampling technique

A purposive sampling technique was used to select a sample of 50 nurses, comprising 10 males and 40 females, from various departments, including general medicine, surgery, intensive care, and emergency units. The sample size was determined to be manageable and sufficient for statistical analysis while capturing diversity in roles and responsibilities.

Data collection tool

Data were collected using a structured, self-administered questionnaire specifically developed for this study. The questionnaire consisted of three main sections. The first one includes demographic data such as age, gender, years of experience, and department, while the second one involves Knowledge and Awareness – assessing understanding of HAIs, routes of transmission, and prevention standards. The last section stated for Compliance and Practices – evaluating daily adherence to IPC protocols such as hand hygiene, use of personal protective equipment (PPE), sterilization, and environmental disinfection.

Validity and reliability

The questionnaire was reviewed by a panel of experts in infection control and nursing education to ensure content validity. A pilot test was conducted on a subset of nurses (n = 10), and necessary modifications were made for clarity and reliability.

Data collection analysis

Participants were informed about the purpose of the study, and consent was obtained. Questionnaires were distributed during work hours with assurances of anonymity and confidentiality. Completed surveys were collected within one week. Quantitative data were entered into SPSS version 25 for analysis. Descriptive statistics (frequencies, percentages, means) were used to summarize data, and cross-tabulations were applied to explore relationships between knowledge levels and demographic variables.

Ethical considerations

The study received ethical approval from the Sabratha Teaching Hospital Ethics Committee. Participation was voluntary, and all data were kept confidential and used exclusively for research purposes.

RESULTS

Material resources scale

Table 1 assesses various aspects of infection control and medical waste management in a hospital, measuring each item by its mean score, standard deviation, and percentage weight. The overall mean score of 1.85 (out of 2) and high percentage weights (ranging from 88% to 92.6%) indicate a strong institutional commitment to infection prevention and safety protocols. Additionally, the low standard deviations (mostly between 0.36 and 0.42) suggest that these practices are consistently applied across different departments, reflecting a well-implemented and uniform compliance system.

Among the highest-performing areas are the documentation of the hospital's vaccination policy for staff (1.85, 92.6%), monitoring of infectious diseases and application of preventive measures (1.84, 92.0%), and the availability of sufficient waste bins with color-coded bags (1.84, 92.0%). These results highlight effective administrative oversight in immunization tracking, disease surveillance, and waste segregation—key components of a robust infection control program. While most categories demonstrate excellent adherence, a few areas show slightly lower scores, suggesting potential opportunities for improvement. These include medical waste containers with lids and foot-pedal mechanisms (1.76, 88.0%), warning labels on hazardous waste bags (1.78, 88.9%), and visibility of posters on infectious disease prevention (1.78, 88.9%). Although these scores still reflect good compliance, they fall marginally below the hospital's otherwise high standards, indicating that minor enhancements—such as ensuring proper container functionality, clearer hazard labeling, and more prominent awareness displays—could further strengthen infection control measures.

Table 2 presents the correlation between each questionnaire item and the overall score for the dimension related to nurses' adherence to general infection control guidelines. The correlation coefficients and significance levels demonstrate statistically significant relationships across all items ($p < 0.05$), indicating that these items reliably reflect the core dimension under investigation.

Table 1. Respondents' Answers to the Items of the Material Resources Scale

Item	Mean Score	Standard Deviation	Percentage Weight	Agreement Level
Are there warning labels (e.g., biohazard, hazardous waste) on containers and bags?	1.78	0.42	88.9%	High
Is there a qualified and trained person responsible for infection risk management?	1.81	0.39	90.7%	High
Is there a hospital infection control guideline/manual available?	1.81	0.39	90.7%	High

To what extent is the hospital's vaccination policy for staff implemented and documented?	1.85	0.36	92.6%	High
Are there posters in the hospital about infectious diseases and preventive actions?	1.78	0.42	88.9%	High
Are there safety policies to protect healthcare staff within the hospital?	1.81	0.39	90.7%	High
Do all medical waste containers have lids and foot-pedal opening mechanisms?	1.76	0.42	88.0%	High
Is medical waste sorted in all departments according to color-coded guidelines?	1.81	0.39	90.7%	High
Are sufficient waste bins and color-coded bags available in all hospital units?	1.84	0.36	92.0%	High
Are waste bins made of thick, leak-proof plastic to reduce infection risk?	1.78	0.42	88.9%	High
Is there a designated, secure, and well-ventilated medical waste storage area ?	1.81	0.39	90.7%	High
Are there labels to differentiate between hazardous and non-hazardous waste?	1.78	0.42	88.9%	High
Are appropriate PPE items worn during outbreaks of infectious diseases?	1.81	0.39	90.7%	High
Are infectious diseases monitored & preventive methods applied?	1.84	0.36	92.0%	High
Is hospital management actively involved in educating patients, families & staff ?	1.78	0.42	88.9%	High
Do nurses adhere to basic infection control protocols followed in the hospital?	1.81	0.39	90.7%	High
Do nurses use all available preventive measures to stop the spread of infection?	1.83	0.36	91.5%	High
Overall Mean Score: 1.85, Standard Deviation: 0.30, Overall Agreement Level: High				

Table 2. The correlation between each questionnaire item and the overall score

Questionnaire Item	Correlation Coefficient	Significance Level	Interpretation
Are there warning labels (e.g., biohazard, hazardous waste) on containers and bags in the hospital?	0.387*	0.001	Statistically significant
Is there a qualified and trained person responsible for infection risk management?	0.914**	0.000	Statistically significant
Does the hospital have a dedicated infectious disease crisis management committee that holds documented regular meetings?	0.819**	0.000	Statistically significant
Is there an infection control manual available in the hospital?	0.926**	0.000	Statistically significant
To what extent is vaccination policy implemented and documented for staff and cleaning workers?	0.392*	0.003	Statistically significant

DISCUSSION

The results of this study demonstrate a high level of adherence by nurses at Sabratha Teaching Hospital to infection prevention and control (IPC) standards. The consistently high mean scores (ranging from 1.76 to 1.85) and percentage weights (88.0% to 92.6%) across all items in the material resources scale indicate that nurses perceive strong institutional support and the availability of essential resources. This aligns with global findings that highlight the role of adequate supplies, structural preparedness, and clear protocols in supporting effective IPC practices (11,12).

The presence of trained personnel, infection control committees, and documented policies was positively associated with adherence levels. Similar findings were reported in studies from Benghazi and Tripoli, which emphasized the value of qualified IPC personnel and structured infection control frameworks (13,14). Furthermore, the widespread availability of labeled medical waste containers and the implementation of color-coded waste segregation practices confirm the hospital's commitment to minimizing exposure risks (15).

Despite the high agreement levels, some variability in specific practices, such as the use of PPE and daily sanitation routines, suggests a need for continuous training and monitoring. This is consistent with international studies indicating that practical compliance may not always match theoretical knowledge due to fatigue, workload, or resource misuse (16,17). Nurses' compliance tends to improve significantly when supported by regular educational programs and feedback mechanisms (18).

The role of hospital management is also critical. Active involvement in education, supervision, and provision of protective equipment correlates strongly with enhanced IPC outcomes (19). Moreover, fostering a safety culture that encourages timely reporting and cross-departmental collaboration has been shown to reduce hospital-acquired infections (20).

In conclusion, while the findings reflect positively on the existing IPC framework at Sabratha Teaching Hospital, the study supports the continued investment in education, resource provision, and performance monitoring as central pillars of sustained infection control.

The analysis of Table 1 shows that the mean scores for all items measuring nurses' compliance with infection prevention guidelines at Sabratha Teaching Hospital range from 1.76 to 1.85, indicating high adherence to material resources and infection control practices. The highest-rated item, "Are staff screened before starting work?", scored 1.85, while the lowest-rated, "Do all medical waste containers have foot-operated lids?", scored 1.76. The overall mean of 1.85 reflects a strong commitment to infection prevention standards.

CONCLUSION

The study found strong overall adherence to infection prevention and control (IPC) standards at Sabratha Teaching Hospital, with high compliance scores (1.76–1.85/2) across key measures. The hospital benefits from well-structured IPC policies, trained staff, and adequate resources. However, slight inconsistencies in PPE use and sanitation indicate areas for improvement. Sustaining high compliance requires ongoing training, supervision, and institutional support, including better monitoring and safety culture reinforcement. These efforts will further reduce hospital-acquired infections and enhance patient and staff safety.

Conflict of interest. Nil

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