

Assessment of Knowledge, Attitude and Practice Towards Infection Prevention and Control Among Health Staff at Seiyun General Hospital Authority

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Abstract

Healthcare workers (HCWs) are continuously exposed to pathogenic microorganisms, which can lead to serious infections. Infection prevention and control (IPC) relies heavily on HCWs' knowledge, attitudes, and practices (KAP). This study aimed to assess KAP towards IPC among health staff at Seiyun General Hospital Authority, Yemen, during 2023–2024. A cross-sectional study was conducted involving 106 participants. Data were collected through a self-administered questionnaire and analyzed using SPSS software. Among participants, 60.6% held a diploma, 62.5% were male, 37.5% were nurses, and 33.7% had 1–5 years of experience. Regarding knowledge, 91.3% reported understanding IPC, and 76.9% acknowledged the role of sterilization. In terms of attitude, 60% strongly agreed that handwashing reduces infections. As for practices, 90.4% washed their hands before patient care, and 76% educated patients about IPC. Significant associations were found between KAP levels and education, age, gender, job category, and experience. Occupational category and work experience influenced KAP levels, while education, age, and gender showed limited impact.

Keywords: Knowledge; attitudes; practices; healthcare workers.

INTRODUCTION

Infection prevention is a systematic effort or process of placing barrier between susceptible host and the microorganisms. Infection control also refers to all policies, procedures and activities which aim to prevent or minimize the risk of transmission of infectious disease at health care facility. Health care-associated infection occurs in a patient during the process of care in a hospital or other healthcare facility that was not present or incubating at admission (Yazie et al., 2019). A tenth of maternal deaths each year are caused by infections contracted during childbirth. Multiple vaginal examinations, extended labour, premature rip of membranes, unsanitary births by inexperienced birth attendants, and non-compliance with Standard Precautions of Infection Control (SPIC) are all factors that increase the risk of puerperal infections (Koshy and Patel, 2015). Healthcare professionals are constantly exposed to microorganisms, many of which can cause illnesses that are serious or even fatal. During their nursing careers, nurses in particular are frequently exposed to a variety of pathogens. Therefore, in order to prevent hospital-acquired infections, health care personnel should be well-versed in and adhere to

infection control procedures (Thankam and Goswami, 2021). Patients who get medical care in a hospital or other medical facility but were not there at the time of admission can develop health-care-associated infections (HCAIs). Medical staff occupational diseases are also included. HCAIs are the second leading cause of death globally and a significant contributor to morbidity and mortality (Neama & Nasir, 2025). Healthcare-associated infections (HCAIs) in healthcare settings are caused worldwide by inadequate infection prevention practices, which also raise socioeconomic burdens, lengthen hospital stays, increase antibiotic resistance, and increase rates of morbidity and mortality, especially in developing and underdeveloped nations (Kiddeer et al., 2025). Infection prevention plays a key role in preventing and reducing the rate of healthcare associated infection (HAIs). HAIs, are the most frequent adverse event in healthcare worldwide can occur as a part of an endemic or epidemic situation and affect the quality of care of hundreds of millions of patients every year in both developed and developing countries (Jemal et al., 2020). Strict adherence to infection control policies, early removal of invasive devices, and timely treatment of infections are examples of infection prevention techniques that are essential to improving patient

outcomes and lowering healthcare costs for patients (Ait Hssain et al. 2025). Healthcare workers acquire these infections during specimen collection, processing and discarding, handling and discarding of medical equipment as well as during patient to HCWs direct interaction at the time of examination. Hospital-acquired infection prevention is—placing a barrier between susceptible hosts and the microorganisms which is an essential component of delivering safe and high-quality service at the facility level (Ayed, 2015). Laboratory-acquired infection is of particular concern for pathogens such as hepatitis B and C viruses (HBV and HCV), human immunodeficiency viruses (HIV), Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome Coronavirus. Moreover, the major source of most hepatitis and HIV infections among healthcare professionals is needle stick injury, which can occur during all stages of needle use procedures (Haguminshuti et al., 2022). The burden of HAIs is on the rise globally despite advancements in medical care and technologies. According to the World Health Organization (WHO), the prevalence of HAIs ranges between 5.7% and 19.1% in hospital settings globally. Recent studies estimated the prevalence of HAIs in Europe and the USA at 6.5% and 3.2%, respectively. The burden of HAIs is strikingly higher in low-resourced countries compared with high-income countries. A WHO-led systematic review revealed that the prevalence of HAIs varies between 7.6% and 15.5% in high-income and low- and middle-income countries, respectively. HAIs contribute to increased length of hospital stay, high mortality, higher health-care costs, and economic burden on families, communities, and countries at large. Hence, prevention and control of HAIs appear as a critical public health concern (Gezie et al., 2019). Healthcare workers HCWs awareness and compliance in disease prevention and control are vital elements for effective prevention. These approaches provide valuable information for health authorities in measuring the impact of ongoing awareness and prevention programs. Additionally, HCWs may act as transmission vehicles/sources for patient-to-patient infections in the clinical setting. Therefore, to warrant effective control measures, HCWs must receive regular training, and acquire sufficient knowledge on viral agents and microbes during infectious outbreaks (Zhang et al., 2020). Infection prevention and control (IPC) is an essential component of healthcare delivery, especially in public hospitals where a high patient volume and scarce resources may raise the risk of healthcare-associated infections (HCAIs). Healthcare-associated infections (HCAIs) are related to increased morbidity, longer hospital stays, and higher healthcare costs. Effective IPC programs are necessary to lower these risks and ensure patient safety. (Ranoto et al., 2025). One of the most important aspects of patient and healthcare worker (HCW) safety in hospital settings is infection prevention and control, or IPC. HCWs' knowledge, attitude, and

practice (KAP) about IPC are important. The discrepancy between behaviours and knowledge, however, suggests that frequent IPC audits and training are necessary (El-Kazzaz et al. 2025). Every healthcare worker (HCW) who comes into contact with a patient's blood or bodily fluids that call for universal precautions should regularly apply the proper barrier precautions to shield their skin and mucous membranes. A known and complicated issue that might be influencing the current global trend is noncompliance with rules and procedures that promote the decrease of nosocomial infections, or HAIs. (Pierre et al., 2025). Nosocomial infections that affect the prognosis of patients in intensive care units are the biggest problem they face. Because of their critical role in infection control, nurses must possess the necessary knowledge and follow established procedures (Bawaqneh et al., 2025). Effective infection control (IC) practices are essential in healthcare institutions due to the rise of fatal pathogens like COVID-19 (SARS-CoV-2) and methicillin-resistant *Staphylococcus aureus* (Jolly et al., 2024). A prevalent problem in healthcare institutions, especially in low- and middle-income countries (LMICs), is healthcare-associated infections (HCAIs). Handling and treating these infections require assessing healthcare workers' knowledge, attitude, and practice (KAP) about HCAI prevention and determining the pertinent aspects (Shacho et al., 2024). Thus, the aim of this cross-sectional study was to assess of knowledge, attitude and practice towards IPC in Seiyun General Hospital Authority among Health Staff. Infection prevention and control (IPC) is essential to ensure patient safety, reduce healthcare-associated infections, and protect healthcare workers from occupational hazards. Effective IPC practices are particularly vital in resource-limited settings, where healthcare facilities often face challenges, such as overcrowding, inadequate resources, and limited training opportunities. Seiyun General Hospital Authority is a critical healthcare provider in its region, yet the extent of healthcare workers' knowledge, attitudes, and practices (KAP) towards IPC remains unexplored. Understanding these factors is crucial for identifying gaps and designing tailored interventions to enhance IPC measures. This study will provide valuable insights into the current state of IPC practices at the hospital, which can guide evidence-based policies, training programs, and resource allocation to strengthen infection prevention and control systems.

The current study's goals are to evaluate the health staff's knowledge, attitudes, and practices about infection prevention and control at Seiyun General Hospital Authority by Assess the impact of educational attainment on infection control, determine the level of infection control understanding, determine the general attitudes about infection control. Lastly, determine the infection control methods.

METHODOLOGY

Study Design

This study was designed as a cross-sectional study.

Study Area

Conducted among healthcare workers in Seiyun General Hospital Authority, Hadramout Governorate, Republic of Yemen, between March and May 2023, using a written questionnaire.

Study Population

The study was conducted on 106 healthcare workers in Seiyun General Hospital Authority.

Sample frame

Physicians, nurses, pharmacists, laboratory technicians, radiologists, midwives, and anesthesiologists were included.

Inclusion Criteria

Healthcare workers over 25 years of age in Seiyun General Hospital Authority and health workers in clinical settings. They have the ability and willingness to participate.

Exclusion Criteria

Administrative staff and workers in administrative settings were excluded.

Sample size

This study included 106 samples calculated based on 95% confidence level and 5% margin of error. In total, 106 respondents answered the questionnaire, which was sufficient to draw a general conclusion about the knowledge and attitudes of healthcare workers towards infection prevention and control. The sample size in this study was recorded according to the following formula:

$$n = z^2 \times \frac{pq}{d^2}$$

N = sample size

Z = power (1.96)

P = disease prevalence

D = standard deviation (0.05)

X = 1 p

Sampling technique

Selection was simple random.

Data collection

Data are based on an interview using a questionnaire, which includes age, gender, Education levels, Occupational status, and work experience. Since the study assessed healthcare worker's knowledge, attitude and practice approaches to dealing with of infection prevention and control, a standard questionnaire was developed, based on the literature on infection prevention and control in WHO. The questionnaire, which consisted of 29 main questions related to knowledge, attitude and

practice, was designed and validated to cover the study objective.

Data Management and Analysis

Data were analyzed by statistical package for social science (Statistical Package for the Social Sciences) (SPSS), version 23.

Ethical consideration:

The study was approved by Ethical Committee of the Seiyun General Hospital Authority and the information was taken, and the consent forms were obtained from each participant

RESULTS AND DISCUSSION

This study included 106 HCW participants at Seiyun General Hospital Sociodemographic characteristics of the respondents. The majority of participants held a diploma (60.6%), followed by those holding a bachelor's degree (29.8%), and a few held a master's degree (6.73%) or a doctorate (2.88%). Participants' ages ranged between 20 and 30 years, at a rate of 41.3%, while they were between 30 and 35 years, at a rate of 34.6%, and older than 35 years, at a rate of 24%. Males constitute 62.5% of participants, while females constitute 37.5%. Employment status: Physicians constitute 18.3% of participants, nurses constitute 37.5%, midwives 7.69%, laboratory technicians 29.8%, physical therapists 0.96%, medical imaging technicians 3.85%, and pharmacists 1.92%. and 33.7% have work experience between one and five years, 28.8% have work experience between five and ten years, and 37.5% have work experience more than ten years (Table 1).

Table 1. Sociodemographic characteristics of the respondents.

Items	Variables	Frequency (n)	Percent (%)
Education levels	Diploma	63	60.6
	Bachloria	31	29.8
	Master	7	6.73
	PhD	3	2.88
Age	20 -30	43	41.3
	30- 35	36	34.6
	>35	25	24
Sex	Male	65	62.5
	Female	39	37.5
Occupational status	Physicians	19	18.3
	Nurses	39	37.5
	Midwives	8	7.69
	Lab technicians	31	29.8
	physiotherapist	1	0.96
	Radiology Technicians	4	3.85
	Pharmacist	2	1.92
	1-5 years	35	33.7
work experience	5-10 years	30	28.8
	More than 10 years	39	37.5

The responses-related to the respondent's knowledge of IPC a large proportion of participants (91.3%) reported having control of their viral infection. 76% of the participants and the party believe disinfection prevents entry into the party, while 24% believe the opposite. 86.5% believe that disinfection prevents disease infection, while 13.5% believe the opposite. 34.6% believe all measures are tamed with a chemical, while 65.4% believe otherwise. 51.9% believe that physical sterilization (heat/radiation) is used for all

measures, and 48.1% believe the opposite. 76.9% believe sterilization destroys all microorganisms, while 23.1% believe the opposite. 87.5% and every stomach needs to be disinfected before sterilization. 87.5% believe using medical equipment is necessary to confirm infection in the hospital. 11.5% believe that a finger replaces the need for hand washing, while 88.5% believe the opposite. 53.8% believe there is a personal belief in HIV and hemoglobin after 46.2% believe the opposite (Table 2).

Table 2. Responses-related to the respondent's knowledge towards IPC.

Items	Variables	Frequency (n)	Percent (%)
Did you know about of infection prevention and control	Yes	95	91.3
	No	9	8.65
Disinfection prevents health care acquired infections	Yes	79	76
	No	25	24
Antiseptic prevents health care acquired infections	Yes	90	86.5
	No	14	13.5
All equipment is sterilized using a chemical process	Yes	36	34.6
	No	68	65.4
For all equipment, physical sterilization (heat/radiation technique) is used	Yes	54	51.9
	No	50	48.1
Autoclaving destroys all microorganisms, including spores	Yes	80	76.9
	No	24	23.1
Each equipment needs decontamination before sterilization	Yes	91	87.5
	No	13	12.5
Personal protective equipment minimizes health care acquired infection	Yes	91	87.5
	No	13	12.5
Wearing gloves replace the need for handwashing	Yes	12	11.5
	No	92	88.5
There is PPE for HIV, HbAgs after exposure	Yes	56	53.8
	No	48	46.2

Table 3. Responses-related to the responds attitudes towards IPC.

Items	Variables (n) (%)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
When caring for a patient, you must be concerned about exposing your family and friends to healthcare associated infections	46	29	13	9	7
Healthcare workers at my facility are concerned about contracting healthcare associated infections while caring for patients	52	35	8	9	0
Washing hands before and after contact with patients reduces the risks of getting healthcare associated infections	60	39	3	1	1
I believe personal protective equipment protect healthcare workers from infection	43	48	6	5	2
In the absence of standard precaution, Infection and nosocomial diseases can occur in health care facilities	46	45	10	3	0
In your workplace, there is a high risk of occupational infection among health worker	53	40	8	3	0

Table 3 shows the responses-related to the respondent's attitudes towards IPC 46% strongly agree with the need to take care not to expose family members and friends to hospital-acquired infections, while 29%

agree and feel reassured. 52% strongly agree that health care workers are concerned about contracting hospital-acquired infections while caring for patients. 60% strongly agree that washing hands before and after

contact with sick people reduces the risk of hospital-acquired infections. 48% strongly agree that PPE protects health workers from infection, on the other hand 46% strongly agree that if standard precautions are not followed, infections and illnesses can occur in health care settings. 53% strongly agree that there is a high risk of occupational injury among health care workers

Comments about the respondent's IPC-related behaviors 90.4% of people used to wash their hands with soap before tending to patients. The effectiveness of soap cleaning following patient care or after-touching liquids is 86.5%. When providing patient care, 69.2% of people

employed their own abilities. According to 63.5% of participants, having written infection rules would be beneficial. Health education for hospitalized individuals with the condition was given by 76.0% of participants. There is 59.6% of the software based on print by hand design. 70.2% of the treated patients covered previous needles. 76.9% reported exposure to blood, fluids, or penetrating wounds. Approximately, 51.0% of the body receiving prophylaxis after exposure to blood. 68.3% clean wounds with alcohol. 60.6% of the agency relied on the availability of manual cleaning supplies in patient care areas (Table 4).

Table 4. Responses-related to the respondent's practices towards IPC.

Items	Variables	Frequency (n)	Percent (%)
Wash hands using soap before patient care	Yes	94	90.4
	No	10	9.62
Wash hands using soap after patient care/contact with fluid	Yes	90	86.5
	No	14	13.5
Wash hands without using soap before and after patient care	Yes	29	27.9
	No	75	72.1
Are using personal protective equipment (PPE) when taking care of patients?	Yes	72	69.2
	No	32	30.8
What kind of PPE are you using in patient care?	Gloves	98	94.2
	Goggles	17	16.3
	Face masks	35	33.7
	Gown	41	39.4
	Other PPE	17	16.3
There are written infection control policies and procedures available	Yes	66	63.5
	No	38	36.5
Recapping needles before disposing	Yes	73	70.2
	No	31	29.8
Ever had contact with blood, liquids or puncture wounds	Yes	80	76.9
	No	24	23.1
What are the Infection Prevention and Control (IPC) measures adopted after being exposed to blood/stick injury?	Taking PEP	53	51.0
	Cleaning by alcohol	71	68.3
	Washing with water	40	38.5
Giving health education to the patients about Healthcare Associated Infections	Yes	79	76.0
	No	25	24.0
The hospital or health center has a competency-based hand hygiene training program	Yes	62	59.6
	No	42	40.4
Supplies necessary for adherence to hand hygiene are readily accessible in-patient care areas	Yes	63	60.6
	No	41	39.4

Level of knowledge, attitudes and practice in IPC among different levels of education. Level of knowledge towards IPC: It appears that there is a statistically significant correlation between the level of education and the level of knowledge towards IPC ($P = 0.05$). Level of attitude toward IPC: It is also shown that there is a statistically significant association between level of education and attitudes toward IPC ($P = 0.05$). Level of Practice with IPC: In the same way, there is a statistically significant correlation between the level of education and practices towards IPC ($P = 0.05$). Level of knowledge and attitudes and practice in IPC among different age groups. Level of knowledge towards IPC: It appears that there is a statistically significant association between age

group and level of knowledge towards IPC ($P = 0.05$). Attitudes towards IPC: It is also shown that there is a statistically significant association between age group and attitudes towards IPC ($P = 0.05$). Practices towards IPC: It appears that there is a statistically significant association between age group and practices towards IPC ($P = 0.05$). Level of knowledge and attitudes and practice in IPC among different levels of sex. Level of knowledge towards IPC: It appears that there is a statistically significant association between gender and level of knowledge towards IPC ($P = 0.05$). Attitudes towards IPC: There is also a statistically significant association between gender and attitudes towards IPC ($P = 0.05$). Practices towards IPC: there is a statistically significant

association between gender and practices towards IPC ($P = 0.05$). Level of knowledge and attitudes and practice in IPC among different levels of occupational. Level of knowledge towards IPC: It appears that there is a statistically significant association between professional category and level of knowledge towards IPC ($P = 0.05$). Attitudes towards IPC: It is also shown that there is a statistically significant association between occupational category and attitudes towards IPC ($P = 0.05$). Practices towards IPC: there appears to be a statistically significant association between the professional category and practices towards IPC ($P = 0.05$) Level of knowledge and

attitudes and practice in IPC among different levels of work experience. Level of knowledge towards IPC: It appears that there is a statistically significant association between the period of work experience and the level of knowledge towards IPC ($P = 0.05$). Attitudes towards IPC: It is also shown that there is a statistically significant association between the length of work experience and attitudes towards IPC ($P = 0.05$). Practices towards IPC: It appears that there is a statistically significant association between the period of work experience and practices towards IPC ($P = 0.05$) (Table 5).

Table 5. Association between respondents' socio-demographic characteristics and respondent's knowledge, attitude and practice towards IPC in Seiyun General Hospital Authority city.

Variable	knowledge towards IPC		P-value	attitudes towards IPC		P-value	practices towards IPC	
	Good	Poor		Good	Poor		Good	Poor
Education levels								
Diploma	12	34	0.05	45	54	0.05	45	64
Bachelor	12	34		45	54		45	64
Master	12	34		45	54		45	64
PhD	12	34		45	54		45	64
Age								
20 -30	12	34	0.05	45	54	0.05	45	64
30- 35	12	34		45	54		45	64
>35	12	34		45	54		45	64
Sex								
Male	12	34	0.05	45	54	0.05	45	64
Female	12	34		45	54		45	64
Occupational								
Physicians	12	34	0.05	45	54	0.05	45	64
Nurses	12	34		45	54		45	64
Midwives	12	34		45	54		45	64
Lab technicians	12	34		45	54		45	64
physiotherapist	12	34		45	54		45	64
Radiology technicians	12	34		45	54		45	64
pharmacist	12	34		45	54		45	64
Work experience								
1-5 years	12	34	0.05	45	54	0.05	45	64
5-10 years	12	34		45	54		45	64
>10 years	12	34		45	54		45	64

P-value *significant = <0.05

The knowledge, attitudes, and practices towards infection prevention and control are found worldwide. The study conducted at Seiyun General Hospital on healthcare workers' (HCWs) knowledge, attitudes, and practices (KAP) towards infection prevention and control (IPC) provides valuable insights into the current status of IPC in the region. Our results identified significant associations between demographic factors such as age, gender, education level, and occupation with the knowledge, attitudes, and practices of IPC. For example, older HCWs and those with more years of work experience tended to have a higher level of knowledge and a more favorable attitude towards IPC, consistent

with findings from Hussein et al. (2017) and Yazie et al. (2019). This suggests that experience and exposure to various clinical scenarios play a role in shaping IPC behaviors. Additionally, the study found that gender and professional category physicians, nurses, etc. also influenced IPC practices, with male HCWs and those in more senior roles showing better adherence to infection control protocols. These findings are in line with studies by Zhang et al., (2020), which highlighted that healthcare workers' professional roles and experience significantly impacted their IPC practices.

Our results from Seiyun General Hospital are consistent with other regional and international studies,

demonstrating that healthcare workers generally possess good knowledge and attitudes toward IPC. The current results were the high level of awareness among HCWs, with 91.3% of participants reporting knowledge of viral infection control, and correctly identifying disinfection and sterilization procedures. This is in line with several other studies, such as the one by Haguminshuti et al. (2022), which reported a high level of knowledge (78.6%) among HCWs in Rwanda. Additionally, the study by Ayed et al. (2015) also found fair to good knowledge levels among nurses, emphasizing the importance of education in IPC. However, some discrepancies in responses, such as the 34.6% of participants who believe chemical agents alone can prevent infection, suggest a need for more targeted training on appropriate disinfection methods and sterilization procedures. In contrast, the study by Jemal et al., (2020) highlighted lower knowledge levels, with only 55.7% of participants showing good knowledge of IPC, indicating that knowledge gaps persist despite training. This suggests that while knowledge levels may be high in Seiyun General Hospital, similar studies from other regions show the need for continued and up-to-date training to address evolving IPC practices.

The attitudes towards IPC in Seiyun General Hospital were generally positive, with 46% strongly agreeing on the importance of preventing hospital-acquired infections for both patients and their families. Similar positive attitudes were reported in studies such as those by Tamang et al., (2020), where HCWs demonstrated a positive attitude towards IPC in Nepal, influenced by their training and educational background. In the current study, 60% of participants believed that washing hands before and after contact with sick individuals reduces hospital-acquired infections, aligning with global best practices emphasizing hand hygiene as a primary infection control measure.

However, while attitudes were largely positive, there were some gaps in the overall consistency of beliefs regarding IPC practices. For example, 48.1% of the participants believed that physical sterilization was used for all measures, which may reflect a lack of understanding regarding the full spectrum of IPC methods, including chemical disinfection. This aligns with findings from Gezie et al., (2019) which showed good attitudes toward IPC but identified a gap in practical implementation. Therefore, although the attitudes towards IPC appear favorable, a deeper understanding of the diverse methods of infection prevention and control is needed to address any remaining misconceptions.

The practice of IPC in Seiyun General Hospital was found to be relatively high, with 90.4% of HCWs washing hands before patient care, which is consistent with findings from study by Lobo et al., (2019), where a majority of HCWs demonstrated good hand hygiene practices. However, it is notable that while most participants reported washing hands effectively, only

63.5% agreed that written infection policies would be beneficial, which suggests that there may be room for improvement in the formalization and communication of IPC protocols within the hospital. This finding mirrors that of Aldhamy et al. (2023), who also noted gaps between knowledge and practice, especially regarding the practical application of IPC guidelines. The study also found significant exposure to risk factors, such as blood and fluid exposure (76.9%), with only 51% receiving prophylactic treatment after such exposures. This is similar to the study by Hamid et al. (2019), which found that while knowledge about infection control was relatively high, the practices related to preventing nosocomial infections were lacking. This disparity emphasizes the need for increased focus on preventive practices, including post-exposure prophylaxis and disposal of sharp objects, as part of comprehensive infection control programs.

This research recommended increasing knowledge and providing instruction. All healthcare personnel must receive regular, up-to-date training on infection prevention techniques. Secondly, improving preventative measures like sterilizing medical equipment, using personal protection equipment appropriately and encouraging adherence to hygiene guidelines should all be improved. Third Tracking performance, to enhance procedures and lower infection-related events, it is critical to routinely assess employee performance and offer pertinent criticism and direction.

CONCLUSION

The results of the presented study showed that Seiyun Hospital staff members are now significantly more aware of infection prevention techniques; nevertheless, there is still room for improvement in the way these practices are implemented in others. On the other hand, deficiencies in the use of some infection prevention and control strategies must be addressed, especially those pertaining to post-exposure prophylaxis, sterilizing methods, and the formalization of written policies. Updating training programs to ensure ongoing professional growth, improving post-exposure protocols, and strengthening the practical application of infection prevention and control methods should be the main goals of future interventions.

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