

Exploring Knowledge, Awareness, and Implementation of Infection Prevention Measures Among Healthcare Professionals in a Tertiary Care Center in Kalaburagi

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Abstract

Hospital-acquired infections significantly impede patient care, leading to heightened medical costs and straining healthcare resources. These nosocomial infections are a critical concern globally, with approximately 1.4 million people worldwide suffering from them at any moment. Research suggests that around 10% of patients admitted to hospitals are likely to contract some form of infection during their stay, highlighting the particular challenge of hospital-acquired infections in developing nations where the prevalence can reach 30–50%. Such infections contribute to significant morbidity and are believed to be responsible for approximately 80,000 deaths each year in the United States alone. Studies by Koch et al. have identified a greater mortality risk among patients with hospital-acquired infections both within 30 days and over a year, compared to those uninfected. The primary mode of transmission is through the contaminated hands of healthcare providers, including doctors, nurses, and other hospital staff. The spread of these infections mainly occurs when healthcare workers transfer pathogens between patients, often due to neglecting hand hygiene or failing to adhere to basic hospital cleanliness protocols. The study was found necessary to intervene and get insights about problems of healthcare-associated disease and complications that arise due to inadequate infection control practices, thereby finding an appropriate solution for the occupational safety of the employees, which focuses on improving the clinical services and well-being of patients and healthcare providers.

Keywords: Hospital-acquired infections, patients, nosocomial infections, healthcare workers

INTRODUCTION

Infection poses a significant challenge in healthcare services globally, representing a leading cause of illness and death linked to clinical, diagnostic, and therapeutic procedures [1, 2]. Hospital-acquired infections (HAI) present a significant challenge in patient care, leading to escalated healthcare expenses and strain on available healthcare resources.

Nosocomial infections, also known as HAIs, pose a grave public health concern, with approximately 1.4 million individuals worldwide affected at any given moment. It is estimated that nearly 10% of hospitalized patients will experience some type of infection during their hospital stay [3–5]. The problem is concerning due to its elevated occurrence, ranging from 30 to 50%, in developing nations [6, 7]. HAIs lead to significant health complications and are linked to approximately 80,000 fatalities each year in the United States [8]. Koch et al. found that patients with HAIs faced an elevated risk of mortality within both 30 days and 1 year compared to those without such infections [9]. The primary pathway for the transmission of these

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infections is via the contaminated hands of healthcare providers, including doctors, nurses, and other personnel. A significant number of infections acquired in hospitals are spread through the transfer of pathogens between patients, often due to healthcare workers not washing their hands post patient evaluation or failing to adhere to basic hygiene protocols in hospitals [10]. Infection rates from HAIs vary by clinical department, with intensive care units (ICUs), neonatal units, and burns units typically experiencing the highest rates. Critically ill patients in ICUs are especially prone to HAIs due to the frequent use of multiple invasive devices for treatment and monitoring, increasing their risk of developing common HAIs such as urinary and respiratory tract infections. Research by Fadeyi et al. highlighted that 17% of critically ill patients exhibited methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, and there was a 52.5% MRSA carriage rate among ICU healthcare workers, with doctors and nurses comprising 22.7 and 16.7% of this statistic, respectively. To reduce the risk of transmitting infectious agents from one patient to another, healthcare professionals in ICUs must adhere strictly to infection control protocols.

NEED FOR THE STUDY

A study on the knowledge, awareness, and practice of infection control among healthcare workers at a tertiary hospital is important for several reasons: patient safety, healthcare-associated infections (HAIs), occupational safety, regulatory compliance, quality of care, public health, research and improvement, resource allocation, staff education, continuous monitoring.

A study on knowledge, awareness and practice of infection control among healthcare workers at tertiary hospitals is essential for patient safety, healthcare safety, regulatory compliance, and overall improvement in the quality of care provided by the hospital. Additionally, improving the quality of care in hospitals can support public health initiatives by minimizing the transmission of infectious diseases.

OBJECTIVES

General Objective

- To study infection control practices among healthcare workers.

Specific Objectives

- To assess the knowledge, awareness, and practice for infection control in a hospital.
- To identify the major factor hampering infection control measures in a hospital.
- To make appropriate recommendations for corrective action.

REVIEW OF LITERATURE

Olatade et al. conducted a survey using a multistage sampling technique to recruit respondents for this study. A custom-designed survey was employed to gather data. Analysis was conducted using both descriptive and inferential statistical methods through the Statistical Package for the Social Sciences (SPSS), version 21. Results showed that a majority, 94.1%, of participants demonstrated a high understanding of HAIs, and 95.9% exhibited comprehensive knowledge of measures to prevent such infections. Factors influencing these preventive measures included workload, scarcity of equipment, and accessibility to preventive tools. The conclusion drawn from the study is that healthcare personnel in the selected tertiary hospitals possess adequate awareness and practices regarding HAI, although certain challenges impact these practices [11].

A hospital-based cross-sectional study was conducted by Desta et al. using a structured pretested questionnaire administered to 150 participants. Healthcare workers were chosen via a systematic random sampling method. Multivariate logistic regression analysis was employed to determine factors associated with knowledge and practice of infection prevention, with variables having a p -value of <0.05 considered statistically significant. The study found that a large majority (84.7%) of healthcare workers possessed adequate knowledge, but only 57.3% demonstrated good practices in infection prevention. Advanced age, longer tenure in the workforce, and higher educational attainment were

significantly linked to both knowledge and practice of infection prevention. Additionally, factors such as participation in in-service training, availability of infection prevention resources, and adherence to guidelines were correlated with better practice. These findings underscore the importance of ensuring continuous access to guidelines and providing ongoing training for healthcare providers. Moreover, efforts should be made to enhance educational levels among professionals, establish standardized infection prevention practices, and offer ongoing mentorship [12].

METHODOLOGY

Research Approach

In this study, a quantitative research approach was found to be suitable for assessing the knowledge, awareness, and practice of infection control among healthcare workers at a tertiary hospital in Kalaburagi.

Research Design

A descriptive (cross-sectional) design is adopted to assess knowledge, awareness, and practice of infection control among healthcare workers at a tertiary hospital in Kalaburagi.

Study Location

The present study was conducted at the Tertiary Care Hospital, Government Institute of Medical Science (GIMS), located in Kalaburagi District in Karnataka.

Population

The healthcare professional working at the GIMS in Kalaburagi (doctors and staff nurses, including lab technicians).

TYPES OF STUDY

Observational Study

Sample

The sample for this study will consist of doctors and staff nurses, including lab technicians who meet the inclusion criteria and do not meet the exclusion criteria.

Sample Size

A total of 60 healthcare professionals working at the GIMS in Kalaburagi.

Sampling Technique

The study will utilize a convenience sampling approach to recruit participants. This method is selected due to its convenience and ease of access for the researcher, involving the selection of participants who are readily available and willing to take part in the study.

Sampling Criteria

Inclusion Criteria

- Healthcare workers who are willing to participate in the study.
- Healthcare workers who provide informed consent to participate in the study.

Exclusion Criteria

- Healthcare workers who are not willing to participate in the study.
- Healthcare workers who did not give informed consent to participate in the study.

Tool and Technique of Data Collection

Description of the Tool

The tool used in this study is a structured knowledge questionnaire regarding knowledge, awareness, and practice of infection control in hospitals. The tool is constructed by the investigators based on a

review of the literature of the present study, a questionnaire derived from the previous studies, and the investigators' personal experience with the help of several experts. The tool has been developed considering the reliability, feasibility, and content validity.

In the present study, the tool is prepared under two sections.

1. Section I consists of sociodemographic data, such as age, gender, profession, work experience, experience in dealing with infection control, and area of practice.
2. Section II consists of a self-administered knowledge questionnaire on knowledge, awareness and practice of infection control among healthcare workers at tertiary care hospitals.

Validation

The questionnaires were used to assess knowledge, awareness, and practice of infection control among healthcare workers at tertiary care hospitals and validated for their reliability and validity. A pilot study will be conducted with a small sample of participants to verify the suitability of the instruments and ensure they yield consistent outcomes.

Validity of the Tool

The prepared tool was submitted to 6 experts in the field of infection control officers and the Hospital Infection Control Committee at GIMS Hospital in Kalaburagi. According to the expert's suggestion, the tool was modified.

Study Period

The present study was conducted from July 1st to September 30th, 2023.

Ethical Consideration

- Permission was obtained from necessary ethical approvals from relevant institutional review boards.
- Written informed consent was obtained from participants before their involvement in the study.
- Ensure participant confidentiality and anonymity.

Plan for Data Analysis

Descriptive statistics (frequencies, percentages, and means) to describe demographic variables and baseline characteristics of the participants.

The collected data was organized into a master chart, and the questionnaire responses were coded before being input into a Microsoft Excel sheet. The results will be presented through various tables and charts.

Section 1: Demographic Characteristics of Respondents

Age-group

The majority, 50% of respondents, were in the age-group of 31–40 years. Around 33.3% of respondents were in the age-group of 21–30 years. And 8% were in the 41–50 age-group, and only 3% of respondents were in the age-group above 50 years (Figure 1).

Gender

The majority, 75% of respondents, are females. The remaining 25% of respondents were males (Figure 2).

In the present study, a total of 60 healthcare workers participated. The majority, 33.3% of respondents, were registered nurses, whereas 25% were doctors, 25% were medical lab technicians, and

16.6% were Group D workers (Figure 3).

Table 1. Classification of respondents by demographic characteristics (n = 60).

Characteristics	Category	Frequency (N)	Percentage (%)
Age (in years)	21–30	20	33.3
	31–40	30	50
	41–50	8	13.3
	Above 50	2	3.3
	Total	60	100
Gender	Male	15	25
	Female	45	75
	Total	60	100
Professional area	Registered nurse/midwife	20	33.3
	Medical doctor	15	25
	Medical lab technician	15	25
	Group D	10	16.6
	Total	60	100
Clinical experience in years	less than 5	10	16.6
	6–10	35	58.3
	11–15	7	11.6
	16–20	5	8.33
	Above 20	3	5
	Total	60	100
Area of practice	Emergency	10	16.6
	ICU	10	16.6
	Operation theater	10	16.6
	Pediatric ward	10	16.6
	Obstetrics and gynecology ward	10	16.6
	Medical surgical ward	10	16.6
	Total	60	100
Employment status	Full time	45	75
	Contract	15	25
	Total	60	100

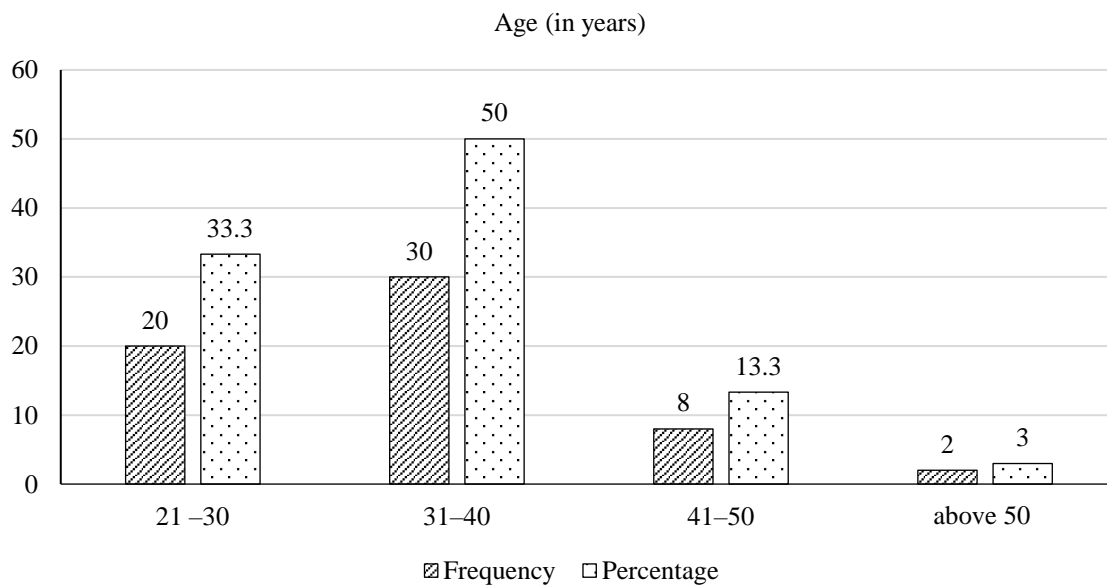


Figure 1. Classification of respondents by age.

The majority, 58.3% of respondents, have 6–10 years of clinical experience, 16.6% of respondents have less than 6 years of clinical experience, and 11.6% of respondents have 11–15 years of clinical

experience; likewise, 8.33% of respondents have 15–20 years of experience whereas only 5% of respondents have above 20 years of experience (Figure 4).

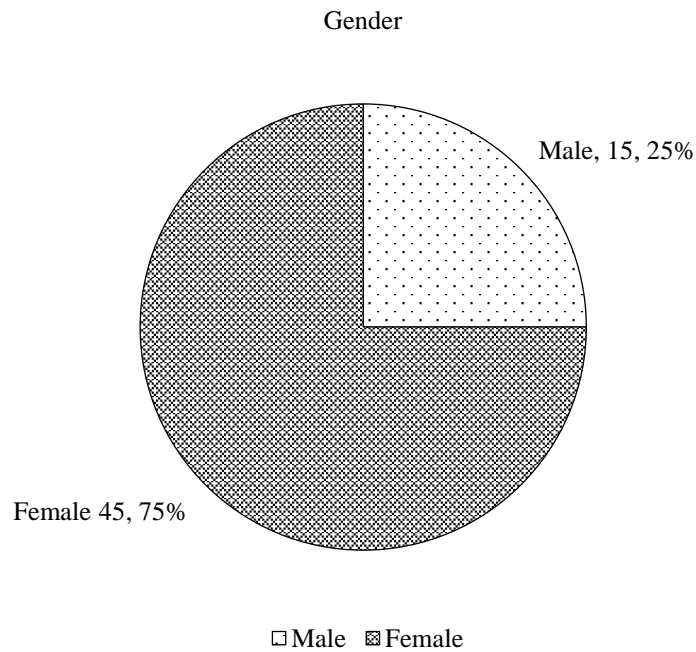


Figure 2. Classification of respondents by gender.

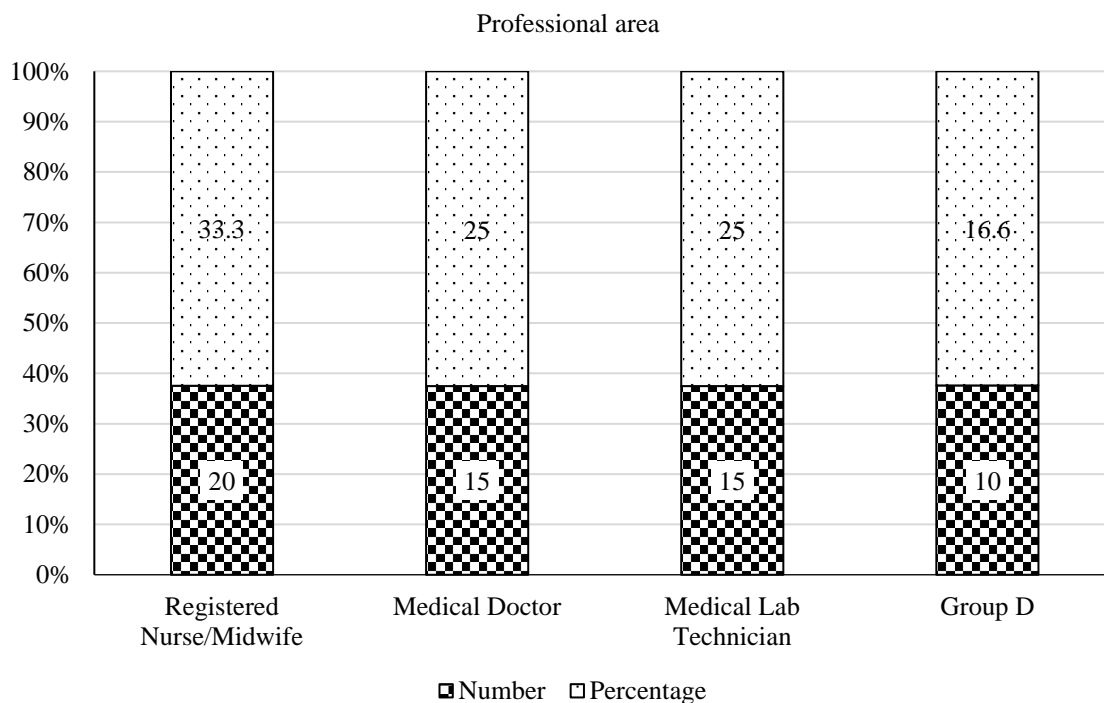


Figure 3. Classification of respondents by professional area.

Area of Practice

In the present study, a total of six areas were selected: emergency, ICU, operation theatre, pediatric ward, OBG ward, and medical-surgical ward, and 10 participants were taken from each area (Figure 5).

The majority, 75% of employees, are regular, whereas 25% of employees are working on a contractual basis (Figure 6).

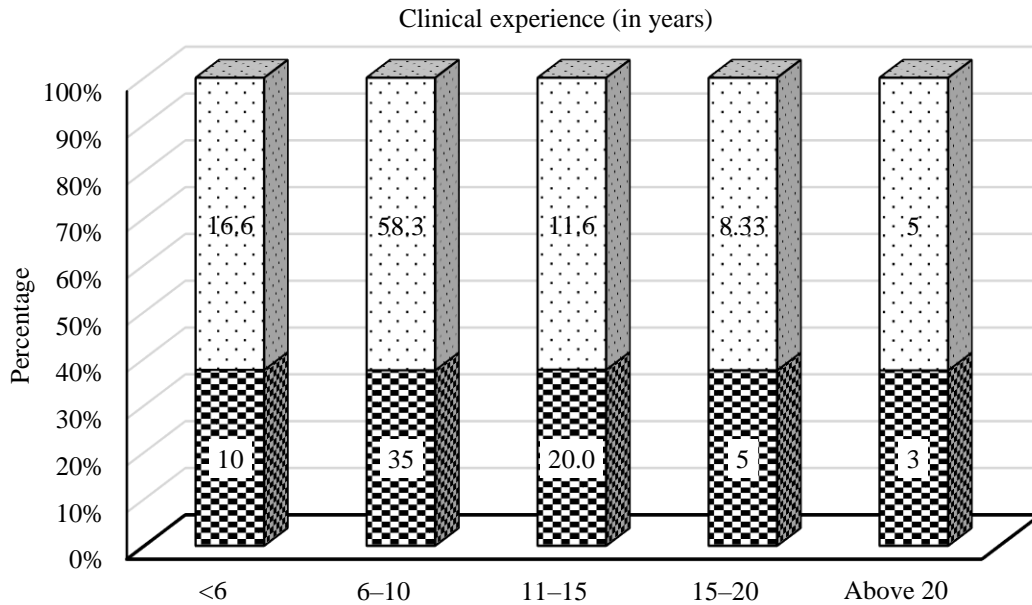


Figure 4. Classification of respondents by clinical experience.

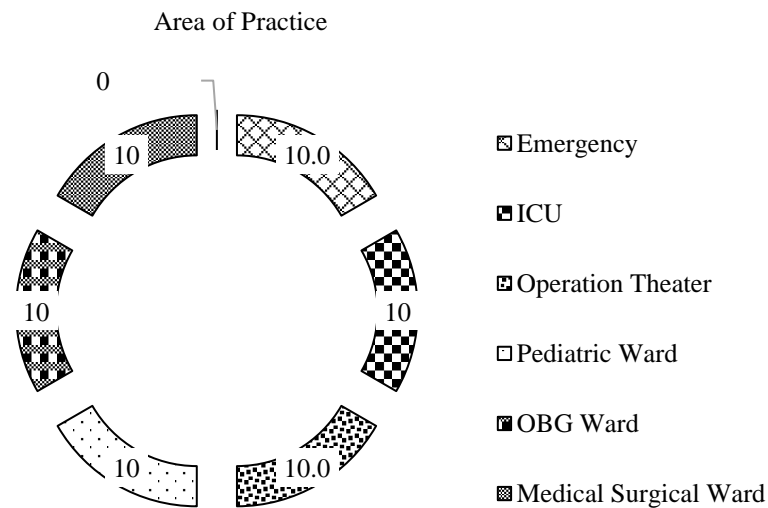


Figure 5. Classification of respondents by area of practice.

Section II: Structured Self-administered Knowledge, Awareness, and Practice Questionnaire on Infection Control Among Healthcare Workers at Tertiary Care Hospitals

The majority of participants have good knowledge about infection control, and 91.66% of participants have good knowledge regarding standard precautions taken to prevent healthcare-associated infection. While only 8.33% of respondents are unaware of standard precautions taken to prevent nosocomial infections, a significant majority, accounting for 83.3%, are aware that nosocomial infections can be transmitted through medical equipment such as syringes, needles, catheters, stethoscopes, thermometers, etc. Additionally, 86.6% of participants are knowledgeable about the curability of nosocomial infections. Regarding the destruction of microorganisms by the autoclaving method, 70%

of respondents are aware, while 80% understand that nosocomial infection is acquired during a patient's hospital admission. Conversely, only 20% of participants lack knowledge about nosocomial infection as a hospital-acquired condition.

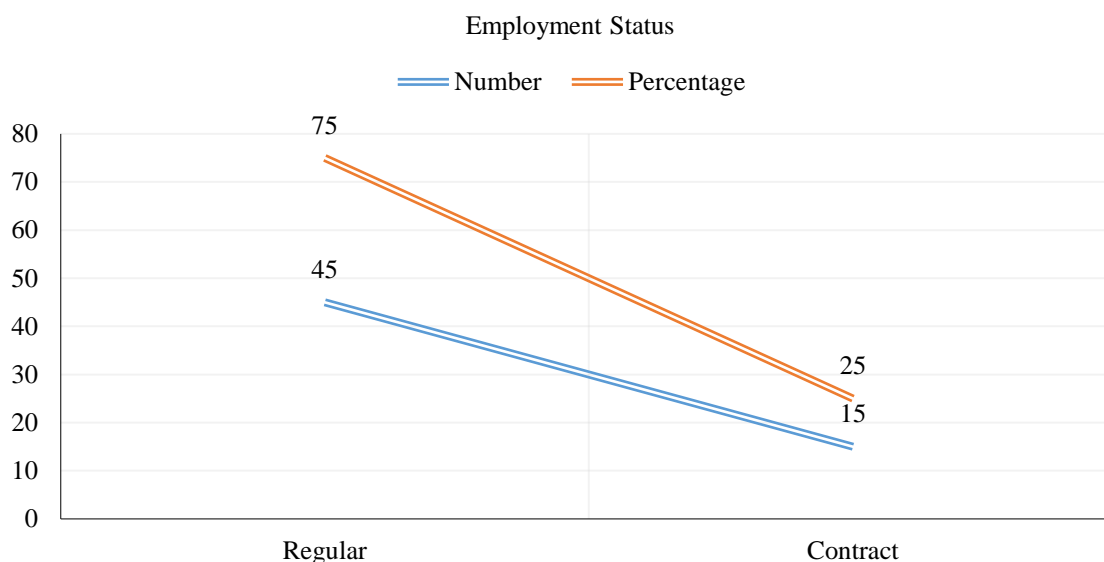


Figure 6. Classification of respondents by employment status.

Table 2. Distribution of knowledge regarding infection control level among healthcare workers (n = 60).

S.N.	Knowledge aspects	True N and %	False N and %	Mean	STD
1.	Nosocomial infection is an infection gotten from the hospital during the admission of the patient	48 (80)	12 (20)	30	25.45
2.	Nosocomial infection is also known as HAI	50 (83)	10 (16.6)	30	28.28
3.	Organisms that cause nosocomial infection include <i>Streptococcus</i> spp., <i>Staphylococci</i> , and <i>Acinetobacter</i> spp.	47 (28.3)	13 (21.6)	30	24.04
4.	Prolonged hospital stay increases the risk of nosocomial infection	40 (66.6)	20 (33.3)	30	14.4
5.	Nosocomial infection can be transmitted by medical equipment such as syringes, needles, catheters, stethoscopes, thermometers, etc.	50 (83.3)	10 (16.6)	30	28.28
6.	Standard precautions are taken to prevent nosocomial infections	55(91.66)	5 (8.33)	30	35.35
7.	Standard precautions apply to all patients regardless of their diagnosis	38 (63.3)	12 (20)	30	18.34
8.	All health workers and patients are considered potentially infectious.	28 (46.6)	32 (53.3)	30	2.82
9.	All microorganisms, including spores, are destroyed by autoclaving	42 (70)	18 (30)	30	16.97
10.	Nosocomial infections are curable	52 (86.6)	8 (13.3)	30	31.11

Furthermore, 66.6% of participants acknowledge that prolonged hospital stays increase the risk of nosocomial infection, whereas 33.3% are unaware of this fact. Similarly, 83.3% of participants recognize nosocomial infection as synonymous with HAI, while 16.6% are unfamiliar with this term. Overall, participants have adequate knowledge about infection control at tertiary care hospitals.

A total of 75% of respondents in the present studies are very aware that protective devices minimize healthcare-acquired infections, whereas only 25% of participants were not aware, 70% of respondents are very aware of when hand hygiene is recommended, and only 16.6% are slightly aware. Around 71.66% of respondents in the studies are moderately aware of the hospital's infection control policies and guidelines, whereas 8.33% of respondents are very aware of the hospital's infection control policies and guidelines, 63.3% of respondents are moderately aware of every equipment needing decontamination before sterilization, whereas only 20% of respondents are very aware of every equipment needing decontamination before sterilization.

The majority of respondents, 53.33%, will do hand hygiene before patient contact, whereas only 8.33% of respondents rarely did hand washing before touching patients. A total of 50% of respondents will hand wash after touching patients, whereas only 8.33% will do so sometimes. 75% of respondents often change gloves between patients or tasks. Only 5% of respondents in the study will do it always. 71.6% of respondents will follow proper cleaning and disinfection of patient care equipment, whereas only 2.33% will do so sometimes.

Table 3. Distribution of awareness regarding infection control level among healthcare workers (n = 60).

S.N.	Awareness aspects	Very aware, N and %	Moderately aware, N and %	Slightly aware, N and %	Not at all, N and %	Mean and %	STD N and %
1.	Are you aware of the hospital's infection control policies and guidelines?	5 (8.33)	43 (71.66)	7 (11.66)	5 (8.33)	15	18.69
2.	Are you familiar with the concept of antimicrobial stewardship and its importance in infection control?	2 (3.33)	5 (8.33)	8 (13.3)	45 (75)	15	20.14
3.	How confident are you in your ability to recognize and manage patients with multidrug-resistant infections (e.g., MRSA or <i>C. difficile</i>)?	3 (5)	8 (13.33)	42 (70)	7(11.6)	15	18.12
4.	When is hand hygiene recommended?	42 (70)	8 (13.33)	10 (16.6)	0 (0)	15	18.51
5.	Protective device minimizes healthcare-acquired infection	45 (75)	7 (11.66)	5 (8.33)	3 (5)	15	20.06
6.	All microorganisms, including spores, are destroyed by autoclaving	40 (66.6)	10 (16.66)	5 (8.3)	5 (8.3)	15	16.83
7.	When there is a risk of splashes or sprays of blood and body fluids, the healthcare workers	15 (25)	25 (41.66)	15 (25)	5 (8.5)	15	8.16
8.	What are the indications for the use of alcohol-based hand rub?	10 (16.6)	33 (55)	10 (16.6)	7(11.6)	15	12.08
9.	Every piece of equipment needs decontamination before sterilization	12 (20)	38 (63.33)	8 (13.33)	2(3.33)	15	15.87
10.	Can hospital infections be transmitted through needles, syringes, catheters, thermometers, etc.?	17 (28.3)	25 (41.3)	15 (25)	39(5)	15	9.09

Table 4. Distribution of practice regarding infection control level among healthcare workers (n = 60).

S.N.	Practice aspects	Always, N and %	Often, N and %	Sometimes, N and %	Rarely, N and %	Never, N and %	Mean	STD
1.	Hand hygiene before patient contact	32 (53.3)	8 (13.3)	15 (25)	5 (8.33)	0 (0)	12	12.42
2.	Hand hygiene after patient contact	30 (50)	15 (25)	5 (8.33)	7 (11.6)	3 (5)	12	11.04
3.	Changing gloves between patients or tasks	3 (5)	45 (75)	5 (8.33)	7 (11.3)	0 (0)	12	18.62
4.	Proper cleaning and disinfection of patient care equipment	10 (16.6)	43(71.6)	2 (2.33)	5 (8.33)	0 (0)	12	17.73
5.	Consistent use of appropriate personal protective equipment (PPE) when needed	20 (33.3)	18 (30)	17(28.3)	3 (5)	2 (3.3)	12	8.76
6.	Changing the time of chlorine solution	15 (25)	15(25)	12 (20)	8 (13.3)	10(16.6)	12	3.78
7.	Used Infection prevention guideline/evidence	25 (41.6)	10 (16.6)	12 (20)	8 (18.3)	5 (8.33)	12	7.71
8.	Recap needle before disposal	20 (33.3)	15 (25)	15 (25)	7 (11.3)	3 (5)	12	6.85
9.	Measures used after exposure for blood/stick injury	10 (16.6)	7 (11.6)	35 (58.3)	3 (5)	5 (5)	12	13.11
10.	Containers disposed of when they are three-quarters full	33 (55)	7 (11.6)	15 (25)	3 (8.33)	2 (3.33)	12	12.80

A total of 25% of respondents in the present study will change chlorine solution from time to time, whereas only 8% will do so sometimes. Around 58.3% of participants in the study participants will take measures used after exposure for blood/stick injury, whereas 5% rarely will follow. 41.6% of respondents in the study used infection prevention guidelines/evidence always, whereas only 5% will never do so.

DISCUSSION

This article discusses the major findings of the study and reviews them in relation to findings from the results of the other studies.

The present study was conducted at the GIMS Hospital in Kalaburagi on 60 healthcare workers during the period from July 1st to September 30th, 2023. This study focuses on evaluating the knowledge, awareness, and implementation of infection control measures by healthcare workers at a tertiary hospital in Kalaburagi. A total of 60 participants were chosen through a nonprobability convenience sampling method, adhering to specific inclusion criteria. Data were gathered using a self-administered and structured questionnaire designed to assess knowledge.

Table 1 represents the classification of respondents by demographic characteristics.

Age-group

The majority, 50% of respondents, were in the age-group of 31–40 years. 33.3% of respondents were in the age-group of 21–30 years. And 8% were in the 41–50 age-group, whereas only 3% of respondents were in the age-group above 50 years.

Gender

The majority, 75% of respondents, were females, and 25 % of respondents were males.

Professional Area

In the present study, a total of 60 healthcare workers participated. The majority, 33.3% of respondents, were registered nurses, whereas 25% were doctors, 25% were medical lab technicians, and 16.6% were Group D workers.

Clinical Experience in Years

The majority, 58.3% of respondents, have 6–10 years of clinical experience, 16.6% of respondents have less than 6 years of clinical experience, and 11.6% of respondents have 11–15 years of clinical experience; likewise, 8.33% of respondents have 15–20 years of experience were as only 5% of respondents are above 20 years of experience.

Area of Practice

In the present study, a total of six areas were selected: emergency, ICU, operation theatre, pediatric ward, OBG ward, medical-surgical ward, and 10 participants were taken from each area.

Employment Status

The majority, 75% of employees, are working as regulars, whereas 25% of employees are working on a contractual basis.

Table 2 represents the distribution of knowledge regarding infection control levels among healthcare workers.

The majority of participants have good knowledge about infection control, and 91.66% of participants have good knowledge regarding standard precautions taken to prevent healthcare-associated infection. However, only 8.33% of respondents lack awareness about the standard precautions taken to prevent nosocomial infections. On the other hand, a significant majority, 83.3%, acknowledge that nosocomial

infections can be transmitted through medical equipment such as syringes, needles, catheters, stethoscopes, and thermometers. Additionally, 86.6% of participants are aware that nosocomial infections are treatable. In terms of sterilization methods, 70% of respondents are knowledgeable about the autoclaving process, effectively destroying all microorganisms. Moreover, 80% of participants understand that nosocomial infections are acquired during a patient's hospital admission. Conversely, only 20% are unaware of this fact. Furthermore, 66.6% of participants recognize that prolonged hospital stays elevate the risk of nosocomial infections, whereas 33.3% are unaware of this association. 83.3% of participants in the study knew about nosocomial infection, also known as HAI, whereas only 16.6% of participants didn't know. Overall, participants have adequate knowledge about infection control at tertiary care hospitals.

Table 3 represents the distribution of awareness regarding infection control levels among healthcare workers.

75% of respondents in the present studies are very aware that protective devices minimize healthcare-acquired infection, whereas only 25% of participants are not aware, 70% of respondents are very aware of when hand hygiene is recommended, and only 16.6% are slightly aware. 71.66% of respondents in the studies are moderately aware of the hospital's infection control policies and guidelines were as 8.33% of respondents are very aware of the hospital's infection control policies and guidelines, 63.3% of respondents are moderately aware of every equipment needs decontamination before sterilization whereas only 20% of respondents are very aware of every equipment need decontamination before sterilization.

Table 4 represents the distribution of practice regarding infection control levels among healthcare workers.

The majority of respondents, 53.33%, will do hand hygiene before patient contact, whereas only 8.33% of respondents rarely do hand washing before touching patients. 50% of respondents will wash their hands after touching patients, and only 8.33% will do so sometimes. 75% of respondents often change gloves between patients or tasks. Only 5% of respondents in the study will do so always. 71.6% of respondents will follow proper cleaning and disinfection of patient care equipment, whereas only 2.33% will do so sometimes. 25% of respondents in the present study will change chlorine solution from time to time, whereas only 8% will do so sometimes. 58.3% of participants in the study will take measures used after exposure to blood/stick injury, whereas 5% will rarely follow. 41.6% of respondents in the study used infection prevention guidelines/evidence always, whereas only 5% will never do so.

CONCLUSION

This study evaluated the understanding, awareness, and implementation of infection prevention measures by healthcare workers at a tertiary hospital in Kalaburagi. Conducted at the GIMS Kalaburagi, data was gathered from 60 healthcare professionals using a self-administered questionnaire on infection control knowledge. Utilizing a nonprobability convenient sampling method for participant selection, the results indicated that the vast majority of healthcare workers possess sufficient knowledge concerning infection prevention in tertiary care settings. Specifically, 91.66% of the respondents demonstrated a strong understanding of the standard precautions necessary to avert healthcare-associated infections. Moreover, 83.3% were aware that nosocomial infections could be spread through the use of medical equipment, including syringes, needles, catheters, stethoscopes, and thermometers. 86.6% of participants know that nosocomial infections are curable, 70% of respondents in the study know that all microorganisms are destroyed by the autoclaving method, 80% of participants know that nosocomial infection is an infection gotten from the hospital during admission of the patient.

A total of 75% of respondents in the present studies are very aware that protective devices minimize healthcare-acquired infections. 70% of respondents are very aware of when hand hygiene is

recommended, and 71.66% of respondents in the studies are moderately aware of the hospital's infection control policies and guidelines. 63.3% of respondents are moderately aware that every piece of equipment needs decontamination before sterilization. The majority of respondents, 53.33%, will do hand hygiene before patient contact, whereas only 8.33% of respondents rarely do hand washing before touching patients. 50% of respondents will wash their hands after touching patients, whereas only 8.33% will do so sometimes. 75% of respondents often change gloves between patients or tasks. Only 5% of respondents in the study will always do so. 71.6% of respondents will follow Proper cleaning and disinfection of patient care equipment, whereas only 2.33% will do so sometimes.

The present study reveals that most healthcare workers had adequate knowledge, awareness, and practice of infection control among healthcare workers at a tertiary hospital in Kalaburagi.

Recommendation

Continuous training, monitoring and feedback, resource allocation, communication, research and evaluation, *kayakalpa*, *laqshya*, and National Quality Assurance Standards should be undergone more often for more practice.

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