



## Nurses' knowledge regarding infection control at national institute of diseases of the chest and Hospital, Dhaka, Bangladesh

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### Abstract

**Background:** Infection control in healthcare settings is imperative for the safety of patients as well as healthcare providers.

**Aim:** The aim of the study was to assess the level of nurses' knowledge regarding infection control at National Institute of Diseases of the Chest and Hospital.

**Methods:** A descriptive type of cross-sectional study was carried out from July, 2023 to June, 2024 among 50 nurses who were selected conveniently from 200 nurses. A self-administering structured questionnaire was used for data collection and descriptive statistics (frequency, percentage and mean) was used for data analysis.

**Results:** The mean age of the respondents was 36.02 years. Majority (92%) of the respondents were female and 64% were Muslim and only 10% were unmarried. More than half (54%) of the respondents did not have any special training on infection control. The overall knowledge level of the nurses showed that about 60% nurses had average level of knowledge on infection control.

**Conclusion and Recommendation:** Nurses' level of knowledge regarding infection control is not satisfactory. So, organizing regular training on ICP, monitoring, development and implementation of guideline to improve knowledge of nurses for infection control in the hospital.

**Keywords:** Nurses, knowledge, infection control, NIDCH, Dhaka, Bangladesh

### Introduction

#### Background & Significance of the Study

Infection control is a practical, evidence-based approach preventing patients and health workers from being harmed by avoidable infections. Infection is a significant concern to the health care system and a burden to the public health discipline. Different types of hospital acquired infections are urinary tract infections (UTI), respiratory tract infection (RTI), bloodstream infection, surgical site infection etc. HAIs are associated with high morbidity and mortality; prolonged hospital stays, long-term disability and a massive financial burden for health systems. Effective infection control requires constant action at all levels of the health system, including policymakers, facility managers, health workers and those who access health services. Without effective infection control it is impossible to achieve quality health care delivery (WHO, 2020) [15].

Globally, over 1.4 million patients affecting annually around the globe and carrying a projected mortality of over 10%. Low and middle-income countries (LMIC) face an undue burden of HAIs with up to 25% of hospitalized patients

compared to 7% in the high-income countries (Harun *et al.*, 2022) [7]. In the United States, 1.7M cases of HAIs happen each year and approximately 99,000 die. In first-world countries, seven in every 100 patients develop HAIs, and a higher occurrence of 15 in every 100 patients is observed in developing ones (Campo *et al.*, 2023) [4]. Only 15.2% of health care facilities meeting all of the minimum requirements, according to a WHO survey in 2019.

A new report shows that where good hand hygiene and other cost-effective practices are followed, 70% of those infections can be prevented (WHO, 2022) [13]. In another study in a Medical Intensive Care Unit in India, 50.3% of the 346 patients developed HAIs during their hospitalization. In Philippines, 28% of patients develop device-associated HAIs and one in every four to almost half of the patients inside the intensive care unit dies because of sepsis or organ dysfunction (Thazha *et al.*, 2022) [12].

Nationally, between September and December 2020, assessment about at 11 tertiary-care hospitals across Bangladesh. Around 90% of hospitals did not have an active monitoring and audit system. About 73% of hospitals had

functional hand hygiene stations but sufficient toilets were available in only 37% of hospitals. Despite various infection control measures, up to 44% of SARS-CoV-2 infections early in the outbreak were hospital-acquired (Harun *et al.*, 2022) [7]. It has been estimated that one out of every 20 hospitalized patients contract a healthcare-associated infection (Das *et al.*, 2020) [6]. Other studies from Bangladesh have estimated overall rates of HAIs ranging from 8 to 30%, exacerbated by inadequate infection controlling measures (Harun *et al.*, 2022) [7].

The one of the main causes of hospital acquired infection (HAI) is the lack of knowledge and improper practice of employees in the hospital (Ali *et al.*, 2022) [2]. Overcrowding, inadequate and unsanitary facilities, lack of routine cleaning and basic infection control measures, needle stick injury and improper waste management may combine to create opportunities for transmission of infection. This type of environment poses a threat of infection, particularly through contact with contaminated hands, objects, or surfaces to all individuals in the wards, including patients, family caregivers, visitors, and hospital staff.

The most important source of spread of these infections is through the contaminated hands of the health care givers: doctors, nurses and other staffs. Most hospital acquired infections are caused by transmission of pathogens from one patient to another. Especially by health care workers who failed to wash their hands after evaluating a patient (Ali *et al.*, 2022) [2].

Infection control in healthcare settings is imperative for the safety of patients as well as healthcare providers (Harun *et al.*, 2022) [7].

Nurses play an important role and act as frontline fighters to provide quality patient care and safe the patients and themselves from any infection in healthcare settings by maintaining standard precaution including hand hygiene, wearing personal protective equipment (PPE), immunization for prevention of communicable diseases, modes of infection transmission, assessment of patients for infection, medical instrument decontamination, healthcare waste handling, needle stick injury and sharp safety policy (Tomczyk *et al.*, 2022) [13]. Infection control is a central pillar in reducing health care-associated infections or antimicrobial resistance. An effective infection controlling measures is necessary in a hospital.

### Justification

The impact of healthcare associated infections and antimicrobial resistance on people's lives is incalculable. Over 24% of patients affected by healthcare associated sepsis and 52.3% of those patients treated in an intensive care unit die each year. In few situations, hospital infection led to septicemia having a mortality rate of 80% (WHO, 2022) [13]. Day by day the number of patients is increased with high risk of infection. Nurses should be familiar with practices to prevent the occurrence and spread of infection and maintain appropriate practice for all patients thought the duration of their hospital stay. The effect of hospital infection in developed and developing countries is the major causes of death and mortality and resulting in significant burden both for patients and health care workers (WHO, 2022) [13].

Bangladesh is a densely populated country with insufficient health care resources. Infection control would be difficult here in without adequate knowledge of nurses on infection control. Nurses play a crucial role in preventing and controlling transmission of the infection through implementing of standard precautions and maintenance of the health care environment (Das *et al.*, 2020) [6]. Considering the insufficiency of studies, it was an urgent need to conduct the study to see the level of nurses' knowledge regarding infection control. For this reason, the study was intended to assess the nurses' knowledge, find out gaps and take proper intervention to overcome the situation.

### Research Question

What is the level of Nurses' knowledge regarding infection control at NIDCH, Dhaka, Bangladesh?

### Research Aim

The aim of this study is to assess the level of Nurses' knowledge regarding infection control at NIDCH, Dhaka, Bangladesh.

### Research Objectives

#### General Objective

To assess the level of nurses' knowledge regarding infection control at NIDCH, Dhaka, Bangladesh.

#### Specific objectives

1. To assess the level of nurses' knowledge regarding the concept of infection.
2. To identify the level of nurses' knowledge regarding controlling measures and management of infection.
3. To find out the level of nurses' knowledge regarding complications of infection.
4. To state the socio-demographic characteristics of the respondents.

#### Research Variables:

##### A. Socio-Demographic Variables:

1. Age
2. Gender
3. Marital status
4. Religion
5. Current Position
6. Professional Educational Qualification
7. Working experience in govt. service
8. Training on Infection Control Program (ICP)

##### B. Knowledge related Variables

1. Concept of infection including-
  - Meaning
  - Types
  - Chain of infection
  - Causing factors
  - Mode of transmission of infection
2. Controlling measures and Management of infection
3. Complications of infection.

#### Operational definitions

- **Knowledge:** In this study, knowledge refers to nurses understanding regarding concept, controlling measures, management & complications of infection.

- **Nurse:** In this study, Nurse refers to the respondents who had registered from Bangladesh Nursing and Midwifery Council (BNMC) and are directly providing nursing care to the patients at National Institute of Diseases of the Chest and Hospital, Mohakhali, Dhaka, Bangladesh.

### Literature Review

A literature review is a comprehensive summary of previous research on a topic it is an important part of research. Review of literature is an integral step in research process. Without literature review is not possible to conduct the study. Review of literature is an imperative part in relevant to research paper. This chapter of the study was described from different authors and organizations that can be utilized to provide a better understanding of burn injury from the following outlines:

1. Concept of Infection
2. Causes of Infection
3. Spread of Infection
4. Complication of Infection
5. Prevention and control of Infection
6. Nurses' Knowledge Regarding Infection Control

**1. Concept:** Infections means invasion into the body by pathogenic microorganisms that multiply & causing disease or damage tissue that patients, health care workers and visitors acquire while in health care facilities.

**2. Causes of infection:** There are several causes of infections including prolonged and inappropriate use of devices and antibiotics, high-risk and sophisticated procedures, immune suppression and other severe underlying patient conditions and insufficient application of standard precautions (Ali and Alam., 2022) [2].

**3. Spread of infection:** In hospitals, infected patients are a source of infection transmission to other patients, health care workers and visitors. Most health care infections are transmitted by health care personnel who fail to practice proper autoclaving techniques of surgical instruments, proper hand washing procedures and change gloves between client contacts. On the other hand, health care providers have exposed to blood born infection especially hepatitis B, C and HIV due to recapping of a needle and sharps injuries (Salem, 2019) [10].

**4. Complications of infection:** Different types of infections are urinary tract infections (UTI), respiratory tract infection (RTI), bloodstream infection, surgical site infection etc. occurred due to negligence of proper infection controlling measures. Such infections prolong hospital stays and can result in long-term disability, high costs to patients, the spread of antimicrobial resistance and millions of avoidable deaths among patients and health workers.

**5. Prevention & control of infection:** Infection prevention and control is very essential in hospital setting to reduce morbidity and mortality of the patients. Infection control and standard precautions is evidence-based practices that can reduce the risk of transmission of infection (Das *et al.*, 2020) [6]. Nurses play a crucial role in preventing and controlling transmission of an infection in healthcare

settings by maintaining standard precautions properly (Salem, 2019) [10].

### 6. Nurses' knowledge regarding infection control:

In India, a quantitative descriptive and cross-sectional design was conducted by Thazha *et al.*, (2021) knowledge & practices on infection control among 587 nurses working in different private tertiary hospitals in South India. Most respondents had not taken any risk assessment training for the last 12 months (53.8%) and (46.2%) respondents attended such training. More than half of them received information about IPC in trainings conducted by their hospital (54.1%), and 36.3% obtained information on IPC from guidelines, books, articles, and 9.6% from other sources. The survey revealed high level of awareness, positive attitude and good IPC practice. Among the IPC practices, "changing gloves between contacts with different patients" was the most often practiced and "washing hands after removal of gloves" was the least practiced.

In Nepal, Srestha & Thapa (2018) [11] conducted a study on "knowledge and practice on infection control among nurses of Bir Hospital Kathmandu". That study was quantitative descriptive design. The study was carried out probability systemic sampling technique. Total 170 samples were selected to determine the level of knowledge on infection prevention. The study showed that 57.1% respondents had adequate knowledge and only 48.2% had good practice on infection prevention through hand hygiene, use of PPE, decontamination, cleaning of instruments, sterilization and use of antiseptics, disposal of sharps and waste disposal. But similarly, 88.8% of the respondents had not received any training related to infection prevention. This study reveals that respondents had better knowledge than practice on infection prevention. The study suggests that need for organizing regular training, monitoring, development and implementation of guideline to improve knowledge and practice of nurses for prevention of infection in the hospital.

In Bangladesh, a cross-sectional study was conducted in 2022 on knowledge and practices regarding infection control among nurses in Secondary Level Hospital. Total 182 nurses were included in this study. The respondents were selected by purposive sampling technique and data were collected by face-to-face interview. The study was found that (78%) respondents had fair knowledge and (90.2%) had fair practices regarding infection control. The study also revealed that, 161 (88.5%) respondents awarded about hand washing, 179 (98.4%) respondents were concerned about waste management and 93 (51.1%) respondents agree and 85 (46.7%) respondents strongly agree about PPE use is important. This study can be concluded that in spite of practice level regarding Infection control, nurses had fair knowledge level. These finding suggest that nurses' knowledge and practice regarding infection control need further improvement (Das *et al.*, 2020) [6].

In Bangladesh, Ali and Alam (2022) [2] conducted a study on "the level of knowledge and practice of nurses on infection control in a tertiary level Hospital". This descriptive type of cross-sectional study was conducted in Dhaka Medical College Hospital and Shaheed Suhrawardy Medical College Hospital Dhaka. Total 139 nurses were included in this study. In this study, 99.3% (N=138) of the respondents were aware of Infection control. Maximum of

the respondents 48.2% (N=67) practice often, 33.8% (N=47) practice always, 17.3% (11=24) sometime and minimum (N=1) of the respondent never practice infection control guideline. Nurses in the current study have average knowledge and practice level regarding infection control.

In Saudi Arabia, Alshathri (2021) [3] conducted a cross-sectional survey on knowledge, attitude and practice regarding infection control measures among nurses at king Khaled Eye Hospital in Riyadh, KSA among 285 nurses. Study objectives are Evaluate the knowledge, attitude and practices regarding infection control among nurses. Among 285 participants, 232 (81.4%) had good knowledge, 47(16.5%) had moderate knowledge, while 6(2.1%) had poor Knowledge.

In Nigeria, Akinwaare *et al.*, (2020) [1] conducted a study on "knowledge and practices of infection control among nurses of a Nigerian hospital. That study was conducted by a descriptive cross-sectional design. The study was carried out 239 participants. The greatest proportion of the participants, 91.6%, had adequate knowledge about infection control, with a large proportion, 42.7%, having low compliance to infection control measures. Moreso, participants identified the lack of gloves (87.4%), tasking nature of hand washing (74.9%), lack of time (74.1%) and lack of color codes for waste disposals (72.0%) as major barriers to effective infection control practices.

In Saudia Arabia, Salem (2019) [10] conducted a study on Knowledge and Practice of Nurses in Infection Control within a Tertiary Care Hospital. That study was cross-sectional descriptive design. Total 60 nurses were selected to evaluate the knowledge and practice of working in medical and surgical units at tertiary care hospital. This study showed that (78.3%) of nurses had fair knowledge while all the nurse's knowledge about hand washing after had well. However, all of the nurses had poorly practice of hand washing before and after patient care. In relation to nurses' knowledge about gloving, disinfection and discarding were good (71.7%, 63.3%, and 93.3%). Generally, (60%) of nurses had good knowledge and 51.7% had poor practice about infection control measures.

### Methods and Materials

The research methodology describes the whole process of the study which covers the areas on research design, study area, study duration, population, sample size, sampling technique, research instrument, data collection procedure, data analysis and interpretation, ethical consideration and assessment criteria.

### Study Design

A descriptive type of cross-sectional study was carried out to assess the level of nurses' knowledge regarding infection control at National Institute of Chest and Diseases Hospital (NIDCH), Dhaka.

### Study Period

The study was conducted from July 2023 to June 2024.

### Study Setting

The place of the study was conducted at National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka. It is a specialized level hospital where all kinds of

chest disease patients come throughout the country for better treatment and nursing management facilities. This hospital was established in 1955. This is 670 bedded hospitals. There are 12 units in department of Respiratory Medicine and 5 units of Thoracic Surgery departments. There are 500 nurses in this hospital. This hospital provides highest possible management for chest and tuberculosis related diseases. Medical, surgical, post-operative, ICU, RCU and operation theater were chosen where 200 senior staff nurses' acts as care provider.

### Study Population

The population in this study consisted of all nurses who were working in medical, surgical, post-operative, operation theater, ICU and critical care unit were considered as the study population. The total numbers of nurses were 200 who were considered as study population.

### Sample size

The sample size of this study was 50 (fifty) according to 25% proportion rate nurses from the total number of population (N=200) for conducting this study.

### Sampling technique

A non-probability convenient sampling technique was adopted for selecting the sample of the study by the researchers for the convenience of the researchers.

### Inclusion criteria

#### Inclusion for selecting study participants include

1. Nurses who had been working at NIDCH.
2. Nurses who were willing to participate voluntarily in this study
3. Nurses those who was psychologically and physically sound.

### Exclusion criteria

Those nurses were excluded from the study who did not meet the inclusion criteria.

### Research Instrument

A structured questionnaire was developed by the researchers on the basis of the study objectives and variables after reviewing the relevant literatures.

### The questionnaire consisted of two parts

- **Part 1:** Socio-demographic questionnaire: consisted of 8 items including-age (in years), gender, religion, marital status, current position, professional educational qualification, total length of government services, and special training regarding Infection Control Programme (IPC).
- **Part 2:** Knowledge Related Questionnaire (KRQ) regarding Infection Control consisted of 03 domains. Domain-1= Concept of Infection which contain 07 questions, Domain-2= Controlling Measures and Management of Infection which contains 12 questions, Domain-3= complications of Infection which contains 1 question. There were 20 questions and each question had 04(four) options and 01(one) option was considered as correct answer. Five marks was allocated for correct answer and thus total marks were 100 (hundred) that was converted into 100% during analysis.

**Validity**

The validity of the questionnaire was assessed and maintained by three experts and the subject teachers and experts in related area in College of Nursing, Mohakhali, Dhaka.

**Reliability**

A Pre-test was conducted at Dhaka Medical College, Hospital on the same characteristics of 10 sample to check acceptance and consistency of the instrument. Mean score of pre-tests was 76 out of 100. After that necessary correction was done before finalization of the questionnaire.

**Ethical consideration**

After approval of the academic research project proposal by the appropriate authority of the College of Nursing, Mohakhali, Dhaka and prior to start data collection procedures, a written permission letter was issued to the hospital director (National Institute of Chest and Diseases Hospital (NIDCH), Dhaka by the principal, College of Nursing Mohakhali, Dhaka, Memo No P.F. 1-1/2003/CN/204/1(11) and obtained permission from the concerned authority, Director of the selected hospital Memo no. NIDCH/AC/ 2024/150.

**Informed Consent and Voluntary Participation**

The written permission was taken from respondents after explaining the objectives of the study by the researchers to encourage them for voluntarily participation.

**Confidentiality and anonymity**

Confidentiality and anonymity were strictly maintained regarding obtaining data from the respondents. The respondents were ensured that their names were not published anywhere except by the concerned investigators. The collected data was kept under lock and key to avoid expression to others, and it was destroyed after the completion of the study.

**No harm and Right to Withdrawn:**

The respondents were ensured that there was no harm for participation in this study and they could withdraw from this study at any time without any hesitation.

**Data collection procedure**

Data were collected after obtaining permission from the Principal, College of Nursing, Mohakhali Dhaka, concerned authority and respondents of NIDCH. The researcher introduced himself/herself to the respondents and explained the objectives and benefits of the study and asked them to participate in the study. A written consent was obtained from them. After getting consent the researcher were collecting data through a self-administered questionnaire which was taken about 15-20 minutes per participant.

**Data management**

Collecting data were checked, organized and entered into the master sheet then was analysed manually by the researchers with the help of scientific calculator.

**Data Analysis and Interpretation**

The descriptive statistics were used for the analysis of the respondents' characteristics, distribution and level of

knowledge of Infection Control in terms of frequency, percentages range and mean. The important variables were analysed to fulfil the objectives of the study.

**Data presentation**

The results were presented by using tables and charts (bar, pie and column) with interpretations.

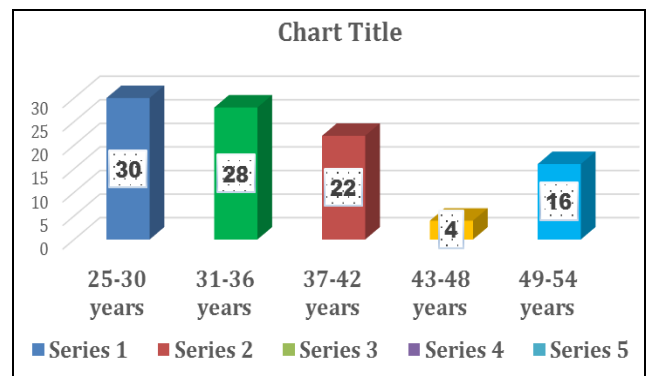
**Grading Criteria:** Total marks were 100 and grading was done within 100%.

S/N	Knowledge level	Percentage
01.	Excellent	90-100%
02.	Very good	80-89%
03.	Good	70-79%
04.	Average	60-69%
05.	Poor	<60%

**Results**

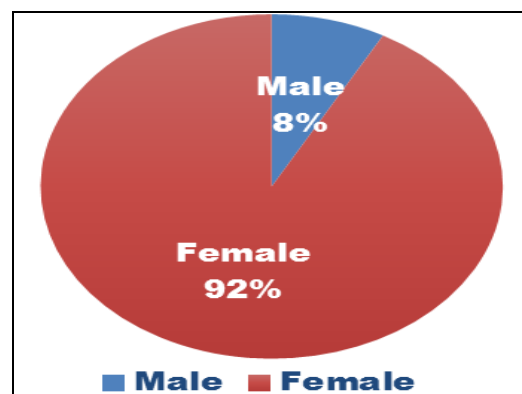
This chapter provides detailed description of the results with appropriate interpretation depending on the nature of the variables and objectives. The result of the demographic characteristics and nurses' knowledge regarding management of burn injury patients were presented as frequency, percentages, and mean by using column, pie chart and table.

**Part 1:** Socio-demographic characteristics of the respondents.



Mean age=36.02 years

**Fig 1:** Distribution of the respondents by age, N=50



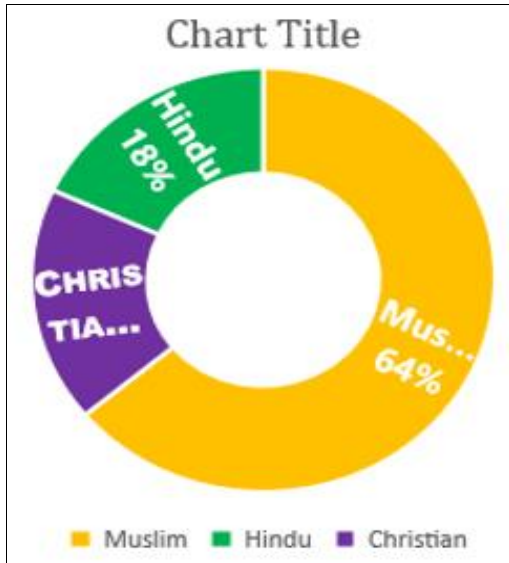
**Fig 2:** Distribution of the respondents by gender, N=50

**Description**

The above Figure 1 shows the distribution of respondents by age where out of 50 more than one fourth of the respondents

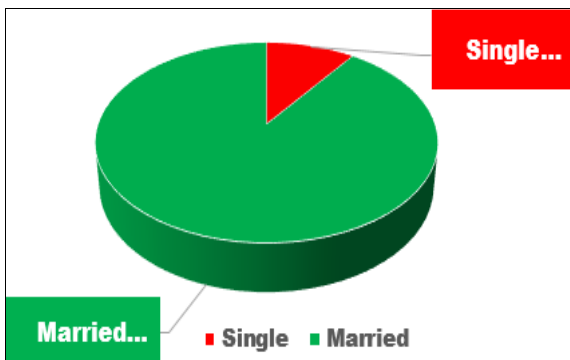
(30%) were in the age group from 25-30 years, 28% in the age group from 31-36 years, 22% age group in between 37-42 years, 4% in the age group from 43-48 years and 16% respondents were in the age group between 49-54 years. The mean age of respondents was 36.02 years.

**Description:** Above Figure 2 indicates that among total number of respondents most of them were female (92%) and the rest (8%) were male.



**Fig 3:** Distribution of respondents by religion, N=50

**Description:** The above Figure 3 sunburst chart illustrates that the greater number of respondents (64%) were Muslim, 18% were Christian and the rest 18% were Hindu.



**Fig 4:** Distribution of respondents by marital status, N=50

**Description:** The above Figure 4 describes that the large number of respondents 90% was married & the remaining 10% was unmarried

**Table 1:** Distribution of respondents by the current position, N=50

Variables	Items	Frequency (F)	Percentage (%)
Current Position	Staff Nurse	1	2
	Senior Staff Nurse	49	98
	Total	50	100

**Description:** Above Table 1 describes that only 2% respondents were staff nurse & the rest 98% respondents were senior staff nurse.

**Table 2:** Distribution of respondents by the professional qualification, N=50

Variables	Items	Frequency (F)	Percentage (%)
Professional Qualification	Diploma In Nursing	31	62
	B.Sc. in Nursing	16	32
	MPH/MSc in Nursing	3	6
	Total	50	100

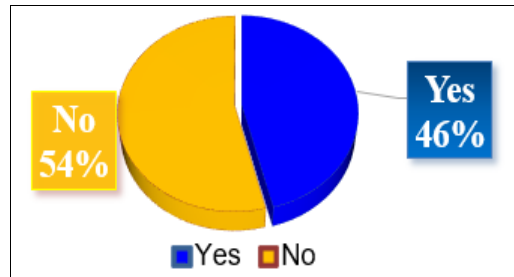
**Description:** Above Table 2 describes that more than half of the respondents (62%) have passed Diploma in Nursing; the remaining 32% have completed B.Sc. in Nursing and 6% acquired MPH/ MSc degree.

**Table 3:** Distribution of respondents by total length of Govt. Service Experience, N=50

Variables	Items	Frequency (F)	Percentage (%)
Total Length of Govt. Service Experience	2-6 Years	27	54
	7-11 years	9	18
	12-16 years	4	8
	17-21 years	3	6
	22-26 years	6	12
	>26 years	1	2
	Total	50	100

Mean = 9.6 years

**Description:** The above Table 3 shows that more than half of the respondents (54%) respondents had 2-6 years, 18% had 7-11 years, 8% had 12-16 years, 6% respondents had 17-21 years, 12% respondents had 22-26 years & the rest 2% had greater than 26 years of Govt. service experience.



**Fig 5:** Distribution of Respondents by Special Training on Infection Control Program (ICP), N=50

**Description:** The above Figure 5 of pie chart mentions that approximately more than half (54%) of the respondents did not have any special training on infection control and only the rest (46%) had short duration training on infection control.

**Part-II: Knowledge Related Information**

**In this section results are presented according to objectives of this study**

**Description:** The above Table 4 describes that most of the respondents (90%) answered correctly regarding Infectious disease that is transmitted by coughing or sneezing and 86% respondents provided correct answer to the types of diseases that are transmitted from one person to another where 60% respondents provided incorrect answer regarding the most commonly hospital acquired infection. Near about half of the respondents (44%) gave incorrect answer to both causing factor for spread of infection and meaning of Portal of Entry respectively.

**Table 4:** Distribution of the respondent’s knowledge regarding concept of infection, N=50

SL.	Variables	Correct Answer		Incorrect Answer	
		(F)	(%)	(F)	(%)
1.	Meaning of infection	37	74	13	26
2.	The most commonly hospital acquired infection	20	40	30	60
3.	Important component for transmission of infection	42	84	8	16
4.	Causing factor for spread of infection	28	56	22	44
5.	Meaning of Portal of Entry	28	56	22	44
6.	Infectious disease that is transmitted by coughing or sneezing	45	90	5	10
7.	Type of diseases that are transmitted from one person to another	43	86	7	14

**Table 4.1:** Level of nurses’ knowledge regarding concept of infection, N=50

Variables	Level	Grading Criteria	(F)	(%)	Obtained score	Mean score
Concept of infection	Excellent	90-100%	3	6	105	35
	Very Good	80-89%	17	34	510	30
	Good	70-79%	11	22	275	25
	Average	60-69%	---	---	---	---
	Poor	<60%	19	38	325	17.1
Total			50	100%	1215	24.3

Total Knowledge Score=69.42% which indicates average level of knowledge regarding concept of infection.

**Description:** The above Table 4.1 shows that only 6% respondents had excellent knowledge, and 38% respondents had poor knowledge regarding concept of infection.

**Table 5:** Distribution of the respondent’s knowledge regarding controlling measures and management of infection, N=50

Sl.	Variables	Correct Answer		Incorrect Answer	
		(F)	(%)	(F)	(%)
1	Effective method to reduce the transmission of infection	29	58	21	42
2	Process that kills, inhibits, or removes all pathogenic microorganisms including bacterial spores	32	64	18	36
3	The best and safest method of sterilization that kills microorganisms	45	90	5	10
4	Level of temperature and duration for autoclave	25	50	25	50
5	Important method of preventing the spread of infection	35	70	15	30
6	The accurate duration for hand washing procedure according to WHO	10	20	40	80
7	The period when instruments must be cleaned and disinfected	34	68	16	32
8	Color bin is indicated to dispose infected biochemical, anatomical & laboratory waste products	32	64	18	36
9	The recommended alcohol concentration for hand rubbing solutions to control infection	29	58	21	42
10	Measure is to be taken immediately after needle stick injury	47	94	3	6
11	Meaning of PPE	50	100	---	---
12	Different types of precaution are mainly required when managing an infectious patient to control infection.	26	52	24	48

**Table 5.1:** Level of nurses’ knowledge regarding controlling measures and management of infection, N=50

Variables	Level	Grading Criteria	(F)	(%)	Obtained Score	Mean Score
Controlling measures of infection	Excellent	90-100%	4	8	200	50
	Very Good	80-89%	11	22	495	45
	Good	70-79%	12	24	480	40
	Average	60-69%	6	12	210	35
	Poor	<60%	17	34	450	26.47
Total			50	100%	1835	36.7

Total Knowledge Score=66.73% which indicates average level of knowledge regarding controlling measures and management of infection.

**Description:** The mentioned table 5 shows that majority of the respondents (100%) answered correctly regarding the Meaning of PPE, 90% respondents gave correct answer to the sterilization is the best and safe methods to control infection. About half of the respondents (52%) provided correct answer to the different types of precaution are mainly required when managing an infectious patient to control infection. Most of respondents (80%) provided incorrect answer regarding the accurate duration for hand washing procedure according to World Health Organization

while 58% respondents recommended alcohol concentration for hand rubbing solutions helps to control infection. 64% respondents gave correct answer to color bin is indicated to dispose infected biochemical, anatomical & laboratory waste products and 68% responded respond correctly to the period when instruments must be cleaned and disinfected to control and manage infection.

**Description:** The above Table 5.1 shows the knowledge of controlling measures and management of infection part. 8% respondents had excellent knowledge, 22% respondents had

very good knowledge, 24% respondents had good knowledge, 12% respondents had average knowledge &

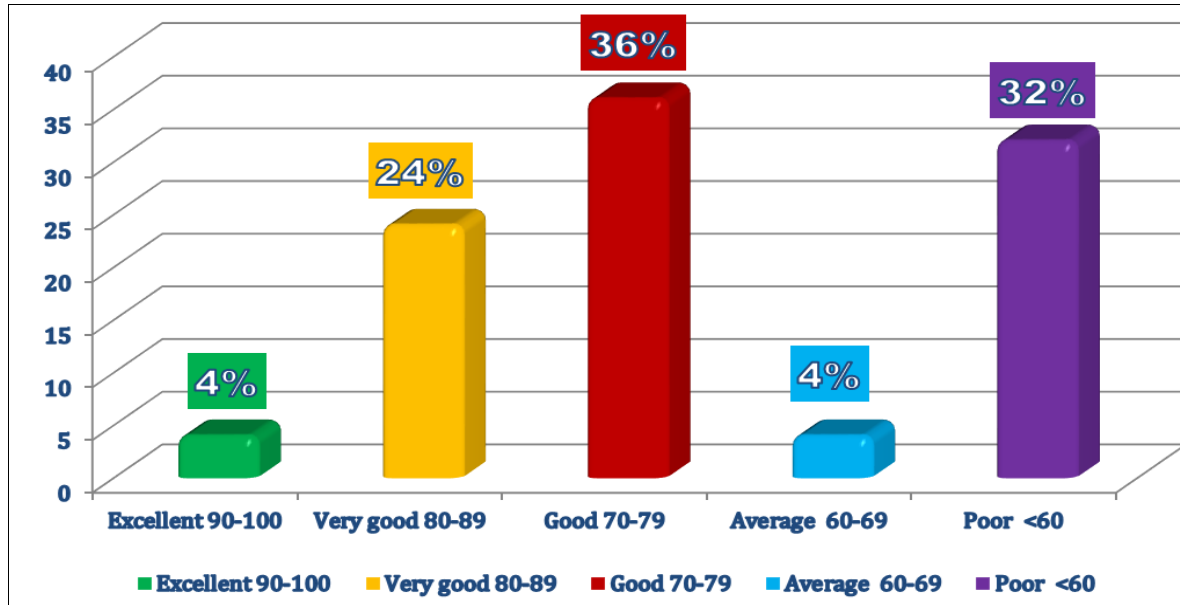
34% respondents had below average/ poor knowledge.

**Table 6:** Distribution of the respondent’s knowledge regarding complication of infection

Sl.	Variables	N=50			
		Correct answer		Incorrect answer	
		(F)	(%)	(F)	(%)
1	Sepsis is the main complication of bacterial infection	37	74%	13	26%

**Description:** The above Table 6 reveals that the complication of infection part where respondents were asked 1 question in this area. Among total respondents 74%

reported correct answer and rest of 26% respondents provided incorrect answer in this area.



**Fig 6:** Distribution of the respondents overall level of knowledge regarding infection control based on grading criteria, N=50

**Description:** Above Figure 6 shows that the overall level of knowledge of the respondents regarding infection control where only 4% respondents had excellent level of knowledge and 4% respondents had average level of knowledge, 24% of the respondents had very good level of knowledge, 36% of respondents had good level of knowledge, and rest of the respondents (32%) had poor level knowledge.

**Discussion**

A descriptive type of cross-sectional study was designed to assess the nurses’ knowledge regarding infection control at National Institute of Diseases of the Chest and Hospital. The study was carried out among 50 respondents who were selected conveniently. A structured questionnaire was used for data collection. The study basically focused on knowledge-based findings. However, the significant findings from both demographic and knowledge-based information on infection control among nurses at National Institute of Diseases of the Chest and Hospital are discussed below.

The study result showed that the mean age of the respondents was 36.02 years. Majority (92%) of the respondents were female. Most of respondents (64%) were Muslim by their religion and only 10% respondents were unmarried. In current study, more than half of the respondents (62%) had completed diploma in nursing, 32%

respondents completed B.Sc. in Nursing and only some 6% of the respondents had completed MPH/MSc degree in nursing according to their professional educational background. This is near to similar to a study was conducted in Nepal, 2018 on infection control knowledge and practice which showed that majority (72.5%) of the nurses had completed diploma in nursing, 22% respondents completed B.Sc. in nursing and only 5.5% of the respondents had completed MPH/MSc degree in nursing (Shrestha & Thapa., 2018) [11].

The mean age of work experience was 9.6 years where more than half of the respondents (54%) had 2-6 years of experience and only 2% of the respondents had work experience of more than 26 years. This finding is somewhat similar to a study done in Philippine Hospitals on knowledge and practice of Nurses on the Prevention and Control of HealthCare-acquired Infections in a Private Tertiary level hospital in 2023, showed that majority of the respondents had work experience of 5 years and very few 1.5% of the respondents had work experience of more than 25 years (Campo & Remon, 2023) [4].

In present study, 54% of the respondents did not get any training related to infection prevention and control less than half 46% of the respondents had received training on IPC. Similarly, a study was conducted by Thazha *et al.*, (2021) in India where more than half of them received information about IPC in trainings conducted by their hospital (54.1%),



and 36.3% obtained information on IPC from guidelines, books, articles, and 9.6% from other sources. Another study conducted by Das *et al.*, (2020) <sup>[6]</sup> on knowledge and practices regarding infection control among nurses in secondary level hospital & showed that 68.7% of the nurses did not get training sessions regarding infection control and 31.3% of them had received training about infection control which is also near too similar to this study.

The overall findings revealed that out of total respondents only 4% had excellent level of knowledge, 24% had very good level of knowledge, 36% respondents had good level of knowledge, 4% respondents had average level of knowledge and rest of 32% respondents had poor level of knowledge which also indicate that most (60%) of nurses had average level of knowledge regarding infection control. Researchers assume that in present study 32% respondents had poor level of knowledge because they did not get any training regarding infection control. Similarly, a study was conducted in Bangladesh by Das *et al.*, (2020) <sup>[6]</sup> reported that only 17.01% nurses had good knowledge but majority of the nurses (78%) had average knowledge due to lack of training about infection control. Near to similar a study conducted in Saudi Arabia by Salem (2019) <sup>[10]</sup> which also reported that 60% nurses had good level of knowledge regarding infection control. In Researchers thinks that all nurses need proper training on Infection Control Pregame (ICP) to prevention and control of infection and to minimize the complication of infection.

### Conclusion

Infection is a major problem encountered in health care delivery services worldwide. Infection control is very essential in hospital setting to reduce morbidity and mortality of the patients. This study was conducted among 50 nurses' knowledge regarding infection control in a specialized level hospital and can be concluded that 60% nurses' had average level of knowledge that is not satisfactory. It is recommended for updating knowledge of nurses through continuing educational programs and providing training program for newly appointed employees about infection control at regular intervals. This study revealed that the hospital maintains different aspect of infection control activities. Appropriate infection control led to prevent risk of spreading infection from patient to nurse and nurse to patient.

### Limitation of the study

There were some limitations during carrying out the research project is as follows:

This study was a cross-sectional study conducted among small number of sample size in one selected hospital. Therefore, the findings cannot be generalized to other hospitals. This study only focused on the assessment of knowledge level but not on the practice of nurses. So, this study may not explore the management of all services.

The study was conducted only among the nurses but not all the health workers.

### Recommendations

According to the findings, the present study recommends the following issue to improve the level of nurses' knowledge regarding infection control.

Regular seminar, symposium and workshop should be organized for nurses to acquire knowledge about infection control.

Government should implement various awareness and special training program for nurses to raise their level of knowledge on infection control.

Similar study can be conducted in a large scale for generalization of the findings.

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### Conflict of Interest

Not available

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