TO ASSESS KNOWLEDGE, ATTITUDES, AND PRACTICES AMONG NURSING STAFF ABOUT PREVENTION OF HOSPITAL ACQUIRED INFECTIONS (HAIs) AT MEDANTA HOSPITAL GURGAON, HARYANA

Dissertation Submitted to

The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Shraddha Akhilesh Rai

Under the Supervision and Guidance of

Dr. Piyusha Majumdar

2023

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled "**To Assess Knowledge, Attitudes, And Practices Among Nursing Staff About Prevention Of Hospital Acquired Infections At Medanta Hospital Gurgaon, Haryana"** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Shraddha Akhilesh Rai

Date:

Dissertation certificate

CERTIFICATE

This is to certify that dissertation titled **"To Assess Knowledge, Attitudes, And Practices Among Nursing Staff About Prevention Of Hospital Acquired Infections At Medanta Hospital Gurgaon, Haryana"** is a record of the research work undertaken by Shraddha Akhilesh Rai in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

Dr. Piyusha Majumdar
(Faculty Guide)
IIHMR University, Jaipur

Date:

Dr. (Col) Mahender Kumar
(School Dean)
IIHMR University, Jaipur

Date:

Abstract:

Introduction: Infections that a patient contracts after being admitted to the hospital but did not exist at the time of their hospitalisation are referred to as hospital acquired infections. Any healthcare team would be incomplete without nurses, who contribute specifically to the management of hospital acquired infections.

Aim: To assess the level of knowledge, attitudes, and practices among nursing staff about prevention of hospital acquired infections (HAIs) at Medanta Hospital Gurgaon.

Objectives:

- To assess the knowledge of infection prevention measures among nursing staff
- To measure the attitude of nurses towards infection control protocols
- To assess the practices of Medanta towards reducing hospital acquired infection.

Methods and Materials: This descriptive cross-sectional study was done among nurses of inpatient department with a sample size of 152 nurses across various specialities. Convenience random sampling technique was used, and data was collected using self-administered questionnaire Only 152 staff nurses who completed and returned the questionnaire were included in this study. Data analysis was done using Microsoft excel software.

Result: Among the respondents, only 56% recognized the vulnerability of patients at extreme age ranges to infections. Out of the 152 participants, 98 nurses were aware of the components encompassed by standard precautions, while the remaining 54 nurses lacked this knowledge. Furthermore, only 39 nurses demonstrated understanding of the criteria for attributing an infection as a healthcare-associated infection (HAI). The study revealed that 150 nurses were fully aware of the five moments of hand hygiene, but the hand hygiene audit showed a concerning compliance rate of 66.3%. Additionally, 66.4% of nurses correctly believed that using hand rub when hands are visibly soiled is incorrect, highlighting a significant knowledge gap. Only 91 nurses knew the correct sequence for donning, and 82 nurses knew the correct sequence for doffing. Among the surveyed nurses, 59 expressed difficulties in practicing infection control precautions due to workload. However, all nurses unanimously agreed on the importance of monitoring infection control activities, provision of hepatitis B and TT vaccinations, and regular training on infection control practices.

Conclusions: The study findings underscore the importance of continuous education, reinforcement, and practical demonstrations to bridge knowledge gaps and promote consistent adherence to infection control practices. By addressing these gaps, healthcare institutions can enhance patient safety, prevent healthcare-associated infections, and create a culture of infection control compliance among healthcare professionals. The healthcare workers' adherence to essential measures such as hand washing and proper use of personal protective equipment (PPE) was below par, resulting in an elevated risk of healthcare-associated infections (HAIs).

Keywords: HAIs, TT, donning, doffing, standard precautions, hand rub.

ACKNOWLEDGEMENT

My sincere gratitude to Dr. Piyusha Majumdar, an assistant professor at the Indian Institute of Health Management Research, for her significant advice, help, and mentorship throughout the course of my dissertation project. The insights and perspectives of Dr. Majumdar have greatly influenced the course of my research and improved the calibre of my work. She has been a constant source of inspiration for me because of her unwavering commitment, forbearance, and encouragement. I sincerely appreciate her for the time and effort she put in me.

I would also like to express my heartfelt gratitude to our respected dean of the MBA Hospital Management programme, Dr. (Col) Mahender Kumar, at Indian Institute of Health management and Research Jaipur, for his continuous guidance and support through out our MBA course. He has provided us students with a plethora of knowledge and insight into the management of hospitals. His mentorship has been extremely helpful in successful completion of my research.

Yours Sincerely,
Shraddha Rai

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List of Abbreviations

S. No	Abbreviation	Full Form
1	HAI	Hospital acquired infection
2	PPE	Personal protective equipment
3	CAUTI	Catheter-associated Urinary Tract Infections
4	CLABSI	Central Line-associated Bloodstream Infection
5	VAP	Ventilator associated pneumonia
6	SSI	Surgical site infection
7	KAP	Knowledge, attitude, and practices
8	CNE	Continuous nursing education
9	IV	Intra venous
10	HCW	Health care workers
11	SOPs	Standard operating procedures
12	SPSS	Statistical Package for the Social Sciences
13	ENT	Ear, nose, throat
14	LDR	Labour, delivery, recovery
15	GI Surgery	Gastrointestinal Surgery
16	CTVS	Cardiothoracic and Vascular Surgeons
17	BMW	Biomedical waste management
18	Uro bag	Urine collecting bag
19	IC	Infection control
20	TT	Tetanus Toxoid
21	HAZMAT	Hazardous Materials Management
22	COVID- 19	Coronavirus disease of 2019,

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About Medanta-The Medicity

Dr. Naresh Trehan envisioned the need for an advanced super-specialty medical facility in India after witnessing the challenges faced by Indian patients who couldn't afford to seek treatment abroad. He recognized the importance of providing high-quality healthcare, advanced technology, and a combination of traditional Indian medicine and contemporary practices, all at an affordable cost. This vision led to the establishment of Medanta, which has now become the leading private hospital in India, thanks to Dr. Naresh Trehan's visionary leadership and our steadfast dedication to fulfilling our mission.

Vision: Our Institute is governed under the guiding principles of providing affordable medical services to patients.

Mission: Our mission is to deliver world class health care by creating institutes of excellence that integrate medical care, teaching, and research.

Core values of Medanta:

- Leadership & excellence: With a commitment to deliver the best possible outcome in everything we do through exemplary action and behaviour.
- Integrity & courage: Maintaining high ethical standards by putting the patient’s interests first and demonstrating the courage to do only what is right.
- Compassion & service: Fostering a culture where everyone is committed to care for patients and their caregivers beyond the call of duty.
- Collaboration, learning & innovation: Promote teamwork and collaboration, welcome change, and creativity to encourage innovation and seek better ways to achieve our goals.

Specialities Offered:

- Institute Of Musculoskeletal Disorders and Orthopaedics
- Cancer Institute
- Breast Cancer
- Head and Neck: Oncology
- Medical and Haematoma Oncology
- Radiation Oncology
- Institute of Critical Care and Anaesthesiology
- Institute of Digestive and Hepatobiliary Sciences
- Gastroenterology
- GI Surgery, GI Oncology and Bariatric Surgery
- Institute of Chest Surgery-Chest Onco Surgery and Lung Transplantation
- Heart Hospital
- Institute of Obstetrics and Gynaecology
- Clinical and Preventive Cardiology
- Cardiac Surgery
- Electrophysiology and Pacing
- Interventional Cardiology
- Kidney and Urology Institute
- Nephrology

- Urology and Andrology
- Institute of Liver Transplantation and Regenerative Medicine
- Institute of Neurosciences
- Ayurvedic Medicine
- Clinical Immunology and Rheumatology
- Dental Sciences
- Dermatology
- Emergency and Trauma Care
- Endocrinology and Diabetology
- Gynaecology and Gynae Oncology
- Internal Medicine
- ENT, Head & Neck Surgery Hospital
- Laboratory Medicine. Pathology and Blood Bank
- Ophthalmology
- Paediatrics
- Peripheral Vascular and Endovascular Sciences
- Radiology and Imaging
- Respiratory and Sleep Medicine
- Plastic, Aesthetic and Reconstructive Surgery

Facilities and Services offered:

- Emergency & Trauma Care
- Critical Care Units
- Lab Tests & Diagnostics
- Wards & Rooms
- eCLINIC-Telemedicine Services
- Day Care
- Home Sample Collection
- Patient Support Services
- Homecare Services
- Medicine Delivery

Medanta Mediclinic

Founded by Medanta, a renowned multi-specialty hospital with headquarters in Gurgaon, India, Medanta Mediclinic is a network of outpatient clinics. These medical clinics are made to give people access to specialised healthcare in a convenient way.

Modern medical technology and skilled medical personnel are employed by Medanta Mediclinics, which also have state-of-the-art medical facilities. They provide a variety of medical services in many different areas, such as cardiology, endocrinology, gastroenterology, orthopaedics, neurology, pulmonology, and others. A wide range of medical disorders are treated in these clinics through consultation, diagnosis, and treatment.

The Mediclinics are made to meet the needs of patients who may not need to be admitted to a hospital or receive inpatient care but still need specialised medical care. For consultations, examinations, diagnostic testing, and minor operations, they provide a comfortable and welcoming environment.

Units	**Overview**
Medanta –The Medicity, Gurugram	Flagship facility of Medanta • Established in 2009 • 1,391 installed beds • 280 ICU beds
Medanta Hospital, Lucknow	• Established in 2019 • 410 installed beds • 93 ICU beds
Medanta Abdur Razzaque Ansari Memorial Weavers' Hospital, Ranchi	• Commenced Operations under "Medanta" brand in 2015 • 200 installed beds • 68 ICU beds
Medanta Super Speciality Hospital, Indore	• Commenced Operations under "Medanta" brand in 2015 • 200 installed beds • 68 ICU beds
Jai Prabha Medanta Super Specialty Hospital, Patna	• Commenced operations under the "Medanta" brand in 2014. Inpatient services launched in 2021 • Designed to accommodate over 500 beds, 112 ICU beds
Medanta Hospital, Noida	• Commencement in FY25 • 300 expected installed beds

Introduction:

A hospital-acquired infection (HAI), according to the Centres for Disease Control and Prevention, is a localised or systemic disease that develops as a result of an adverse reaction to the presence of an infectious agent or its toxin, without any evidence of the agent being present or developing at the time of admission.

If the date of the occurrence falls on or after the third calendar day (CL) after admission, where the day of admission counts as one, an infection is considered to have been acquired in a hospital.

Hospital-acquired infections also includes infections that occur after discharge of the patient as well as occupational infections among healthcare workers. However, it does not include colonization or inflammation resulting from tissue response to injury or non-infectious agents.

Hospital-acquired infections can be acquired through two sources:

- Endogenous source: These infections originate from the patient's own flora, meaning that the patient's own microorganisms or pathogens cause the infection.
- Exogenous source: These infections come from external sources, which can include:
    - Environmental sources: Pathogens present in the hospital environment, such as contaminated surfaces, medical equipment, or water sources.
    - Healthcare workers: Infections can be transmitted from healthcare personnel who may be carrying pathogens or fail to follow proper infection control protocols.
    - Other patients: Patients who are already infected or colonized with pathogens can spread the infection to other patients within the hospital setting.

Hospital-acquired infections are commonly caused by a group of microorganisms known as the ESKAPE pathogens. These pathogens include:

- Enterococcus faecium: A type of bacteria that commonly causes infections in healthcare settings, particularly in patients with compromised immune systems.
- Staphylococcus aureus: A bacterium responsible for various infections, including surgical site infections and bloodstream infections. It is known for its antibiotic resistance, such as methicillin-resistant Staphylococcus aureus (MRSA).
- Klebsiella pneumoniae: A bacteria that can cause pneumonia, urinary tract infections, and bloodstream infections, often associated with antibiotic resistance.
- Acinetobacter baumannii: A bacteria known for causing infections in intensive care units (ICUs) and often resistant to multiple antibiotics.
- Pseudomonas aeruginosa: A common cause of healthcare-associated pneumonia, urinary tract infections, and bloodstream infections, especially in patients with weakened immune systems.
- Enterobacter species and Escherichia coli: These bacteria can cause various infections, including urinary tract infections, surgical site infections, and bloodstream infections, and can also exhibit antibiotic resistance.

Healthcare workers, and nurses in particular, are at an increased risk of acquiring infections due to several factors:

- Proximity to Infected Patients: Nurses have close and frequent contact with patients, including those who may be colonized or infected with contagious pathogens. This proximity increases the likelihood of exposure to infectious agents.
- Invasive Procedures: Nurses often perform invasive procedures, such as inserting intravenous lines, urinary catheterization, and wound care. These procedures can breach the body's natural defence mechanisms, making healthcare workers more susceptible to infections.
- Suboptimal Adherence to Infection Prevention Practices: In busy healthcare settings, adherence to infection prevention practices may be compromised due to time constraints, inadequate resources, or lack of awareness. Failure to follow hand hygiene protocols, proper use of personal protective equipment (PPE), and aseptic techniques can contribute to the risk of infection.
- Exposure to Drug-Resistant Pathogens: Healthcare workers, including nurses, may encounter drug-resistant microorganisms like methicillin-resistant Staphylococcus aureus (MRSA) or multidrug-resistant bacteria. These organisms pose an additional challenge in terms of treatment and infection control.

With regard to hospital-acquired infections, nurses face a number of occupational risks. Below are some of these risks:

- Nurses are more likely to come into contact with patients who are sick with infectious diseases, increasing their risk of infection. Their chance of contracting illnesses is increased by this exposure.
- Accidental needlestick injuries are a possibility for nurses because they constantly handle needles and other sharp objects. They are at danger of contracting hepatitis B, hepatitis C, and other blood-borne illnesses because of this.
- Lack of PPE: In some circumstances, nurses might not have access to or be able to properly use PPE. This makes them more susceptible to contracting illnesses from patients.
- Long work shifts: Nursing professionals' immune systems might be compromised by long shifts and fatigue, leaving them more vulnerable to infections.
- High levels of stress and burnout can impair nurses' immune systems and increase their susceptibility to infections.
- Inadequate education and training: Nurses who lack enough training and awareness of infection control procedures may be more susceptible to hospital acquired infections.

The safety of nurses must be prioritised by healthcare organisations in order to reduce these risks. To do this, they must receive enough training, encourage adherence to infection control procedures, ensure access to the right PPE, and put in place workload and fatigue management procedures.

The major types of hospital-acquired infections are:

- Catheter-associated urinary tract infection (CAUTI): This type of infection occurs when a urinary catheter is used, leading to an infection in the urinary tract.
- Central line-associated bloodstream infection (CLABSI): CLABSI happens when a central venous catheter is used, and bacteria enter the bloodstream, causing an infection.
- Ventilator-associated pneumonia (VAP): VAP is a lung infection that develops in patients who are on mechanical ventilation. It is caused by bacteria entering the lungs through the ventilator tube.
- Surgical site infection (SSI): SSI refers to an infection that occurs at the site of a surgical incision. It can happen after any surgical procedure and is caused by bacteria entering the incision site.

These types of hospital-acquired infections are a significant concern in healthcare settings and require strict adherence to infection prevention protocols to reduce their occurrence.

Literature review:

S No.	Authors (Year)	Study Location	Sample size	Sampling technique	Salient features
1	A S M Anwarul Kabir et al. (2018)	Dhaka city	234	Convenience random sampling	From January to June 2017, nurses with two years of experience from two tertiary hospitals in Dhaka city participated in this descriptive cross-sectional study. As a technique for gathering data, a self-administered questionnaire with a variety of questions about knowledge, attitude, and practise addressing HAI was employed. All of the staff nurses working in the various in-patient wards of these two hospitals received the questionnaire. The study only included 234 staff nurses who completed and returned the questionnaire. Software from Microsoft Excel 2013 was used to analyse the data. The findings of this study indicate that most participants exhibited a high level of understanding regarding infection prevention, but there was limited implementation in their actual practice. To enhance knowledge, attitude, and practice regarding healthcare-associated infections (HAIs), it is crucial to establish a regular training program and implement

					performance feedback mechanisms, particularly focused on hand hygiene. These measures are essential for bridging the gap between knowledge and practice, and for promoting effective infection prevention strategies.

2	Kaushik Nag et al. (2018)	Tripura	191	Convenience random sampling	A cross-sectional study was conducted at Tripura Medical College and Dr. BRAM Teaching Hospital, Hapania, involving 191 healthcare workers, including staff nurses, nursing students, lab technicians, OT assistants, ward girls, and sweepers who were present on the survey day. Data was collected using self-administered questionnaire, and for analysing Microsoft excel was used. The participant population was predominantly comprised of staff nurses (35.1%) and nursing students (31.9%). The findings revealed that 87.4% of healthcare professionals were familiar with hospital-acquired infections (HAI). Urinary tract infections were reported as the most frequent type of HAI by study participants (60.5%), and nurses were identified as the group most susceptible to such infections (34.6%). A significant number of participants (94.8%) expressed their belief that working in a hospital exposed them to infectious diseases, and 60.2% indicated their willingness to change their workplace to prevent contracting infections from a hospital. Among the participants in the trial, a noteworthy 90% of healthcare personnel who had contact with patients practiced hand hygiene afterwards. However, despite

					their awareness of hospital-acquired infections (HAIs), the absence of adequate quality control measures remains concerning, potentially hindering effective prevention of these infections. To tackle this issue, it is imperative to implement substantial Information, Education, and Communication (IEC) interventions. These initiatives should focus on emphasizing the importance of HAI prevention among healthcare personnel, aiming to enhance infection control protocols and reduce the incidence of HAIs.

3	Nini Asfaw (2021)	Aksum Saint Mary hospital, Northern Ethiopia.	139	Convenience random sampling	The study revealed deficiencies in the practice and understanding of nurses regarding the prevention of hospital-acquired infections (HAIs). However, higher educational attainment, increased experience, and access to HAI prevention literature were positively associated with better practices. Experience and participation in formal training were also linked to improved knowledge. To enhance nurses' knowledge and skills in HAI prevention, implementing continuing education programs, providing in-service training, and ensuring availability of appropriate guidelines are recommended strategies. These interventions can contribute to improving nurses' abilities in effectively preventing HAIs.

4	Jeyasheelan VP, Deiva suga SS, Myneni S, et al.	Panimalar Medical College Hospital & Research Institute, Chennai, Tamilnadu, India	367	Convenience random sampling	In general, the participants of the study, who were healthcare workers, exhibited satisfactory understanding and attitudes towards the prevention of hospital-acquired infections (HAIs). Continuous education and intensive training on HAIs at all levels are essential for improving the knowledge and perception of infection prevention among tertiary care health workers. Collaboration between policymakers and the infection control team is necessary to develop and enhance effective intervention methods aimed at reducing HAIs. In future research, stronger observational study designs may be employed to validate the knowledge, perception, practice, and attitude of professionals across various levels of healthcare delivery systems towards HAI prevention.

5	Sunil Kumar Kakkar et al. (2021)	Tertiary care hospital in India	105	Convenience random sampling	Both the first post intervention response and the second post intervention answer in the current study showed a substantial rise in attitude score from preintervention level. After intervention, nurses' infection control procedures also got better, though it wasn't statistically significant. In order to lower the occurrence of HAIs, it is necessary to build a system of continuous education, according to a previous study that found education has a favourable impact on the nursing staff's KAP. Incidence of IV catheter-associated HAI decreased in both male and female patients between pre- and post-intervention. However, only female patients showed a change in the incidence of CAUTI. This is possibly because it is standard practise for resident doctors to catheterize male patients, whereas nurses catheterized female patients in accordance with procedure in our institute, and these resident doctors were not included in the study group. As a result of the intervention, nurses performed better. This demonstrates the potential for CNE to play a substantial role in reducing the

					frequency of HAIs by raising nursing practitioners' awareness of protocols designed to reduce HAIs. The results of this study suggest that a single teaching programme on HAI prevention contributed to a decrease in the frequency of infections associated with IV lines. The execution of initiatives and protocols intended to lower the incidence of HAIs depends heavily on the education and training of healthcare professionals. The study re-emphasized the significance of regular educational programmes in reducing the incidence of HAIs.

6	Biruk Bayleyegn et al. (2021)	University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia	236	Convenience random sampling	The study included the participation of 236 healthcare professionals, achieving a response rate of 100%. The majority of respondents (60.6%) were men between the ages of 26 and 30. Nurses constituted the largest group (62.7%) based on participant density within each field, and 95.5% of the healthcare workers (HCWs) held a first degree. Furthermore, a significant portion (69.5%) of the 236 HCWs had less than five years of work experience. The study revealed that a high proportion of participants (90.2%) possessed knowledge regarding the prevention of healthcare-associated infections (HAIs). Similarly, a substantial majority (96.6%) of survey participants displayed a strong understanding of the importance of implementing standard operating procedures (SOPs) to reduce HAIs. Moreover, over 92% of survey participants recognized the significance of hand washing before and after patient treatment, as well as the use of personal protective equipment (PPE), in preventing HAIs. A positive attitude

					towards HAI prevention was shared by 135 respondents (57.2%) in the sample. Additionally, 207 study participants (91.1%) strongly agreed on the necessity of using antiseptics to avoid HAIs. However, there was not universal agreement among respondents regarding the importance of changing masks as a measure of HAIs control, with a combined percentage of disagreement and uncertainty reaching 46.2%. Despite having sufficient understanding of infection control, the healthcare professionals in this study fell short in terms of their attitudes and adherence to safe practices. The standard of care provided by these professionals for fundamental practices such as hand washing, wearing PPE, disposing of infectious objects, and handling leftover samples was subpar, ultimately increasing the risk of HAIs. Furthermore, the study found a strong correlation between the practice and attitude towards HAI prevention and risk factors, including the HCWs' educational level and job experience.

					Therefore, it is recommended that strict adherence to clinical specimen handling and disposal procedures be ensured, alongside continuous on-the-job and off-the-job training. Additionally, hospitals should provide necessary resources such as PPE, continuous water supply, hand washing sinks, and infection prevention equipment to enhance healthcare professionals' infection prevention practices.

7	Yakob et al. (2015)	The Mizan-Aman General Hospital in Southwest Ethiopia	135	Convenience random sampling	The Mizan-Aman General Hospital in Southwest Ethiopia served as the study's site, and 135 healthcare professionals served as the study's sample. A self-administered questionnaire was used to collect data as part of a cross-sectional study design. Epidata 3.1 was used for data entry, and SPSS version 17 was used for analysis. According to the findings, 57 (42.2%) of the 135 respondents who worked in healthcare indicated that they always followed conventional precautions. 65.6% of the population have previously taken part in training. The knowledge that disease-causing substances could be transmitted by contaminated needles and sharp objects was shared by all responders. Nearly 76.3% of medical professionals believed they were at risk of catching HIV while at work. 91 (67.4%) healthcare workers utilised sharp and liquid-proof containers without removing syringes, compared to 59 (43.7%) who used open pails. In terms of personal protective equipment, 95 (70.4%) healthcare personnel were aware of the requirement to use gloves

					and gowns when working with patients. The majority of the respondents—63, or 46.2%—regularly adhered to the guidelines for handling blood and body fluids. When taking blood samples, 103 (76.5%) medical staff said they wore gloves. After using a needle, 84 (62.5%) members of the medical staff promptly covered it, and 92 (68.7%) did the same before handling patients. Inadequate, negative, and inconsistent information, attitudes, and practises about traditional precautions were found to be prevalent among healthcare professionals, according to the study. The researchers suggest reinforcing and integrating common measures into standard services through training programmes and the establishment of infection prevention standards, protocols, norms, and laws for healthcare staff.

8	OE Amoran et al. (2013)	Hospital setting in Nasarawa State, Nigeria	421	Convenience random sampling	(Oe Amoran 2013) With a sample size of 421 healthcare professionals, this study was carried out in a hospital setting in Nasarawa State, Nigeria. In order to choose the participants, the proportionate sampling method was used. The study was cross-sectional and analytical in design. In Nasarawa State, between January and February 2009, a standardised self-administered questionnaire was used to gather pertinent data from healthcare providers. Proportions and medians were used to define patient characteristics. To compare proportions for categorical variables, chi-square tests were utilised. To find the contributing components, a logistic regression model was created with infection control as the outcome variable. The findings showed that, of the 421 healthcare professionals surveyed, the majority (77.9%) comprehended infection control and general precautions in a correct manner. Although vaccination, postexposure prophylaxis, and surveillance for emerging illnesses are all considered routine infection

					control practises, 19.2%, 19.2%, and 28.0% of respondents couldn't name them. The percentage of healthcare professionals who said they put on gloves before touching patients or patient care items was about 70.1%. Only 12.6% of participants reported washing their hands before to donning gloves, while 10.7% did so after taking the gloves off. After each patient visit, roughly 72.4% of people changed their gloves. A competent sharps disposal system was only available to 3.3% of respondents' workplaces. The majority of participants (98.6%) indicated that the lack of equipment was the main cause of noncompliance with general precautions. The study found many statistically significant variations in how typical precautions are used. In contrast to those who had not, people who had been exposed to blood products and bodily fluids over the previous six months had different behaviours (2 = 3.96, P = 0.03). Additionally, different behaviours were seen between workers in secondary and tertiary facilities compared to those in primary healthcare facilities (2 =

					14.64, P = 0.001), as well as between urban and rural areas (2 = 4.06, P = 0.02), as well as between public and private healthcare providers (2 = 22.32, P = 0.001). With an odds ratio of 4.56 (confidence interval: 1.00-21.28), recent exposure to blood and bodily fluids over the previous six months was the only factor that predicted adherence to standard precautions. According to the study's findings, environmental problems such a lack of equipment and protective materials and knowledge gaps among healthcare personnel present serious problems that must be addressed immediately. In Nigeria and other low-income nations in Africa, the implementation of a surveillance system for hospital-acquired infections is advised to improve consistent adherence to basic measures among healthcare staff.

Methodology:

This descriptive-cross-sectional study was done among staff nurses in Medanta – The Medicity Multi-Speciality Hospital in Gurgaon during March-May 2023. Following the inclusion and exclusion criteria a questionnaire was supplied to all staff nurses available at different in-patient wards across various specialities. Among 152 nurses who responded, filled completely, and returned the questionnaire were included in this study.

Study design: Descriptive cross- sectional study

Study setting: Medanta- The Medicity

Study duration: 1 March – 31 May 2023

Sample size: 152

- Inclusion criteria: Nursing staff from Inpatient ward
- Exclusion criteria: Operation theatre, Intensive care unit, Emergency, Daycare, Out-patient area.

Data collection: Data was collected using self-administered questionnaire. The questionnaire consists of questions regarding knowledge (21 questions), attitude (6 questions), practices (5 questions).

- Knowledge: When caring for patients, knowledge involves having a clear awareness of and understanding of infection prevention measures.
- Attitude: When providing care for patients, attitude is one's individual viewpoint on infection control measures.
- Practise: Practise is a skill for caring for patients in terms of infection prevention activities.

Data analysis: Collected data was analysed using Microsoft excel.

Biasness in study:

- Sampling Bias: Convenience random sampling may introduce sampling bias, as it relies on selecting participants who are easily accessible or readily available. This may not represent the entire population of nursing staff accurately and may result in a biased sample.
- Self-Administered Questionnaire: The use of a self-administered questionnaire can introduce response bias. Participants may provide socially desirable answers or may not fully understand the questions, leading to inaccurate responses. Additionally, there may be a risk of incomplete or missing data if participants choose not to answer certain questions.

Limitations: Limited Scope: The study focused solely on assessing knowledge, attitudes, and practices among nursing staff. It did not consider other factors that could influence hospital-acquired infections, such as organizational policies, resources, or patient-related factors. This limited scope may not provide a comprehensive understanding of the issue.

Ethical considerations: Ethical considerations of the study:

- Obtaining informed consent from participants
- Ensuring confidentiality
- Obtaining necessary approvals (Nursing Director and Deputy General Manager of Operations).

Results

The following are the study participants' demographic information:

- The study's participants age distribution is depicted graphically in the clustered bar graph below. In terms of age groupings, this succinct summary gives crucial details regarding the demographic make-up of the research population.

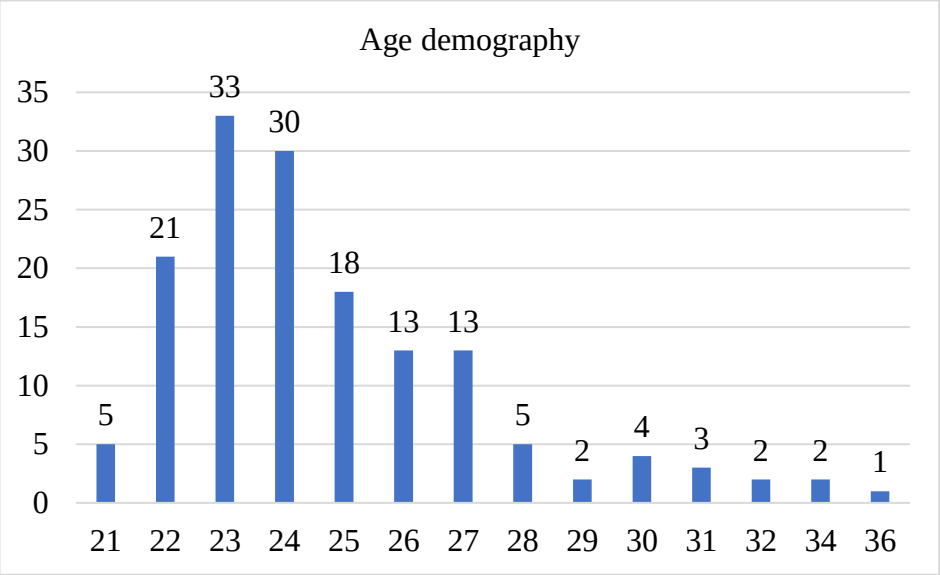

Fig 1.1

- The pie chart below depicts the gender distribution for this study. Among 152 nurses, 85.5% female and 14.5% male

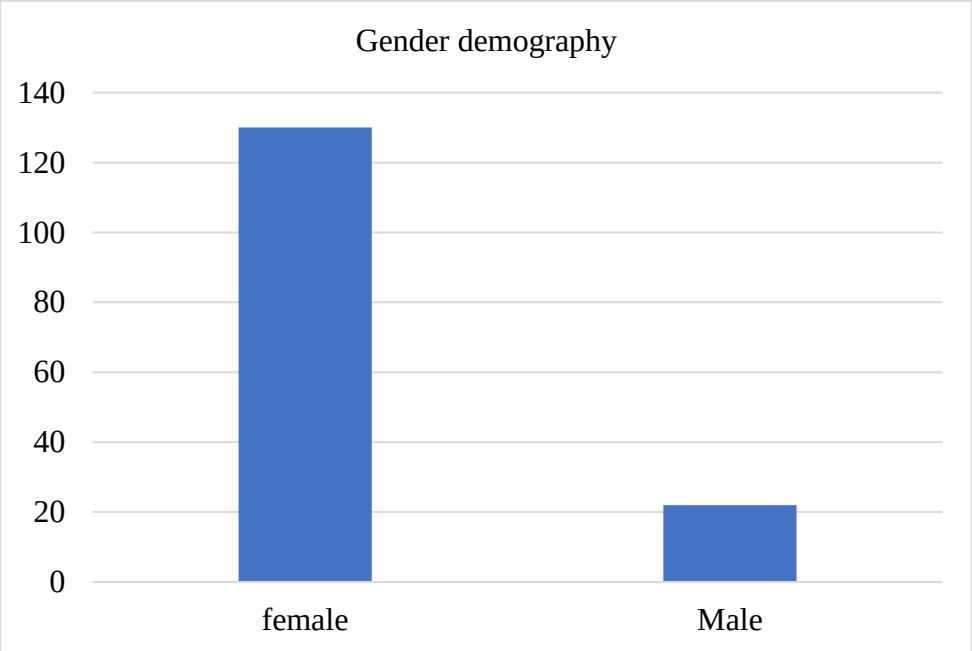

Fig 1.2

- The following clustered bars depicts the work experience of employees in this study. Of the 152 nurses, 38.2% had more than 6 months and less than 2 years of experience, 27.6% had less than 6 months, and 23% had more than 2 years and less than 5 years of experience. Remaining 11.2% of nurses had more than 5 years of experience.

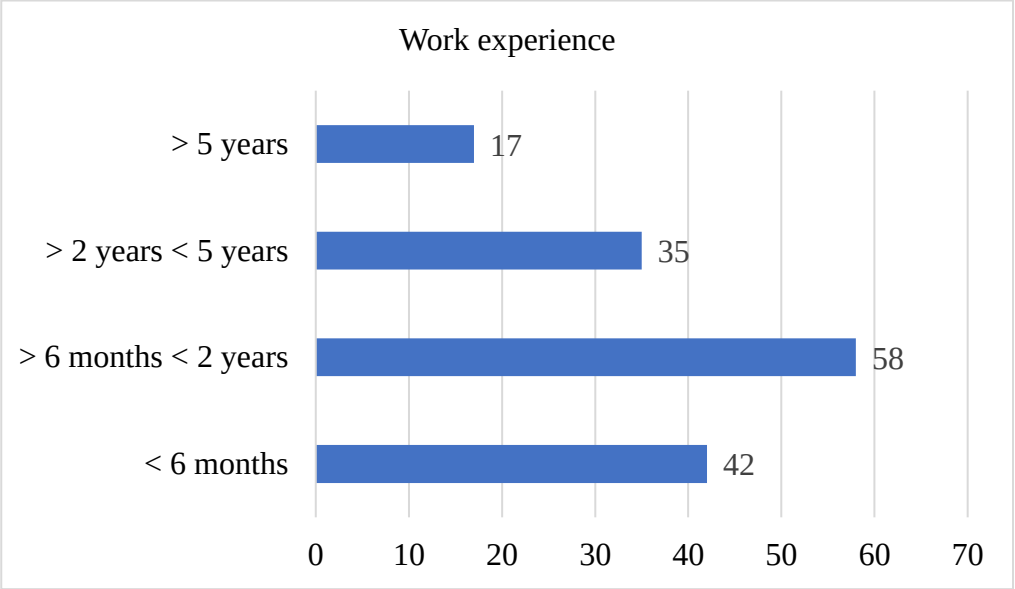

Fig 1.3

- The following clustered bars shows the distribution by specialization. Here, the questionnaire was filled out by nurses, the largest number of study participants were from neuroscience department.

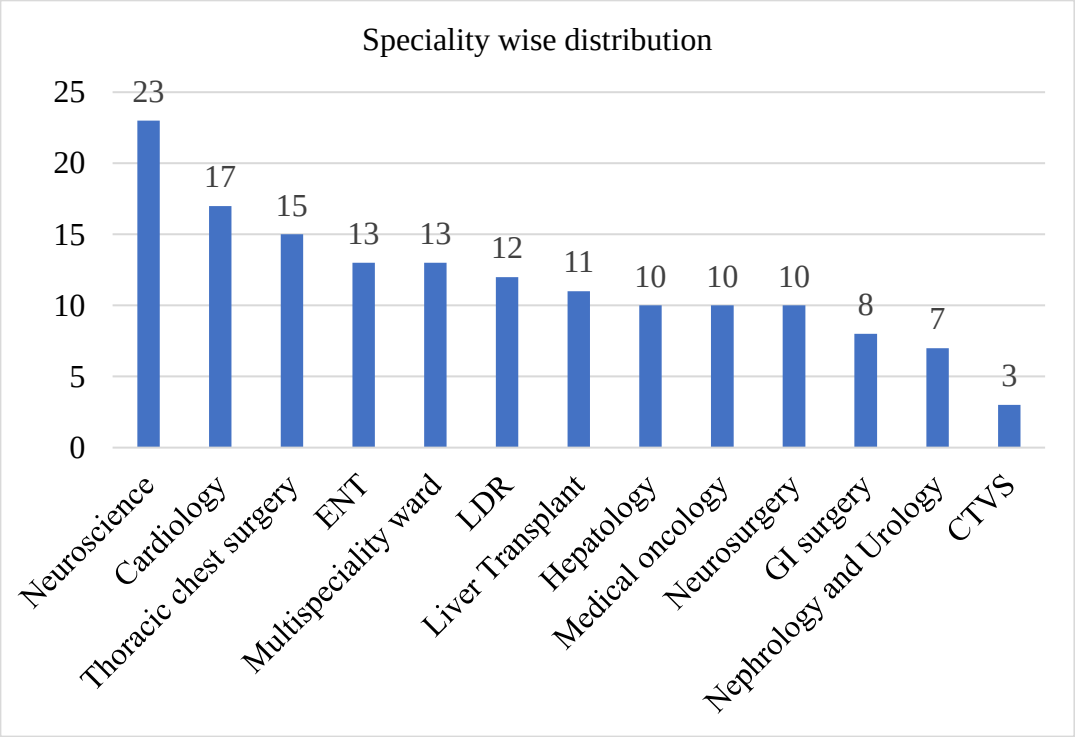

Fig 1.4

Knowledge:

- The pie chart below shows the percentage of people who have heard about infection control practises. 100 percent of the nursing staff have heard about it.

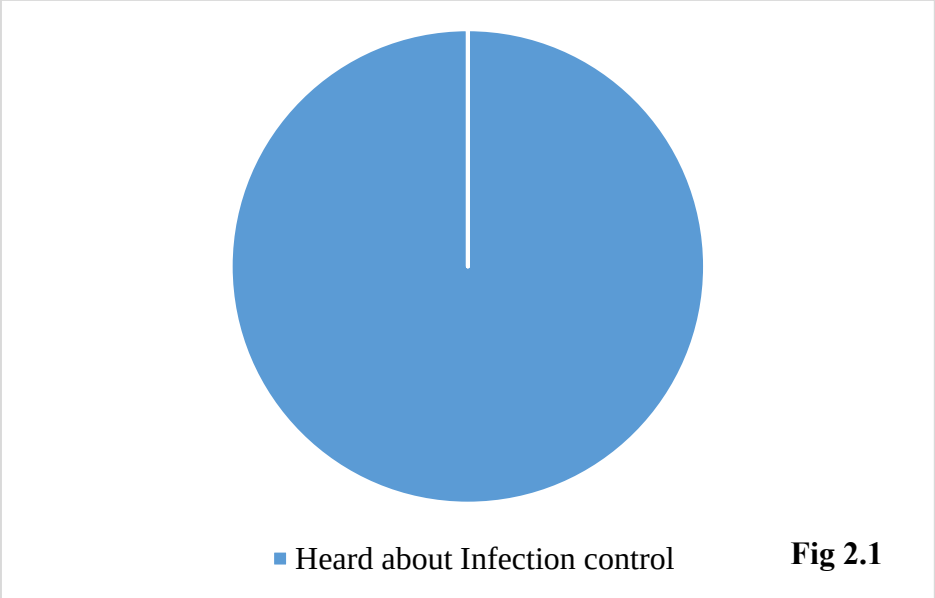

Fig 2.1

- The pie chart below summarizes the Key resources from where nurses have heard about infection control. Out of 152 study participants 126 nurses have heard about infection control through hospital training, 22 nurses have heard through educational books and remaining 4 have heard from colleagues.

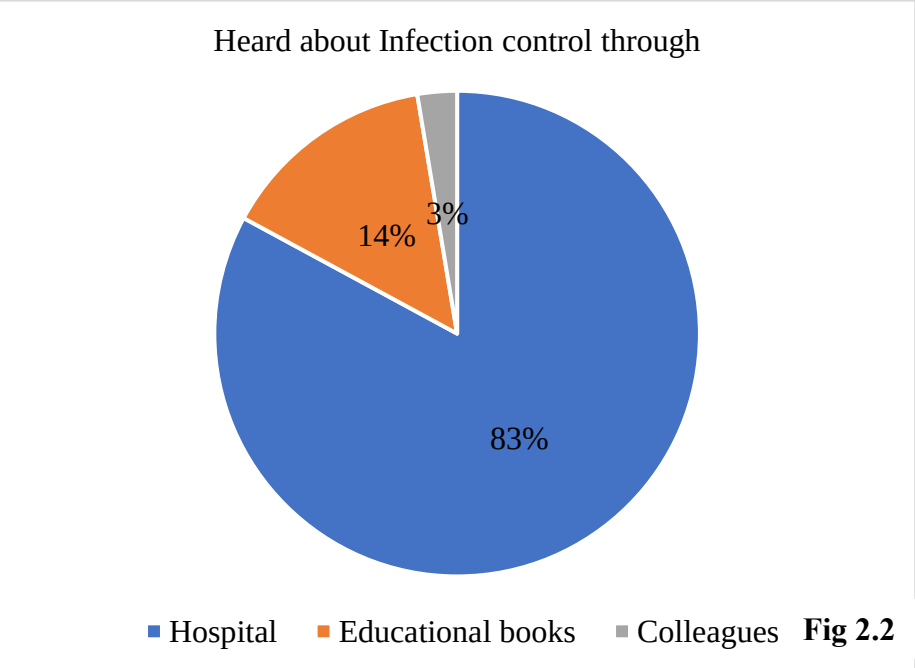

Fig 2.2

- Below pie chart shows how nurses perceive the benefits of infection control measures. It reveals that of the 152 nurses surveyed, 89% believe that these precautions protect both patients and healthcare professionals, 10% think it is to protect only healthcare workers, and 1% think that neither group is protected by them.

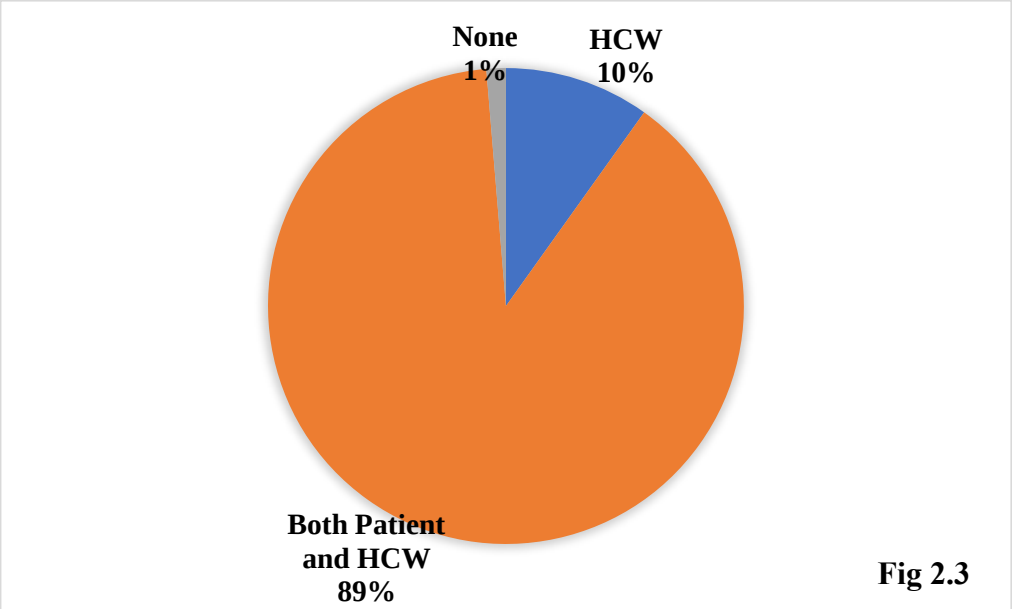

Fig 2.3

- The percentage of nurses who are aware that young or old age increases the risk of nosocomial infections is succinctly represented in the pie chart below.

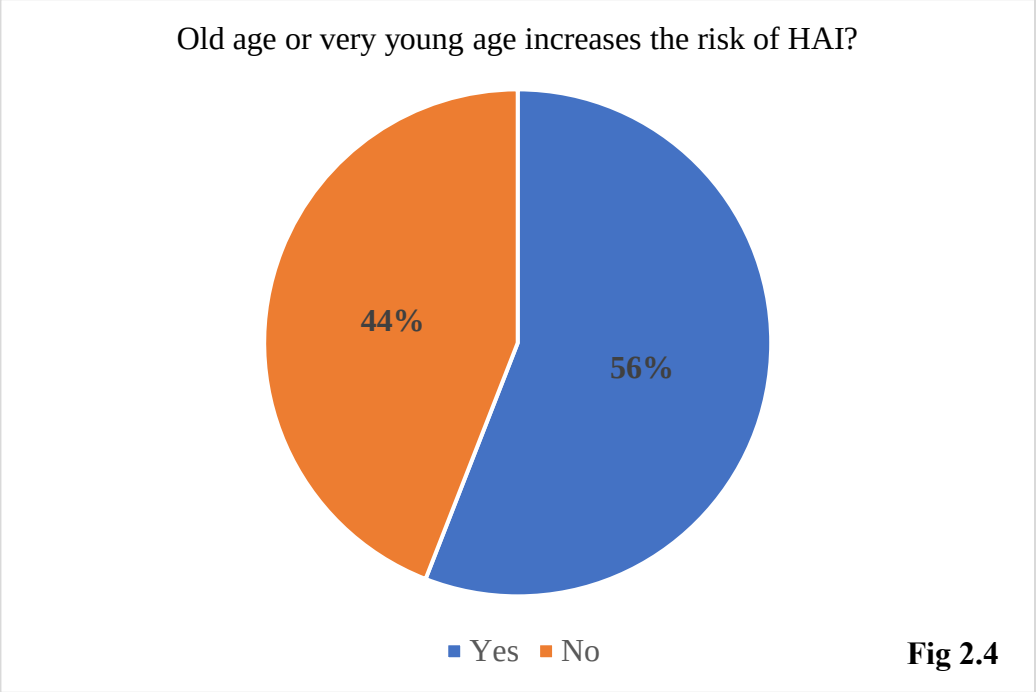

Fig 2.4

- The clustered column chart that follows shows nursing understanding of the precautions that make up standard precautions, including hand hygiene, personal protective equipment, managing biomedical waste, disinfection, spillage clean-up, respiratory hygiene, and cough etiquette. This brief illustration gives a quick summary of how nurses see the various components of conventional precautions.

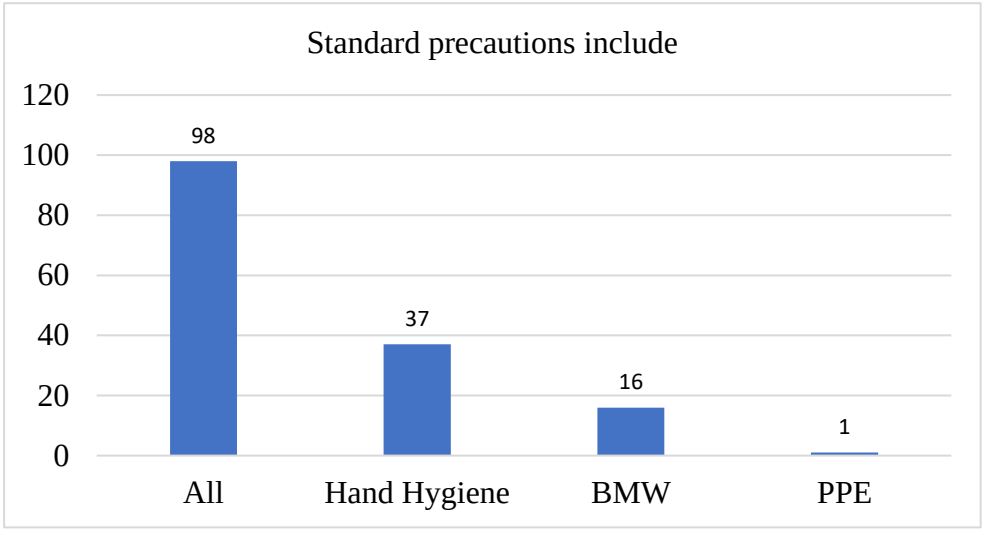

Fig 2.5

- The understanding of nurses about the time period after which an infection in a patient in the hospital is regarded a hospital-acquired infection rather than being present on admission is shown in the cluster column chart below. This image gives a clear description of how nurses see the window of time that separates hospital-acquired infection from pre-existing infection at admission.

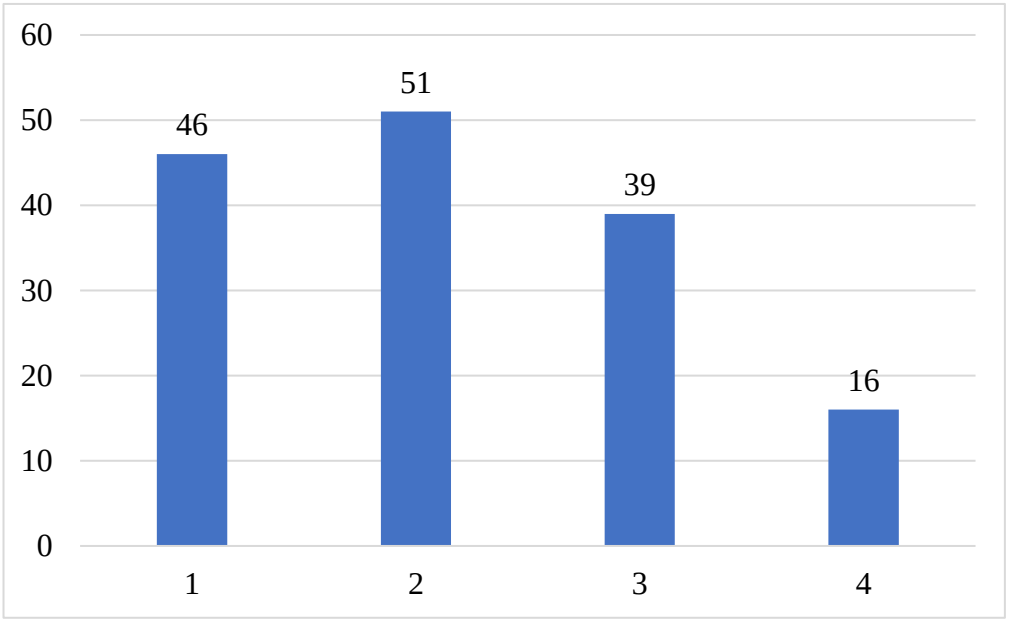

Fig 2.6

- The pie chart presented below visually stands for nursing knowledge about the moments of hand hygiene. This concise depiction offers valuable insights into the understanding of healthcare professionals about the critical instances when hand hygiene should be performed.

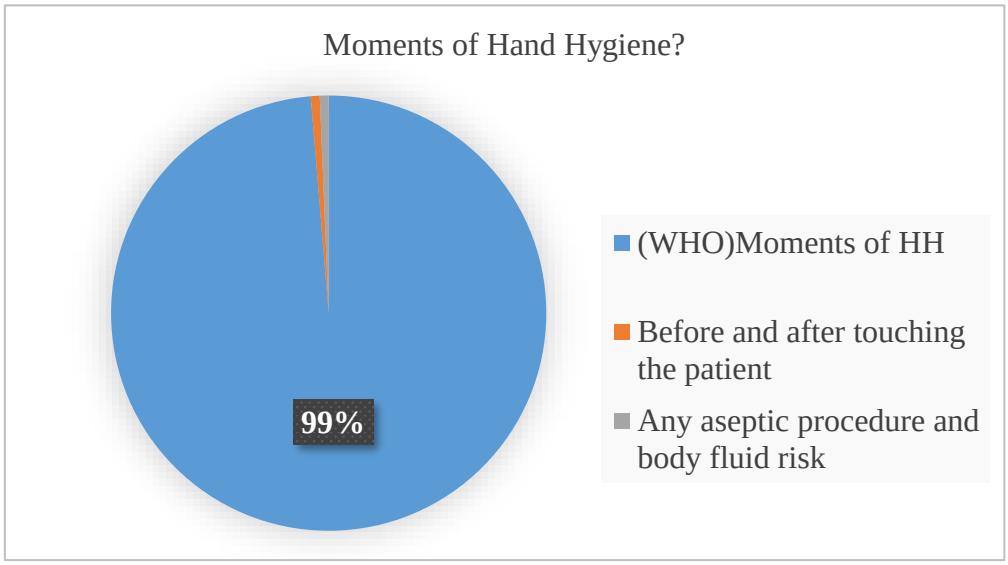

Fig 2.7

- The clustered bar chart that is shown below clearly demonstrates the knowledge of nurses regarding the ideal time frame for performing alcohol-based hand rubbing. This succinct explanation provides insightful information on how healthcare providers perceive the right moment to use an alcohol-based hand rub.

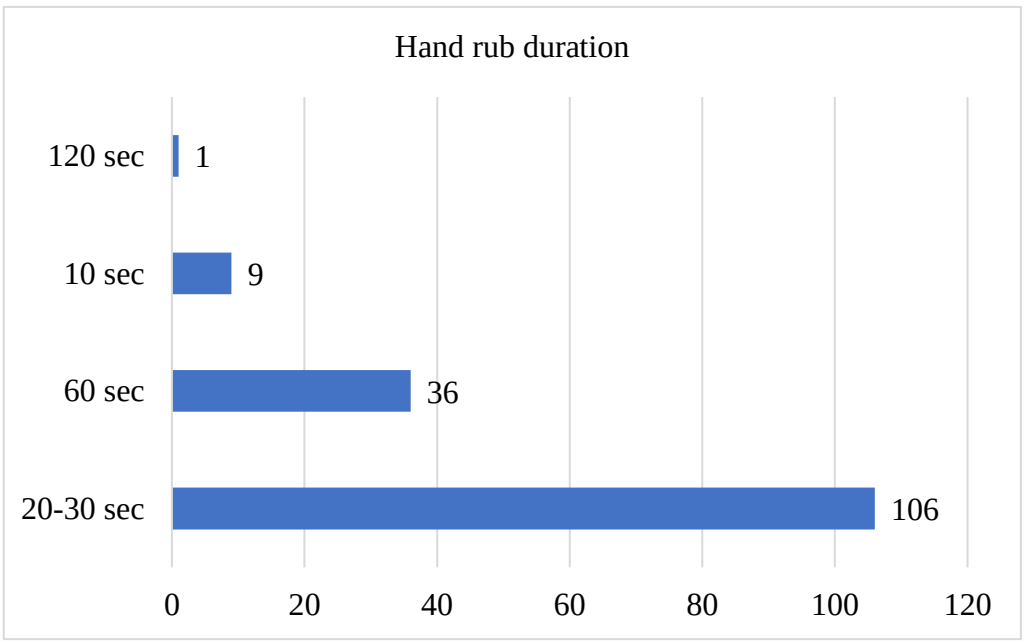

Fig 2.8

- The clustered column chart that is displayed below visually depicts nurses' opinions regarding the use of hand sanitizer when hands are visibly dirty.

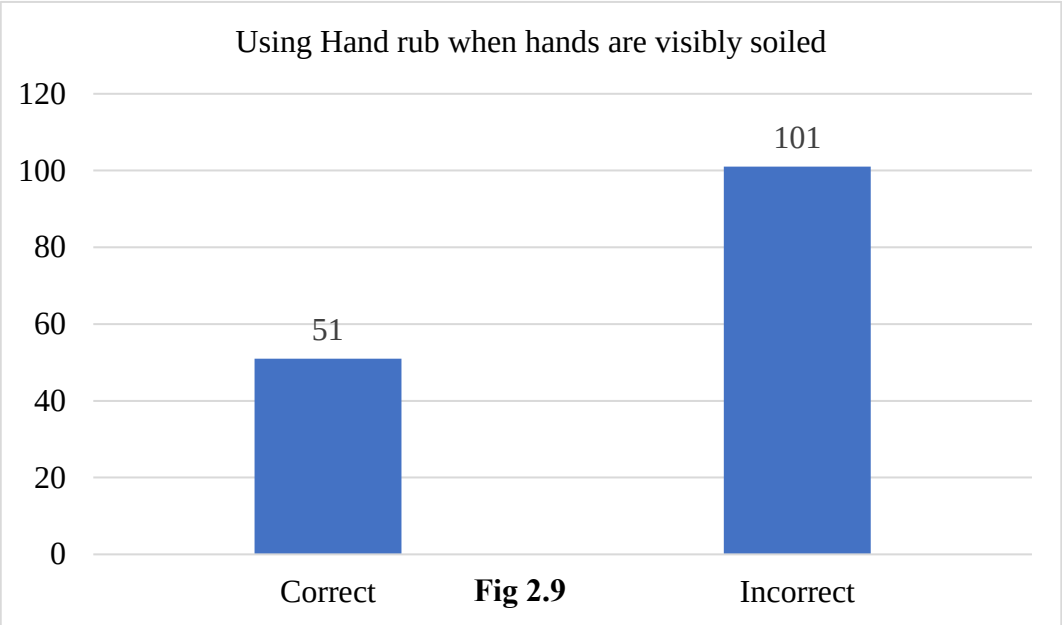

Fig 2.9

- In the clustered column chart below, nursing information regarding the right way to put on and take off personal protective equipment (PPE) is visually depicted. This clear depiction offers insightful details into the understanding of healthcare professionals regarding the proper order for wearing and donning PPE.

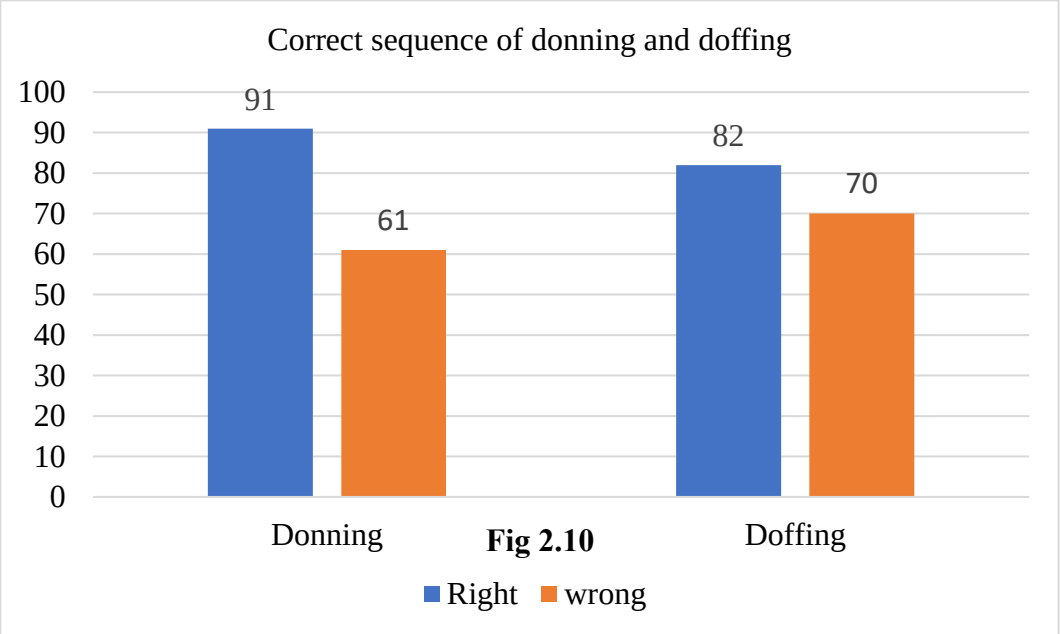

Fig 2.10

- The understanding of nurses regarding the most appropriate personal protective equipment (PPE) to use when taking a patient's temperature who has an infection that spreads through droplets is shown in the pie chart below.

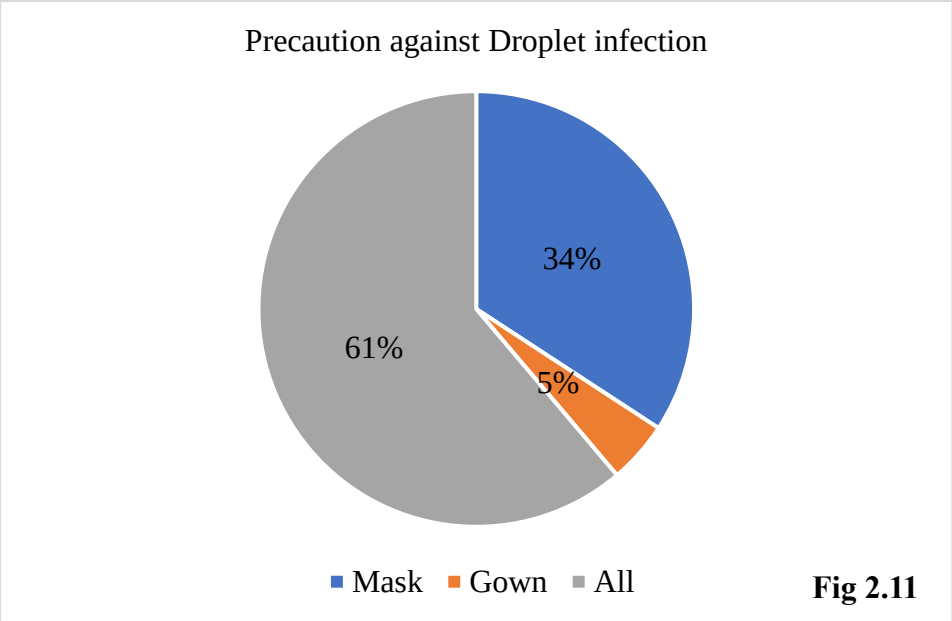

Fig 2.11

- The following clustered column depicts the nursing knowledge on concentration of the chlorhexidine solution used that is 2% for changing dressing for central line bundle care.

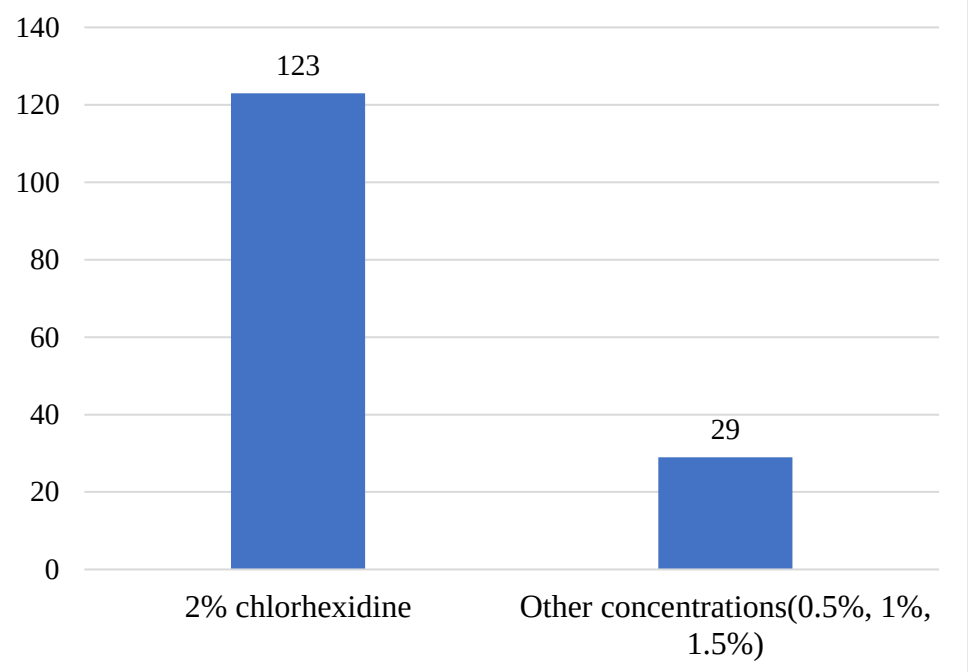

Fig 2.12

- The following clustered column depicts the nursing knowledge on using alcohol swab for hub decontamination for central line bundle care.

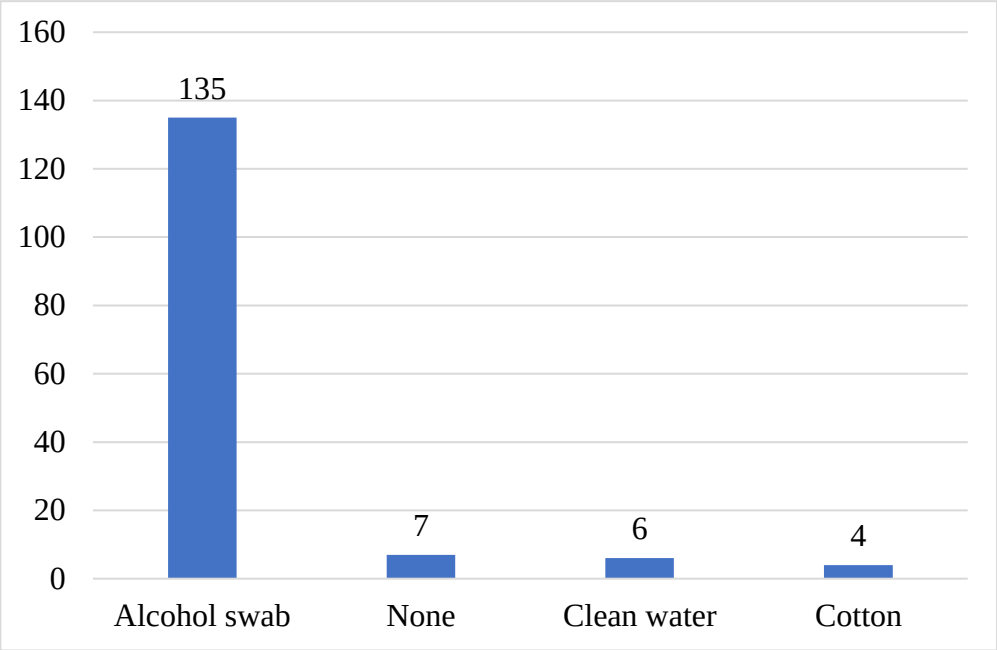

Fig 2.13

- The awareness of nurses regarding when to start antimicrobial prophylaxis prior to a surgical incision is shown in the pie chart below. This clear illustration offers insightful information on how medical experts perceive the ideal time to begin antimicrobial prophylaxis before surgery.

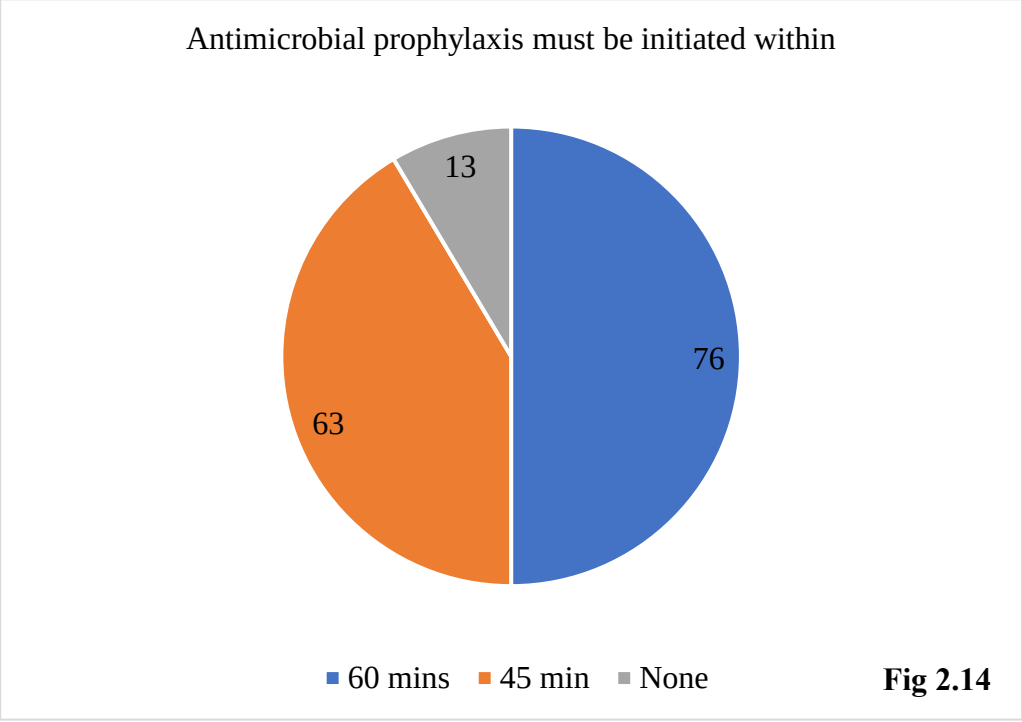

Fig 2.14

- The knowledge of nurses regarding the correct positioning of the uro bag which should be placed below the abdomen level and above the floor is shown in the clustered bar diagram below.

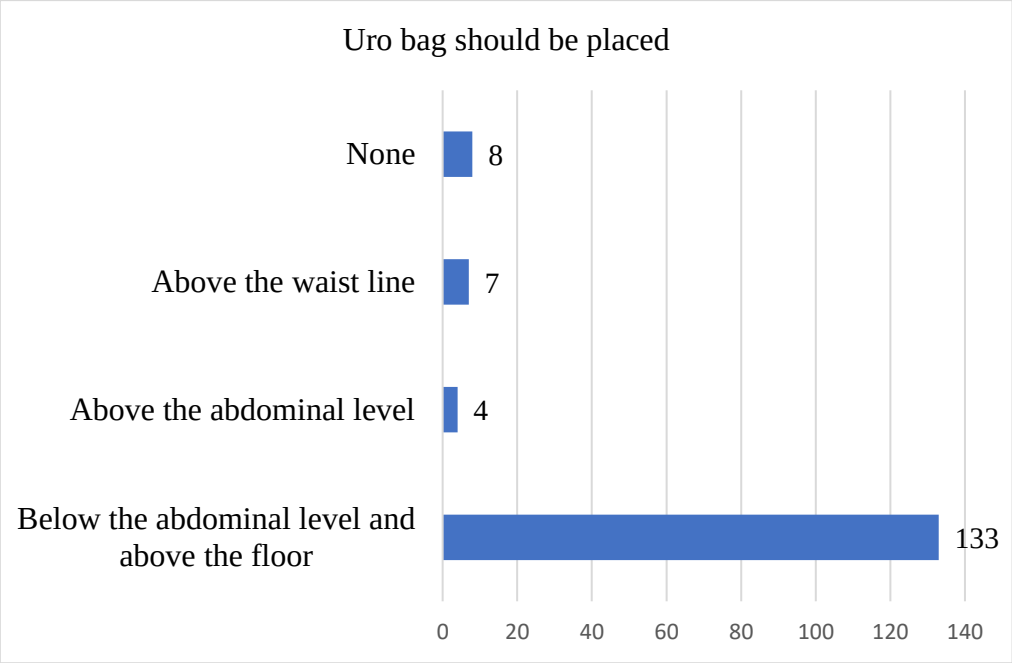

Fig 2.15

- The following pie chart represents nurses' knowledge regarding the initial step to be taken in the event of a needle stick injury, which is to hold the wound under running water. This concise visual provides valuable insights into healthcare professionals' understanding of the recommended immediate response for needle stick injuries.

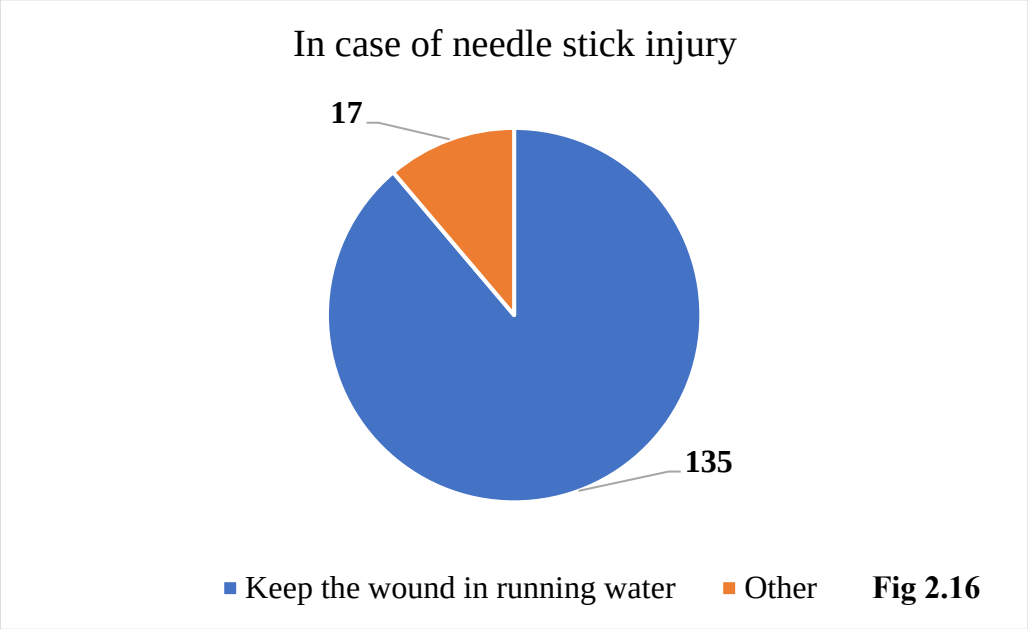

Fig 2.16

- The pie chart below presents nurses' knowledge regarding the practice of recapping needles before disposing them in a sharp container.

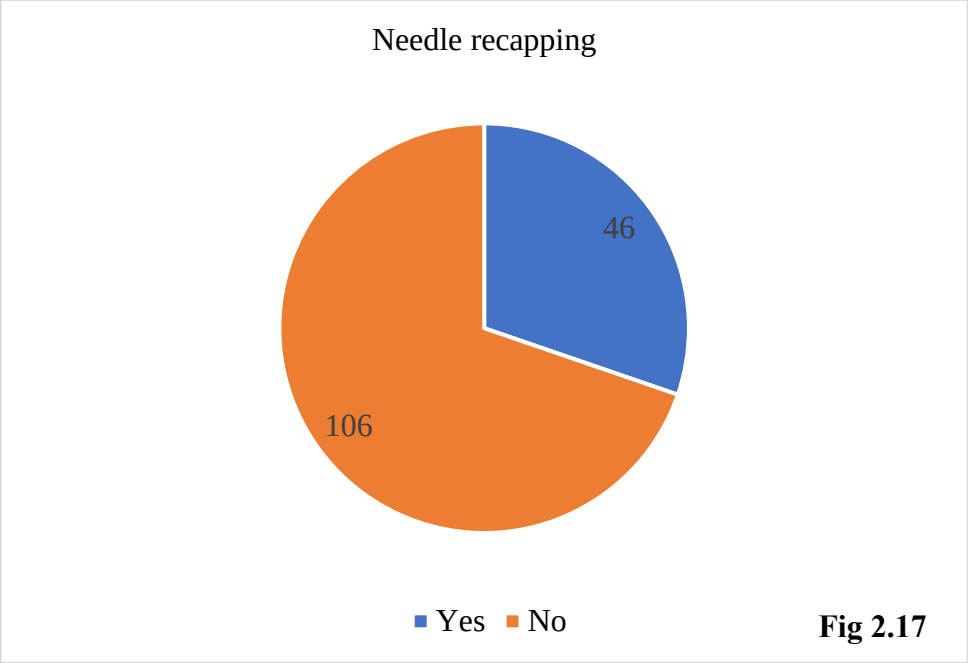

Fig 2.17

- The clustered column below shows what nurses know about the ideal head angle to lower the incidence of ventilator-associated pneumonia in ventilator patients.

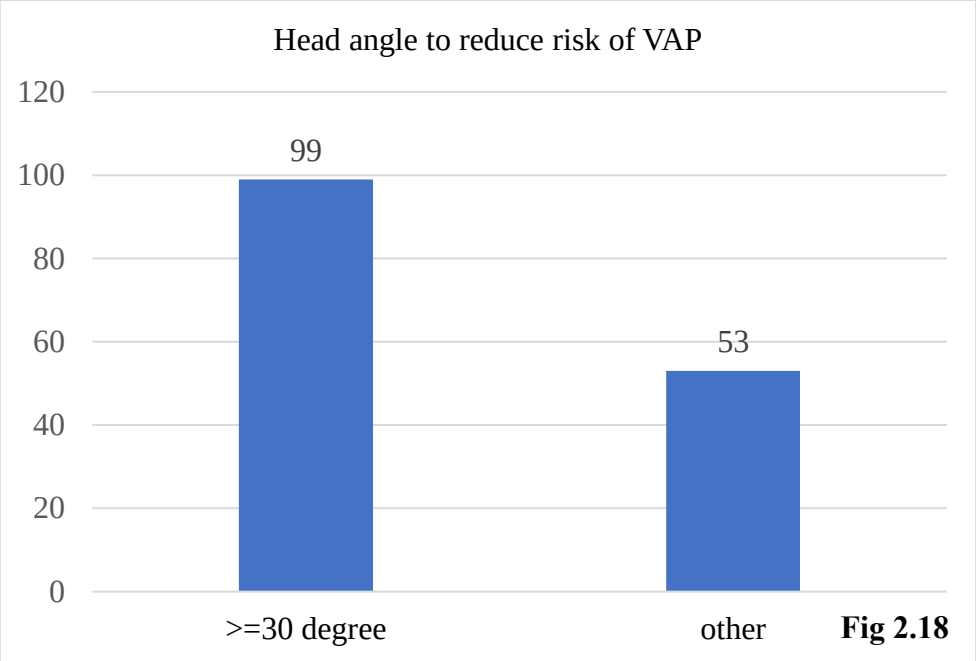

Fig 2.18

- The awareness of nurses in identifying the yellow bag as the proper container for human anatomical waste in biomedical waste management is shown in the pie chart below. This succinct visual illustration offers important insights into how healthcare practitioners categorise waste products for efficient disposal.

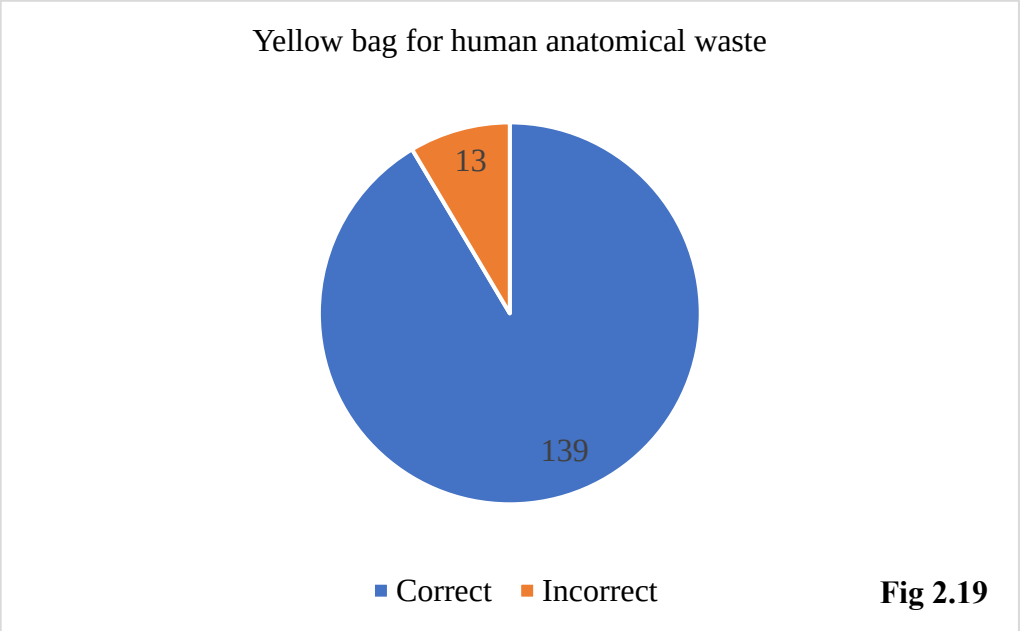

Fig 2.19

- The awareness of nurses regarding the proper disposal of needles in a sharp container is shown in the pie chart below.

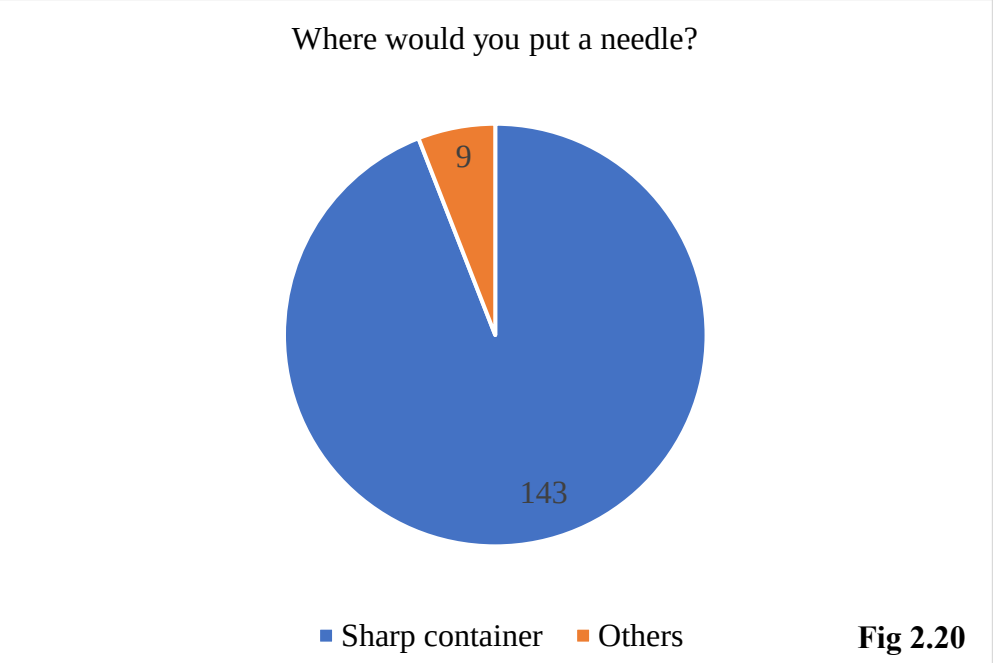

Fig 2.20

Attitude:

- The knowledge and attitudes of nurses regarding whether hand hygiene can be neglected when gloves are used are displayed in the clustered column chart below. This succinct image offers insightful information about how healthcare professionals see and comprehend the value of hand hygiene even when wearing gloves.

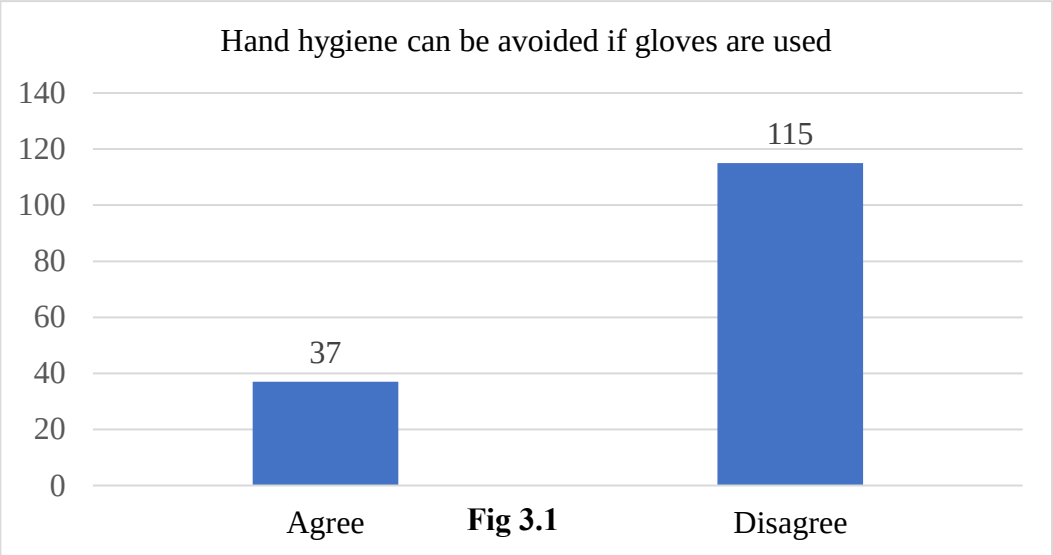

Fig 3.1

- The clustered column chart below depicts nurses' attitudes towards the difficulty of practicing infection control precautions due to workload. This concise visual representation provides valuable insights into healthcare professionals' perceptions regarding the challenges they face in adhering to infection control measures amidst their workloads.

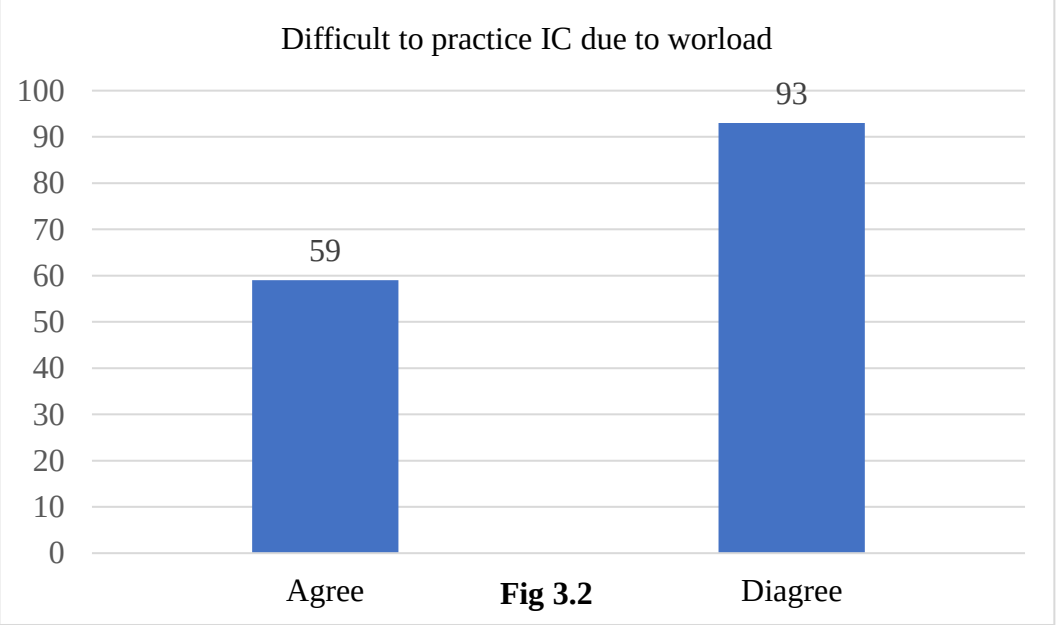

Fig 3.2

- The clustered column chart below indicates how nurses perceive about constantly adhering to infection control guidelines and practises. This succinct visual depiction offers insightful information on the perspectives of healthcare professionals about the consistent application of infection control guidelines in their practise.

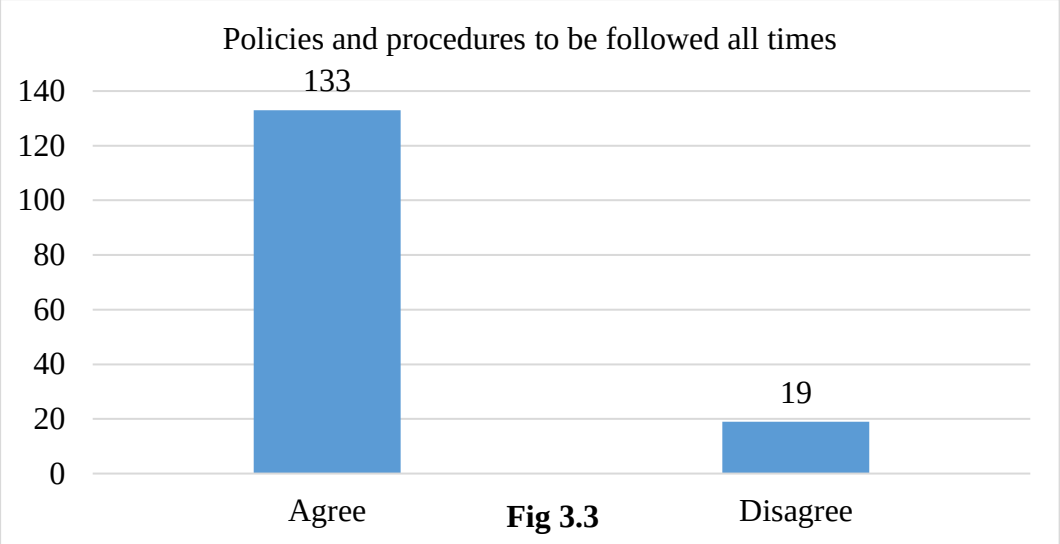

Fig 3.3

- Regarding the application of bundle care for CLABSI (central line-associated bloodstream infection), CAUTI (catheter-associated urinary tract infection), VAP (ventilator-associated pneumonia), and SSI (surgical site infection), nurses' perspectives are shown in the clustered column chart below. This succinct graphic depiction offers insightful information into the viewpoints of healthcare professionals regarding the significance of adhering to bundle care procedures for the prevention of these particular healthcare-associated infections.

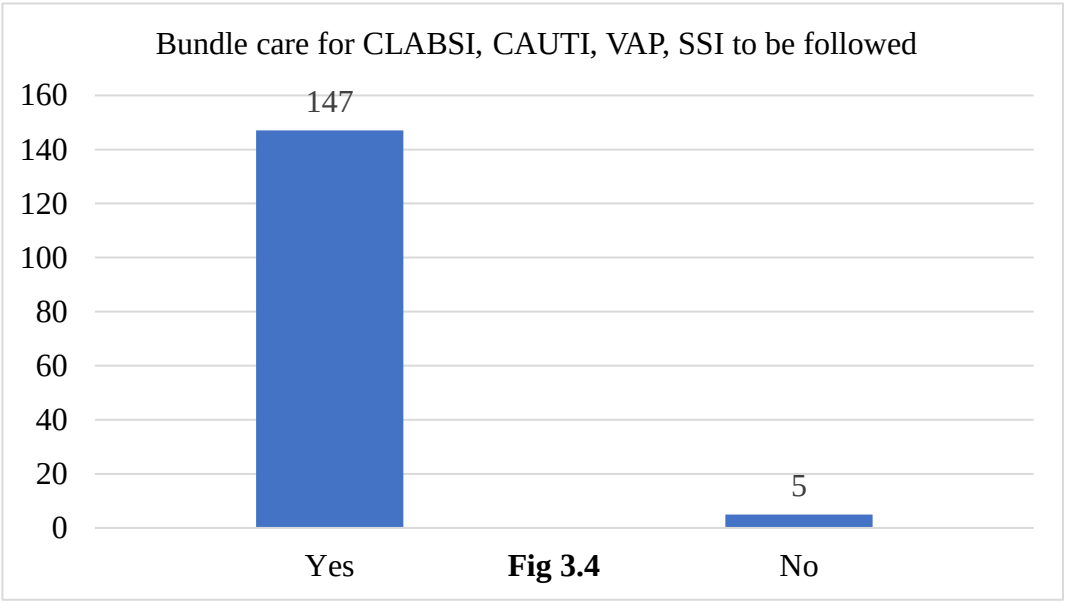

Fig 3.4

- Nursing staff views towards following biomedical waste management protocols are depicted in the clustered column chart below.

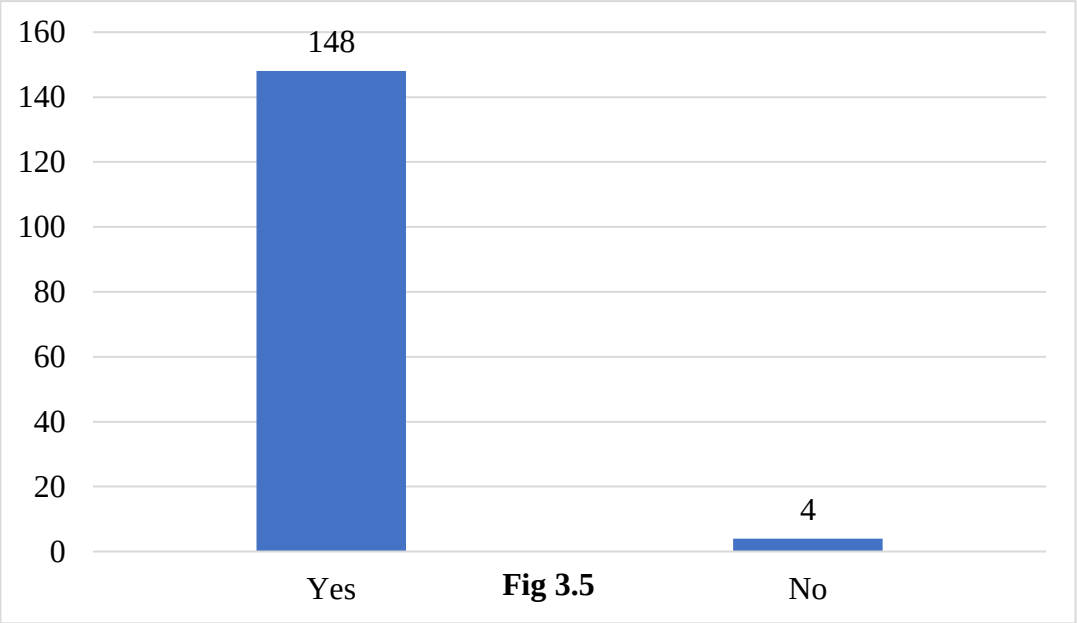

Fig 3.5

- The attitudes of nurses towards the impact of infection control procedures in lowering workplace dangers are shown in the clustered column chart below. This succinct image offers insightful information into the perspectives of healthcare professionals regarding the degree to which certain procedures have the potential to reduce hazards in the workplace.

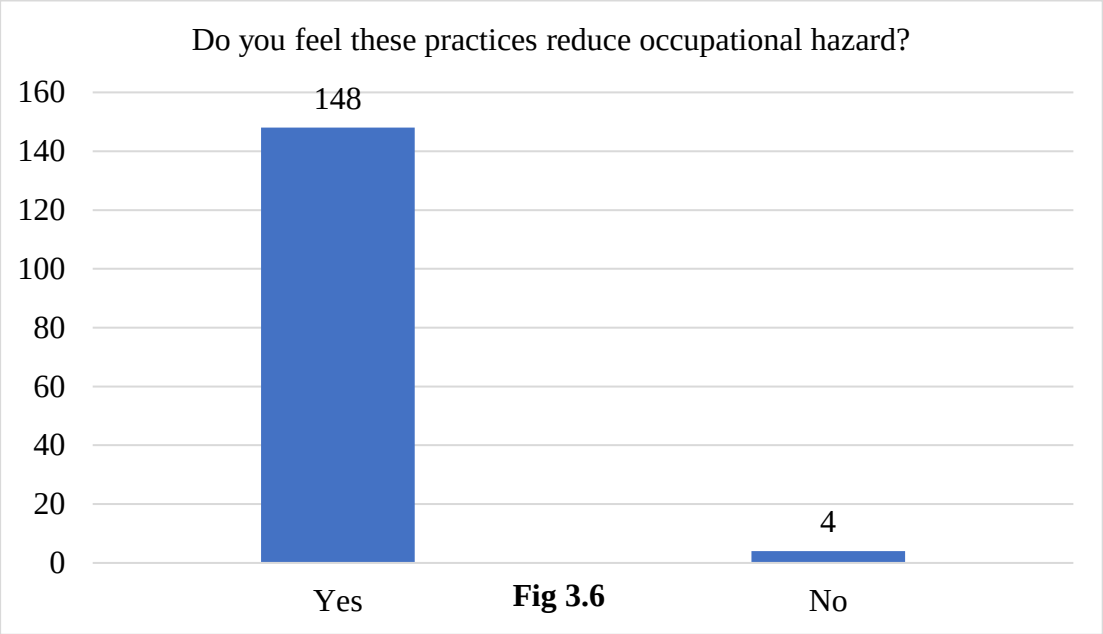

Fig 3.6

Practices:

- The clustered pie chart below illustrates that 100 percent of the nurses surveyed have agreed with the following statements:
    - Infection control and prevention activities are monitored in the hospital.
    - Hepatitis B and TT vaccination are provided to all nurses.
    - Regular training is provided to the hospital staff regarding infection control practices.
    - This concise visual representation highlights unanimous agreement among nurses regarding these key aspects of infection control and prevention measures in the hospital setting.

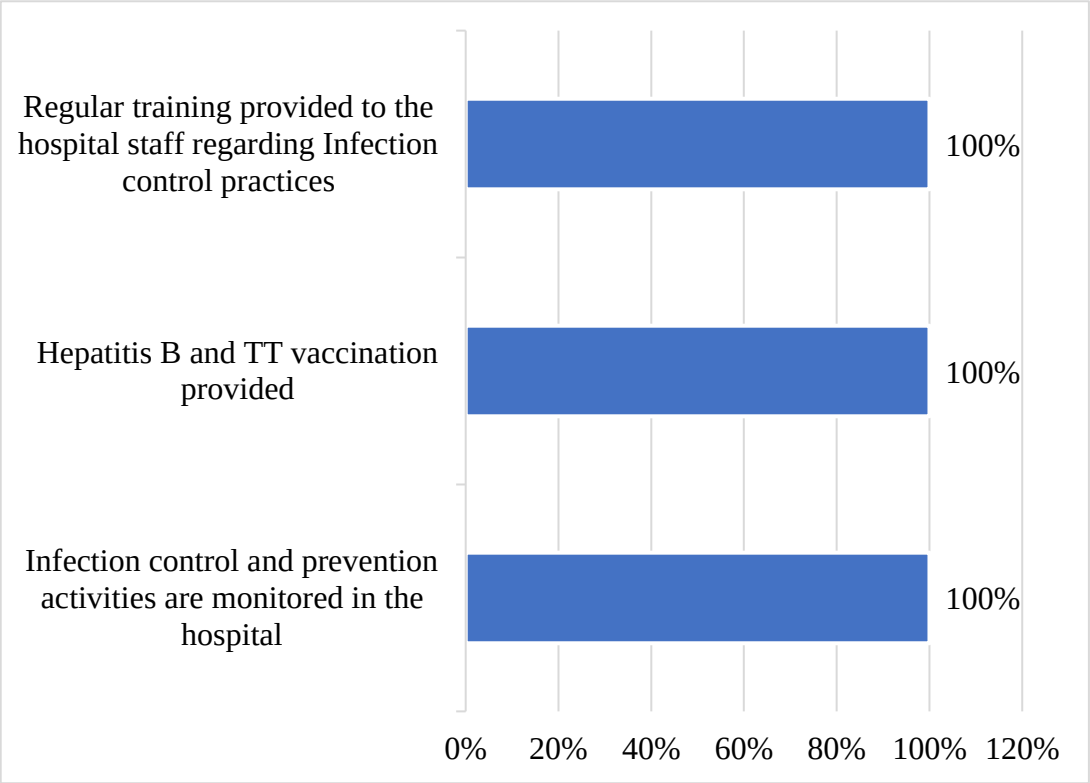

Fig 4.1

- The perceptions of nurses regarding the availability of personal protective equipment (PPE) kits are shown in the clustered column chart below.

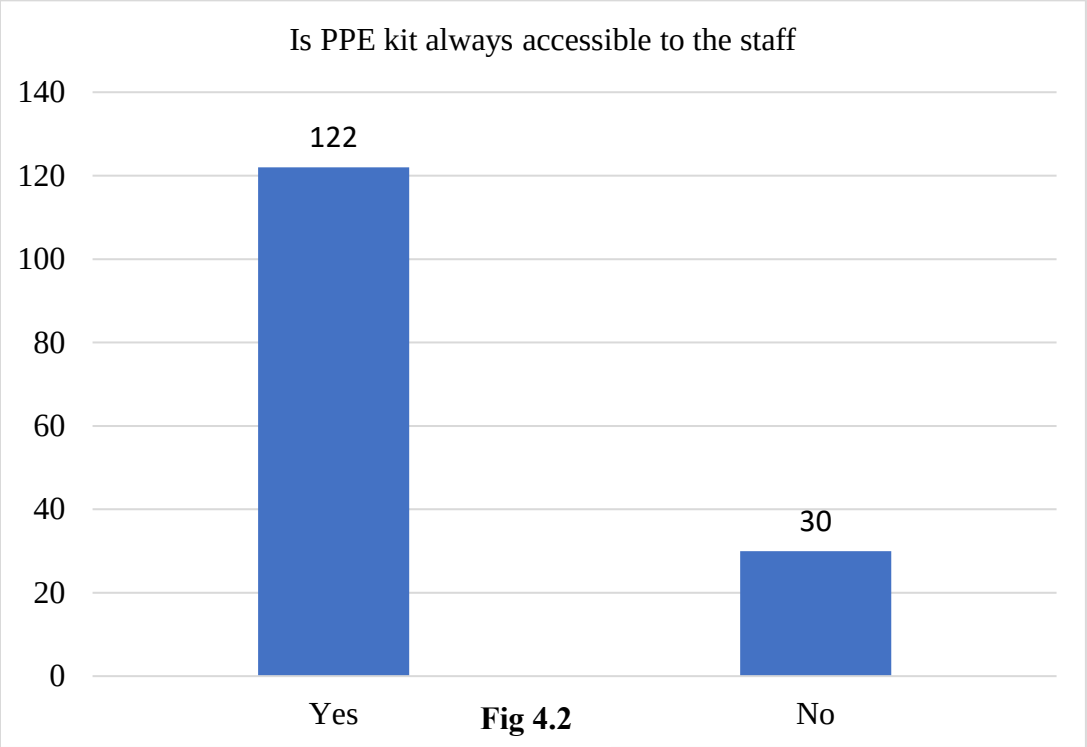

Fig 4.2

Discussion:

- An essential component of healthcare is infection control, which protects not only the patients, but also the committed staff members who work tirelessly to give medical care. This analysis indicates that a staggering 89% of nurses are aware of the need of these safety measures and acknowledge their crucial role in safeguarding both patients and themselves. However, a worrying 11% of respondents still do not fully comprehend the advantages of such practises. A potent technique for enforcing these procedures is to include infection control reminders in daily morning briefings. These briefings must emphasise the advantages of infection control practises, emphasising their capacity to reduce the spread of infectious diseases, safeguard vulnerable patients, and improve general patient outcomes.
- The findings from this study involving 152 participants have unveiled important insights regarding the awareness of the susceptibility of different age groups to nosocomial or hospital-acquired infections. Among the respondents, a mere 56% acknowledged the fact that patients at advanced or incredibly young ages are more vulnerable to such infections. In conclusion, my findings strongly support the notion that knowledge drives attitude. The awareness among nurses regarding the heightened vulnerability of advanced age and incredibly young age patients to nosocomial infections plays a crucial role in shaping their approach to patient care. It is concerning, that the following data reveals a concerning lack of awareness among 44% of nurses regarding this vital information.
- The statistical analysis of the data, comprising 152 participants, sheds light on the knowledge of nurses regarding standard precautions. Among the respondents, 98 nurses demonstrated awareness that standard precautions encompass various components, including hand hygiene, biomedical waste management, personal protective equipment (PPE), disinfection, spillage cleaning, respiratory hygiene, and cough etiquette. However, concerning findings were observed among the remaining 54 nurses. Within this group, 37 nurses incorrectly believed that standard precautions solely referred to hand hygiene. Additionally, 16 nurses perceived biomedical waste management as the sole element of standard precautions. Furthermore, one nurse erroneously associated standard precautions solely with the use of PPE. To address this issue, it is imperative to ensure that training programs and educational initiatives

provide equal attention and comprehensive coverage of all components of standard precautions. By dedicating sufficient focus and resources to areas beyond hand hygiene, such as biomedical waste management, disinfection, and respiratory hygiene, we can foster a more holistic understanding of standard precautions among nurses. This, in turn, will contribute to the effective implementation of infection control measures and safeguard the well-being of both patients and healthcare providers. In conclusion, while a majority of the nurses in the study demonstrated an understanding of the diverse elements comprising standard precautions, there remains a notable knowledge gap among a portion of the participants. Addressing this gap necessitates a balanced approach during training, highlighting all aspects of standard precautions to ensure comprehensive compliance and a safer healthcare environment. This imbalance in knowledge is a cause for concern, as incomplete understanding of standard precautions can lead to critical consequences during emergencies. For instance, in scenarios requiring spillage cleaning using specialized HAZMAT kits, nurses lacking awareness of this aspect may not be adequately prepared to respond effectively.

- It was revealed through the analysis of 152 study participants that only 39 nurses possessed knowledge regarding the attribution of an infection as a healthcare-associated infection (HAI). If the event date falls on or after the third day of admission, with the day of admission counting as day one, and at least 48 hours have passed, the infection is regarded as a HAI. The majority of nurses appear to have a significant knowledge gap when it comes to the specific criteria for classifying an infection as a HAI. This knowledge gap could potentially result in incorrect classification or delayed identification of HAIs, which would compromise patient care and raise the risk of preventable infections. Therefore, it is critical to give educational initiatives targeted at improving nurses' comprehension of the temporal requirements for HAI attribution top priority. By equipping nurses with this essential knowledge, healthcare institutions can improve the accuracy of HAI surveillance and promote proactive infection prevention measures. Comprehensive understanding of the timing criteria for HAI attribution enables nurses to implement appropriate interventions promptly, leading to better patient outcomes and overall quality of care.

- Following study involving 152 participants, it was found that 150 nurses demonstrated full awareness of the five moments of hand hygiene: before touching the patient, after touching the patient, after a procedure or body fluid exposure risk, after touching the patient's surroundings, and before a procedure. However, the findings from my hand hygiene audit, which focused on 46 participants conducted in a cancer ward where chemo ports and PIC lines are inserted, revealed a concerning compliance rate of only 66.3%. These results indicate a significant discrepancy between knowledge and implementation among the observed nurses. While they possess the necessary knowledge regarding hand hygiene practices, there seems to be an issue in translating that knowledge into consistent adherence to proper hand hygiene protocols. Addressing this implementation gap is crucial to ensure patient safety and prevent healthcare-associated infections in a high-risk environment like the cancer ward. It is essential to explore the underlying factors contributing to the suboptimal compliance rate and develop targeted interventions to improve hand hygiene practices.

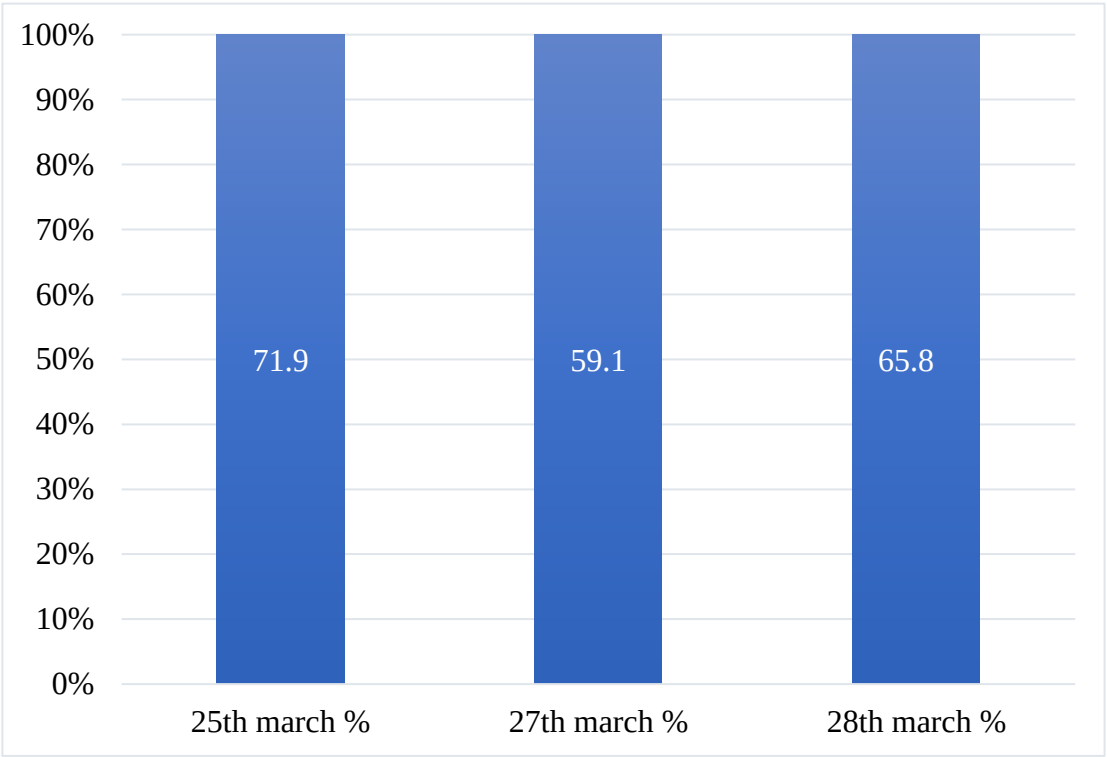

Fig 5.1 Hand Hygiene Audit

- Of the 152 study participants, 106 nurses were aware that the suggested time for an alcohol-based hand rub is between 20 and 30 seconds. The fact that the remaining 46 nurses lacked accurate knowledge of the duration, however, is alarming. Both patients and healthcare staff may be at risk because to this information gap over the ideal time frame for alcohol-based hand rub. The efficiency of the hand hygiene practise may be compromised by insufficient hand rubbing time, allowing dangerous microorganisms to remain on the hands. This raises the possibility of spreading illnesses inside the hospital. Prioritising educational initiatives that stress the need of following the advised period for alcohol-based hand rub is crucial to resolving this issue. Clear directions and reinforcement of the relevance of complete hand rubbing for the designated amount of time should be provided via training programmes and continuous education.
- Of the 152 participants in the study, only 101 nurses (66.4%) properly stated that hand hygiene should be undertaken when hands are clearly dirty and that using hand rub while hands are visibly soiled is a bad practise. The remaining 51 nurses (33.6%) thought that this was a good practise. This serious knowledge gap on proper hand hygiene procedures can have negative effects on patients and healthcare professionals. For proper cleaning and elimination of dirt, pollutants, and germs, hand rub should not be used on hands that are clearly filthy. Infection transmission risk may rise as a result of hazardous bacteria remaining on hands. Prioritising educational initiatives targeted at enhancing awareness and encouraging proper hand hygiene practises is crucial to resolving this problem. Training programmes and continuous instruction should stress the need of washing hands with soap and water when they are obviously unclean while also teaching the proper use of hand sanitizer for everyday hand hygiene in the absence of obvious soiling.
- The results showed that there is a substantial gap in understanding the proper method for putting on and taking off personal protective equipment (PPE). Only 91 nurses out of the 152 study participants could correctly answer the wearing sequence, whereas only 82 nurses could correctly answer the doffing sequence. It is necessary to know the proper procedure for donning and doffing, especially in specialised industries like liver transplant where stringent infection control

procedures are essential. When entering potentially dangerous locations, proper donning ensures that healthcare professionals are completely covered, and proper doffing stops the spread of contaminants and maintains a safe atmosphere after leaving patient areas. The importance of these procedures was also made clear during the COVID-19 pandemic, when following the right wearing and doffing procedures was crucial in reducing the spread of the virus among healthcare personnel. Prioritising education and training programmes that concentrate on the proper sequences for donning and doffing PPE is crucial to addressing this knowledge gap. Stressing the significance of these procedures and giving precise, step-by-step instructions will assist guarantee the security of patients and healthcare professionals. Additionally, adding real-world examples, role-playing activities, and routine competency reviews can help to reinforce the right methods and promote a culture of adherence to proper donning and doffing standards.

- Of the 152 nurses who responded to the study, 123 nurses showed that they knew that 2% chlorhexidine should be used to change dressings on central lines. The fact that 29 nurses were unable to answer the question correctly, however, is worrying. Similarly, 135 nurses correctly chose alcohol swab as the suggested practise when asked about the best approach for hub decontamination in CLABSI bundle care. Even while this shows that they are carrying out the operation correctly, it is still crucial for nurses to understand the reasoning behind their choices in order to reduce the likelihood of mistakes in the future. In healthcare settings, verbal reinforcement of best practises is essential to ensure precise and consistent use of protocols. Healthcare facilities can help nurses better understand reasons for suggested practises, solidify their knowledge, and lessen the risk of mistakes by verbally educating and reminding them. Healthcare organisations can increase patient safety and raise the standard of care by encouraging a culture of lifelong learning and stressing the value of knowing the "why" behind operations.
- Of the 152 nurses who participated in the survey, it is alarming to see that only 76 nurses properly identified the need to start antimicrobial prophylaxis an hour before to the surgical incision in order to prevent surgical site infections (SSIs). This discovery reveals a large knowledge gap in nurses' understanding of when to administer antibiotic prophylaxis. It is crucial to understand that this knowledge shouldn't be restricted to just operating room nurses. Ward nurses,

who are in charge of the pre- and post-operative care of patients, are also extremely important in ensuring that antimicrobial prophylaxis is administered on schedule. All nurses involved in perioperative care should participate in educational activities to close this knowledge gap. These interventions ought to emphasise how crucial it is to start antimicrobial prophylaxis at the right moment in order to maximise its efficacy in avoiding SSIs. Healthcare facilities can increase patient safety and lower the risk of surgical site infections by improving nurses' knowledge of the appropriate timing of antimicrobial prophylaxis. To guarantee uniform and standardised practises throughout the care continuum, collaboration between operating room nurses, ward nurses, and other healthcare professionals participating in perioperative care is essential.

- Among the 152 nurses surveyed, it is encouraging to find that 133 nurses correctly identified the appropriate positioning of the uro bag for patients with urinary catheters - below the abdominal level and above the floor. This positioning helps to prevent catheter-associated urinary tract infections (CAUTIs). While the majority of nurses demonstrated understanding in this area, it is important to continue focusing on further improvement. This can be achieved through ongoing education, reinforcement of best practices, and regular reminders to ensure consistent adherence to proper catheter bag positioning. Implementing educational programs that emphasize the importance of correct uro bag placement and the rationale behind it can further strengthen nurses' knowledge and understanding. Providing practical demonstrations, case studies, and incorporating this information into regular nursing training sessions can enhance retention and application of the knowledge in clinical practice.
- Needle stick injury response: Out of the 152 study participants, 135 nurses correctly answered that the first step in the event of a needle stick is to hold the wound under running water. This indicates that a majority of the nurses have awareness about the initial response to such an injury, which is positive.
- Needle recapping: However, it is concerning that 46 nurses mentioned that they recap needles before disposing of them. This practice is inappropriate and increases the risk of needle stick injuries. It is essential to educate these nurses about the dangers associated with needle recapping and emphasize the importance of safe disposal practices.
- Proper disposal: On a more positive note, 143 out of the 152 nurses reported following the practice of disposing needles in sharp containers. This indicates a

good adherence to proper disposal protocols, which helps minimize the risk of needle stick injuries to healthcare workers and others involved in waste management. However, continued education and reinforcement of these practices are still necessary.

- Education and reporting: Based on the findings, there is a need to further educate nurses about needle stick injuries, emphasizing safe practices, including proper disposal, and avoiding needle recapping. It is also crucial to promote a culture of reporting NSIs without blaming individuals involved. Encouraging reporting can help identify areas of improvement, implement preventive measures, and ensure the well-being of healthcare workers.
- Out of the 152 nurses surveyed, 99 nurses demonstrated knowledge of the recommended practice for reducing the risk of ventilator-associated pneumonia (VAP) in ventilator patients. Specifically, they correctly identified that maintaining a head angle of 30 degrees or greater is crucial. This indicates a significant understanding of the preventive measure among the majority of participants. Continued education and reinforcement of this practice can help ensure consistent adherence and improve patient outcomes in VAP prevention.
- Among the 152 nurses surveyed, a significant majority of 143 nurses correctly identified that human anatomical waste should be discarded in a yellow-coloured bag. This demonstrates a commendable level of knowledge and adherence to proper waste segregation practices. However, considering that biomedical wastes can pose infection risks, it is crucial to strive for 100 percent compliance in this regard. Emphasizing the importance of strict adherence to waste management protocols and providing continuous education can help ensure optimal infection control and minimize potential hazards associated with biomedical waste disposal.
- Among the 152 nurses surveyed, 115 nurses recognized that hand hygiene cannot be avoided even when gloves are used. However, 37 nurses held the belief that hand hygiene can be skipped when gloves are worn. This discrepancy highlights the need for further education and clarification regarding the importance of hand hygiene as an essential infection control measure, regardless of glove usage. Emphasizing the role of hand hygiene in preventing cross-contamination and transmission of pathogens can help bridge the gap and promote a consistent understanding and adherence to best practices among healthcare professionals.

- Of the 152 nurses who responded to the study, 59 said that their workload makes it difficult to follow infection control precautions. The majority of nurses, meanwhile, did not feel this way. This suggests that workload may be a contributing factor affecting adherence to infection control practices for a significant number of nurses. Strategies such as workload management, adequate staffing, and streamlined processes can help alleviate the burden and create an environment that supports the implementation of infection control precautions. Additionally, it is essential to acknowledge and address the perceptions of the remaining nurses who do not find it difficult to practice infection control despite their workload. Identifying their strategies and promoting their positive experiences can serve as examples and inspiration for others, fostering a culture of infection control compliance.
- In the study involving 152 nurses, a positive attitude towards infection control practices was observed. Specifically, a significant number of nurses demonstrated favourable views towards key aspects of infection control:
    - Out of the 152 nurses, 133 nurses expressed the belief that infection control policies and procedures should be adhered to at all times. This highlights a strong commitment to following established guidelines and protocols.
    - Additionally, 147 nurses out of the 152 participants agreed that bundle care, which includes specific measures for preventing healthcare-associated infections such as CAUTI, CLABSI, VAP, and SSI, should be implemented. This shows a high level of awareness and recognition of the importance of comprehensive strategies for infection prevention.
    - Moreover, 148 nurses out of the total 152 nurses acknowledged the significance of following biomedical waste management protocols. They also believed that these practices contribute to reducing occupational hazards associated with healthcare waste.
    - These findings indicate a positive and proactive attitude among the majority of nurses towards infection control practices. The high level of agreement suggests a shared understanding of the importance of infection prevention measures and a commitment to creating a safe and healthy healthcare environment.

- In the study involving 152 nurses, it was observed that all nurses unanimously agreed on certain crucial aspects related to infection control practices within the hospital setting. These findings demonstrate a strong consensus among the participants:
    - Monitoring of infection control activities: All 152 nurses acknowledged that infection control and prevention activities are actively monitored in the hospital. This suggests the presence of a robust system in place to ensure adherence to infection control protocols and guidelines. Regular monitoring allows for timely identification and rectification of any deviations, thus promoting a safer healthcare environment.
    - Hepatitis B and TT vaccination provision: Another unanimous agreement among all 152 nurses was the provision of Hepatitis B and Tetanus Toxoid (TT) vaccinations. Vaccination against Hepatitis B is essential for healthcare workers, as it reduces the risk of transmission in the workplace. Similarly, TT vaccination protects against tetanus, a bacterial infection that can occur through exposure to contaminated wounds. Ensuring access to these vaccinations demonstrates a commitment to safeguarding the health and well-being of healthcare personnel.
    - Regular training on infection control practices: All nurses in the study reported receiving regular training regarding infection control practices. Continuous education and training play a vital role in enhancing knowledge, reinforcing proper techniques, and updating healthcare professionals on the latest developments in infection prevention. By providing regular training, the hospital promotes a culture of ongoing learning, ensuring that staff members remain updated and equipped to implement effective infection control measures.
    - These findings highlight the hospital's dedication to maintaining high standards of infection control. The active monitoring of infection control activities, provision of necessary vaccinations, and regular training contribute to a comprehensive approach to prevent and control healthcare-associated infections.

Conclusion:

- The findings from the analysis of the various aspects of infection control among the surveyed nurses provide valuable insights into the current state of knowledge and practices in healthcare settings. While the majority of nurses demonstrated awareness and understanding of key infection control measures, there are notable knowledge gaps and areas for improvement.
- The awareness of nurses regarding the susceptibility of different age groups to nosocomial infections was found to be crucial in shaping their approach to patient care. However, a concerning lack of awareness was observed among a portion of the participants, indicating the need for targeted education and training programs to address this knowledge gap.
- The knowledge of nurses regarding standard precautions showed both positive and concerning findings. While a majority demonstrated an understanding of the diverse components of standard precautions, there remains a notable knowledge gap among some nurses. Comprehensive training programs that provide equal attention to all aspects of standard precautions, beyond hand hygiene, are necessary to ensure effective implementation and safeguard patient and provider well-being.
- The study also identified knowledge gaps in areas such as the classification of healthcare-associated infections, proper hand hygiene practices, donning and doffing sequences of personal protective equipment, timing criteria for antimicrobial prophylaxis, and appropriate needle stick injury response. Addressing these gaps through targeted educational interventions, regular reinforcement, and practical demonstrations can improve patient safety and overall quality of care.
- While the majority of nurses demonstrated knowledge in areas such as proper catheter bag positioning, disposal of sharps in appropriate containers, and reducing the risk of ventilator-associated pneumonia, ongoing education and reinforcement are essential to ensure consistent adherence to best practices.
- The findings also shed light on the need for education regarding hand hygiene practices when gloves are used, the impact of workload on infection control practices, and the positive attitude of nurses towards infection control policies and bundle care.

- In conclusion, the study findings underscore the importance of continuous education, reinforcement, and practical demonstrations to bridge knowledge gaps and promote consistent adherence to infection control practices. By addressing these gaps, healthcare institutions can enhance patient safety, prevent healthcare-associated infections, and create a culture of infection control compliance among healthcare professionals.

Recommendations:

- Implement educational programs or training sessions specifically focused on raising awareness among nurses about the vulnerability of certain age groups to HAIs. This can include providing information about the physiological factors and weakened immune systems that make advanced age and infancy more susceptible to infections.
- Comprehensive Training: Provide training sessions that focus on all components of standard precautions, including hand hygiene, biomedical waste management, personal protective equipment (PPE), disinfection, spillage cleaning, respiratory hygiene, and cough etiquette. Ensure that training covers practical aspects, such as demonstrating the proper wearing and removal of PPE and spillage cleaning using HAZMAT kits.
- Include accurate time frame for identifying hospital-acquired infections (HAIs) in trainings to ensure timely reporting and accurate identification of HAIs.
- Improve implementation of hand hygiene by conducting random audits to ensure higher compliance rates among nurses.
- To address the disparity between self-reported needle disposal practices and actual observations, it is recommended to implement random audits. Findings from the study revealed that out of 152 nurses, 46 reported recapping needles before disposal, while 106 reported proper needle disposals without recapping. However, upon randomly checking the sharp containers, it was discovered that most containers contained recapped needles. Conducting random audits can help identify and rectify discrepancies, ensuring adherence to proper needle disposal practices among healthcare professionals.

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Annexures: Study Tool

Demographic details

Name:

Age:

Gender:

Years of experience:

Department:

Knowledge

Ever heard about infection control precautions?

☐ Yes ☐ No

Main Source of Information from where you have heard about Infection control practices?

☐ Hospital training ☐ Educational books ☐ Colleagues ☐ Others

Advantages of Infection control precautions?

☐ Protects Healthcare workers ☐ Protects Patients ☐ Both ☐ None

Advanced age or very young age increases the risk of Nosocomial infection?

☐ True ☐ False

Standard precautions include?

☐ Hand Hygiene ☐ Personal Protective Equipment ☐ Biomedical waste handling

☐ Hand Hygiene, Personal Protective Equipment, Biomedical waste handling, Disinfection, Spillage cleaning, Respiratory Hygiene and cough etiquette

An infection is attributed as HAI if date of event occurs on or after which calendar day of admission where day of admission is counted as 1?

☐ 1 ☐ 2 ☐ 3 ☐ 4

Donning (wearing) correct sequence:

☐ Hand Hygiene, shoe cover, first pair of gloves, gown, N95 mask, hood, face shield, second pair of gloves

☐ Shoe cover, first pair of gloves, gown, N95 mask, hood, face shield, second pair of gloves, Hand Hygiene

☐ Hood, face shield, first pair of gloves, second pair of gloves, hand hygiene, shoe cover, mask

☐ None

Doffing (removing) correct sequence:

☐ Gloves, goggles, gown, mask ☐ goggles, gloves, gown, mask

☐ Mask, gown, gloves, goggles ☐ none

Patient has an infection that is spread through droplets. Which of the following is essential for the nurse to use when taking patients temperature?

☐ Mask ☐ Gown ☐ Goggles ☐ All

Change of dressing for central line is done using?

☐ 1% chlorhexidine ☐ 2% chlorhexidine ☐ 0.5% chlorhexidine ☐ 1.5% chlorhexidine

Hub decontamination in CLABSI maintenance bundle care is done before each hub access using?

☐ Clean water ☐ Alcohol ☐ Cotton ☐ None

For prevention of Surgical Site Infection Surgical antimicrobial prophylaxis must be administered within?

☐ 60-120 minutes ☐ 120-240 minutes ☐ 360 minutes ☐ 45 minutes

Uro bag should be placed?

☐ Below the abdominal level and above the floor ☐ above the abdominal level

☐ Above the waist line ☐ None

In case of Needle Stick Injury:

☐ Hold the wound in running water ☐ use hand rub ☐ use band aid ☐ None

Do you recap needle before disposal?

☐ Yes ☐ No

To reduce the risk of VAP (Ventilator Associated Pneumonia) the head of the bed should be?

☐ less than 30 degree ☐ More than equal to 30 degree ☐ 20 degree ☐ None

Yellow is the color coding of the bag used in hospitals to dispose of human anatomical wastes such as body parts

☐ True ☐ False

Where would you put a syringe?

☐ Yellow bag ☐ Sharp container ☐ Black bag ☐ None

Attitude

Hand Hygiene can be avoided if gloves are used?

☐ Agree ☐ Disagree

It is difficult to practice infection control precautions due to heavy workload?

☐ Agree ☐ Disagree

Infection control policies and procedures should be adhered at all times?

☐ Agree ☐ Disagree

Do you follow insertion and maintenance bundle for CLABSI, CAUTI, VAP, SSI?

☐ Agree ☐ Disagree

Do you follow Biomedical waste management protocol of categorizing hospital waste before disposal?

☐ Yes ☐ No

Do you feel these precautions help in reducing occupational hazard in healthcare workers ?

☐ Yes ☐ No

Practices

Infection control and prevention activities are monitored in the hospital?

☐ Yes ☐ No

Hepatitis B and TT vaccination is provided to the staff ?

☐ Yes ☐ No

PPE kit is always accessible to the staff?

☐ Yes ☐ No

Is Regular training provided to the hospital staff regarding Infection control practices?

☐ Yes ☐ No

Is Key performance indicator related to HAI being captured in your department?

☐ Yes ☐ No