"A STUDY ON CONTROL PRACTICES FOR HOSPITAL ACQUIRED INFECTION IN INTENSIVE CARE UNIT AT PARK HOSPITAL, GURGAON"

Dissertation
In
Park Hospital, Gurgaon

(February 11th – May 11th 2013)

A dissertation submitted in partial fulfillment of the requirements

for the award of

Post-Graduate Diploma in Health and Hospital Management

By
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Park Hospital
(A Unit of Park Medicentre Pct. Ltd.)
250 Bedded Superspecialty Hospital

NABH
Park Hospital
West Delhi

Certificate of Internship Completion

Date:.....

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Shital Babulal Patil** has successfully completed her **3 months** internship in our organization from **February 11, 2013** to **May 15, 2013**. During this internship she has worked on **"A STUDY ON CONTROL PRACTICES OF HOSPITAL ACQUIRED INFECTION IN ICU"** under the guidance of me and my team at Park Hospital, Gurgaon.

We wish her good luck for her future assignments

(Signature)

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Certificate of Approval

The following dissertation titled **"STUDY ON CONTROL MEASURES OF HOSPITAL ACQUIRED INFECTION IN MICU AT PARK HOSPITAL,GURGAON"** is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name	Signature
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Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Shital Babulal Patil**, a graduate student of the **Post-Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. She is submitting this dissertation titled **"A STUDY ON CONTROL PRACTICES OF HOSPITAL ACQUIRED INFECTION IN ICU"** in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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FEEDBACK FORM

Name of the Student: Dr Shital Patil

Dissertation Organisation: Park Hosp, South City II, Gurgaon

Area of Dissertation: Operations

Attendance: Regular

Objectives achieved: yes

Deliverables: Fulfilled assigned tasks

Strengths: Intelligent & hard working. Takes responsibilities

Suggestions for Improvement: There is always scope for learning

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Abstract

"Hospital is the place for cure" – this comes to our mind when we think about the hospital, treating the patients under same roof was considered as a revolutionary idea, and was expected that it will ease the job of healing. **Intensive Care Unit** (**ICU)** is one of the important aspects of critical care medicine. It includes resuscitation, emergency care for life threatening conditions, and intensive nursing care. Due to high dependency of ICU patients and their critical conditions there are increased chances of getting hospital acquired infections among these patients. Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients. They are a significant burden both for the patient and for public health as well as to health care personnel

The study was focused to find out the physical facilities and control measures available for infection control (IC).

The objectives of the study to study the physical facilities available for infection control in intensive care unit and also the existing infection control procedures used in the intensive care unit, to find gap according to NABH guidelines in the infection control measures, to motivate the staff for infection control measures . The research approach adopted in the study was a descriptive method. It includes collection of information regarding infection control procedures and its measures and also existing physical facilities available for infection control through questionnaires, studying relevant record maintained in ICU

Acknowledgement

"A journey is easier when you travel together. Interdependence is certainly more valuable than independence. This project report is the result of two months of training whereby we have been accompanied and supported by many people. It is a pleasant aspect that we now have the opportunity to express our gratitude to all of them."

I am extremely indebted to all the professionals at **Park Hospital, Gurgaon** for sharing generously their knowledge and precious time which inspired me to do our best during internship.

I owe a great debt to **Dr. Ankit Gupta (MD**), **Dr. V. S. Bhalla** (Medical Superintendent), and for showing their interest and sharing their valuable views in spite of their busy schedule. It has been our privilege to work under their dynamic supervision in the hospital.

The data collection and our learning would have not been possible without in depth discussions with Dr Vandana. I thank her for providing timely guidance, assistance, unconditional support & motivation during my dissertation study.

In IIHMR

I am highly grateful to **Mrs. Kirti Udyai** and all the departmental heads and staff for giving me time in spite of their hectic schedule. Without their active cooperation and participation it would not have been possible to accomplish my task.

Dr. Shital Patil

Contents

Graph	List Of Graphs	Page No.

PART-1

INTERNSHIP REPORT

1.1 INTRODUCTION:

As an integral part of the curriculum , a student of PGDHM is required to undergo 3 months of practical exposure in a reputed organizations to get in depth exposure to the functioning of various departments in that organization and get familiarized with the day to day occurring problems & handling them by way of Internship.

1.2 OBJECTIVE OF INTERNSHIP:

Working with PARK HOSPITAL , it gave me an opportunity

- To complete my internship with efficacy and efficiency
- To understand working of whole hospital and seek opportunity that provides me the real experience
- To groom myself as a professional

The duties required me to involve in the managerial activities of the hospital and perform daily rounds of the various departments.

ORGANIZATION PROFILE

Park Hospital was founded by Dr. Ajit Gupta who believes in taking up challenging assignment where he can continue to apply his Social, Administrative & Hospital management skills in a wide exposure of medical services keeping a positive and committed & targeted attitude.

Park Hospital is a Multi super speciality tertiary care hospital which has attained supremacy in the field of health care services. Park hospital is religiously dedicated to provide latest, ultramodern and sophisticated medical care. The Hospital follows its principle of improving Health Care Processes via adopting exclusive equipments and technology in order to enhance the success rate & patient gratification. Park also has a team of highly proficient and veteran doctors & efficacious paramedical staff that link together to provide the most sophisticated & highest standard of care in all penchant of Health in conjunction with super specialties.

Park Hospital Units:

Park Hospital, West Delhi

Park Hospital, South Delhi

Park Hospital, Gurgaon

Park Hospital, Faridabad

Park Hospital, Panipat

Park Hospital has state of Heart and Lung institute. The institute is equipped with Siemens Flat Panel fixed Lab, Intra aortic Balloon Pumps and other important equipment including Modular OTS for open heart and Bypass surgeries with Ultra modern ICU/CCU complex. Park Hospital also dreams of setting up of health care services by offering the crème of medical assistance with the help of excellent medical facilities. Park Hospital is ardently devoted to provide quality care that would treat health problems and simultaneously focus on overall well being of patient.

MISSION

"To deliver state-of-the-art personalized healthcare services to people of all social and economic background and achieve highest level of patient satisfaction."

VISION

"To be a leading name in the healthcare sector by providing holistic healthcare at affordable cost."

QUALITY PARAMETERS

•The hospital has been designed for maximum safety and comfort of the patients and healthcare providers. It complies with national &International standards for hospital accreditation.

•Clinical governance is an integral part of our practice.

•Robust quality and infection control practices are in place.

•Best in class modular OT's and ICU's with HEPA filters, laminar air flow & complete air changes per hour & access control minimize the risk of infection.

•Isolation rooms have been earmarked in the ICU to treat critically ill infectious patients thus preventing threat to other patients

•Green building: The hospital is designed to allow sunlight in most of the ICUs and patient rooms as it minimizes stress on the patients and gives them proper orientation of time.

•Stringent "Biomedical Waste Management" practices for segregation, storage, transport & disposal of hospital waste are in place.

•The hospital has one of the most advanced infrastructures which help in patient & employee safety & reduce the excessive burden on the environment.

•The "Hospital Information System" used is most advanced and user-friendly and helps to reduce medical errors as well as contributes to faster and better patient management.

Departments, Services, Facilities:

Park Hospital, West Delhi

Location: Keshopur Mandi, West Delhi

Promoters: Park Group of Hospitals

Total number of beds: 305 beds

Single specialty or multi-specialty: Multi-specialty hospital.

Park Hospital, Gurgoan

Location: Q Block, South City 2, Sec 47

Promoters: Park Group of Hospitals

Total number of beds: 250 beds (Proposed to Make 400)

Single specialty or multi-specialty: Multi Super specialty hospital.

AREA OF DISSERTATION: Operations

During the period(Feb- May, 2013) , I worked at PARK HOSPITAL, GURGAON in OPERATIONS during which I looked after day to day working of the hospital which gave me a better insight about operational aspect of the hospital.

OBJECTIVES OF INTERSHIP:

- To complete my internship with efficacy and efficiency
- To understand working of whole hospital and seek opportunity that provides me the real experience
- To groom myself as a professional

The duties required me to involve in the managerial activities of the hospital and perform daily rounds of the various departments.

DESIGNATION: Asst. Operations Manager

TASKS PERFORMED:

During the internship period, I was given the responsibility to coordinate and communicate various tasks like:

- Coordinate workforce management objectives with focus on individual, departmental and hospital wide initiatives and team concepts.
- Focus on patient satisfaction
- Facilitating admission and discharge process
- Supervision of housekeeping staff and looking after inventory management
- Coordinating with Front desk, MRD, Billing, Pharmacy, laundry and other departments

Part 2

PROJECT REPORT

"A study on control practices for hospital acquired infection in Intensive Care Unit at Park Hospital, Gurgaon".

INTRODUCTION

Infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients. They are a significant burden both for the patient and for public health. A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing 4 WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections.

A high frequency of HAI in ICU's is evidence of a poor quality of health service delivery, and leads to avoidable costs. Many factors contribute to the frequency of nosocomial infections: hospitalized patients are often immune-compromised, they Undergo invasive examinations and treatments, and patient care practices and the hospital environment may facilitate the transmission of microorganisms among patients. The selective pressure of intense antibiotic use promotes antibiotic resistance. While progress in the prevention of nosocomial infections has been made, changes in medical practice continually present new opportunities for development of infection, hence it is the responsibility of health care providers to ensure an adequate arrangement to control the risk of infection. Since infection control is the quality standard of patient care, it is essential wellbeing of patients and safety of both patients and health care workers in a population. Also, infection control measures are to be viewed as a priority and have to be fully integrated into the continuous process of improvement of quality care.

Definition According to WHO

Nosocomial infections

Nosocomial infections, also called "hospital-acquired infections", are infections acquired during hospital care which are not present or incubating at admission.
Infections occurring more than 48 hours after admission are usually considered nosocomial.

According to NABH standards, 5th chapter that covers hospital infection control (HIC)

- The hospital infection control programme is documented which aims at preventing and reducing the risk of nosocomial infection
- The hospital should have a multidisciplinary infection control committee.
- The hospital should have an infection team.
- The hospital should have designated and qualified infection control nurse for this activity.
- Hand washing facilities in all patient care areas should accessible to healthcare providers.

Hospital Acquired Infection

Studies throughout the world document that nosocomial infections are a major cause of morbidity and mortality, and Infection control is a major area of concern in every hospital, although there have been numerous guidelines set out to try and protect both the patients and staff from hospital acquired infections. There have been many studies which have proved that 9% of the inpatients who have been admitted in ICU suffer from HAI.

The term Hospital Acquired Infection is defined as infection developing in patients after admission to the hospital, which was neither present nor in the incubation period at the time of hospitalization. Such infections may become evident during their stay in the hospital or sometimes after their discharge.

Many microorganisms associated with hospital-acquired infections display two particular features; firstly, they are pathogens of well established medical importance and secondly, they can withstand the rigorous of the hospital environment .It benefits them to survive outside temperature human tissues because an appropriate environment niche will provide shelter until some timely mechanisms facilitate their transfer back to patients. Not all of them demonstrate this capacity; some originate from the patient's own flora, especially those who are immune compromised and others can survive only in human tissues and thus rely upon person-to-to person spread in order to disseminate. Nosocomial infections typically affect patients, who are immune compromised because of age, underlying diseases, or medical or surgical treatment. Noso comial infection rates in adult and paediatric ICU are approximately three times higher than elsewhere in hospitals.

The site of infection and the pathogens involved are directly related to treatment in ICUs.
10 The patients hospitalized in ICUs are 5 to 10 times more likely to acquire nosocomial infections than other hospital patients. The frequency of infections at different anatomic sites and the risk of infection vary by infection site. Contributing to the seriousness of nosocomial infections, especially in ICUs, is the increasing incidence of infections caused by antibiotic-resistant pathogens.

Classification of hospital acquired infections:

Hospital Acquired Infection classified as:
1. Infection contracted and developing outside the hospitals and require admission to the hospital (e.g. pneumococcal pneumonia)
2. Infections contracted outside, but clinically apparent when the patient is in the hospital (e.g. chickenpox or zoster)
3. Infections contracted, and developing when the patient is in hospital (e.g. device associated bacteraemias)
4. Infections contracted within the hospital, but not becoming clinically apparent until after the patient has been discharged (e.g.: many postoperative wound infection),
5. Infections contracted by hospital staff as a consequence of their work, whether or not this involves direct contact with patients (e.g. hepatitis B)

Sources of hospital acquired infection:

Sources of hospital acquired infection are infecting microorganisms from fellow patients which may be multidrug resistant, infecting organisms from hospital staff, infecting organisms from instrument, blood products, intravenous fluid, from patient's normal flora, etc, insects are also source multidrug infection, organism may be present in air, dust, water, antiseptic solution, food, surfaces contaminated by patient's secretions, blood fluid, etc.

Predisposing factors for hospital acquired infection:

The predisposing factors for hospital acquired infection are hospital environment heavily laden with a variety of pathogens, organisms present in air, dust, antiseptic location, water and food or may be spread from sheddings from the patients, and hospital microbial flora is usually multi-drug resistant. Patients have impaired defense mechanism due to disease therapy and investigations in the hospital, instrumentation hospitals may introduce infection, blood, blood products and IV fluids may transmit many infections and accidental inoculation of infectious material

Mode of transmission:

The hospital acquired infection spreads by various routes as following:

1. Contact: Main route of transmission. Transmitted by hands or clothing of hospital personnel and even patient himself or transmitted by contact with inanimate objects.
2. Air- borne route: Transmitted by inhalation of droplet, dust from bedding floors, exudates dispersed from wounds, skin, etc, and aerosols produced by nebulizers, humidifiers and air conditioning apparatus
3. Oral route: Transmitted by ingestion of contaminated food or water
4. Parenteral route: Transmitted by the use of contaminated syringes, needles and other instruments, by administration of contaminated blood, blood products, infusion fluids or tissue.
5. Inoculation route: Infection by inoculation occurs when infected material is
Inoculated directly into tissue as in hepatitis B virus infection, virus is inoculated
By transfusion of contaminated blood or inoculation of material containing the
Virus
6. Iatrogenic transfer: Infections may also occur during diagnostic or therapeutic
Procedures, if proper care is not taken

Infecting organisms:

A few decades ago common microorganisms was Staphylococcus aureus. Over the years the pattern has changed. At present the infecting microorganisms are pathogenic Escherechia coli, Pseudomonas aeruginosa, Staphylococcus aureus, streptococcus faecalis, Klebsiella, Proteus. Other organisms may be found less commonly are Methicillin resistant Staphylococcus aureus, clostridia which may cause gas gangrene, tetanus, candidiasis may cause pneumonia, meningitis and gastro enteritis, pneumocystic carinii may cause pneumonia, hepatitis B or C Virus which may hepatitis after 6 to 8 weeks, HIV infection may

manifest late and tuberculosis may manifest late. A cause for every clinician whose patient is on ventilator is the ventilator associated pneumonia.

Common hospital –acquired infection:

Some of the common hospital acquired infection as given below:

 Surgical site infection Any purulent discharge, abscess, or spreading cellulitis at the surgical site during the month after the operation Urinary infection Positive urine culture (1 or 2 species) with at least 105 bacteria/ml, with or without clinical symptoms

 Respiratory infection Respiratory symptoms with at least two of the following signs appearing during hospitalization:

1. Cough
2. Purulent sputum
3. New infiltrate on chest radiograph consistent with infection

 Vascular catheter Inflammation, lymphangitis or infection purulent discharge at the insertion site of the catheter

 Septicaemia fever or rigours and at least one positive blood culture

RATIONALE OF STUDY

Health care-associated infections (HAI) are an important public health problem because they occur frequently, cause morbidity and mortality and represent a significant burden among patients, health-care workers and health systems. HAI occur worldwide and affect all countries, irrespective of their degree of development.

Outbreaks of HAI may have severe consequences in hospitals and transmission from former patients, visitors and staff may also lead to outbreaks in the community. The emergence of infections such as severe acute respiratory syndrome (SARS), viral haemorrhagic fevers, avian influenza, and the threat of pandemic influenza highlight the need for efficient infection-control practices in health-care settings. Among many lessons learnt from the SARS epidemics is the fact that health-care facilities can act as amplifiers of the outbreaks, increasing the number of cases occurring. Adequate preparation and an ongoing institutional culture of safe health-care practices to prevent and control the dissemination of pathogens are relevant in the control of many outbreaks of communicable disease that may affect the community.

It is very important that HAI should be as low as possible, as it can lead to unnecessary increase in:

- Suffering of the patient
- Average length of stay
- Cost of treatment

Therefore, its of utmost importance that the hospital staff should follow a proper infection control program and should be properly aware of it.

OBJECTIVES

GENERAL OBJECTIVE:

"A study on control practices in Intensive Care Unit for hospital acquired infection at Park Hospital, Gurgaon".

SPECIFIC OBJECTIVES :

1) To study the physical facilities available for infection control in the intensive care unit at Park Hospital, Gurgaon.

2) To study the existing infection control procedures used in the intensive care unit at Park Hospital, Gurgaon

3) To analyse the gap in the infection control measures used for hospital acquired infection in intensive care unit as per NABH guidelines

4) To motivate the staff to follow infection control protocols and standards

REVIEW OF LITERATURE

A prospective study was performed over a period of 13 months in two ICUs of Jawaharlal institute of post graduate Medical Education and Research (JIPMER) , Pondecherry, India. Surveillance samples were collected from the HCWs and the ICU environment results shows that ICU environment was observed to be the potential reservoir for VAP pathogens; therefore , strict adherence to environmental infection control measures is essential to prevent health care associated infections **(Joseph et al. 2010)**

INICC, International Nosocomial Infection Control Consortium, evolves from itinerant information work and training that started in the late 90s. During the twentieth century the rate of healthcare-associated infection was not known in developing countries, in this way INICC emerged as a necessity. For this reason, since 2002, INICC has been measuring healthcare-associated infection rates in 46 developing countries. and has found that the rate of ventilator-associated pneumonia is 16 per 1000 ventilator days, that is, 3 times higher than in US; the rate of central line-associated bloodstream infection is 7 per 1000 central lines-days, that is, 3 times higher than in US; and the rate of catheter-associated urinary tract infection is 6 per 1000 urinary catheter-days, that is, also 3 times higher than in US.

Despite their best intentions, health professionals sometimes act as vectors of disease, disseminating new infections among their unsuspecting clients. Attention to simple preventive strategies may significantly reduce disease transmission rates. Frequent hand washing remains the single most important intervention in infection control. However, identifying mechanisms to ensure compliance by health professionals remains a perplexing problem. Gloves Gowns and masks have a role in preventing infections, but are often used inappropriately, increasing service costs unnecessarily. While virulent microorganisms can be cultured from stethoscope and white coats, their role in disease transmissions remains undefined. There is greater consensus about sterile insertion techniques for intravascular catheters- a common source of infections – and their care. By following a few simple rules identified in this review, health professionals may prevent much unnecessary medical and financial distress to their patients. **(H Saloojee et al. 2010)**

Studies and incidence conducted on Hospital Acquired Infection

Intensive care units have the highest prevalence of hospital-acquired infections in the hospital setting. The European Prevalence of hospital-acquired infection in Intensive Care Study (EPIC), involving over 4500 patients, demonstrated that the nosocomial infection prevalence rate in ICU was 20.6 % .ICU patients are particularly at risk from nosocomial infections as a result of mechanical ventilation, use of invasive procedures and their immune compromised status. HAI are an important public health problem in the developing countries, particularly in the intensive care unit (ICU) setting. They performed a prospective nosocomial infection surveillance study during the first year of an infection control program in six Argentinean ICUs.

Nosocomial infections were identified using the Centers for Disease Control and Prevention National Nosocomial Infections Surveillance System Definitions and site-specific nosocomial infections rates were calculated.
The rate of catheter-associated bloodstream infections in ICUs was 30.3 per 1,000 device days; it was 14.2 per 1,000 device-days in coronary care units (CCUs).
The rate of ventilator-associated pneumonia in ICUs was 46.3 per 1,000 devices; it was 45.3 per 1,000 device-days in CCUs.

The rate of symptomatic catheter associated urinary tract infections in medical- surgical ICUs were 18.5 per 1,000 device days; it was 12.1 per 1,000 devices –days in CCUs.
Ten to 30 per cent of patients admitted to ICU in hospitals and nursing homes in the country acquire nosocomial infection as against an impressive five per cent in the West, according to members of Hospital Infection Society (HIS), India. This alarming situation is attributed to hospitals' reluctance to invest in infection control.

Reports that in the European Prevalence of Infection in Intensive Care (EPIIC) study, 21% of patients had an infection directly related to their admission to ICU. They prolong the hospital stay and increase morbidity and mortality by approximately 300 %.
The incidence of nosocomial infection is highest in burn units, surgical ICUs and ICUs for low birth weight (LLW) neonates (15-30 %), intermediate in medical and pediatrics ICUs (5-10 %) and lowest in coronary care units (1-2%). The infection rate may low in the early days of ICU stay, but can increase up to 80 % as the duration of stay exceeds 5 days or more. Hospital acquired infection are today by far common complications affecting hospitalized patient. Currently, between 5 to 10 % of patients admitted to acute care hospital acquire one or more infections, and the risks have steadily increased during recent decades. These adverse events affect approximately 2 million patients each year in the United States, results in some 90,000 deaths, and add an estimated $ 4.5 t0 $ 5.7 billion per year to the costs of the patient care.

METHODOLOGY

This chapter deals with the research methodology selected in order to study physical facilities available for infection control, existing infection control procedures and to give the suggestive measures to improve infection control procedures in ICU.

Study Design: Descriptive Cross-sectional study

Sample Size: 40(Dr=10, Nurse=16, CSSD staff= 7, Housekeeping =7)

Study area: MICU, Park Hospital, Gurgaon

Tools and techniques:

Primary Data: Questionnaire, Observation
Secondary Data: Registers, Files

Sample Technique: Convenient

Study Duration: 3 months (11^{th} Feb-11^{th} May 2013)

Source of data

The study is carried out in the intensive care unit, particularly the Intensive care unit of Park Hospital, Gurgaon. The required data is collected from nurses, doctors, hospital nursing assistance, staff of central sterile supply department who is responsible for supplying sterile items to medical intensive care unit, housekeeping staff who work in medical intensive care unit, through questionnaires, personal observation and studying relevant record or infection control maintained in the intensive care unit

Method of data collection

The tools adopted for study is descriptive method and the required data is obtained from respondents, consisting of nurses, doctors, staff of central sterile supply department (supplying sterile items to intensive care unit), housekeeping staff who work in intensive care unit

Through questionnaires, personal observation and studying relevant record for infection control maintained in medical intensive care unit.

Separate questionnaire are given according to category as:

Questionnaire 1 is meant for and doctors and nurses, there are 10 doctors and 16 nurses (N=26).

Questionnaire 2 is meant for CSSD staff. (N= 7)

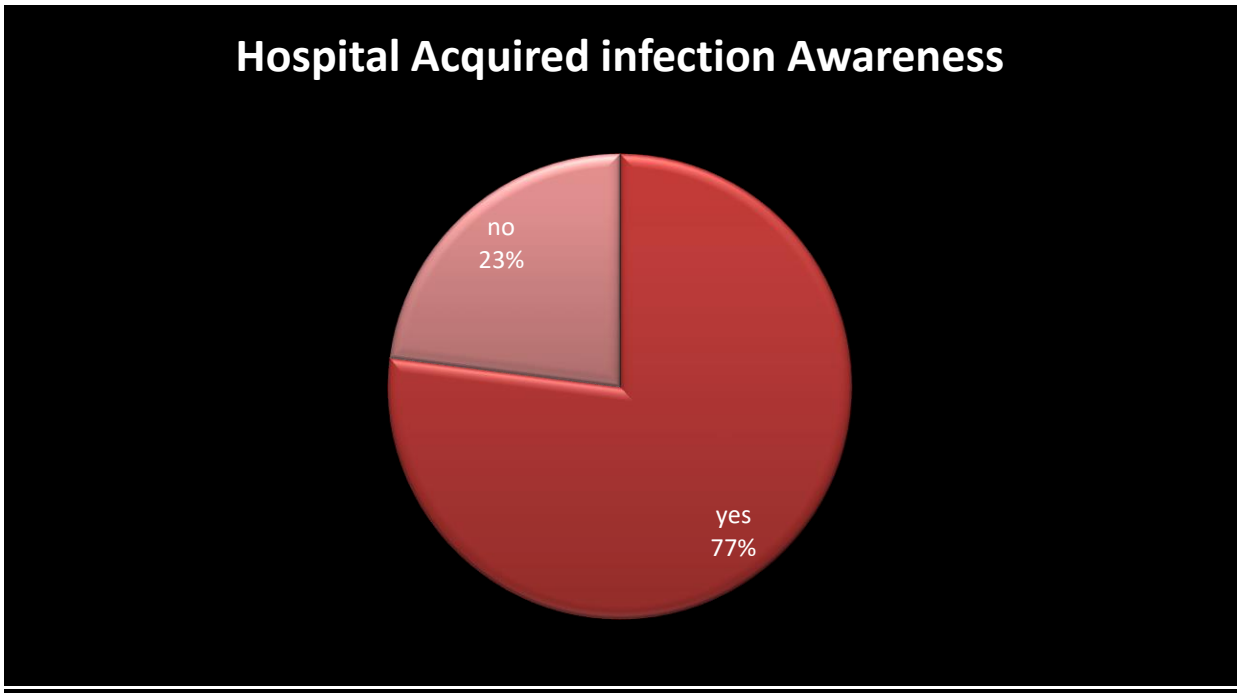
Questionnaire 3 is meant for housekeeping staffs (N=7) who works in ICU.

STUDY FINDINGS

Table 1

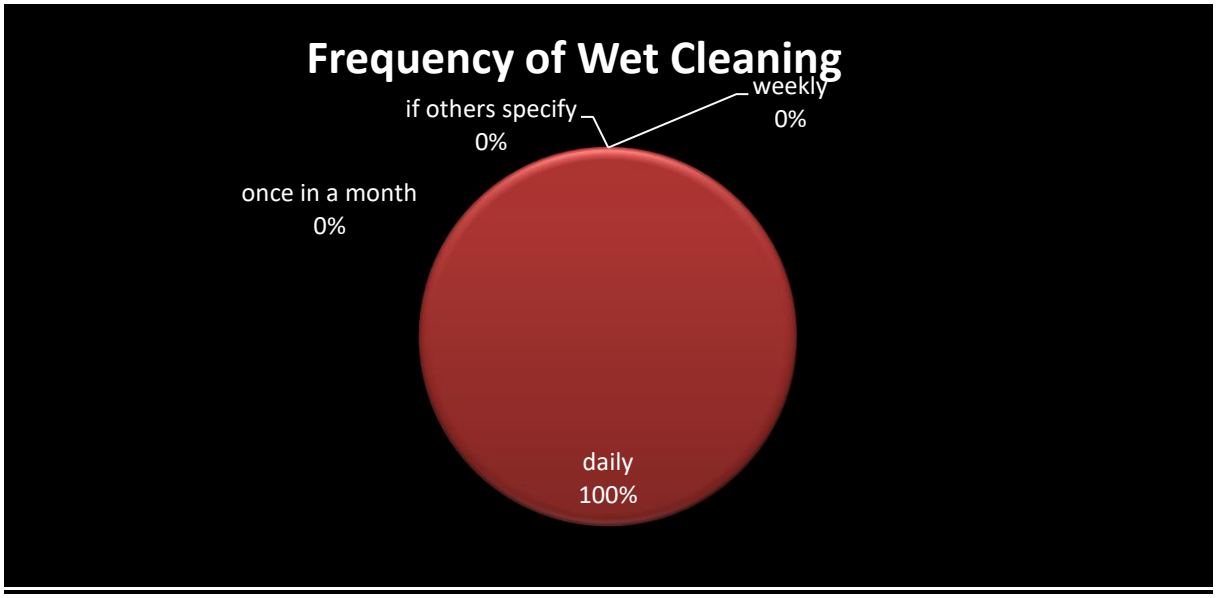
Sr. No.	Facility Required according to NABH standard	Present	Absent
1	Doctor's Change Room	Present	
2	Nurse's change room	Present	
3	Technician change area		Absent
4	Sterile storage area		Absent
5	Instrument and linen room	Present	
6	Trolley bay Present	Present	
7	Gas cylinder storage	Present	
8	Class 1V staff change room		Absent
9	Dirty utility room	Present	
10	Waste store room		Absent
11	Isolation room		Absent
12	There is standard operating manual for ICU		Absent
13	Culture studies of swabs from ICU floor / equipment are done	Present	
14	Bacteriological testing of water is done	Present	
15	Bacteriological testing of air is done		Absent
16	Isolated room for infectious patient, burn		Absent
17	Any protocol for wearing gloves		Absent

Graph 1 :Awareness about Hospital Acquired infection



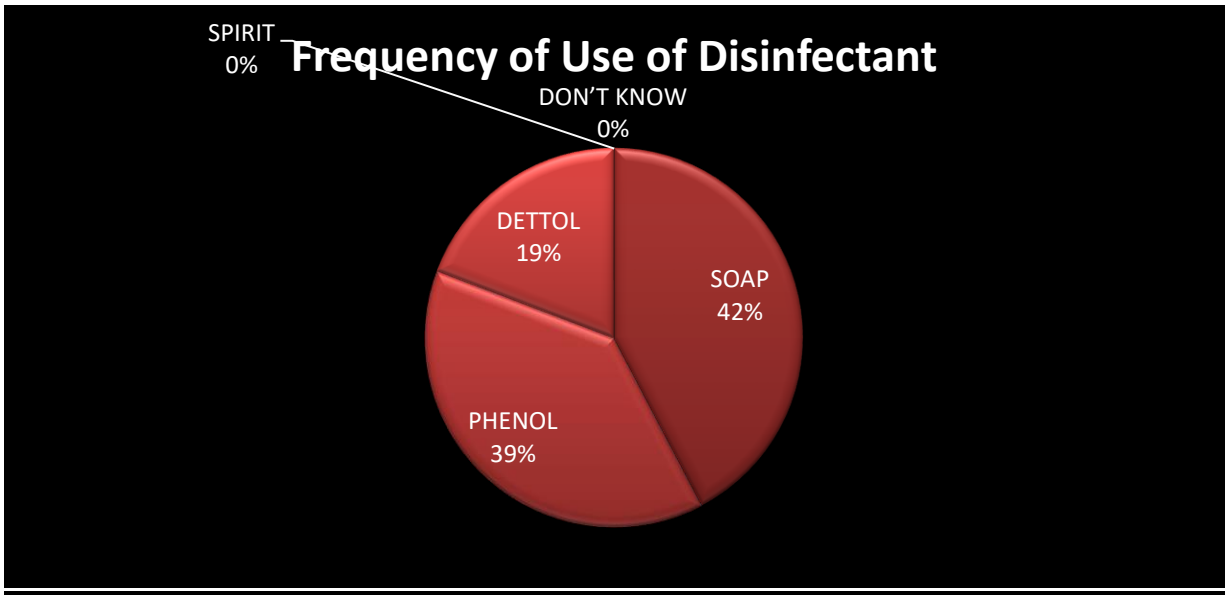
In the study, it was found that only 77% respondent had knowledge about hospital acquired infection (HAI), whereas 23% respondent had not aware of HAI.

Graph 2: <u>Frequency of wet cleaning in ICU</u>



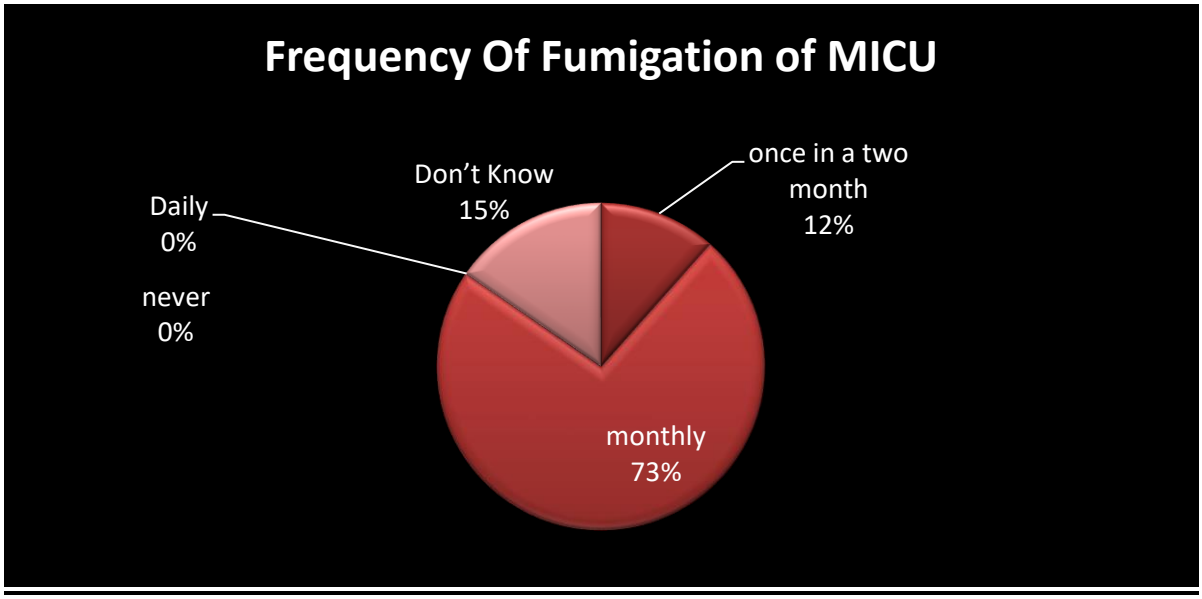
In the study, it was found that hundred percent respondent said that table, trolleys and surface of ICU have been wet cleaned daily.

<u>Graph 3 :Frequency of DISINFECTANTS used for wet cleaning of ICU</u>

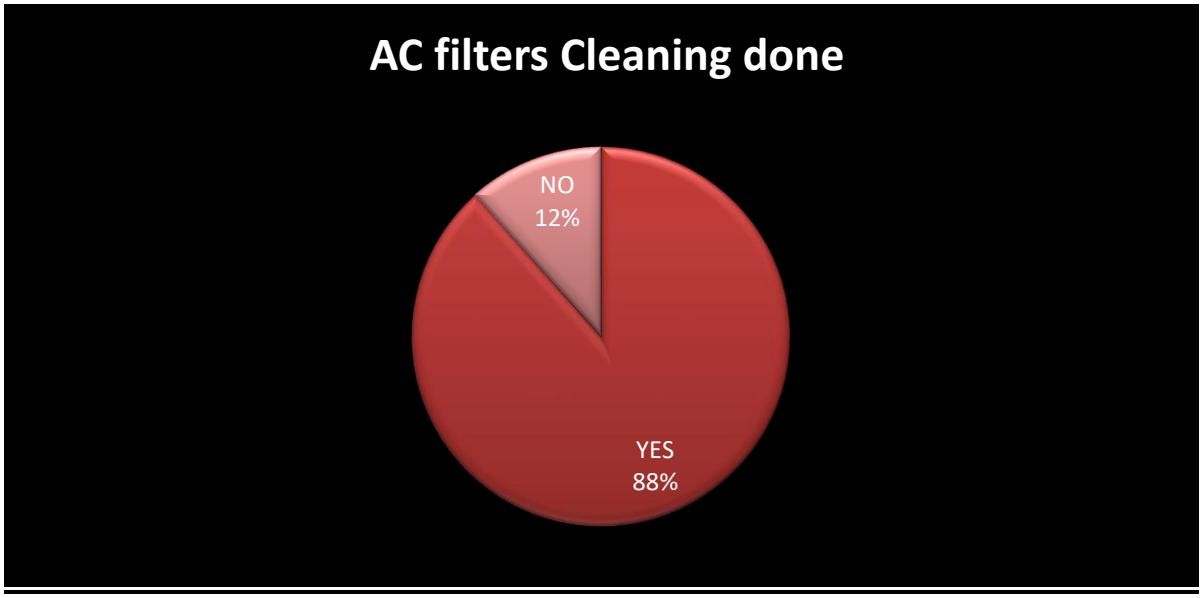


The study shows that 42% respondent said that soap and water are used for wet cleaning, 39% respondent said that Phenol is used , while 19% respondent said that dettol is used to wet cleaning as disinfectant

Graph 4 : Frequency of Fumigation in ICU

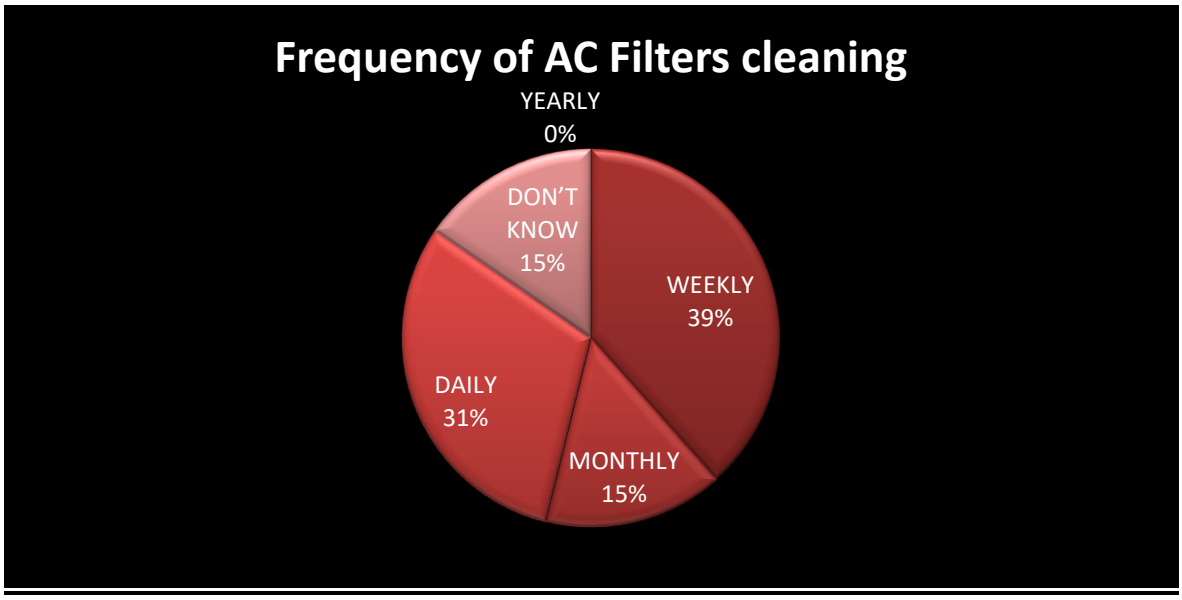


The following observations were made:
73% responded that fumigation is done once in a month
12% responded that Fumigation is done once in a two months
15% responded don't know about the fumigation of MICU
Graph 5: AC filter's proper cleaning Done



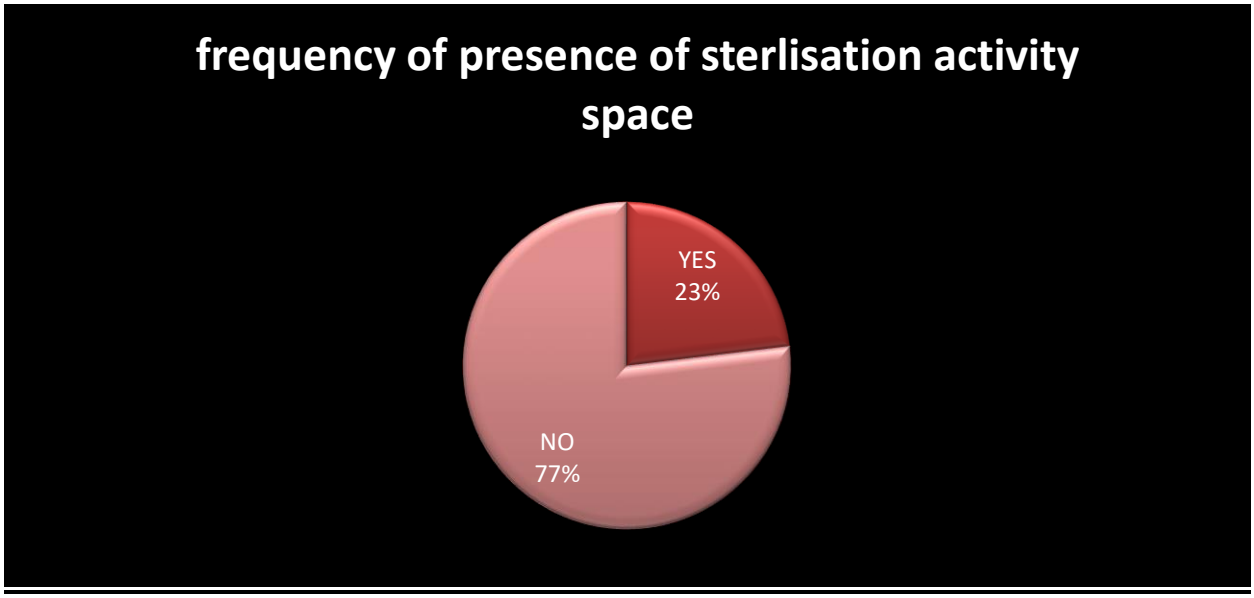
The study shows that 88% responded that filters of air conditioners has been cleaned properly whereas 12% not agree with cleaning of air conditioners filters

Graph 6: Frequency of AC Filters Cleaning



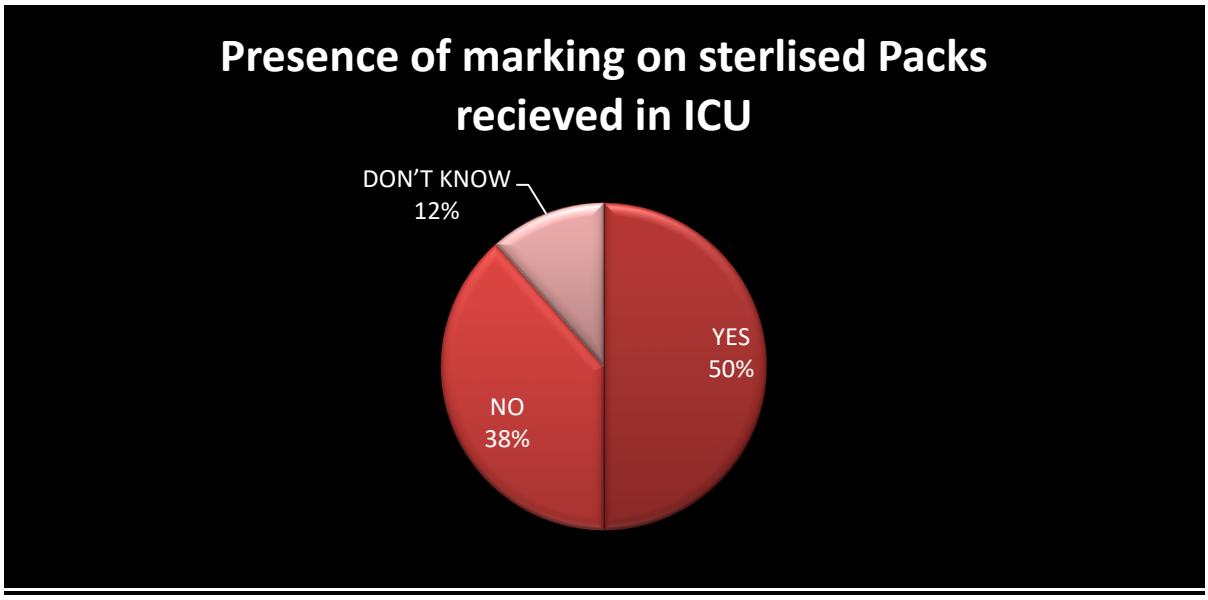
The study shows that cleaning of AC done monthly according to 15% responded, whereas 39% respondent said weekly done, 31% said Daily done while 15% don't know about cleaning frequency.

Graph 7: Presence of Available Space for Sterilisation activities



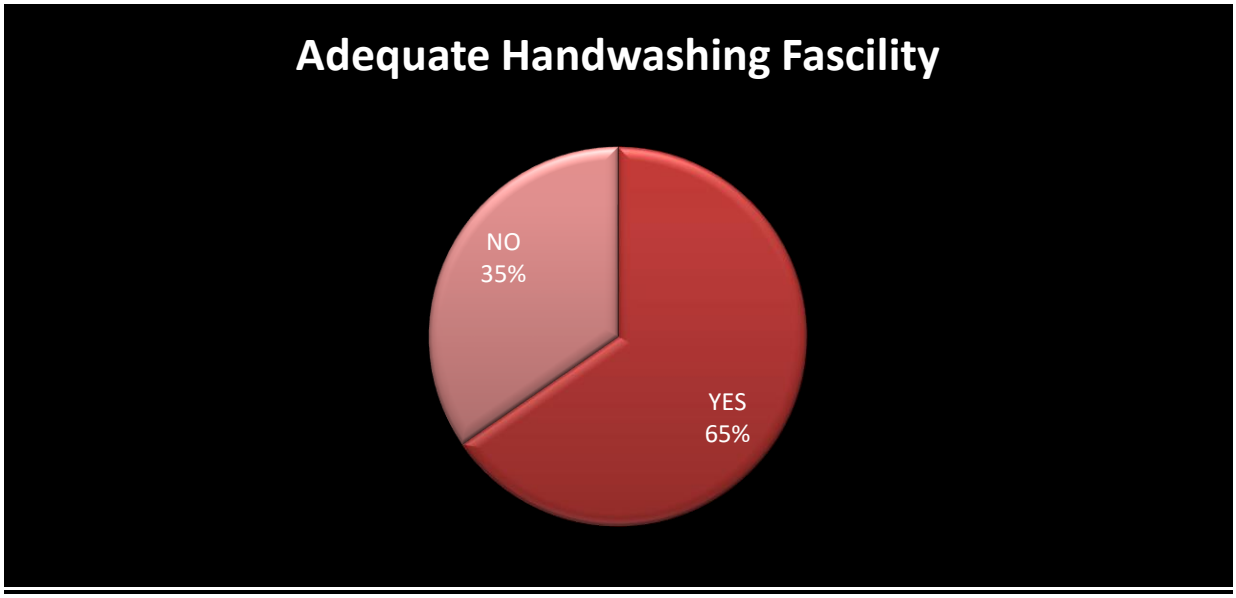
According to data 77% responded that there is adequate space available for sterilisation activities in MICU, while 23% respondent are disagree.

Graph 8 : Use of marker on the sterilised packs received in ICU



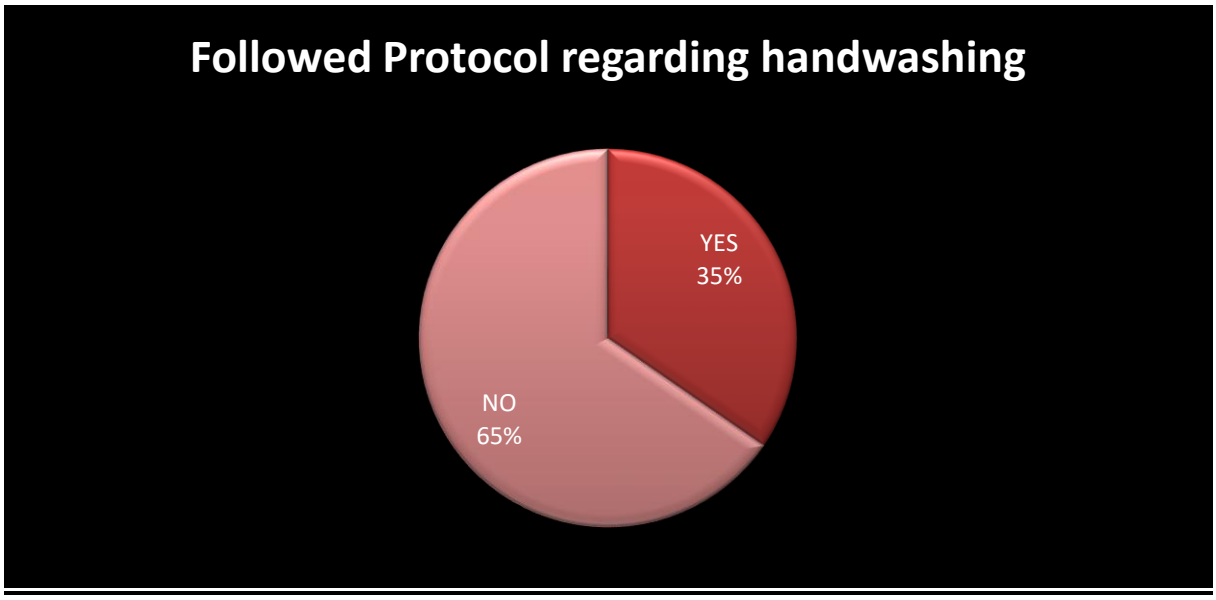
The study shows that 50% responded that they use marker to indicate the sterilised packs received in ICU from CSSD while 38% said they don't use the marker to show sterilised packs, while 12% respondent don't know the marking procedure.

Graph 9 : Response for adequate handwashing Facility



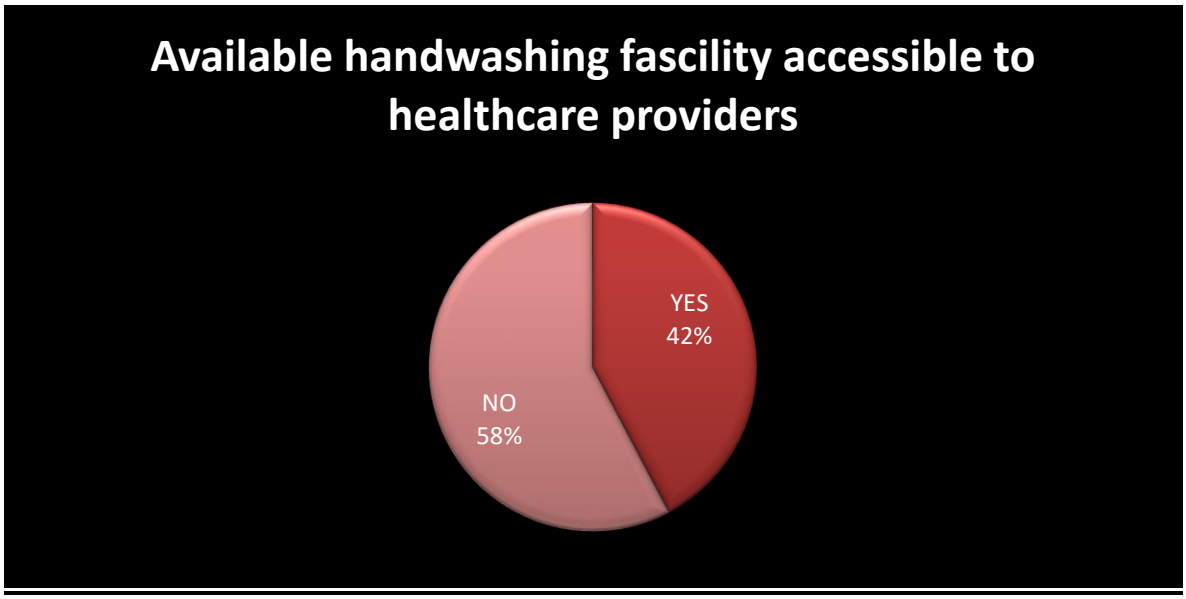
The study shows that 65% respondent agree that available hand washing facilities in ICU is adequate while 35% respondent disagree with available hand washing facilities.

Graph 10: Frequency of following of any protocol regarding hand washing



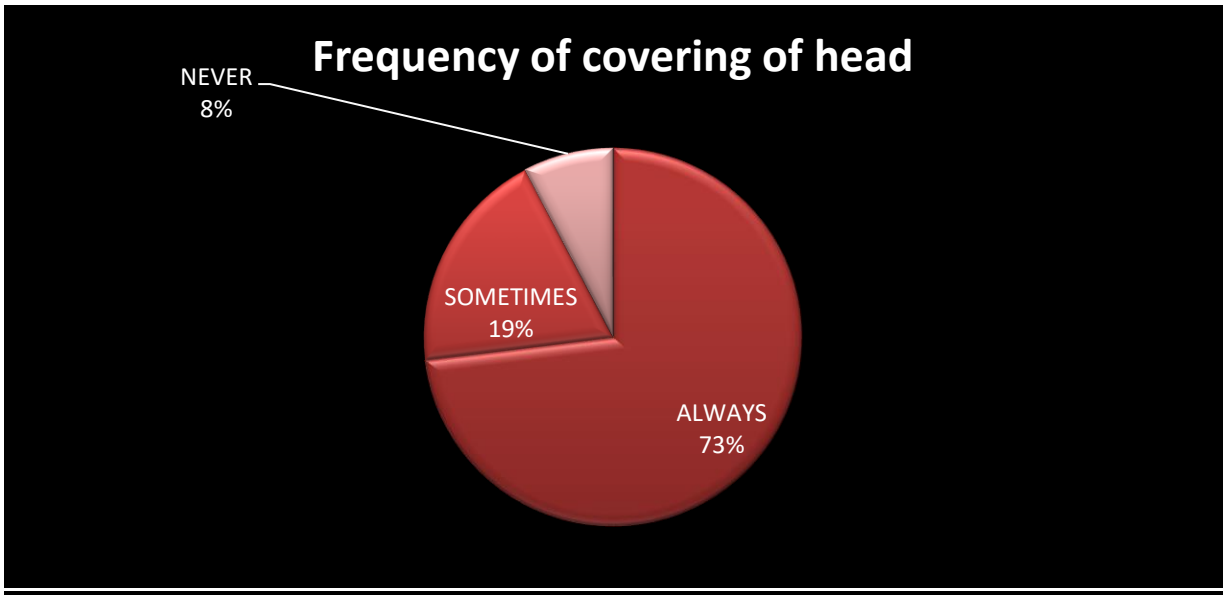
The study shows that only 35% respondent following the protocol regarding hand washing while 65% just wash their hands normally without any protocol.

Graph 11: Frequency of availability of accessible hand washing facility to the Drs and nurses.



The study shows that only 42% respondent thinks that available hand washing facilities is accessible while 58% respondent said that hand washing facilities are not accessible.

Graph 12: Frequency of covering of head and hairs

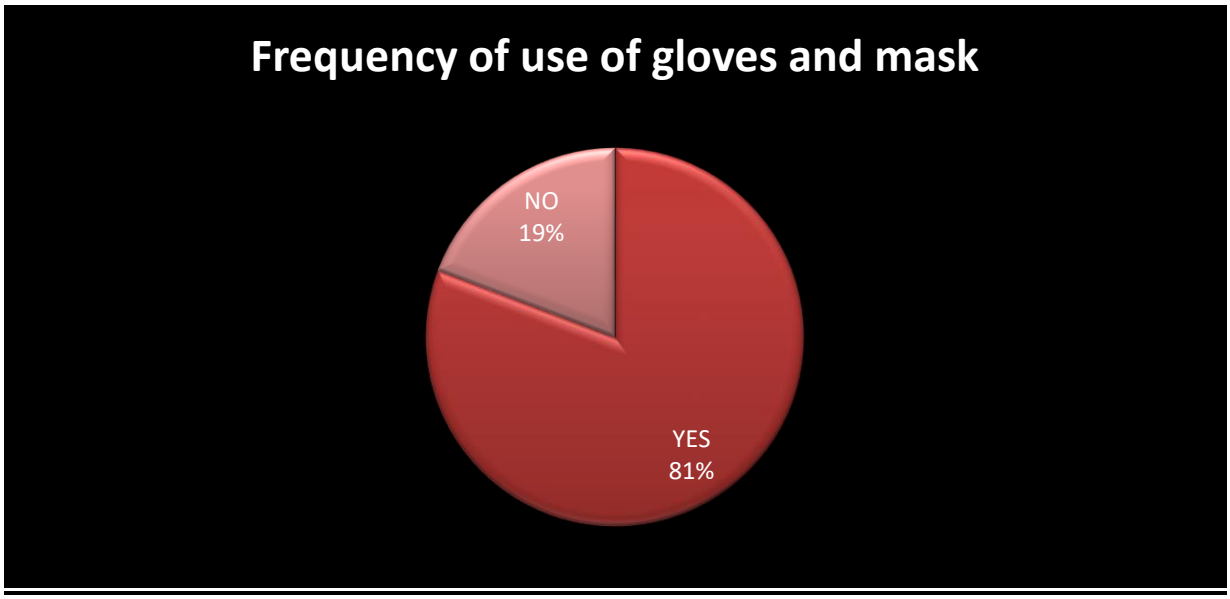


The study shows that 73% responded that they always cover their head and hair with sterilised caps while 19% cover their sometimes and 8 % never cover their head before entering the ICU.

Graph 13: Response for shoe cover wearing before entering the ICU

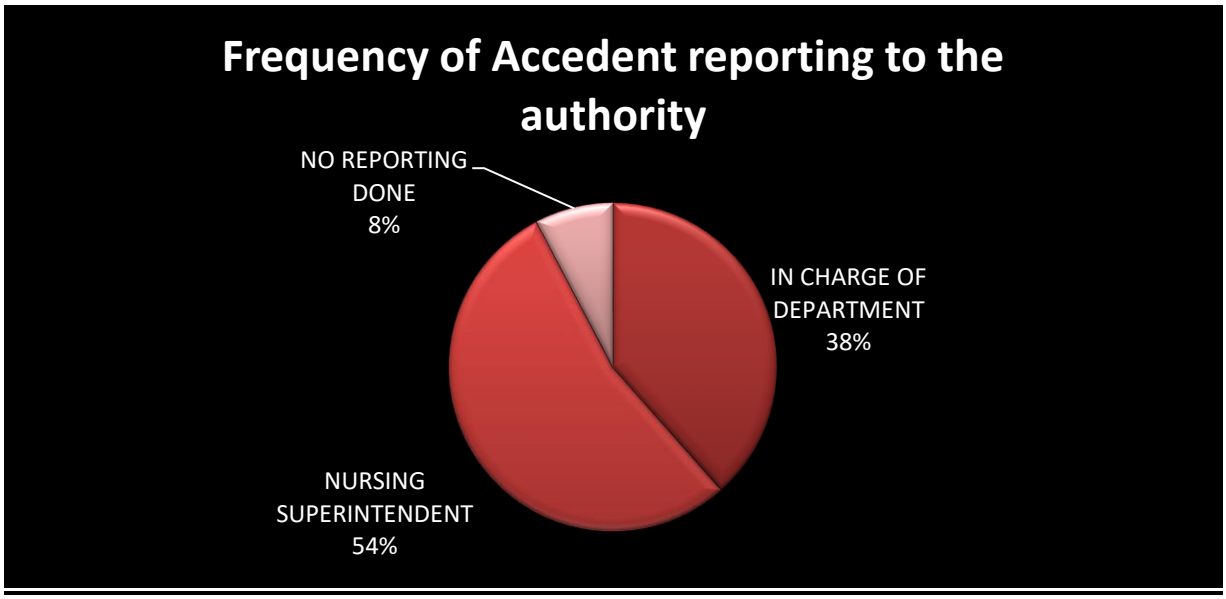
The study shows that 100% respondent said that they always wear shoe covers while entering the ICU area.

Graph 14: Frequency of using of disposable gloves and masks



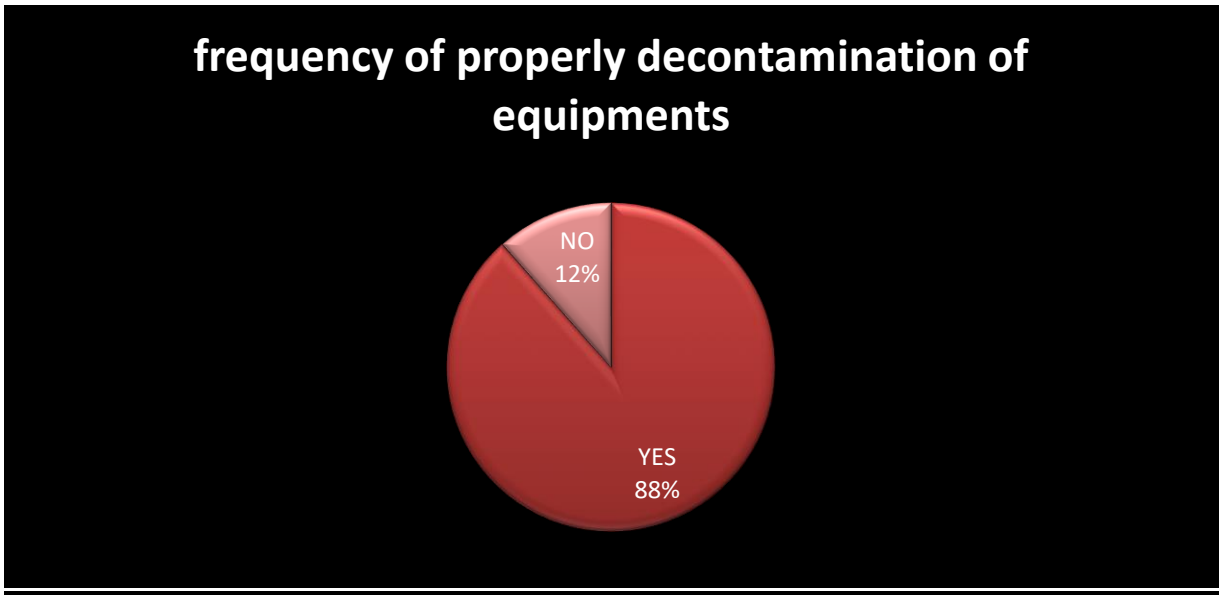
The study shows that 81% respondent always wears gloves and masks in the working area of ICU whereas 19% said don't need of wearing of gloves and masks.

Graph 15: Frequency towards accident reporting authority



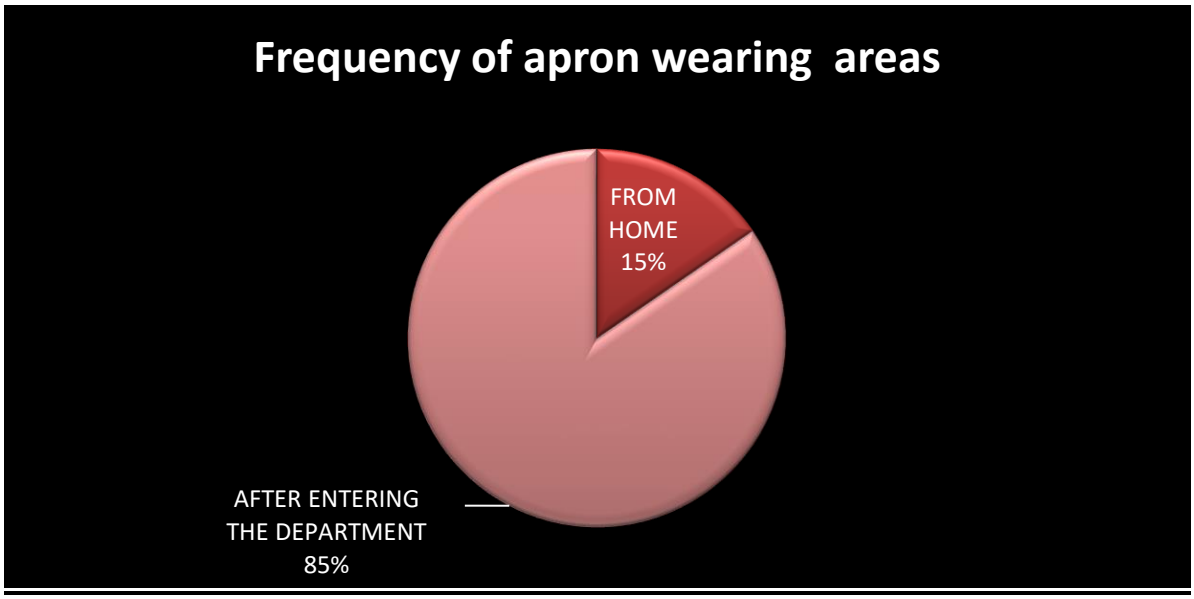
The study shows that 38% respondent said that they reporting the accidents like needle-stick injury, spills, etc to the ICU in charge, whereas 54% respondent reporting to the nursing superintendent, while 8% said they do not report to anyone.

Graph 16: frequency of properly decontamination of equipments used in ICU



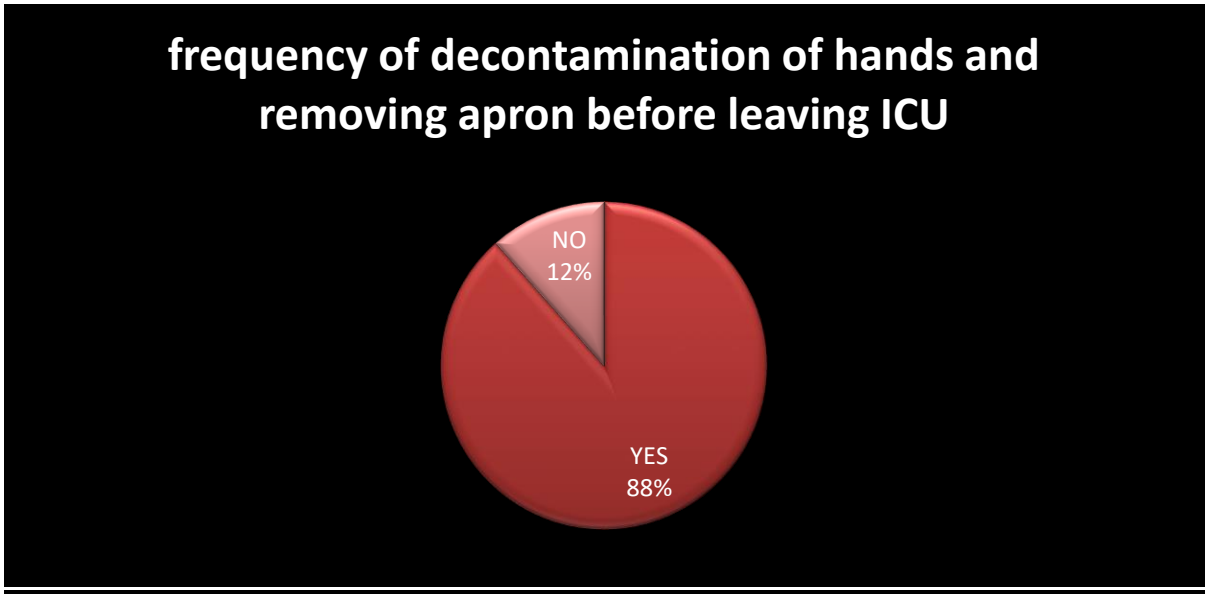
The study shows that 88% respondent agree with proper decontamination done for equipments while 12% said that proper procedures is not done during equipment decontamination.

Graph 17: Response towards Apron wearing Area



The study shows that 85% respondent wear apron after entering the department in the changing room, while 15% respondent wear apron from their home and hostel.

Graph 18: Frequency of decontamination of hands first then removing apron before leaving ICU



The study shows that 88% respondent said that they decontaminate their hands first and then removes apron before leaving working area, while 12% not follows such protocols.

Graph 19: frequency of waste collection from ICU

The study shows that 77% respondent said that biomedical waste collection is done twice a day while 23% said that once a day in the ICU.

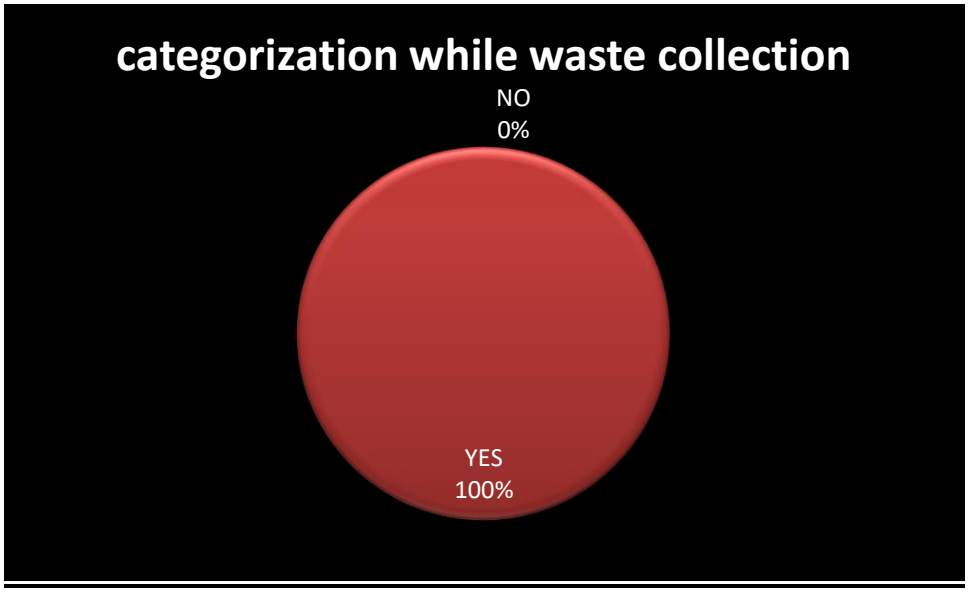
Graph 20: Who is responsible for collection of biomedical waste.

The study shows that 73% respondent said that housekeeping collects waste generated in ICU while 27% said it is collected by ward boys.

Graph 21: Frequency of getting training regarding waste disposable.

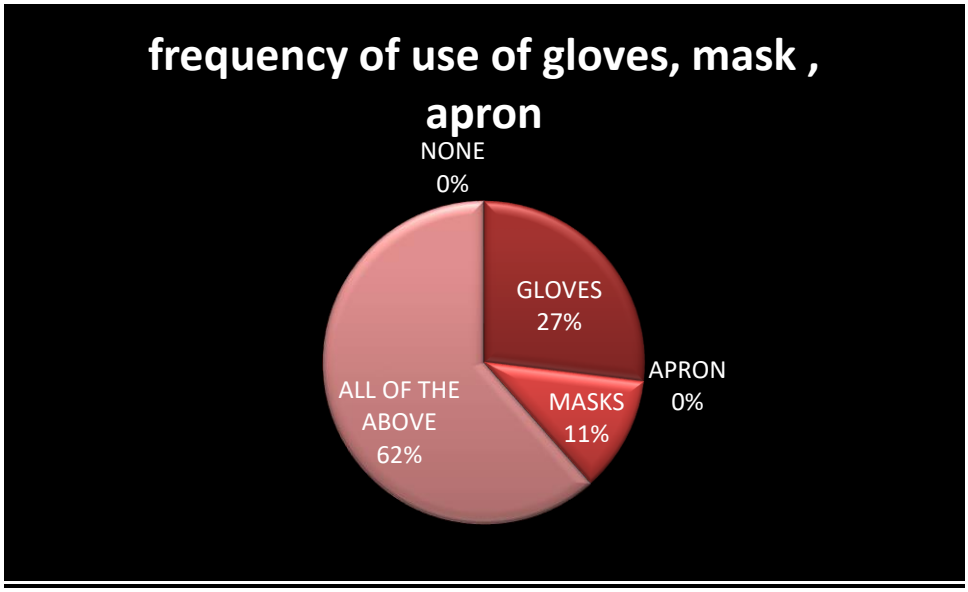
The study shows that 85% respondent said that they had given waste disposable training by the hospital while 15% respondent said they didn't get such a training.

Graph 22: frequency of categorisation of biomedical waste while collection



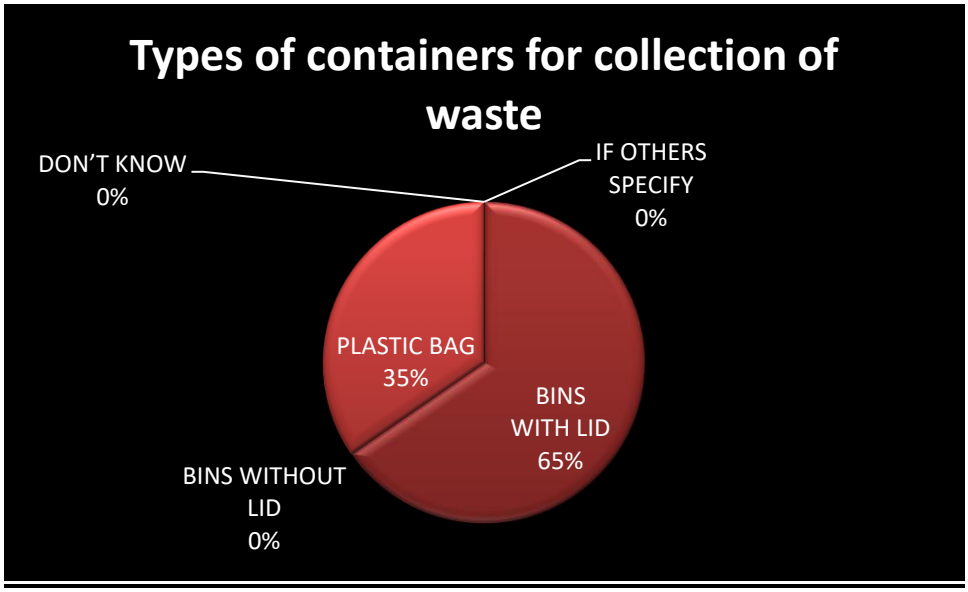
The study shows that 100% respondent said that categorisation has done according to coloured plastic bags while collection of waste material from ICU

Graph 23: frequency of material used while handling the waste



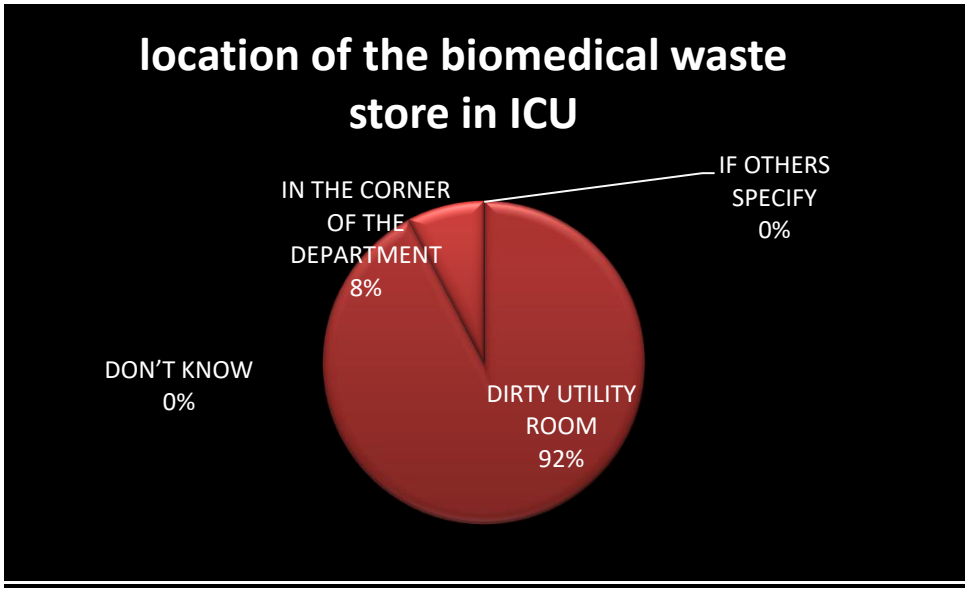
The study shows that 11% respondent uses masks only, 27% respondent uses gloves only, while 62% respondent uses masks, gloves, apron simultaneously.

Graph 24: Types of containers used for collection of waste



The study shows that 65% respondent said that bins with lid uses, while 35% respondents plastic bags are uses to collect waste material.

Graph 25 : Location of waste collection store in ICU



The study shows that 92% respondent said that waste stores in the dirty utilty room, while 8% respondent said it stores at the corner of the ICU department

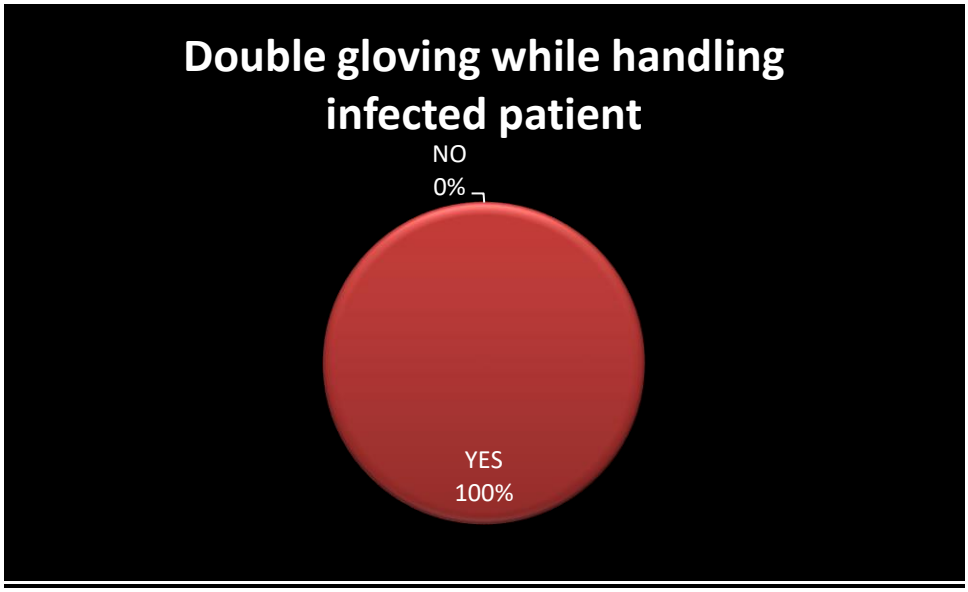
Graph 26: Response towards final dispose of infected waste

The study shows that 54% respondent said that infected waste is taken away by the outsourced organisation,
11% respondent said it buried while 8% respondent said it incinerates and 27% respondent don't know the final disposal place of biomedical waste of ICU

Graph 27: Response towards disinfection of waste before its disposal

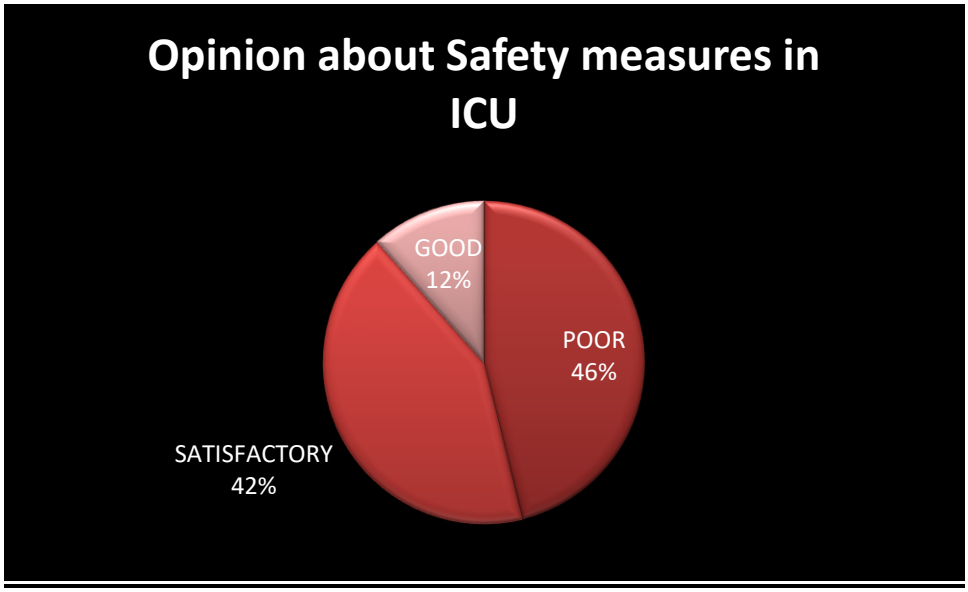
The study shows that 92% respondent said that disinfection procedure is done before disposal of infected wastes while 8% said no any disinfection is done.

Graph 28: response towards double gloving while handling infected patients



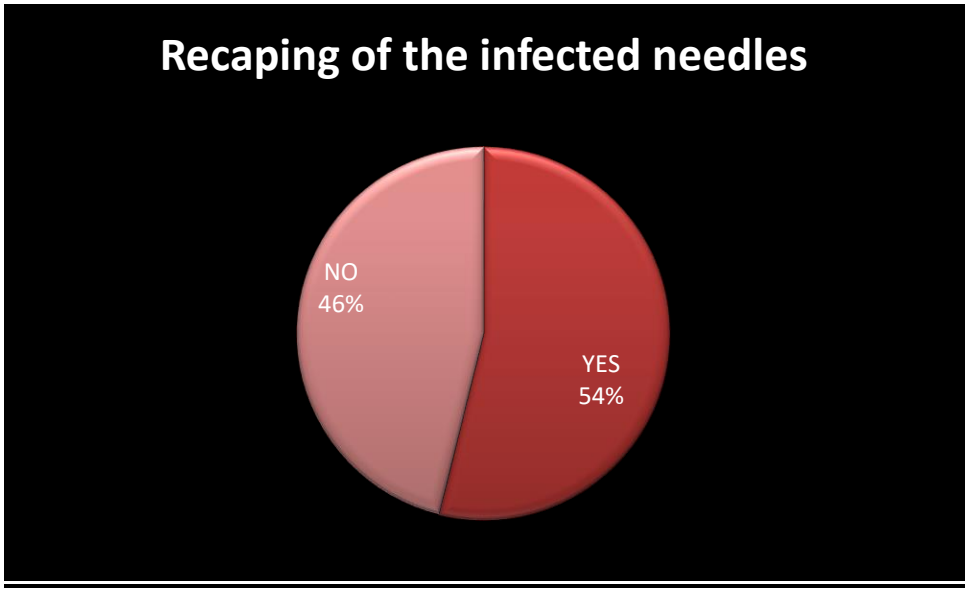
The study shows that 100% respondent answered that double gloving is done while handling seriously infected patient during their shifting

Graph 29: Response towards safety measures against infection



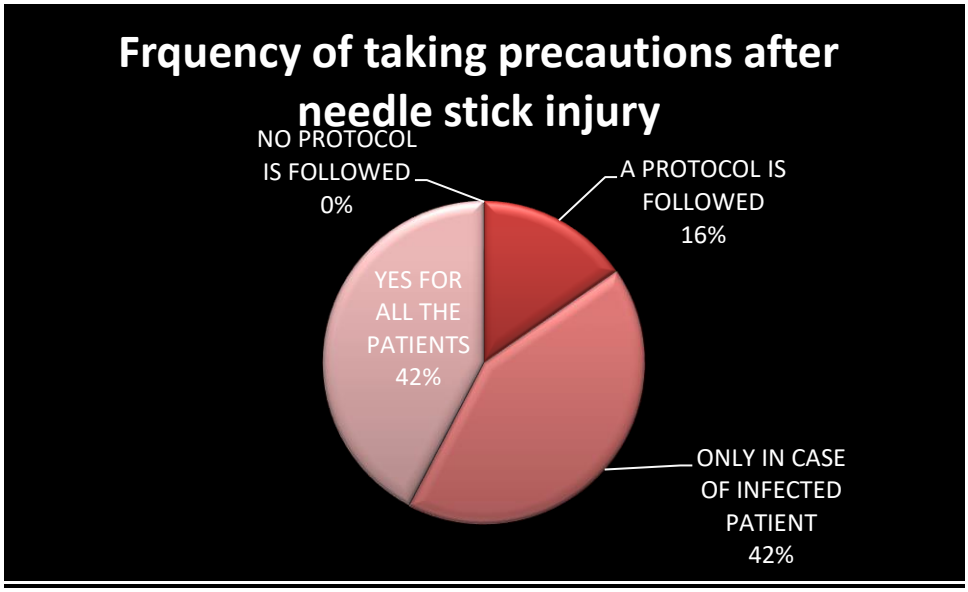
The Study shows that 46 % respondent said that safety measures are at poor level, while 42% respondent said that safety measures against infection is satisfied level whereas 12% respondent thinks its good.

Graph 30 : Frequency towards recapping of needles



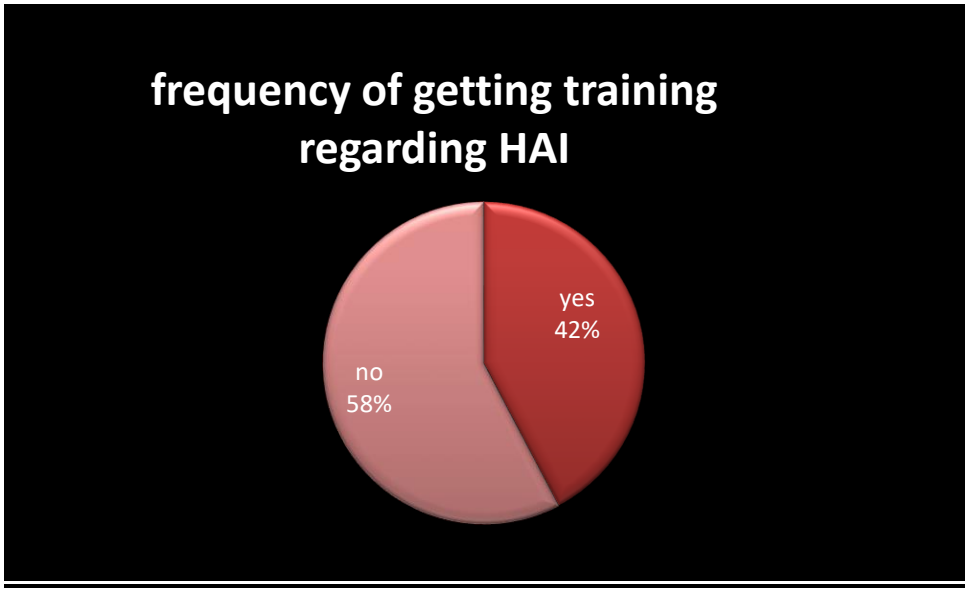
The study shows that 54% respondent doing recapping of needles while 46% respondent do not recap the needles and uses needle destroyer immediately

Graph 31: Frequency of taking precautions after needle stick injury



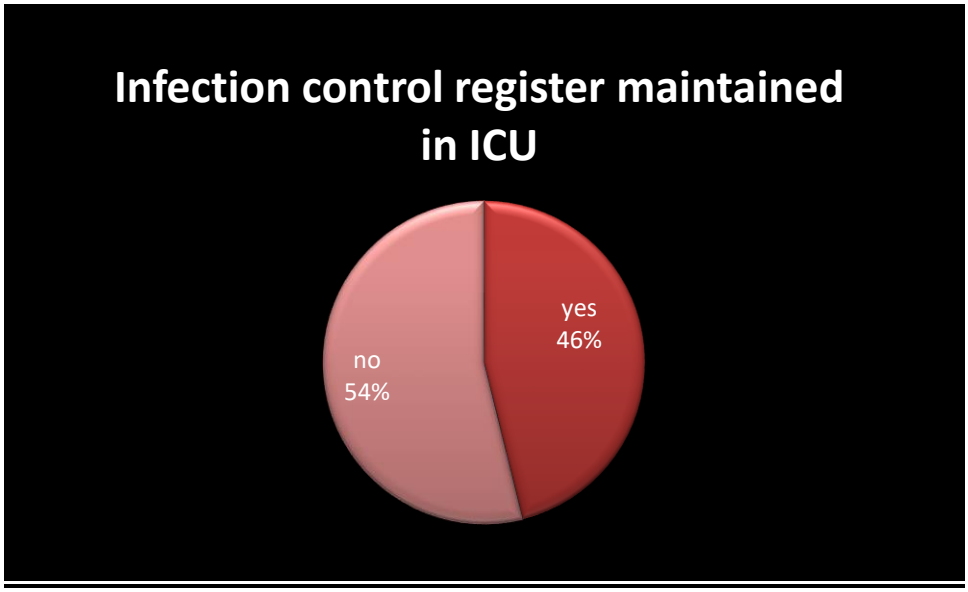
The study shows that Only 16% respondent follows protocol for needle stick injury precautions while 42% follows for all patients and 42% follows only in case of infected patient.

Graph 32: response towards hospital acquired infection control training



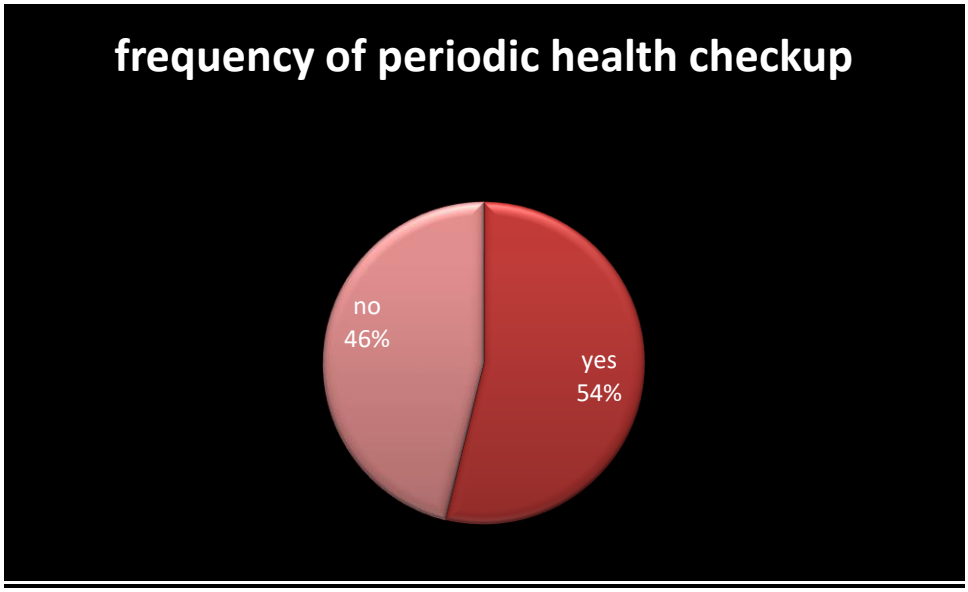
The study shows that 42% respondent said that they have received formal training regarding hospital acquired infection control while 58% said not done any training.

Graph 33: response towards maintaining of infection rate register in ICU



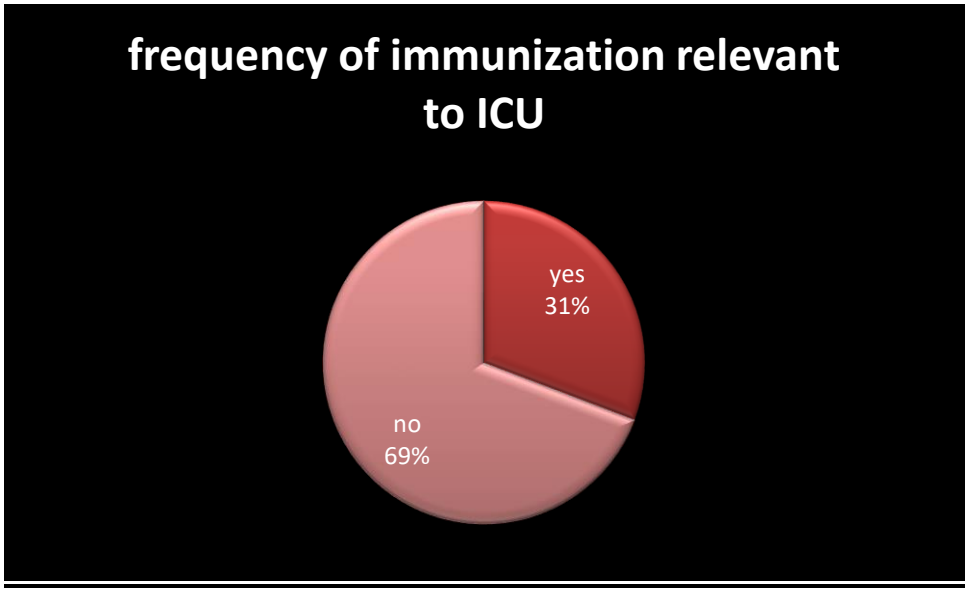
The study shows that 46% respondent agree with maintaining of infection rate register while 54% disagree with presence of any such register.

Graph 34: Response towards periodic health check up



The study shows that 54% respondents undergoing periodic health check up while 46% do not undergo any such health checkup.

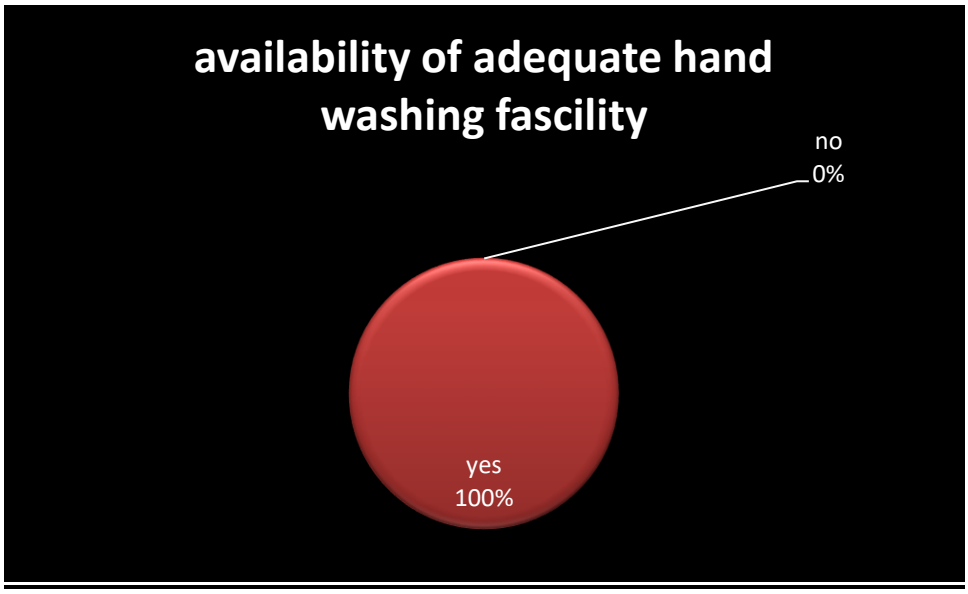
Graph 35: Response towards immunisation relevant to hospital job



The study shows that Only 31% respondent said that immunisation is given is relevant to their work while 69% respondent said that no immunization given .

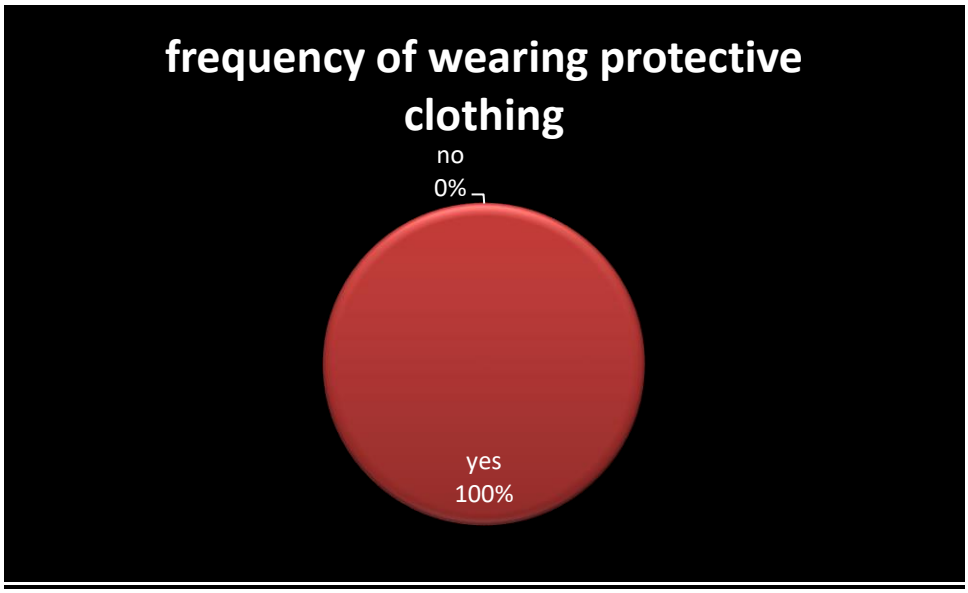
Questionnaire for CSSD

Graph 36 : Response towards availability of adequate hand wash facilities



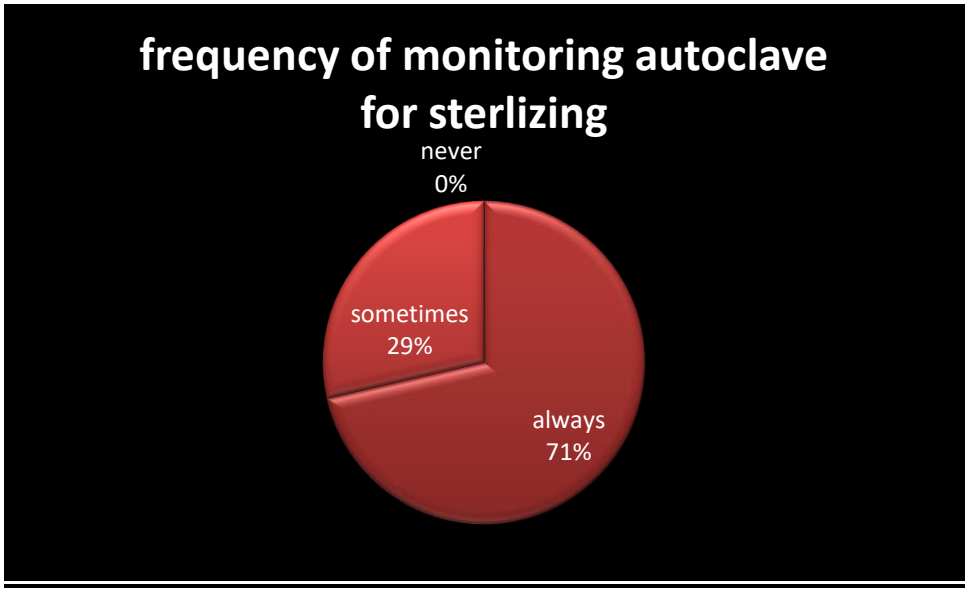
The study shows that 100 % CSSD staff is agree with the availability of adequate hand wash facility

Graph 37: frequency of wearing of protective clothing



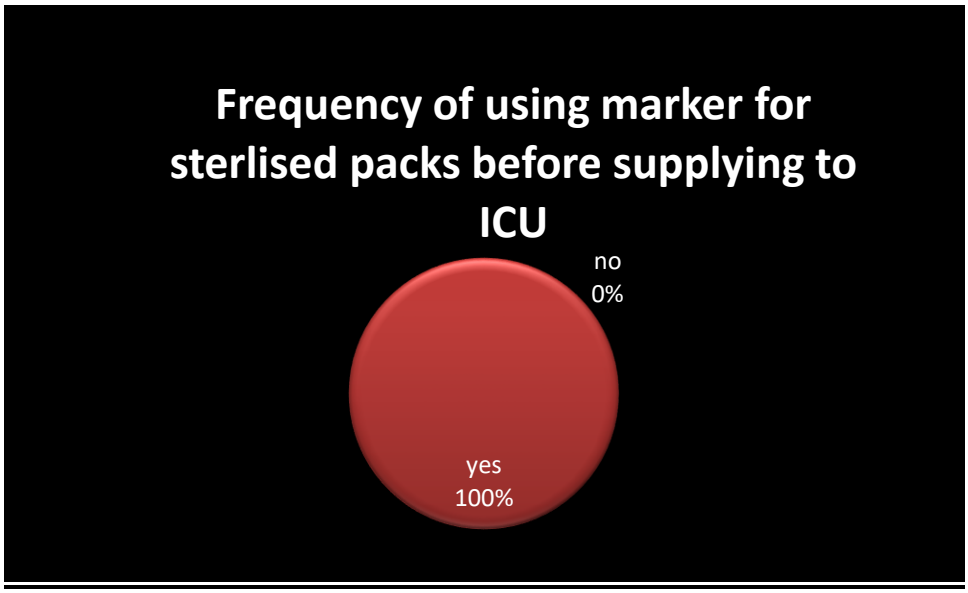
The study shows that 100% respondent said that they wears protective clothing (Gloves, masks, apron, hair cover , shoe cover) in the working area

Graph 38: frequency of monitoring autoclave for sterilising efficiency of autoclave



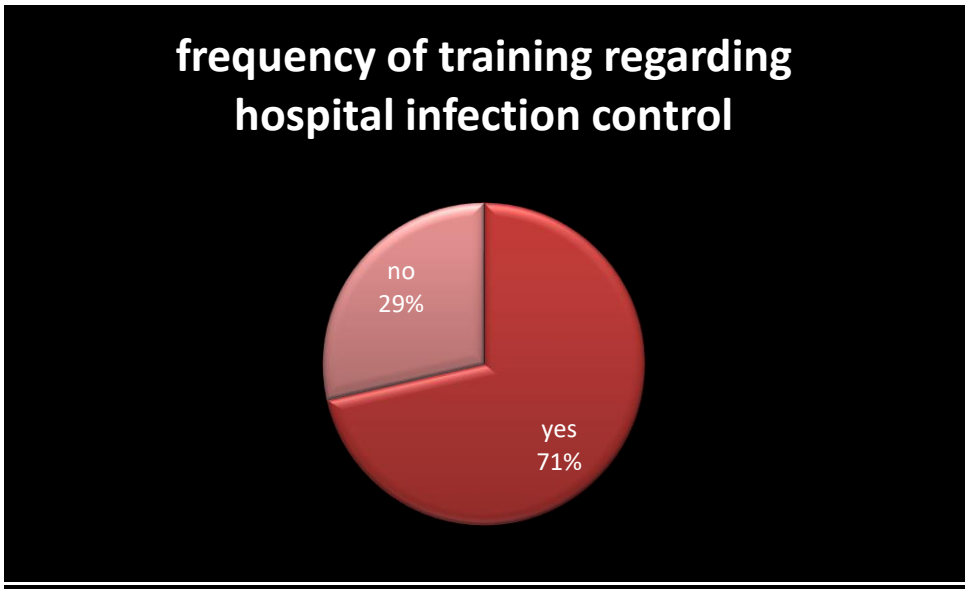
The study shows that 71% respondent answered that they always monitored sterilisation efficiency of autoclave while 29% answered sometimes .

Graph 39: frequency of use any marker to indicate the packs that have been sterilized before supplying to ICU



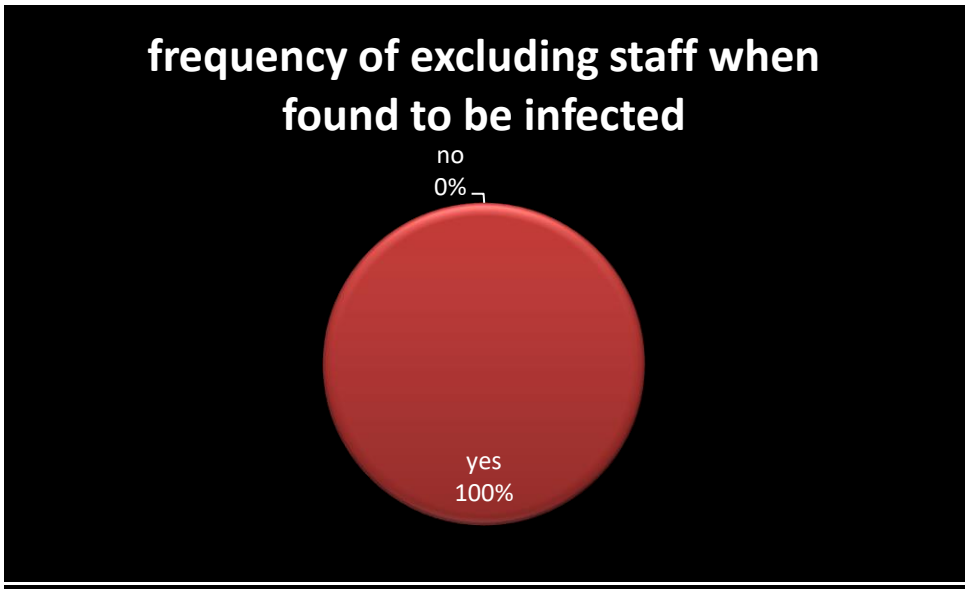
The study shows that 100% marking is done by the CSSD staff on sterilised packs before sending to the ICU.

Graph 40: frequency of training in hospital infection control programme



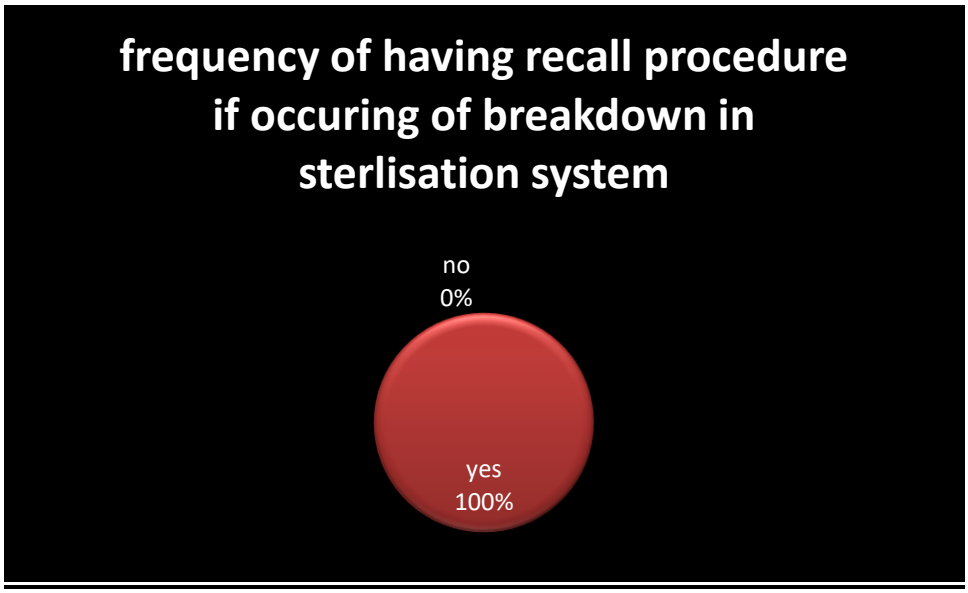
The study shows that 71%respondent said that they have got formally training in hospital infection control programme

Graph 41:Frequency of excluding from their work when found to be infected from any disease



The study shows that 100% respondent said that they have been excluded from their work when found to be infected from any disease

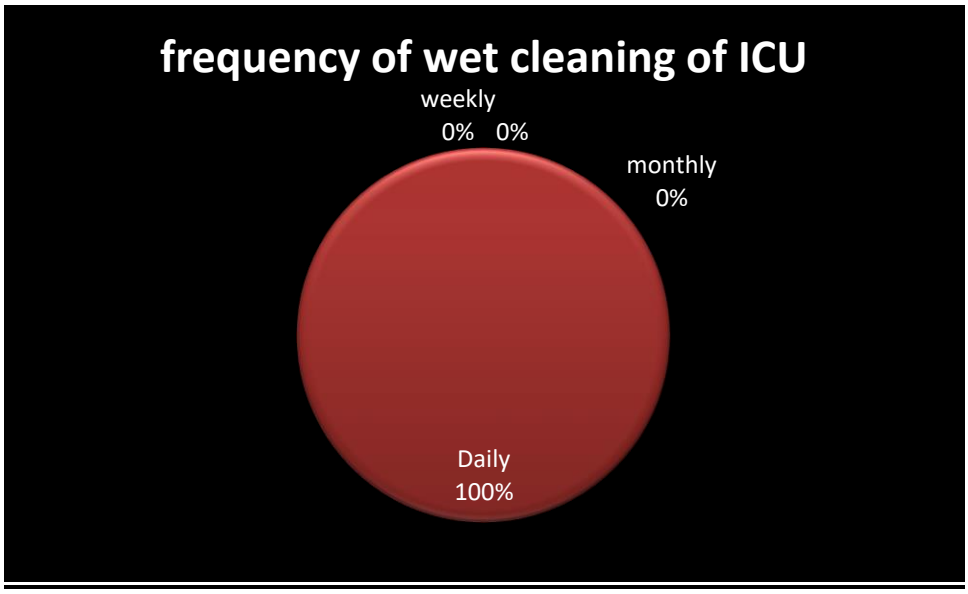
Graph 42: established recall procedure when breakdown in the sterilization system is identified



The study shows that 100% respondent are agree with the statemenyt that there is established recall procedure when breakdown in the sterilization system is identified

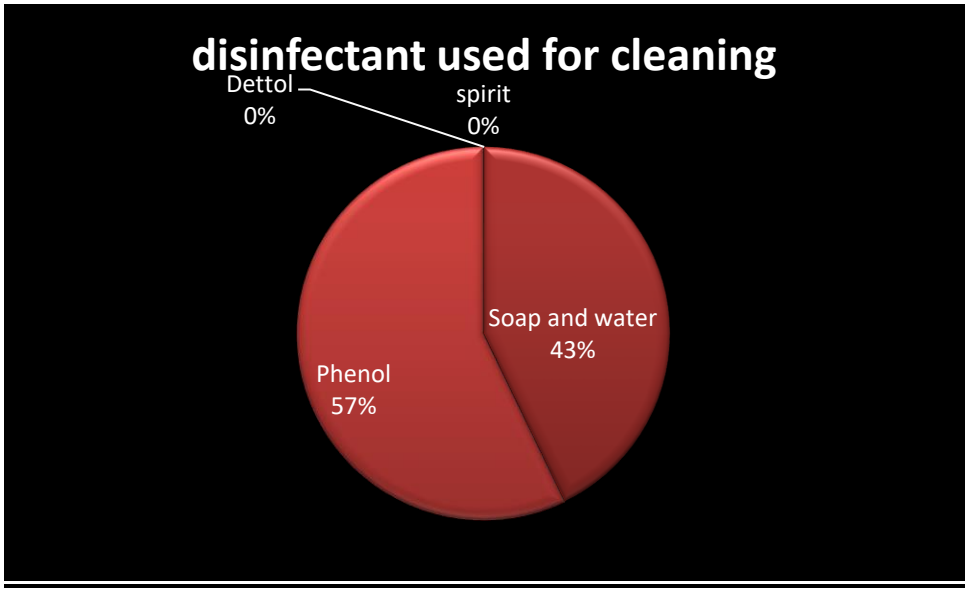
Questionnaire for Housekeeping

Graph 43: Frequency of wet cleaning of ICU



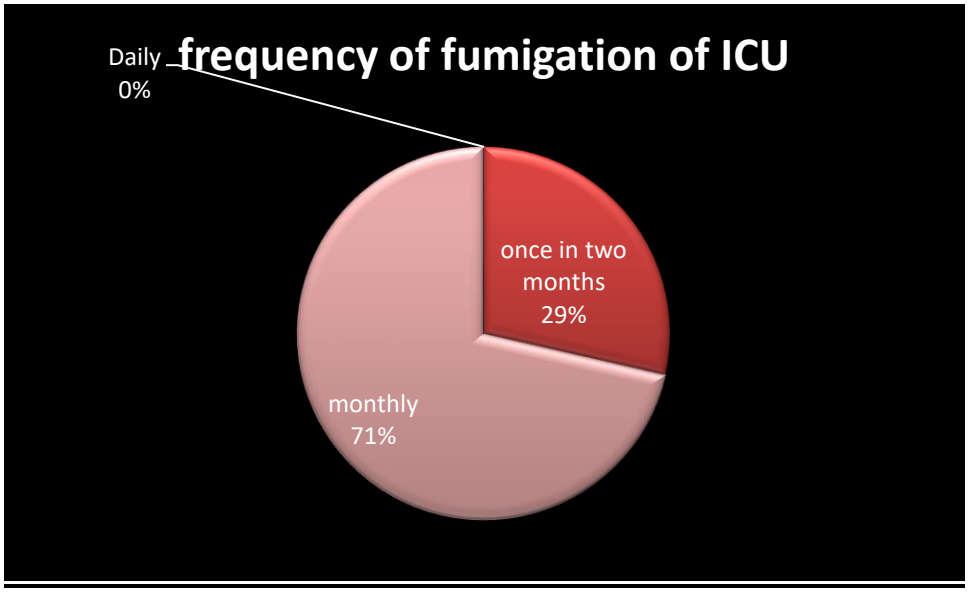
The study shows that 100% respondent said that wet cleaning of ICU is done Daily

Graph44: Types of antiseptic uses for wet cleaning



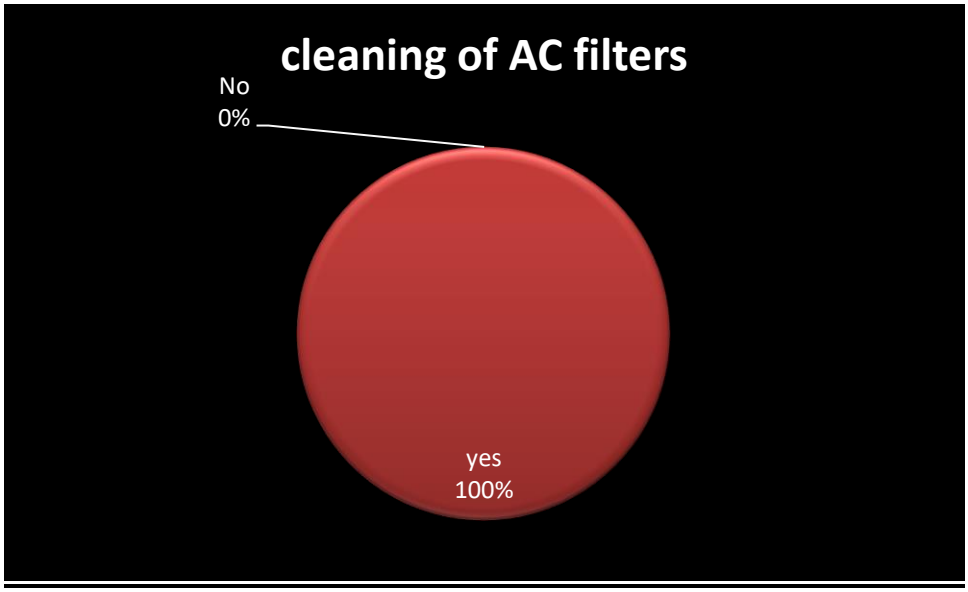
The study shows that 57% respondent said that Phenol uses for wet cleaning while 43% respondent said that soap and water uses for wet cleaning of ICU

Graph45: Frequency of fumigation of ICU



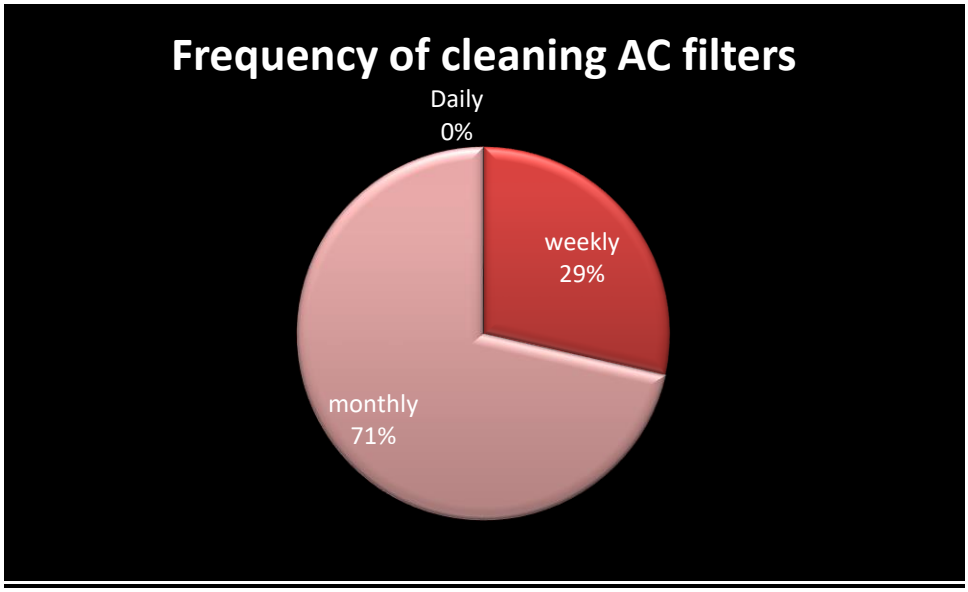
The study shows that 71% respondent said that fumigation of ICU is done once in a month while 29% respondent said that fumigation done once in the two months

Graph 46: Is cleaning of the filters of Air Conditioners done?



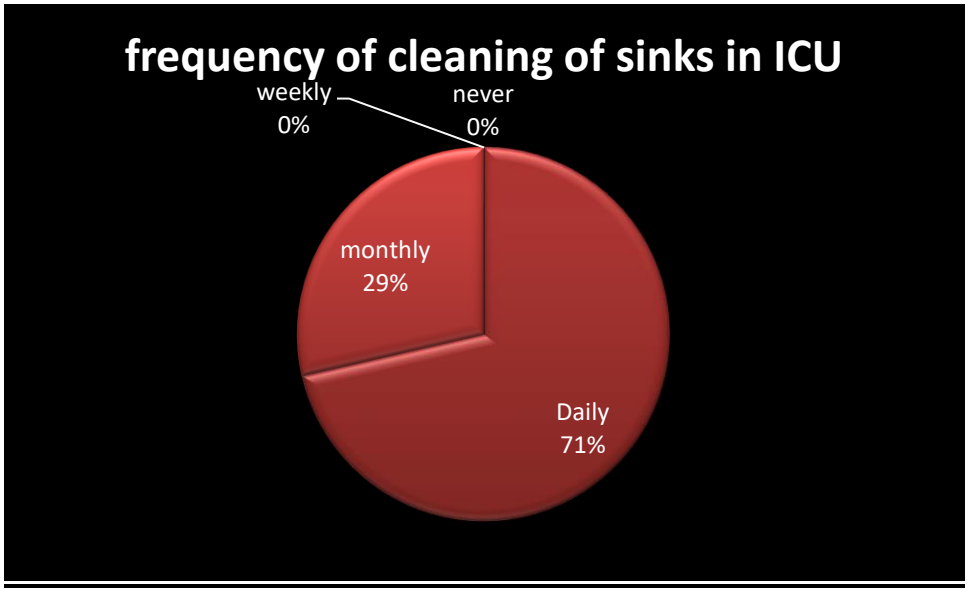
The study shows that 100% respondent said that cleaning of air conditioners done

Graph 47: Frequency of cleaning of AC filters



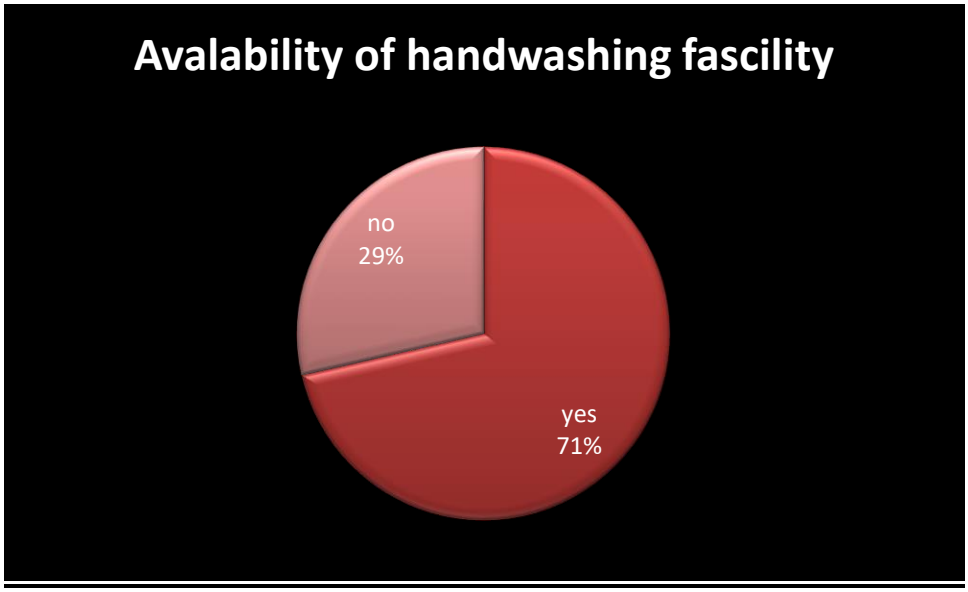
The study shows that 71% respondents said that cleaning of AC filters done once a month while 29% said done once in a week.

Graph 48: Frequency of disinfection of the sink in ICU



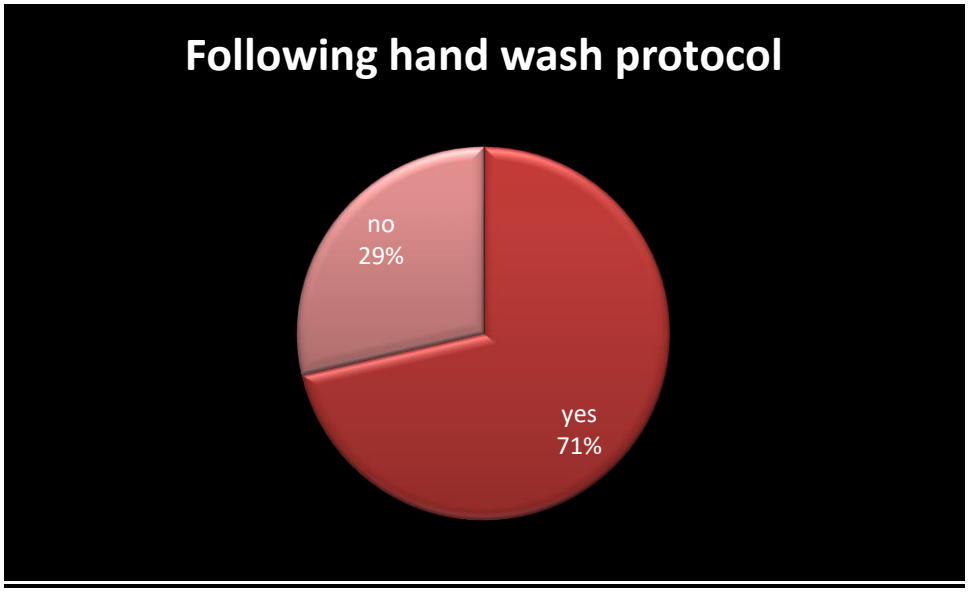
The study shows that 71% respondents said that cleaning of the sinks done daily while 29% said once in a month

Graph 49: Response towards availability of adequate hand washing facilities



The study shows that 71% respondents said that ICU have adequate hand washing facilities while 29% not agree with adequacy of hand washing facilities.

Graph 50: Frequency of following any protocol regarding hand washing

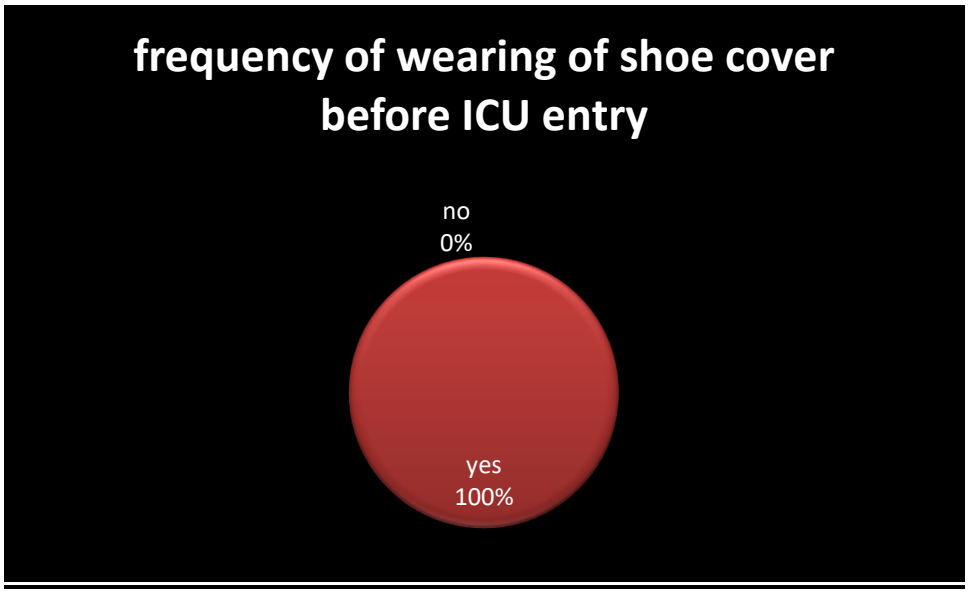


The study shows that 71% respondents said that they followed protocol regarding hand washing while 29% wash their hands normally without any protocol.

Graph 51: Frequency of wearing of disposable gloves and masks

The study shows that 100% respondents answered that they are wearing disposable gloves and masks during working in ICU

Graph 52: Frequency of wearing of shoe covers when entering ICU

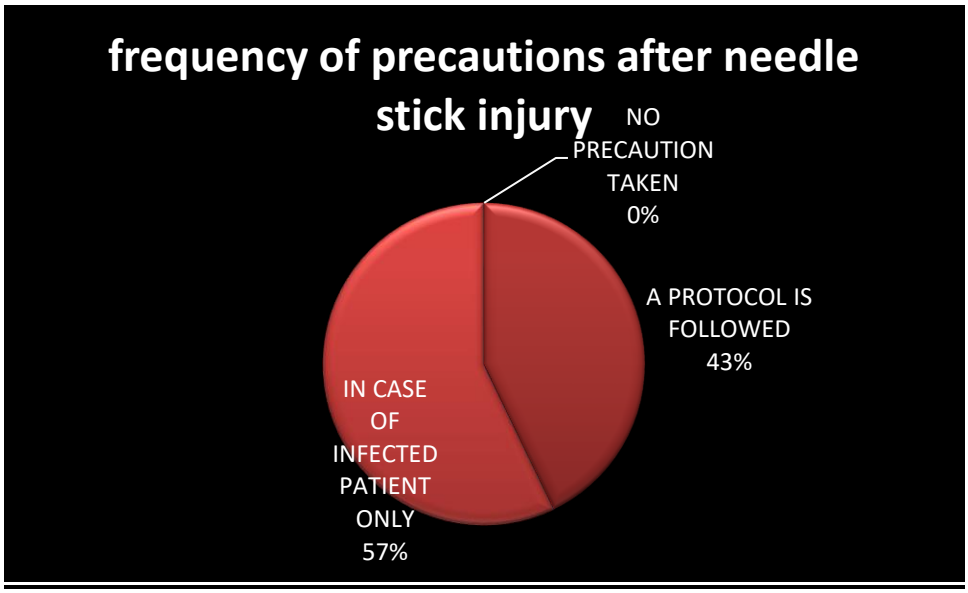


The study shows that 100 % respondents answered that wear shoe covers when entering ICU.

Graph 53: Frequency of Opinion About Safety measures of ICU towards infection

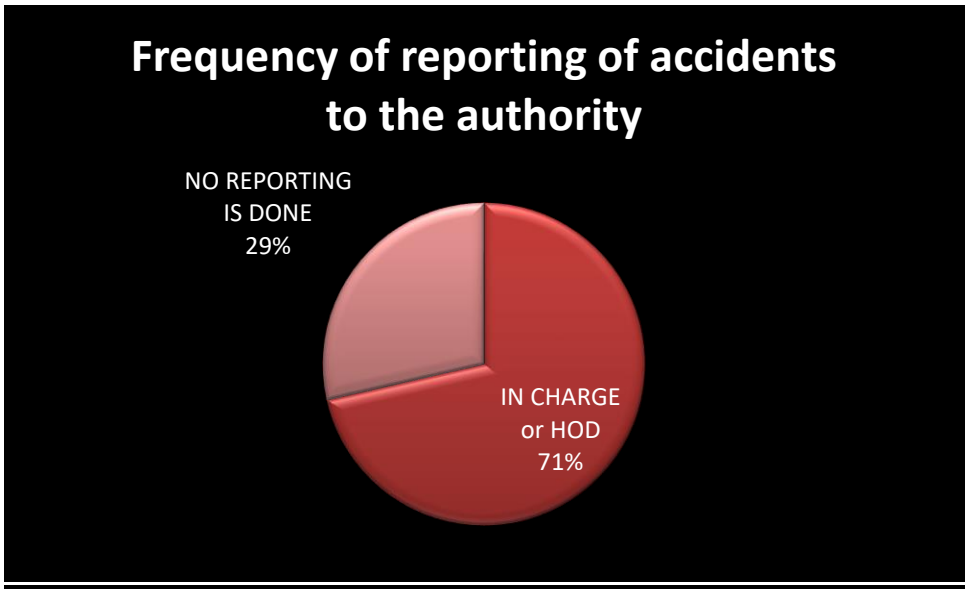
The study shows that 71% respondents said that safety measures are poor while 29% respondents said that its at satisfactory level

Graph 54: Frequency of taking precautions after needle – stick injury



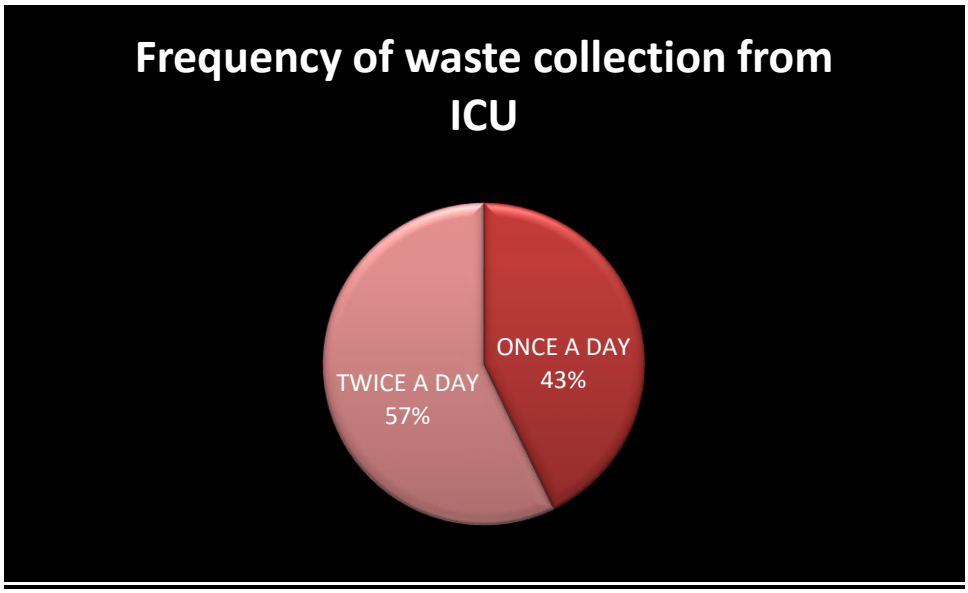
The study shows that 43% respondent said that they followed a protocol against needle stick injury while 57% followed protocol only after in case of infected patient.

Graph 55: Types of Reporting authority after accidents occur



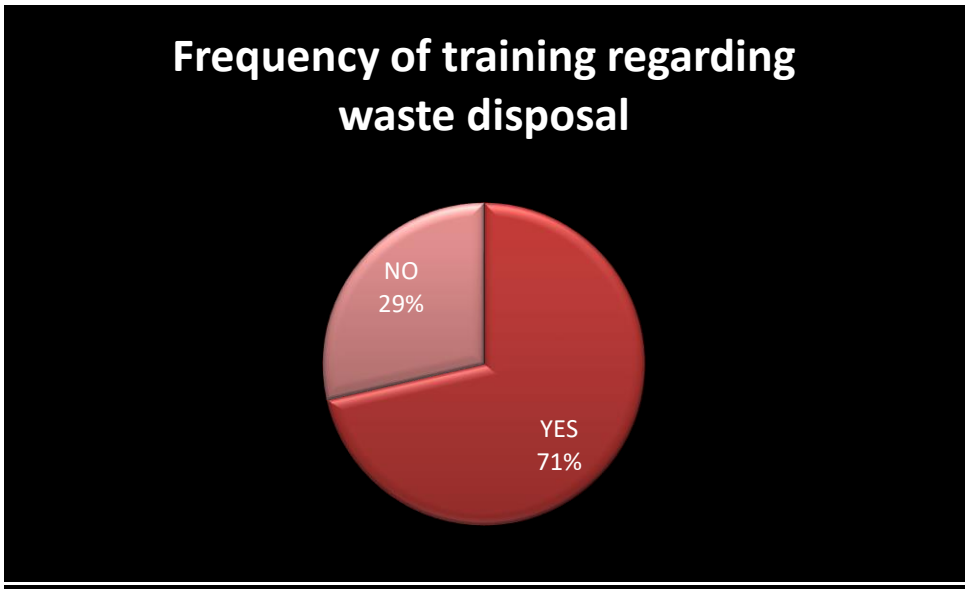
The study shows that 71% respondents said that they reports to the ICU in charge in case of any accidents like needle- stick injury, spills etc, while 29% never report to any authority.

Graph 56: frequency of waste collection in ICU



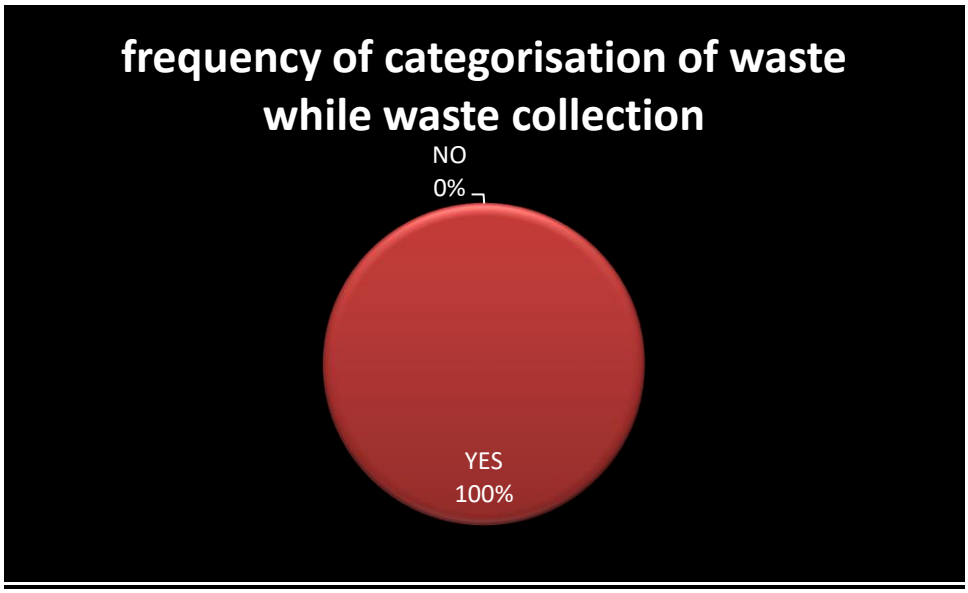
The study shows that 57% respondent said that thay collected waste twice a day while 43% respondents said that once a day

Graph 57: Frequency of training regarding waste disposal to the staff



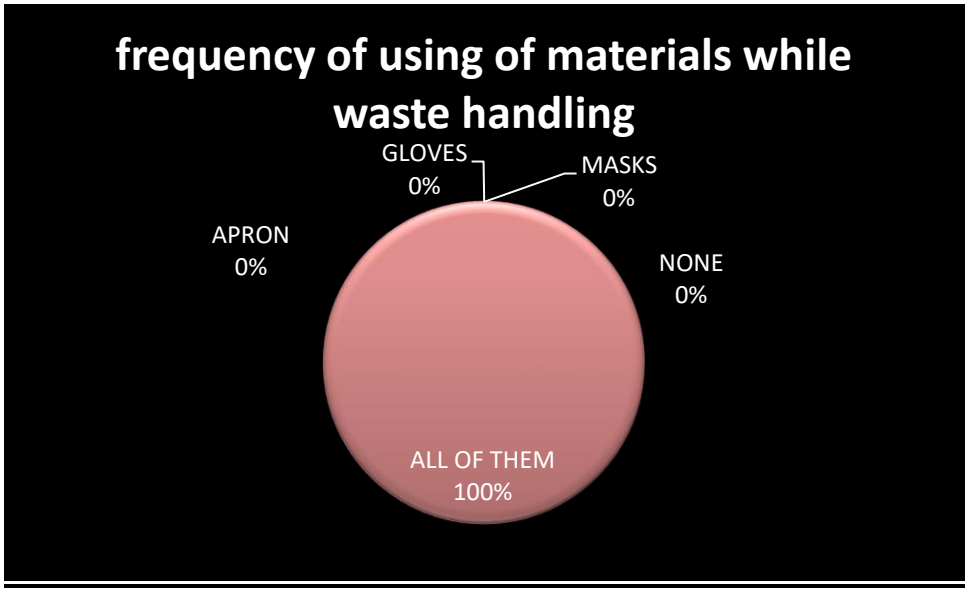
The study shows that 71% respondent said that training regarding waste disposal has given while 29% said that no any training done yet.

Graph 58: Frequency of categorization of waste while being collected



The study shows that 100% respondent said that categorization of waste is done properly while being collected.

Graph 59: Frequency of safety material used while handling waste

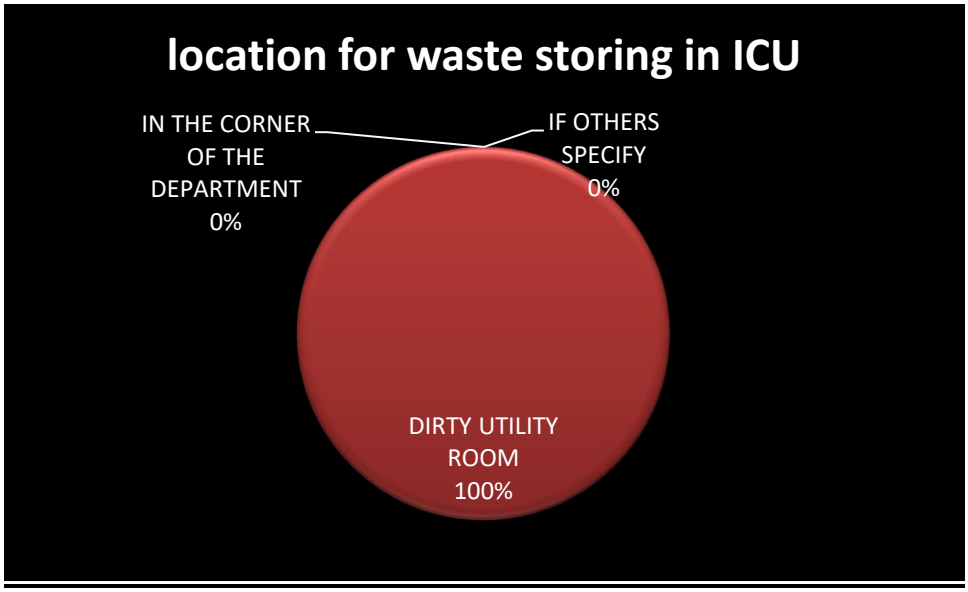


The study shows that 100% respondent said that gloves, apron, mask are used simultaneously during handling of waste material in ICU.

Graph 60: Types of containers used for collection of waste

The study shows that 71% respondents answered that bins with plastic bags is used while waste collection whereas 29% respondents said that only plastic bags are used for waste material collection.

Graph 61: location for waste collection area in the ICU.



The study shows that 100% respondents said that waste collection area in the ICU is dirty utility room.

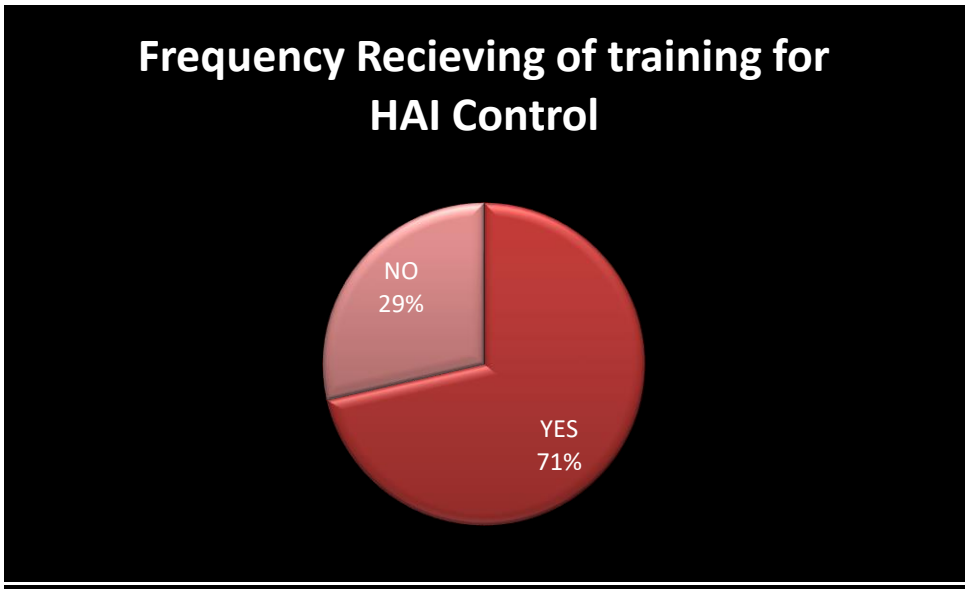
Graph 62: location of final disposal of infected waste

The study shows that 54% respondents said that final disposal of infected waste is done by outsourced department whereas 11% respondents said that infected waste is buried and 8% said that infected waste is incinerated, 27% respondents said that they don't know about the final disposal of infected waste.

Graph 63: frequency of disinfection of waste before final disposal

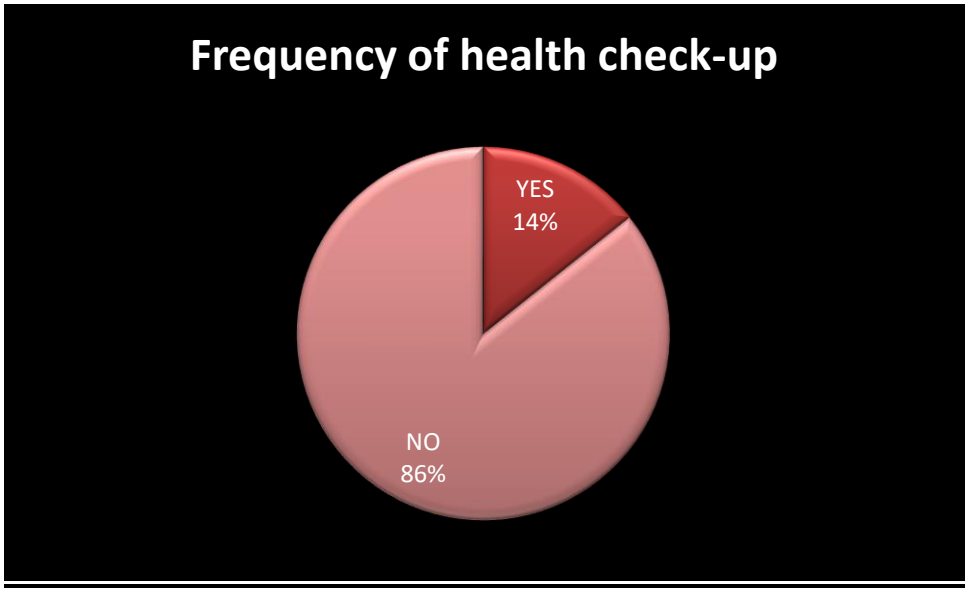
The study shows that 71% respondents agreed that waste material is disinfected before final disposal while 29% respondent disagreed about disinfection of infected waste before disposal.

Graph 64: Frequency of receiving any formal training regarding hospital acquired infection control



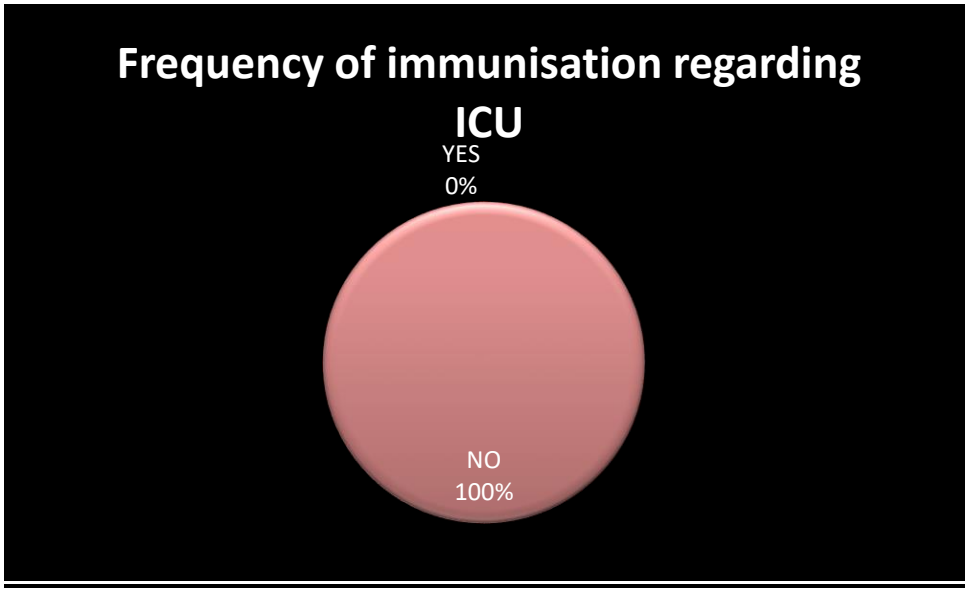
The study shows that 71% respondent said that they undergone a training regarding hospital acquired infection control whereas 29% respondent had not received any training regarding hospital acquired infection control

Graph 65: Frequency of health check-up of housekeeping staff



The study shows that 86% respondent answered that they do not undergo any health check-up whereas only 14% respondent said that they have done health check-up.

Graph 66: Response for immunization relevant to ICU



The study shows that 100% respondent said that they do not undergo any immunisation programme.

DISCUSSION

Hospital acquired infections creates a major problem to the patients admitted to hospital as well as to health care personnel , affecting the reputation of the hospital and making unnecessary cost to patient during the treatment. Hospital acquired infection occurs in ICU because of lapses in accepted standards of practice on the part of health care personnel, so strict adherence to rules and policies regarding hospital infection control like proper hand hygiene techniques, using items and equipments, antibiotic policy, barrier techniques, proper sterilization and disinfection procedures become essential for preventing and reducing the rate of hospital acquired infection The existing system of Infection Control measures in ICU, Park Hospital has been in practice since a year.

The study was focused to find out :
The existing physical facilities, existing control measures for infection control, NABH gap analysis for infection control in ICU, And to motivate the staff regarding hospital acquired infection control

Physical Facilities for infection control:

- By studying existing physical facilities **available** for infection control in ICU Park Hospital are doctor's changing room, nurse's changing room, linen and instrument room, Gas cylinder storage, Dirty utility rooms ,only one sink outside ICU for hand washing , one toilet room at the corner of ICU.
- While Technician change area, Sterile storage area, Class IV staff change room, Waste store room, Isolation room are **absent.**
- When comparing with NABH rules the facilities available for infection control is poor.
- Visitors waiting/changing room is absent.
- Cross infection from visitors and doctor's clothes could be there as there is no provision for changing clothes and wearing sterile gown before contacting the patient.

- Cross infection from visitors coming to ICU as they at times ignore to wear shoe cover and do not wash hands before touching patients, moreover there was no provision for changing cloths for them also

.**Documentation :**

- There is no standard Operating Manual for ICU. But as per NABH recommendations there must be standard operating manual for infection control, which must be updated periodically. An antibiotic policy must be established and implemented

- Culture studies of swabs from ICU floor / equipment are done.
- Bacteriological testing of water is done but for air it is not done.
- Protocol for wearing gloves are absent.

- There must be policies specifying the frequency of cleaning agents used for walls, floors, windows, beds, curtains, screens, fixtures, furniture, bath and toilets, all reused medical devices. (according to WHO guidelines)

- No any protocol for proper hand washing is observed.

Cleaning, disinfection and sterilization

- The study revealed that surfaces, ICU tables and trolleys are wet cleaned daily.
- Fumigation is done once in a months.
- Cleaning of air filters of air conditioners are done weekly.
- Sterilizing efficiency of autoclave is monitored properly.
- Marker to know that the items supplied to ICU have been subjected to complete sterilization is done
- Available hand washing facility is adequate.
- Only single sink is present in the ICU.
- Wearing of shoe cover and covering of head is done properly before entering the ICU.
- There is proper decontamination of equipment is done.
- Most of the staff wear apron in the ICU area before entering the ICU.
- Waste collection is done twice in a day.
- There is daily use of disinfectant likes Phenol, Soap and water
- Fumigation of ICU is done once in a monitor.

Safety measures and precautions

- The study revealed that according to 46% respondents (nurses and doctors, N=26), the level of safety measures are poor.
- 100% respondent always do double gloving for seriously infected patient,
- 42% (nurses/doctors, N=26) and 57% (house keeping staff, N=7) take precautions after needle-stick injury only in case of infected patient.
- 54% do recapping of infected needles using safety device.
- 85% of respondents (nurses/doctors, N=26) wear apron in the working area but not from home.
- 88% of respondents (nurses/doctors, N=26) decontaminate the hand first and then remove apron before leaving working area.
- 100% (housekeeping=7) are wearing gloves, mask, apron while waste handling.
- Frequency of health check-up is satisfactory but immunisation to relevant area is at poor level.

RECOMMENDATIONS

1) There should be Infection Control Committee in the hospital.

2) An infection control nurse should be recruit in the hospital.

3) There should be a standard operating manual for infection control programme and policy. It should includes:

- Proper hand washing guidelines
- Personal hygiene protocols,
- Immunisation programme,
- Pathological testing of water and air in the ICU area.
- Linen and laundry utilisation rules,
- Precautions taking while handling infected patient,
- Biomedical waste collection-disinfection and disposal guidelines,
- Use of advanced disinfectant solutions for wet cleaning of ICU.

4) Periodic health checkups of ICU staff should be compulsory.

5) There should be Proper adequate resources to support infection control programme like housekeeping clothing changing room, sterile storage area, infected waste store a room, visitors waiting and cloth changing area, and isolated room for infectious patient and also in case of burn.

6) Proper training programme for staff should be given periodically.

7) CME(Continuing Medical Education) programmes regarding HAI should be arranged periodically. It should includes patient, staff and visitors in the hospital area.

CONCLUSION

The study revealed that current physical facilities available for infection control are satisfactory but that existing infection control measures practiced in ICU is not upto the standard (NABH) and needs improvement and up-gradation.

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ANNEXURE

QUESTIONNAIRE FOR DOCTORS AND NURSES

Name:
Age:
Sex:
Designation:

1) Do you know about Hospital Acquired infection?
    a) Yes
    b) No

2) How often is wet cleaning of ICU done?
    a) Daily
    b) Weekly
    c) Once in a month
    d) If others specify

3) What DISINFECTANTS are used for wet cleaning of ICU?
    a) Soap and water
    b) Phenol
    c) Dettol
    d) Spirit
    e) DONT KNOW

4) How often do you fumigate ICU?
    a) Once in the two months
    b) Monthly
    c) Daily
    d) DONT KNOW
    e) Never

5) Do you know the filters of Air Conditioners has been cleaned properly?
    a) Yes
    b) No

6) If yes, how frequently?
    a) Weekly
    b) Monthly
    c) Daily
    d) DONT KNOW

e) YEARLY

7) Do you have adequate space available for sterilization activities?
   a) Yes
   b) No

8) Do you use any marker to indicate the packs that you received in ICU that have been sterilized?
   a) Yes
   b) No
   c) Don't know

9) Do you have adequate hand washing facilities?
   a) Yes
   b) No

10) Do you follow any protocol regarding hand washing?
   a) Yes
   b) No

11) Do you think hand washing facilities in all patient care areas are accessible to health care providers?
   a) Yes
   b) No

12) Do you cover the head fully when entering ICU?
   a) Always
   b) Sometimes
   c) Never

13) Do you wear shoe covers when entering ICU?
   a) Always
   b) Sometimes
   c) Never

14) Do you use disposable gloves and masks?
   a) Yes
   b) No

15) In case of any accidents like needle- stick injury, spills, etc WHOM do you report to -
    a) In- Charge of the department or HOD
    b) NURSING SUPERINTENDENT
    c) No reporting is done

16) Is decontamination of equipments has been done properly?
    a) Yes
    b) No

17) Do you wear the apron from the following given areas like)
    a. From home
    b. After entering the department

18) Do you decontaminate your hand first and then remove your apron before leaving working area?
    a) Yes
    b) No

19) What is the frequency of waste collection in ICU?
    a) Once a day
    b) Twice a day

20) Who collects the waste generated?
    a) Housekeeping
    b) Wardboy
    c) Don't know

21) Are the staffs given any training regarding waste disposal?
    a) Yes
    b) No

22) Is there any categorization of waste while being collected?
    a) Yes
    b) No

23) Does the staff use any of the following while handling waste?
    a) Gloves
    b) Aprons
    c) Masks
    d) All the above
    e) None

24) What are the containers used for collection of the waste?

a) Bins with lid
b) Bins without lid
c) Plastic bag
d) Don't know
e) If other, specify

25) Where is the store in ICU?
a) Dirty utility room
b) In the corner of department
c) Don't know
d) If other, specify

26) How the infected waste is finally disposed?
a) Incineration
b) Burial
c) Taken to municipal collection point
d) Don't know
e) If others, specify

27) Is the infectious waste disinfected before disposal?
a) Yes
b) No

28) Is double gloving done while handling seriously infected patient during their shifting?
a) Yes
b) No

29) What is your opinion about safety measure of ICU?
a) Good
b) Satisfactory
c) Poor

30) Do you recap the infected needles using safety device?
a) Yes
b) No

31) Do you take any precautions after needle- stick injury?

a) No particular protocol followed
b) A protocol is followed
c) In case of infected patient

d) For all the patients

32) Have you been received formal training regarding hospital acquired infection control?
   a) Yes
   b) No

33) Has there any kind of infection rate register maintained in ICU?
   a) Yes
   b) No

34) Do you undergo periodic health check up?
   a) Yes
   b) No

35) Have you undergone immunization relevant to your work ?
   a) Yes
   b) No

QUESTIONNAIRE FOR CSSD STAFF

Name:

Age:
Sex:
Designation:

1) Do you have adequate hand washing facility accessible to all the staff of your department?

a) Yes
b) No

2) Do you wear protective clothing (Gloves, masks, apron, hair cover , shoe cover) in the working area ?

a) Yes
b) No

3) How frequently do you monitor the sterilizing efficiency of autoclave?

a) Always
b) Sometimes
c) Never

4) Do you use any marker to indicate the packs that have been sterilized before supplying to ICU?

a) Yes
b) No

5) Have you been formally trained in hospital infection control programme?

a) Yes
b) No

6) Have the staff been excluded from their work when found to be infected from any disease?

a) Yes
b) No

7)Do you have an established recall procedure when breakdown in the sterilization system is identified?

a) Yes
b) No

QUESTIONNAIRE FOR HOUSE KEEPING STAFF WORKING FOR ICU

Name:
Age:
Sex:
Designation:

1. How often is the wet cleaning of ICU done ?
    a) Daily
    b) Weekly
    c) Monthly

2. If yes, what antiseptic / antiseptics are used for it?
    a) Soap and water
    b) Phenol
    c) Dettol
    d) Spirit

3. How often do you fumigate ICU?
    a) Daily
    b) Weekly
    c) Monthly

4. Do you clean the filters of Air Conditioners?
    a) Yes
    b) No

5. If Yes, how frequently?
    a) Daily
    b) Weekly
    c) Monthly

6. Do you disinfect the sink in ICU?
    a) Daily
    b) Weekly
    c) Monthly
    d) Never

7.Do you have adequate hand washing facilities?
    a) Yes
    b) No

8.Do you follow any protocol regarding hand washing?

a) Yes
b) No

9.Do you wear disposable gloves and masks?

a) Yes
b) No

10.Do you wear shoe covers when entering ICU?

a) Yes
b) No

11.What is your opinion about the safety measures of ICU?

a) Good
b) Satisfactory
c) Poor

12. Do you take any precautions after needle – stick injury?

a) A protocol is followed
b) In case of infected patient only
c) No precautions taken

13. In case of any accidents like needle- stick injury, spills , etc do you report to the following

a) In-Charge of the department or H.O.D
b) No reporting is done

14. What is the frequency of waste collection in ICU ?

a) Once a day
b) Twice a day

15. Are the staffs given any training regarding waste disposal?

a) Yes
b) No

16. Is there any categorization of waste while being collected?

a) Yes
b) No

17. Does the staff use any of the following while handling waste?

a) Gloves

b) Masks
c) Apron
d) a and b
e) None

18. What are the containers used for collection of waste?
    a) Bins with plastic bag covered by lid
    b) Bins without lid
    c) Plastic bag
    d) If other , specify

19. Where is the waste store in ICU?
    a) Dirty utility room
    b) In the corner of the department
    c) If other specify

20. How is the waste finally disposed?
    a) Incineration
    b) Burial
    c) Taken to municipal collection point
    d) If other specify

21. Is the infectious waste disinfected before disposal?
    a) Yes
    b) No

22. Have you been received any formal training regarding hospital acquired infection control?
    a) Yes
    b) No

23. Do you undergo periodic health check- up?
    a) Yes
    b) No

24. Have you undergone immunization relevant to your work?
    a) Yes
    b) No