Infection Control in Intensive Care Unit
In Park Hospital

A Dissertation proposal for

Post-Graduate Diploma in Health and Hospital Management

By

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Dr. Chanchal Arora

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 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 (ICU) .

The main 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 . 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.

There were following majors findings during the study conducted in Park hospital, West Delhi.

CLEANING, DISINFECTION AND STERILIZATION: The study revealed that surfaces in ICU are wet cleaned daily and walls are wet cleaned monthly. ICU tables and trolleys are wet cleaned daily. Fumigation is done weekly. Cleaning of air filters of air conditioners are done monthly as per nurses and doctors. Sterilizing efficiency of autoclave is monitored weekly or daily as per most of the respondents.

PREPARATION OF ICU: It is found from the study that according to majority of respondents, there is adequate hand washing facility which is easily accessible to health care providers but no appropriate technique is followed regarding hand washing.

SAFETY MEASURES AND PRECAUTION: The study revealed that according to sixty six(66) percent respondents amongst nurses and doctors (N=105), the level of safety measures is satisfactory; eighty two (82%) percent nurses and doctors always do double gloving while dealing with the patient. Sixty three percent nurses/doctors (N=105) take precautions after needle-stick injury only in case of infected patient. Sixty (60%) percent of respondents (N=105) decontaminate the hand first and then remove apron before leaving working area.

WASTE MANAGEMENT SYSTEM: The study revealed that health care waste generated in ICU is collected once daily. Waste is categorized while being collected. They use gloves and masks while handling waste. Majority of staff responded that all the waste generated is collected in bins with lid. Majority of staff (nurses/doctors, housekeeping) responded that the infected waste is not disinfected before disposal.

EMPLOYEE HEALTH AND TRAINING: The study revealed that 90 out of 150 respondents (nurses, doctors, housekeeping) have undergone formal training of hospital acquired infection control, Thirty six(36%) percent have undergone periodic health check-up and 52 respondents have received immunization relevant to their work. Result show that current physical facilities available for infection control are satisfactory. Strict adherence to standard infection control procedures need to be given under consideration and existing infection control measures in ICU needs improvement and up-gradation .

List of Abbreviations

AAC	Access, assessment and Continuity of care
COP	Care of Patient
CQI	Continuous Quality Improvement
FMS	Facility of Management and Safety
HAI	Hospital Acquired infection
HIC	Hospital Infection Control
HRM	Human Resource Management
IC	Infection control
IMS	Information Management System
ICU	Intensive Care unit
MOM	Management of Medication
NABH	National accredation board for hospital &health care providers
PRE	Patient Right and Education
ROM	Responsibility of Management
PMT	Project Management Techniques

PART – I

INTERNSHIP REPORT

1.1 ORGANIZATION PROFILE

Park Hospital Gurgaon is an ambitious initiative from the house of Park. Fully-equipped with all state-of-the-art medical facilities, this 250 bed super-specialty hospital is the beginning of a new era in taking healthcare services in Gurgaon to a new level. Park Hospital Gurgaon envisions of providing a comprehensive spectrum of advanced medical & surgical interventions with a perfect mix of inpatient and outpatient services to people of all social and economic backgrounds. It is the onset of a new experience where patients not only get medical services as per international standards but also receive an empathetic and humane treatment by the professionals attending to them. It is about pursuing a dream called 'wellness for all'

A branch of Park Group of Hospitals having branches in South Delhi, West Delhi, Faridabad and other upcoming hospitals in Panipat and Cancer Hospital in West Delhi

Fully equipped 70 bedded ICU/ CCU complex with ultramodern intensive care facilities manned by intensivists, physicians and residents round the clock

Department of Interventional Cardiology and Cardiothoracic Surgery equipped with latest GE Innova, IQ Cath Lab and Ultramodern Cardiothoracic Operation Theatres.

Park Mother's Nest- High end premium boutique birthing center with Labor Delivery Recovery (LDR) suite.

The Park 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."

The Park Vision

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

About Logo

P E R S O N A L I S E D

A L L S P E C I A L I T I E S

R E S O N A B L E C O S T

Q U A L I T Y S E R V I C E S

The two hands stand for care & help.Blue color signifies excelence and orange indicates the zeal for care.The logo also assure people that they are in safe and caring hands

Commitment Towards Quality

At Park Hospital, we believe in our people, our systems and our commitment to quality and continuous improvement. It is our aim to deliver safe, cost-effective care to the community and the patients we serve. At Our Hospital we believe that the patient experience is comprised of outstanding quality and excellent customer service.

We are committed to provide our patients with the: Highest-quality, safest and most-satisfying care possible.

We continuously strive to improve the quality of our health care services by

- Adopting latest technology and equipments to strengthen our Medical processes and procedures to achieve the set objectives.
- Induction of regular training programs for staff.
- To meet the National and International Standards.

- Park Super Speciality Hospital, Gurgaon is in the process of applying for NABH Accreditation at the earliest.

There are many factors that patients and their families consider when choosing a hospital, but, the most important ones are the quality of patient care and the satisfaction experienced by both the patients and their families. That's why we follow strict quality and safety practices throughout our entire hospital, monitor our staff's compliance with these practices and continuously seek ways to improve.

Park Hospital is committed to meet or exceed customer expectation in quality, delivery and cost. As the level of their expectation increases every year, continuous quality improvement is critical to our success in the competitive marketplace.

The key elements of a successful strategy can be organized into the following categories:

- Developing the right culture for quality to flourish
- Attracting and retaining the right people to promote quality
- Devising and updating the right in-house processes for quality improvement
- Giving staff the right tools to do the job.

Salient features of Park Hospital

- More than 25 departments, 100 doctors, 500 paramedical support staff available round the clock
- A branch of Park Group of Hospitals having branches in South Delhi, West Delhi, Faridabad and other upcoming hospitals in Panipat and Cancer Hospital in West Delhi
- Fully equipped 70 bedded ICU/ CCU complex with ultramodern intensive care facilities manned by intensivists, physicians and residents round the clock

- Department of Interventional Cardiology and Cardiothoracic Surgery equipped with latest GE Innova, IQ Cath Lab and Ultramodern Cardiothoracic Operation Theatres
- Park Mother's Nest- High end premium boutique birthing center with Labor Delivery Recovery (LDR) suite.
- Department of Neonatology comprising of all the ultramodern facilities with monitoring units, open and close Incubator, Ventilators, Analyzers, with dedicated team of Neonatologists and Paramedical staff.
- Park Trauma Center- Comprehensive integrated approach by team of Orthopaedicians, Neurosurgeons, General Surgeons and other paramedical staff to handle all kind of trauma cases.
- Fully functional Gastroenterology department with all ultramodern equipments manned by Gastroenterologist and Gastro Intestinal surgeon to deal with all kind of routine and emergency procedures.
- 24 x 7 Blood Bank services.
- Department of Radio Diagnosis equipped with advanced CT, MRI, Ultrasound, Color Doppler, and Digital X- Ray system 24 x 7

Various departments and services

- Anesthesia /Pain Management
- Blood Bank
- Cardiology and Cardio Thoracic Vascular Surgery
- Critical care
- Cancer and Oncology
- Dentistry

- Dermatology and Cosmetic Surgery (Plastic and Reconstructive Surgery)
- Emergency Medicine and Ambulance Services
- Endocrinology
- ENT (Ear , Nose and Throat)
- General and LaparoscopicSurgery (Minimal Invasive and Bariatric Surgery)
- Gastroenterology
- Gynecology and Obstetrics
- Internal Medicine
- Nephrology
- Neurology and Neurosurgery
- Ophthalmology
- Orthopedics
- Pediatrics
- Pulmonology and respiratory Medicine
- Urology
- 24 hour emergency and pharmacy
- Radiology Services and diagnostics

Location of services & Distribution

Basement:

1) Radiology- X-Ray, Ultrasound, CT Scan, MRI
2) Pathology and Microbiology
3) Neurology Lab- EEG, EMG
4) OPD Chambers- ENT, Psychiatry and Psychology, Respiratory Medicine, Urology and Nephrology,
5) Ophthalmology
6) Dermatology
7) Blood bank
8) Physiotherapy
9) Dental
10) Accounts
11) IPD Billing
12) Medical Record Department and Store
13) Admin Offices
14) Conference Room and Auditorium
15) Gas Manifold
16) Restaurant

Ground floor:

1) RECEPTION (Front Desk)
2) TPA and International Patients Desk
3) Casualty
4) Admin Offices
5) OPD Chambers- Medicine, Surgery, Orthopaedics, Gastroenterology, Paediatrics, Neurology and Neurosurgery, Cardiology and Cardiothoracic Surgery, Obs & Gynae etc.
6) Mother's Nest- Obs & Gynae Wards, Labour Room, LDR (Birthing) Suites, NICU and Nursery.
7) Surgical ICU
8) Gastro Lab
9) OT Complex- 3 Major and 1 Minor Operation Theatre

First Floor:

1) Inpatients Wards – Single Rooms and Twin Sharing Rooms, Suite Rooms
2) Medical ICU- I

Second Floor:

1) Inpatient Wards- General Wards, Single Rooms and twin sharing rooms.
2) Dialysis Unit
3) Heart Centre - Cardiac OT, Cath Lab, Heart Command, CCU and Medical ICU-II.

PARK GROUP - OTHER HOSPITALS:

1) Park Sunil Hospital (South Delhi) – 50 bedded
2) Park Hospital (West Delhi, Keshopur) – 304 bedded and NABH Accredited.

OTHER UPCOMING PROJECTS:

3) Park Hospital (Faridabad)
4) Park Hospital (Panipat)
5) Park Cancer Hospital (West Delhi)

ROLES AND RESPONSIBILITIES DURING INTERNSHIP

During my internship period in Park Group of Hospitals, Gurgaon and West Delhi I worked under the designation of Operations Manager.

Till now I have actively participated in various activities which include:

- Hospital Planning- project management that included Architectural activities, preparing checklists of various departments.
- Designing of Policy Guidelines for setting up a new hospital- e.g. HR policy making.
- Recruitment process of the hospital- Classification of resumes received from various sources such as via email or walk-ins, Scheduling of interviews.
- Website development of Park hospital, Gurgaon.
- Catalogue designing- Undergoing detailed Literature Review.
- Training of the Nursing Staff.
- Literature review of the hospital
- Hospital Operations
- Claim Processing.

Routine/ general management

Handling of the operations in the areas assigned to me and was responsible for the smooth functioning of operations in the hospital.

In-depth study of the following fields:

- Operations

- Claim processing

Learning during Dissertation

- Project Management Techniques (PMT).
- Understand the various aspects involved in starting a new hospital and various challenges associated with it.
- Enhance my managerial skills.
- To understand working of whole hospital and seek opportunity that provides me real experience.
- To groom myself as a professional.
- Coordination within various departments of the hospital.
- Role of Health care IT in smooth functioning of the hospital.

PART – II

DISSERTATION REPORT

ON

INFECTION CONTROL

IN

INTENSIVE CARE UNIT

AT

PARK HOSPITAL

CHAPTER ONE- INTRODUCTION

1.1 Background

"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. But it turned wrong in Pre-Listerian era because of lack of knowledge on sterilization and antisepsis. Gangrene and death were almost mandatory for the patients suffering from wounds. This lead into development of new discipline called as senics which was dealing with the nosocomial infections (Hospital– acquired infections).

The word hospital is closely related to the word hospitality and is derived from the word 'hospice' which means a place for refuge, a house for rest. Various functions of a hospital are as follows:

1. Care of the sick and injured.

2. Education of physician, nurses, paramedical and other personnel

3. Public health –disease prevention and health promotion

4. Research

Patient care is provided in facilities which range from highly equipped clinics and technologically advanced university hospitals to front-line units with only basic facilities. Despite progress in public health and hospital care, infections continue to develop in hospitalized patients, and may also affect hospital staff.

Nosocomial comes from the Greek word nosokomeion meaning hospital (nosos = disease, komeo= to take care of) therefore Nosocomial infections are defined as infections which is a result of treatment in a hospital or a healthcare service unit, but secondary to the patient's original condition. Infections are considered nosocomial if they first appear 48 hours or more after

hospital admission or within 30 days after discharge. As per the WHO definition it is an infection acquired in hospital by a patient who was admitted for a reason other than that infection. An infection occurring in a patient in a hospital or other health care facility in which the infection was not present or incubating at the time of admission. This includes infections acquired in the hospital but appearing after discharge and also occupational infections among staff of the facility.

In 1861,Semmelwis1 observed the association of Puerperal sepsis with the attendants on patients by medical officers and students and he was successful to bring a dramatic reduction in infection rate by the introduction of handwashing with chlorinated lime. After her experience of hospital sepsis, Florence Nightingale(1863) wrote in her book Notes on hospitals, ……the very first requirement in a hospital that it should do the sick no harm ….the actual mortality in hospitals, especially in those of large crowded cities, is very much higher than any calculation founded on mortality of the same class of disease among patients treated outside hospital…Lord Lister (1867) introduced his antiseptics surgery with the extensive use of carbolic acid. Hospital – acquired infections also called nosocomial infections are defined as infections developing in the patients after admission to hospital , which were neither present nor in incubation at the time of hospitalization .Such infections may manifest during their stay in hospital or, sometimes , after the patient is discharged .

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.

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.

- Patient may acquire infection before admission to the hospital = Community acquired infection.
- Patient may get infected inside the hospital = Nosocomial infection.

- It includes infections
  - not present nor incubating at admission,
  - infections that appear more than 48 hours after admission,
  - those acquired in the hospital but appear after discharge
  - also occupational infections among staff**.**

1.2 Operational Definitions:

Hospital acquired infection: An infection acquired in a patient in a hospital or other facility in whom it was not present or incubating at the time of admission or the residual of an infection acquired during a previous admission.

Infection: Infection is the lodgment and multiplication of organisms in the host.

Decontamination: It is a process which removes or destroys micro-organisms to render an object safe for use. It includes cleaning, disinfection and sterilization.

Cleaning: It is a process that removes foreign material (e.g. soil, organic material,microrganisms. Disinfection: It is a process that reduces the number of pathogenic micro-organisms, but not necessarily bacterial spores, from inanimate objects or skin, to a level which is not harmful to health.

Sterilization: It is a process by means of which an article, surface or medium is made free from all living microorganisms including spores.

1.3 RATIONALE OF THE STUDY

Patient in hospital are likely to get sick due to a new variety of microorganisms responsible for wide spectrum of hospital infection, bacterial isolates of more resistant to standard antibiotic therapies, patient clustered in specialized units and a variety of health care providers directly involved in patient care.

So, hospital has increasingly become unsafe place for patient during their stay. Infection is a health hazard of great expense and significance affecting the final outcome of treatment.

People at Risk

Everyone but nurses, doctors and housekeeping staff are more prone. If infection control is not taken seriously in ICU, then the incidence of nosocomial infections will continue to rise. Infection control is considered to be serious affair in patient and employee safety measures.

1.4 SCOPE OF THE STUDY

After conduction of research study and analysis of infection control in ICU, action plan/recommendations will be given which needs to be implemented in order to control the infection control in Intensive Care Unit in the appropriate manner and to fulfill the quality hygiene in ICU.

1.5 AIM & OBJECTIVES

Aim

This project intended to assess the infection control protocols in the Intensive Care Unit.

Objectives

1) To study the physical facilities available for infection control in the intensive care unit.

2) To study the existing infection control procedures used in the intensive care unit.

1.6 REVIEW OF LITERATURE

Hospital Acquired Infection:

The term hospital acquired infection, hospital– associated infection, hospital infection or nosocomial infection(nosocomio,meaning hospital) 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.

Dancer depicts that 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 facilitates 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.

Weinstein says that nosocomial infections typically affect patients, who are immuno compromised because of age, underlying diseases, or medical or surgical treatment. Nosocomial infection rates in 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.

As per Weber and researchers 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 varies 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 Infection : In the words of Slack hospital acquired infection classified as :

(a) Infection contracted and developing outside the hospitals and require admission to the hospital (e.g. pneumococcal pneumonia),

(b) Infections contracted outside, but clinically apparent when the patient is in the hospital (e.g. chickenpox or zoster)

(c) Infections contracted, and developing when the patient is in hospital (e.g. device-associated bacteraemias),

(d) Infections contracted within the hospital, but not becoming clinically apparent until after the patient has been discharged (e.g. many postoperative wound infection)

(e) 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 Inquired Infection:

According to Gupte, 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 of Hospital Inquired Infection:

As per Bhatia and collegues8, 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, 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 IVfluids may transmit many infections and accidental inoculation of infectious material

Mode of Transmission:

In the words of Nagoba , hospital acquired infection spreads by various routes as follows:

Contact: Main route of transmission. Transmitted by hands or clothing of hospital personnel and even patient himself or transmitted by contact with inanimate objects.

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

Oral route: Transmitted by ingestion of contaminated food or water

Parenteral route: Transmitted by the use of contaminated syringes, needles and other instruments, by administration of contaminated blood, blood products, infusion fluids or tissue .

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

.Iatrogenic transfer: Infections may also occur during diagnostic or therapeutic procedures, if proper care is not taken

Infecting Organisms:

According to Pai 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 .

Common Hospital Inquired Infection:

Chakraborty enlisted common hospital acquired infection as given below:

Urinary tract infection: Approximately 40 % of hospital- acquired infections (e.g., E.coli , S.epidermis, Enterococcus , Klebseilla etc.) occur in the urinary tract and are usually associated with catheterization or instrumentation of urethra, bladder or kidneys

Infection of the lower respiratory tract: Some 15 - 20 % of all hospital acquired infections are the lower respiratory tract which are the leading causes of mortality. The major pathogens include gram- negative bacilli and Staphylococcus aureus which replace the conventional pathogens, such as streptococcus pneumonia Wound and skin sepsis: Infection of the surgical wounds and other soft tissues account for about 18% of the hospital-acquired infections (e.g., S.aureus , P.aeruginosa)

Gastrointestinal infection: e.g., food poisoning , Salmonella infection

Studies and incidence conducted on Hospital Inquired Infection:

In the words of Inweregbu and others , 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 immunocompromised status.

According to Rosenthal and his colleagues13, nosocomial infections 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 medical- surgical ICUs was 30.3 per 1,000 devicedays; it was 14.2 per 1,000 device-days in coronary care units (CCUs). The rate of ventilator-associated pneumonia in medical- surgical ICUs was 46.3 per 1,000 device; it was45.3 per 1,000 device-days in CCUs .The rate of symptomatic catheterassociated urinary tract infections in medical- surgical ICUs was 18.5 per 1,000 device days ; it was 12.1 per 1,000 device –days in CCUs .The rate of nosocomial infections in Argentinean ICUs found during surveillance suggested that ongoingtargeted surveillance and implementation of proven infection control strategies is needed in developing countries such as Argentina.

According to Al-Fallouji14,Senic (the study on the efficiency of nosocomial infection control) audit report from Georgia, USA on 33,8000 patients, published in1983, the commonest site was urinary tract, but most expensive in terms of treatment, cost and hospital discharge was wound infection, average cost was $ 1800 per infection (though the hospital was reimbursed only $15) with a maximum of $42,000. the most expensive nosocomial infection were pneumonia (average cost $3000 and maximum $9000) wound infection (average cost $3000 and maximum $26000) and urinary tract infection (average cost $600 and maximum $8000).

The Senic audit also demonstrated that a small reduction in USA infection rates from 5% to 7% could cover costs of employing a team consisting of an infection control nurse, a part time epidemiologist with clinical assistance and expenses. The study concluded that surveillance and reporting of wound infection to surgeons are of great importance in prevention of post-operative wound infection with better awareness, improved techniques, teaching and good infection control.

Rudra and Rudra 15 reported 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.

According to Burke 16, 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.

.**Classification of pathogenic germs**

Conventional pathogens

Cause disease in healthy individuals in the absence of specific immunity. Examples: Staphylococcus aureus, Streptococcus pyogenes, Salmonella sp. ,Shigella sp, Corynebacterium diphtheriae, Mycobacterium tuberculosis, Bordetella pertussis, hepatitis A and B viruses, rubella virus, rotaviruses, human immunodeficiency virus (HIV).

Conditional pathogens

Cause disease, other than trivial local infections, only in persons with reduced resistance to infection (including newborn infants) or when implanted directly into tissue or a normally sterile body area. Examples: Streptococcus agalactiae, Enterococcus sp., Clostridium tetani, Escherichia

coli, Klebsiella sp., Serratia marcescens, Acinetobacter baumanii, Pseudomonas aeruginosa, Candida sp.

Opportunistic pathogens

Cause generalized disease, but only in patients with profoundly diminished resistance to infection. Examples: atypical mycobacteria, Nocardia asteroids, Pneumocystis carinii

Reservoirs and transmission

Bacteria that cause nosocomial infections can be acquired in several ways:

1. The permanent or transient flora of the patient (endogenous infection). Bacteria present in the normal flora cause infection because of transmission to sites outside the natural habitat (urinary tract), damage to tissue (wound) or inappropriate antibiotic therapy that allows overgrowth (C. difficile, yeast sp.). For example, gram-negative bacteria in the digestive tract frequently cause surgical site infections after abdominal surgery or urinary tract infection in catheterized patients.

2. Flora from another patient or member of staff

(Exogenous Cross-Infection). Bacteria are transmitted between patients: (a) through direct contact between patients (hands, saliva droplets or other body fluids), (b) in the air (droplets or dust contaminated by a patient's bacteria), (c) via staff contaminated through patient care (hands, clothes, nose and throat) who become transient or permanent carriers subsequently transmitting bacteria to other patients by direct contact during care, (d) via objects contaminated by the patient (including equipment), the staff's hands, visitors or other environmental sources (e.g. water, other fluids, food).

3. Flora from the health care environment (Endemic or epidemic exogenous environmental infections). Several types of microorganisms survive well in the hospital environment:

In water, damp areas, and occasionally in sterile products or disinfectants (Pseudomonas, Acinetobacter, Mycobacterium)

--In items such as linen, equipment and supplies used in care; appropriate housekeeping normally limits the risk of bacteria surviving as most microorganisms require humid or hot conditions and nutrients to survive

--In food

--In fine dust and droplet nuclei generated by coughing or speaking (bacteria smaller than 10 m in diameter remain in the air for several hours and can be inhaled in the same way as fine dust).

Prevention of nosocomial infections

Prevention of nosocomial infections is the responsibility of all individuals and services providing health care. Everyone must work cooperatively to reduce the risk of infection for patients and staff. This includes personnel providing direct patient care, management, and physical plant, provision of materials and products, and training of health workers. Infection control programmes are effective provided they are comprehensive and include surveillance and prevention activities, as well as staff training. There must also be effective support at the national and regional levels.

National or regional programmes

The responsible health authority should develop a national (or regional) programme to support hospitals in reducing the risk of nosocomial infections. Such programmes must: set relevant national objectives consistent with other national health care objectives.

- develop and continually update guidelines for recommended health care surveillance, prevention, and practice.
- develop a national system to monitor selected infections and assess the effectiveness of
- Interventions harmonize initial and continuing training programmes for health care professionals
- facilitate access to materials and products essential for hygiene and safety
- encourage health care establishments to monitor nosocomial infections, with feedback to the professionals concerned.

The health authority should designate an agency to oversee the programme (a ministerial department, institution or other body), and plan national activities with the help of a national expert committee. Professional and academic organizations must also be involved in these programmes.

Management of Hospital Inquired Infection:

Management of hospital acquired infection is not an easy task; it requires education of health care personnel regarding infection control procedures and strict adherence to rules and policies of infection control.

Panigrahi mentioned that that organization of a nosocomial infection control is not an easy task. The three main supportive elements to be considered for the infection control programme are:

(1) The development of an effective surveillance system,

(2) The development of policies to reduce risk of hospital acquired infection

(3) The maintenance of a continuing education programme for hospital personnel

Surveillance of hospital acquired infection is very important and it should be continuous process consisting of elements i.e. definition of categories of infection, systematic case finding and data collection and tabulation of data, analysis and interpretation of data and reporting of relevant findings to individuals for appropriate action .The best way to carry out control programme is to establish an infection control committee.

According to Weinstein, physician can contribute to infection control efforts by acting as role models for other personnel by paying careful attention to handhygiene recommendations and barriers precautions during contact with patients and by observing posted isolation precautions ,giving corrective feedback to caregivers who do not adhere to hand-hygiene recommendations or isolation precautions, placing invasive device based on clinical need (not just on convenience), removing invasive device promptly when they are no longer needed clinically, limited surgical antimicrobial prophylaxis to the perioperative period , doing exercise care in initial empirical antibiotic selection (avoid “shot gun” approaches), narrow use of the spectrum of antibiotic therapy once a pathogen is recovered and discontinuing antibiotic therapy in a timely fashion and making familiar with the hospital’s blood borne pathogen and tuberculosis control plans and making order of appropriate isolation precautions promptly for infected patients , alternate nursing staff to lapses in asepsis(e.g Soiled dressings at sites of intravascular catheters) and to infectionpredisposing situations (e.g aspiration – prone positioning of patients)

during patient rounds and notifying infection-control practitioners of potential infection control problems(e.g surgical wound infections that manifests after a patient's discharge)

CLEANING, STERILIZATION AND DISINFECTION:

Proper infection control procedures need to be followed for both patient safety and health care personnel. Cleaning, sterilization and disinfection are important procedures need to be carried out for hospital infection control.

WHO guidelines recommended routine cleaning of hospital environment to ensure that environment is visibly clean, and free from dust and soil. 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.

NABH standard recommended that there must infection control manual, which must be updated periodically . Equipment cleaning and sterilization must be included, an appropriate antibiotic policy must be established and implemented It also focussed on adherence to standard precaution at all times.

Sleigh and Timbury mentioned that medical, nursing and ancillary staff must be educated in the basic concepts of infection control. All staff must follow good practice to minimize the risk to patients. E.g. Frequent hand washing is the important measure for preventing cross-infection

.Staff must be taught how to wash hands effectively. Staff suffering from infection, e.g. viral respiratory infections, septic lesions, should be excluded from contact with patients. Staff should be protected by appropriate immunization, e.g . BCG vaccine, Hepatitis B vaccine .

According to Anand and Sidhartha 23, common chemicals used for disinfection are –

-Bleach 1 % solution should be distributed through out the hospital in plastic recyclable bottles for disinfection of materials contaminated with blood / body fluids

-Bleaching powder for – for toilets, urinals, bathroom, etc

- Methylated spirits (70%) – for disinfecting surfaces on which bleach cannot be used, e.g. smooth metal surfaces, table tops, etc

- Alcoholic hand wash (70 %) – Methylated alcohol to which 1 % glycerine is added, available in all clinical settings

-Glutaraldehyde (2%) –Cidex for disinfection of surfaces and instruments, which are destroyed by bleach, changed after 14 days.

- Detergent with enzyme – for cleaning endoscopes, theatre instruments and obstetric instruments before disinfection

- Savlon 1 % - for cheatle forceps, solution to be changed every day. For effective disinfection, contact period of 30 % minutes is required.

HANDWASHING:

Nayak and Kulkarni depicts that hand hygiene has always been considered one of the cornerstones of infection control but adherence to recommendations for hand hygiene practices remains extremely low in health care settings. Nosocomial infection, many of which are transmitted from patient to patient by poorly sanitized hands of health care workers, exert a significant toll in human and economic terms every year. So, health care personnel need to follow proper handwashing technique for prevention of hospital infection.

According to Inglis, hand washing, preferably with a disinfectant preparation, before and after contact with a patient or their body fluids is probably the single most effective means of preventing transmission of microorganisms between hospital patients. Similarly, Singh and Rattan also mentioned that hand washing is the single most important procedure known to prevent nosocomial infection in hospital environment .

WASTE MANAGEMENT SYSTEM:

Ministry of Health and Family Welfare,(1998) recommended the following hospital waste management process. Segregation at the source and safe storage is the key to whole waste management process. It should be carried out at the point of generation to keep general waste

from infectious waste. By segregation, a hospital can reduce total treatment cost, reduce the impact of waste on community and reduce the chance of infecting health care workers.

Hospital managers may prefer to use plastic or metal bins for waste storage in order to save on the cost and paperwork of buying large number of one strip sacs. Treatment of waste is required to disinfect, or decontaminate by chemical disinfectants of waste at right source, so that there is no longer the source of pathogenic microorganisms. After treatment residue can be handled safely, transported, stored or disposed. Infectious waste needs to be destroyed or infected by recommended methods of disinfecting or destruction of biologically infected waste such as autoclaving and microwaving. Incineration is the better option for the large scale infectious waste management.

DOCUMENTATION, EMPLOYEE HEALTH AND TRAINING:

According to Bennett and Brachman30, personnel health service can contribute to infection control activities by establishing such policies and procedures as placement evaluations, health and safety education, immunization programmes, monitoring potentially harmful infectious exposures and instituting appropriating preventive measures ,coordinating plans for managing outbreaks among healthcare workers providing information regarding infection risks related to employment and developing guidelines for restricting work because of infectious disease and maintaining health records of all HCW's . As per Bennett and Brachman , health care providers have the duty to protect the health personnel as well as patients. Health care workers are exposed to a wide array of health and safety hazards including exposure to biologic agents, stress, injury and chemical agents.

Immunization of the personnel is an important component of hospital control programs.

CHAPTER TWO

RESEARCH METHODOLOGY

2.1 Source of data

The study is carried out in the intensive care unit, Park Hospital, West Delhi. The required data is collected from nurses, doctors, housekeeping staff who work in intensive care unit.

2.2 Study Design

The tools adopted for study is descriptive method where data was collected through questionnaires, interviews and personal observations.

2.3 Method of data collection

The required data is primary in nature collected through questionnaires, interviews, personal observation and studying relevant record for infection control maintained in intensive care unit.

2.4 Sample Size

The data is obtained from 150 respondents, consisting of nurses, doctors, housekeeping staff who work in the intensive care unit.

Total number of respondents (N) = 150

S.NO.	TYPES OF RESPONDENTS	NUMBER
1.	Doctors and Nurses	105
2.	Housekeeping	25
3.	Management	20

2.5 Duration of the study

9th February 2012 to 11th March 2012.

CHAPTER THREE

RESULTS AND FINDINGS

3.1 KEY OBSERVATIONS

S.NO.	PROCEDURE	OBSERVATION
1.	There is standard opening manual for ICU	NO
2.	Culture studies of swabs from ICU floor done	YES
3.	Bacteriological testing of water is done	NO
4.	Bacteriological testing of air is done	NO
5.	Antibiotic policy	NO
6.	Any protocol for wearing gloves	NO

3.2 RESULTS AND FINDINGS

3.2.1 FREQUENCY OF WET CLEANING IN ICU

FOR TOTAL RESPONDENTS (N=150)

WET CLEANING	DAILY		WEEKLY		MONTHLY	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
SURFACE	150	100				
WALLS			36	24	114	76
ICU TABLE	150	100				
TROLLEY	150	100				

In the study, it was found that hundred percent responders said that surface of ICU, table and Trolleys are been wet cleaned daily. Further analysis revealed that twenty four percent responded that walls are wet cleaned weekly while seventy six percent responded that walls are cleaned on monthly basis and not regularly.

FOR NURSES AND DOCTORS (N=105)

WET CLEANING	DAILY		WEEKLY		MONTHLY	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
SURFACE	105	100				
WALLS			36	24	114	76
ICU TABLE	105	100				
TROLLEY	105	100				

Almost 100 percent nurses and doctors believed that ICU surface, tables and trolleys are cleaned daily though 76 percent said that walls are not cleaned regularly.

FOR HOUSEKEEPING (N=25)

WET CLEANING	DAILY		WEEKLY		MONTHLY	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
SURFACE	25	100				
WALLS			19	75	6	25
ICU TABLE	25	100				
TROLLEY	25	100				

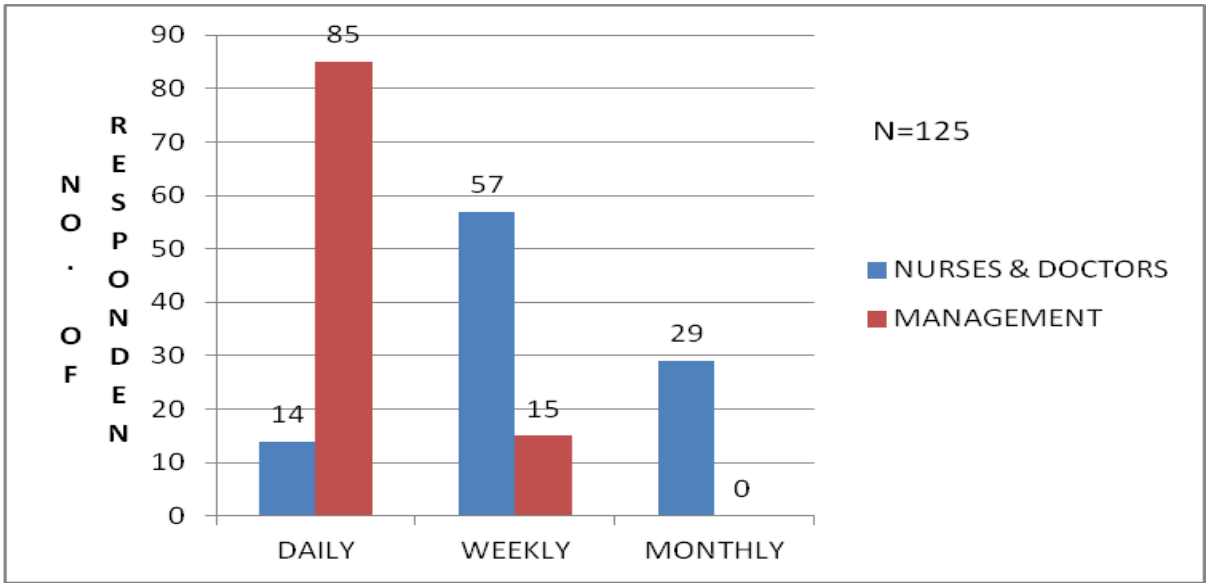
Out of 25 housekeeping people 100 percent responded that surface, tables and trolleys are regularly cleaned on daily basis but 75 percent amongst them also believed that walls are also cleaned on weekly basis in contrast with other staff while only 25 percent said that it was done on monthly basis.

FOR MANAGEMENT (N=20)

WET CLEANING	DAILY		WEEKLY		MONTHLY	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
SURFACE	20	100				
WALLS			14	70	6	30
ICU TABLE	20	100				
TROLLEY	20	100				

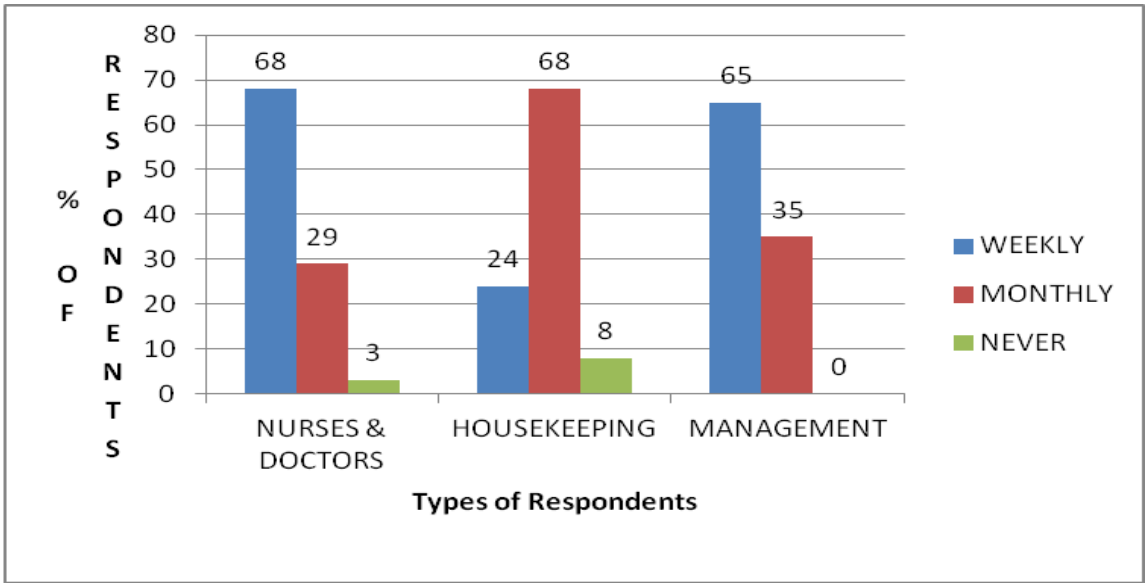
Management strongly believed that ICU surface, tables and trolleys are cleaned daily and also a good percentage of 70 percent believed that walls in ICU are being cleaned on weekly basis which is quite different finding if compared with doctors and nurses.

3.2.2 THE FREQUENCY OF MONITORING STERILIZING EFFICIENCY OF AUTOCLAVE (N=150)



The above graph prevailed that 14% of the doctors and nurses reported that the monitoring of sterilizing efficiency of autoclave was done daily whereas 57 % responded reported that sterilizing efficiency of autoclave was monitored weekly, and rest 29% responded that it is done monthly while in case of management responses are quite different from that of doctors and nurses may be because management has regular monitoring on the sterilization process. 85% of management persons responded that monitoring sterilizing efficiency of autoclave was done daily and 15 % reported that sterilizing efficiency of autoclave was monitored weekly.

3.2.3 FREQUENCY OF FUMIGATION OF ICU



For Nurses and Doctors (N=105):

On analyzing the above graph, it was found that 68 percent respondents amongst doctors and nurses reported that fumigation has been done weekly, 29 percent said it was done monthly whereas only 3 percent reported that it was never been cleaned.

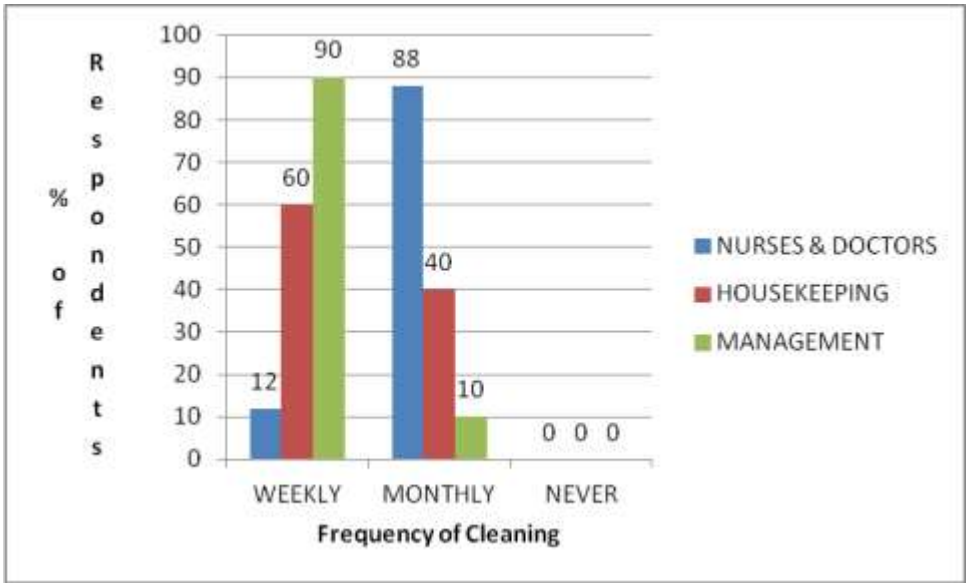
For Housekeeping (N=25):

Amongst housekeeping group, 8 percent respondents said that fumigation is not practiced at all while 68 percent said that it was done on monthly basis.

For Management (N=20):

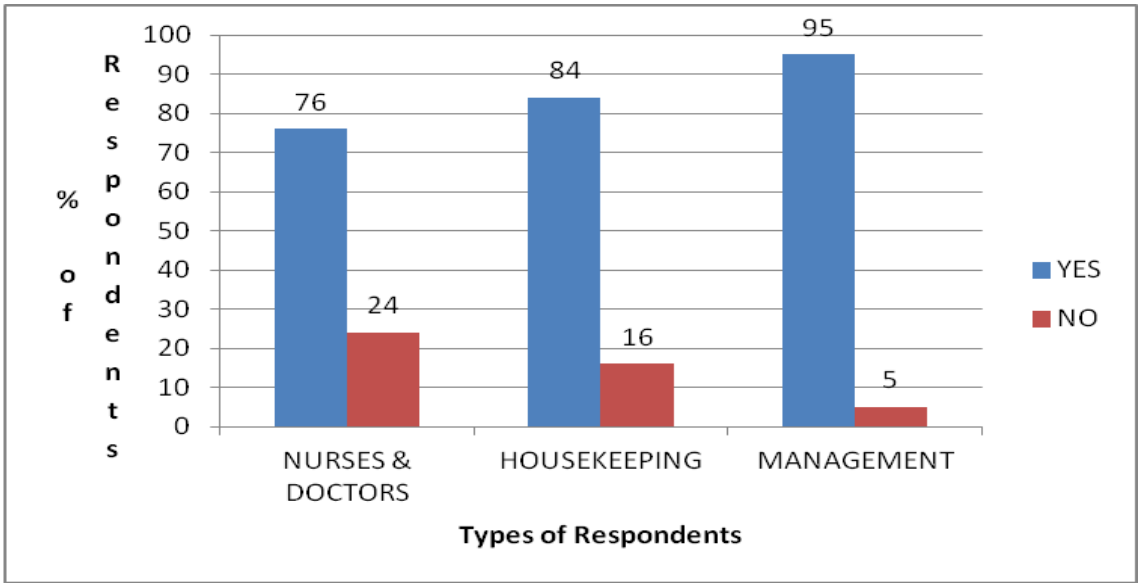
65 percent respondents amongst management reported positively in case of practice of fumigation in ICU on weekly basis and 35 percent said that it is done on monthly basis. No respondent in management gave negative response for fumigation in ICU.

3.2.4 FREQUENCY OF CLEANING THE AIR CONDITIONER (N=150)



On analyzing the above graph, it is quite evident that none of the respondents (doctors & nurses, housekeeping and management) included for the study responded negatively regarding cleanliness of air conditioners placed in the ICU. 90 percent respondents amongst the management (where N= 20) strongly believed that air conditioners in the ICU are cleaned regularly on weekly basis. Only 10 percent amongst management respondents reported that air filter was cleaned monthly. The response amongst the medical staff including doctors and nurses (N=105) was opposite of the management where only 12 percent of them responded that it was cleaned weekly. Rest 88 percent said that it was being done only monthly. It needs further deep study that who is the respondents who are reporting affirmative and who are reporting positive. The response amongst the housekeeping was non directional as 60 percent respondents out of N=25 believed that cleaning of air filters is carried out weekly while 40 percent believed that the practice was carried out only monthly.

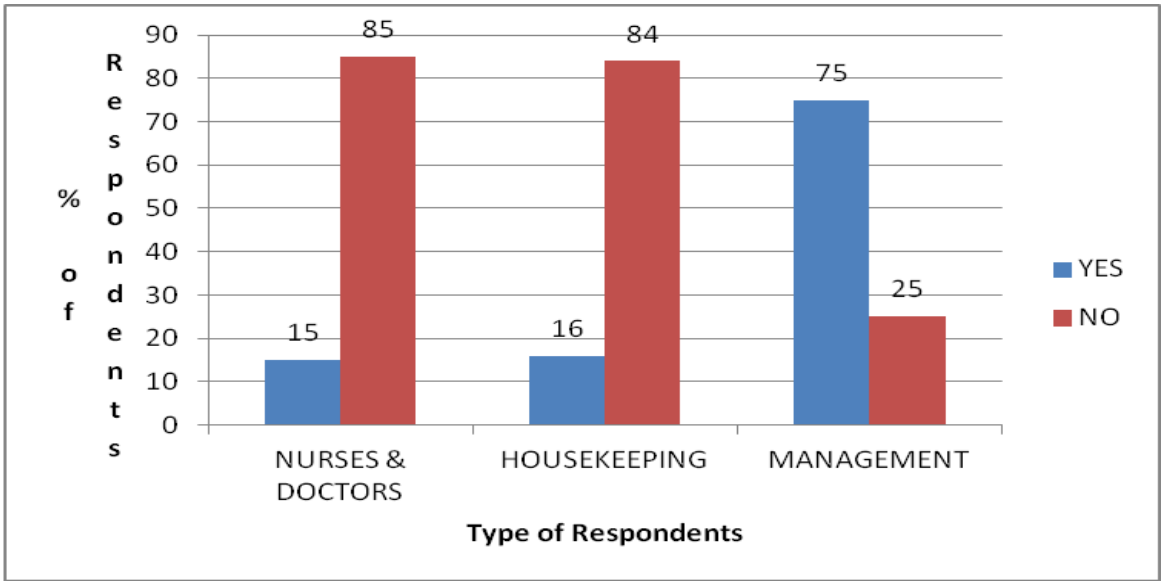
3.2.5 RESPONSE OF STAFF REGARDING HANDWASHING FACILITY (N=150)



For N= 150

On analyzing the above data, it was revealed that majority of the respondents amongst doctors & nurses, housekeeping and management reported that there were adequate hand washing facilities available in the hospital, where as only 24 percent amongst the doctors & nurses, 16 percent amongst the housekeeping and only 5 percent amongst the management reported that the facilities provided for hand washing were not adequate.

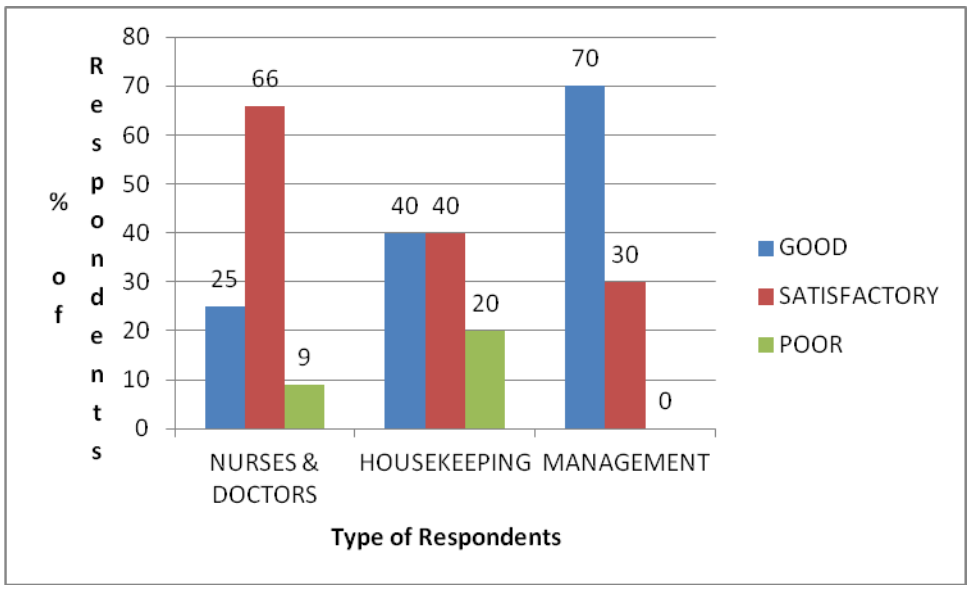
3.2.6 WHETHER ANY PROTOCOL IS FOLLOWED REGARDING HANDWASHING IN ICU (N=150)



On analysis of the above graph, to find out that whether any protocol is being followed for hand washing or not, it was revealed that 85 percent respondents amongst the doctors & nurses, 84 percent amongst the housekeeping and 75 percent amongst the management reported affirmatively that any protocol is not being followed in hand washing whereas only 15 percent, 16 percent and 25 percent amongst the doctors & nurses, housekeeping and management respectively were in the opinion that the protocol was followed while hand washing.

This implies that majority of the respondents included in the research study were aware of the facilities available for hand washing but they were not aware of the protocols to be followed regarding hand washing in ICU.

3.2.7 LEVEL OF SAFETY MEASURES FOLLOWED IN ICU



It is very important to follow adequate safety measures in ICU. Analysis of the above graph on safety measures followed in ICU revealed following findings:

For doctors & nurses (N= 105):

Out of N=105 respondents, only 25 percent respondents were found reported to be good on the safety measures followed in ICU while 66 percent of the respondents said that safety measures taken was only up to the satisfactory level, whereas 9 percent responses in terms of safety measures was poor.

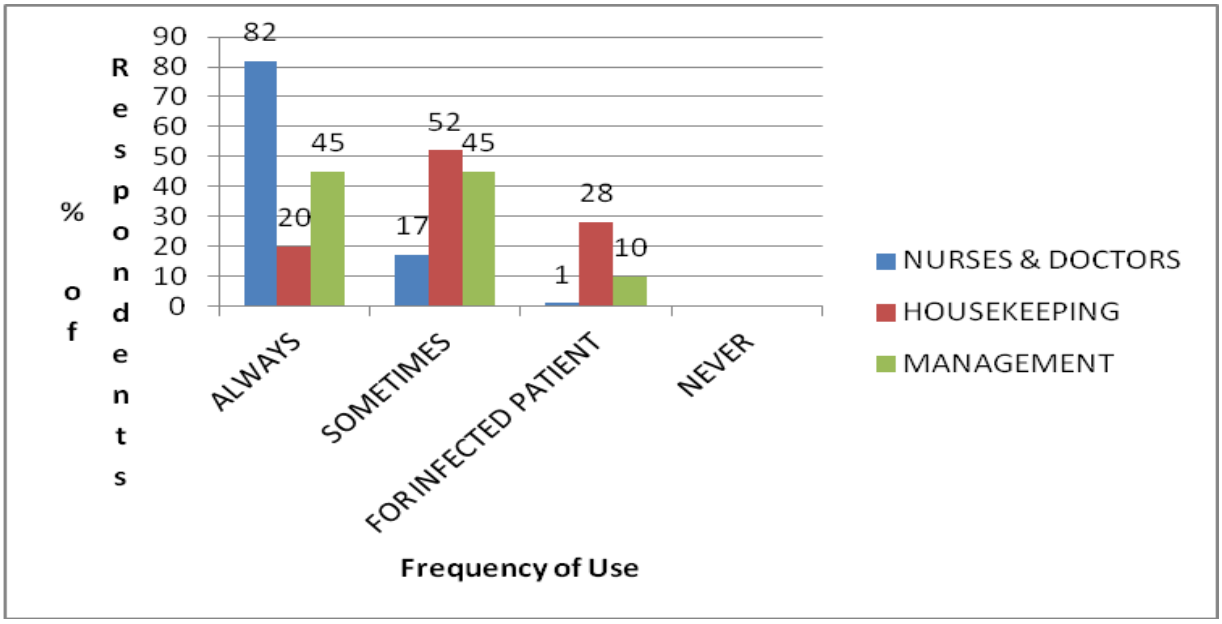
For housekeeping (N=25):

As evident from above, the response for level of safety measures in ICU was negative in case of housekeeping group in comparison to management and doctors & nurses. Only 40 percent replied that the level of safety was good while 40 percent believed that it was satisfactory.

For Management (N=20):

No one in the management responded in a negative manner in case of the level of safety measures in ICU. Quite a good number of 70 percent respondents replied that the safety measures practiced in ICU were good while 30 percent said that the level of safety measures is only up to the satisfactory level.

3.2.8 RESPONSE OF STAFF REGARDING THE USE OF DOUBLE GLOVING FOR SERIOUSLY INFECTED PATIENT



For Nurses and Doctors (N=105):

The above table reflects that 82 percent respondents amongst doctors and nurses, were using the double gloves always while dealing with seriously infected patients whereas 17 percent respondents report to be using the double hand gloves not regularly but sometimes or often. Though it was satisfactory to note from the above table that there were only 1 percent respondents who were found never using the gloves while dealing with seriously infected patients.

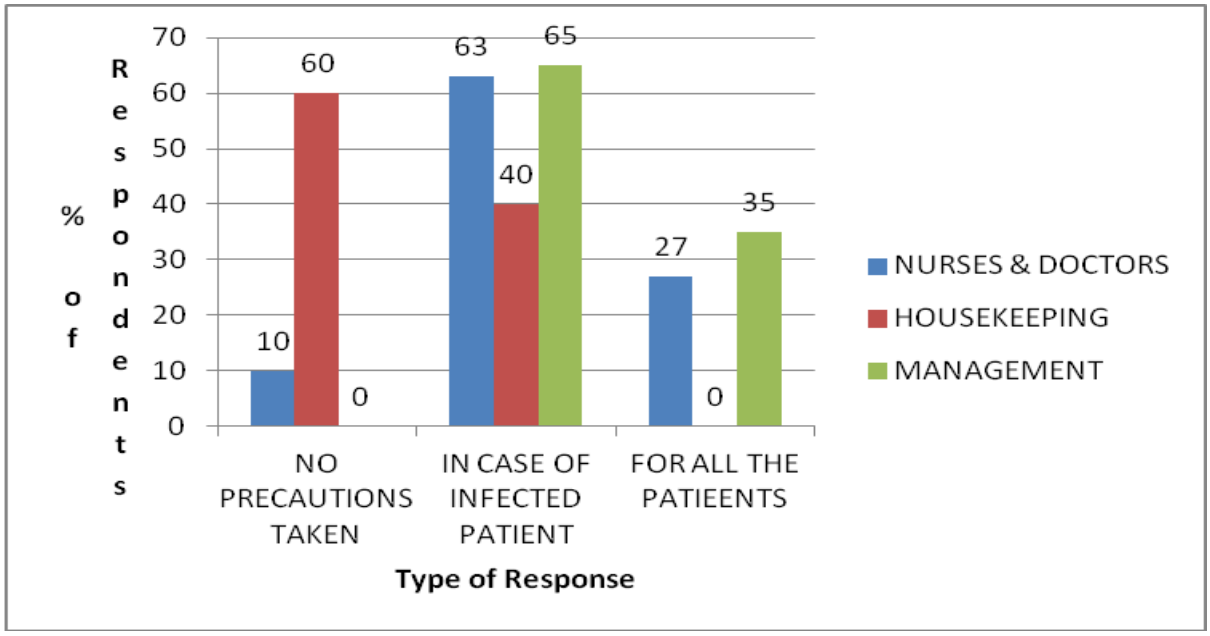
For Management (N=20):

According to management, 40 percent of the medical staff was using the double gloves either always or often while dealing with patient while only 10 percent said that double gloving was being practiced only in case of seriously infected patient.

For Housekeeping (N=25):

The status of the housekeeping group was not found to be satisfactory in case of use of double gloves while dealing with the patient. 28 percent of the housekeeping respondents said that they practiced double gloving only in case of seriously infected patient. Only 20 percent of the respondents always used the double gloves while 52 percent practiced double gloving only sometimes.

3.2.9 RESPONSE REGARDING PRECAUTIONS TAKEN AFTER NEEDLE STICK INJURY



For Nurses and Doctors (N=105):

The above graph reflects that 63 percent respondents take precautions after needle stick injury in case of infected patient only whereas only 27 percent of respondents were found to take precautions for all the patients. Only 10 percent doctors were not following proper guidelines to take precautions after needle stick injury Though it was satisfactory to note from the above table that respondents are aware of the needle stick injury but measures should be taken that it should be applied for all the patients with adherence to some protocol.

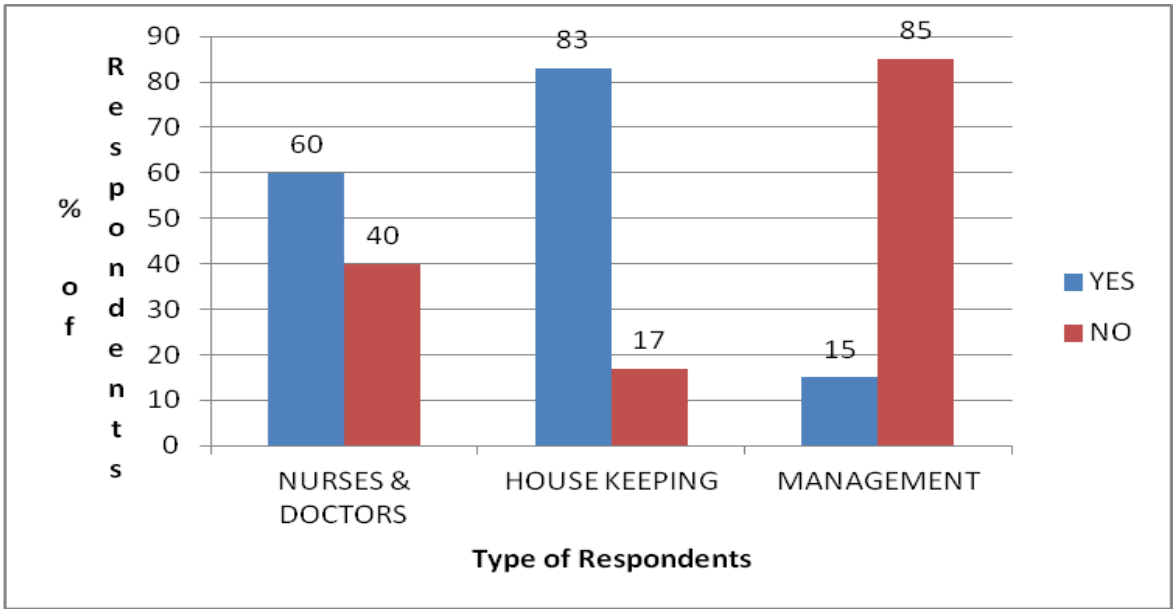
For Management (N=20):

According to management, no one in the hospital staff was careless in taking precautions after needle stick injury. About 65 percent of the medical staff takes precautions following needle stick injury in case of infected patient while 35 percent of the medical staff takes precautions for all the patients.

For Housekeeping (N=25):

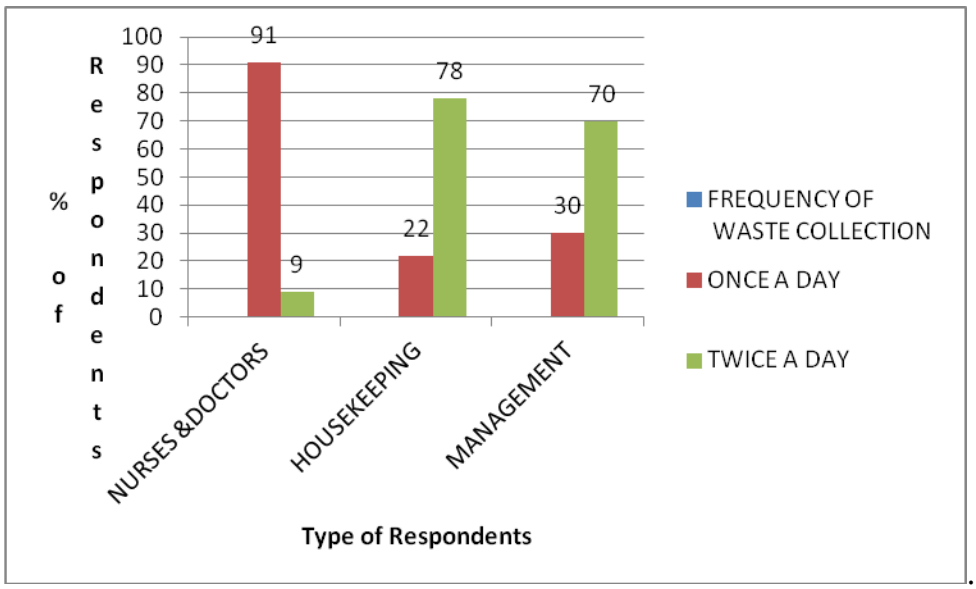
It is evident from the above graph that housekeeping staff either takes no precautions after needle stick injury (60 percent) or takes precautions only in case of infected patient (40 percent). The precautions are not practiced for all the patients.

3.2.10 RESPONSE WHETHER STAFF DECONTAMINATE HAND FIRST AND REMOVE APRON BEFORE LEAVING WORKING AREA (N=150)



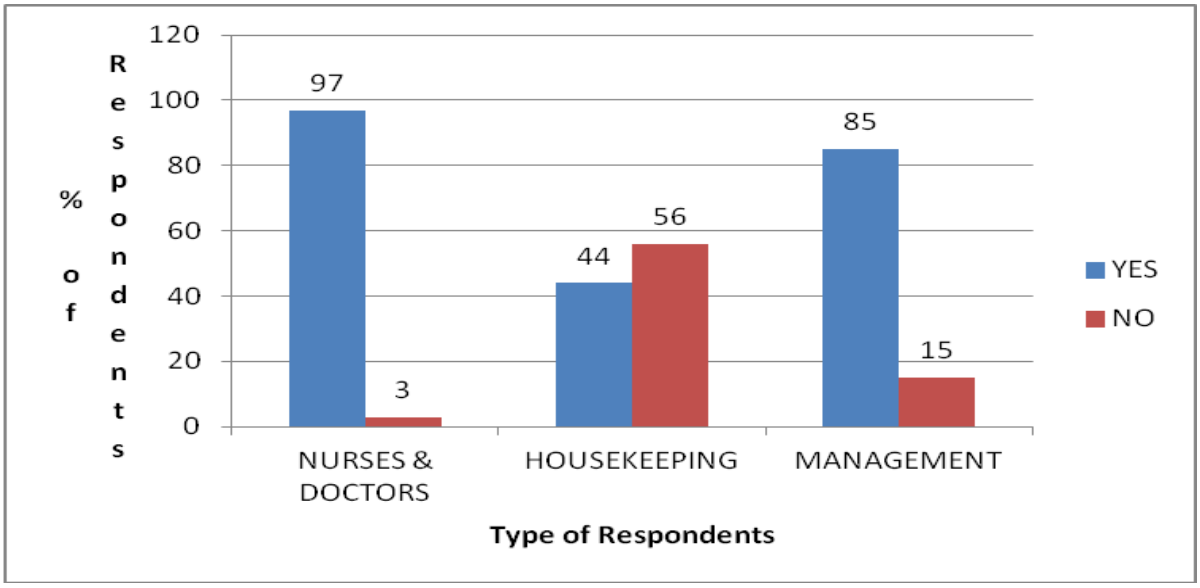
On analyzing the above graph, it was found that 60 percent respondents amongst the nurses and doctors and 83 percent respondents amongst the housekeeping staff reported that they decontaminate hand first and remove apron or hospital attire before leaving working area where as according to management people only 15 percent decontaminate hand first and remove apron or hospital attire before leaving working area. 40 percent respondents amongst the nurses and doctors, 17 percent amongst the housekeeping staff and 85 percent respondents amongst the management reported that they don't decontaminate hand and remove apron when leaving working area. Proper training of the staff is required regarding the same.

3.2.11 FREQUENCY OF WASTE COLLECTION IN ICU (N=150)



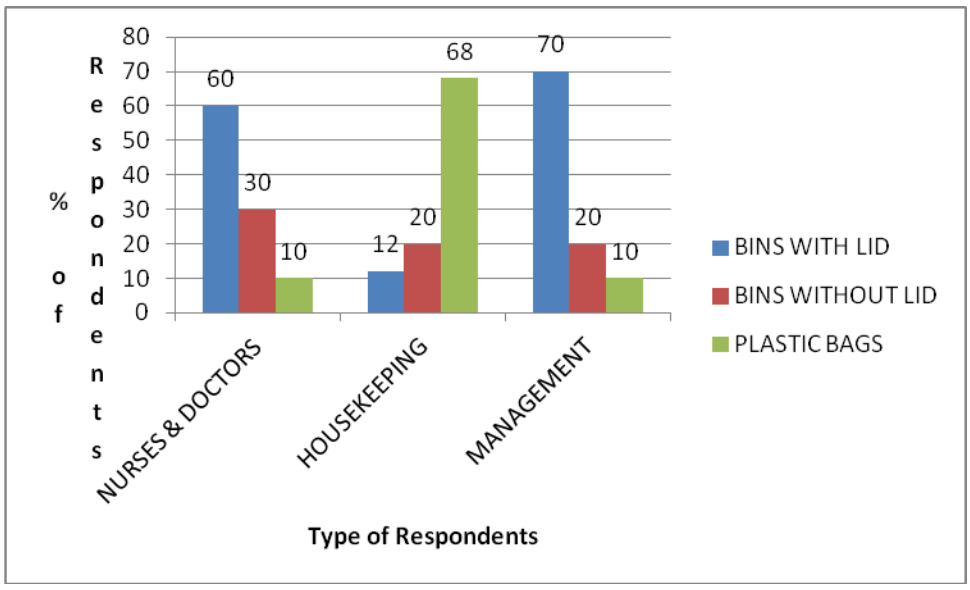
It is evident from the above graph that 70 percent amongst the management and 78 percent amongst the housekeeping staff answered that waste generated from the ICU is collected twice a day while only 9 percent respondents amongst the doctors and nurses agreed that waste is collected twice a day and rest of the doctors and nurses i.e. 91 percent strongly believed that waste is collected only once a day. The discrepancy in the above responses needs further evaluation.

3.2.12 WHETHER CATEGORIZATION OF WASTE IS DONE WHILE BEING COLLECTED (N=150)



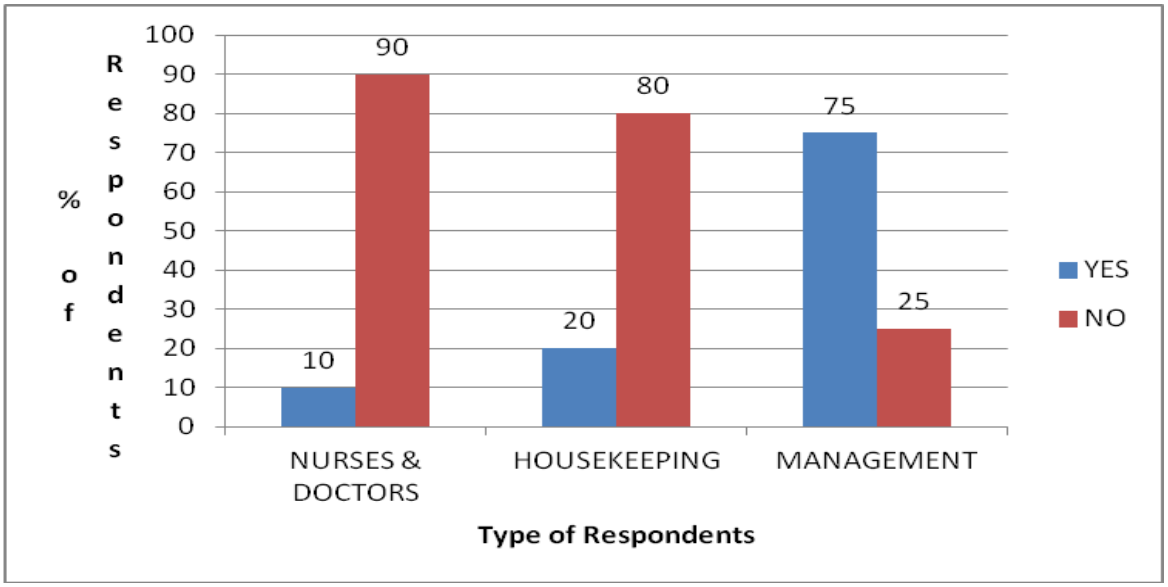
Analyzing the above data, revealed that majority of the respondents i.e. 97 percent amongst the doctors and nurses and 85 percent amongst the management reported that appropriate categorization of waste is done in ICU while being collected. Only 3 percent nurses and doctors and 15 percent management were not convinced about appropriate categorization of waste while being collected. Amongst the housekeeping staff, 44 percent said that proper categorization of waste is done while being collected while 56 percent said that te categorization of waste was not adequate and further training and efforts are required to know the importance of categorization of waste when it is being collected for safe disposal.

3.2.13 RESPONSE REGARDING THE CONTAINERS USED FOR WASTE COLLECTION IN ICU (N = 150)



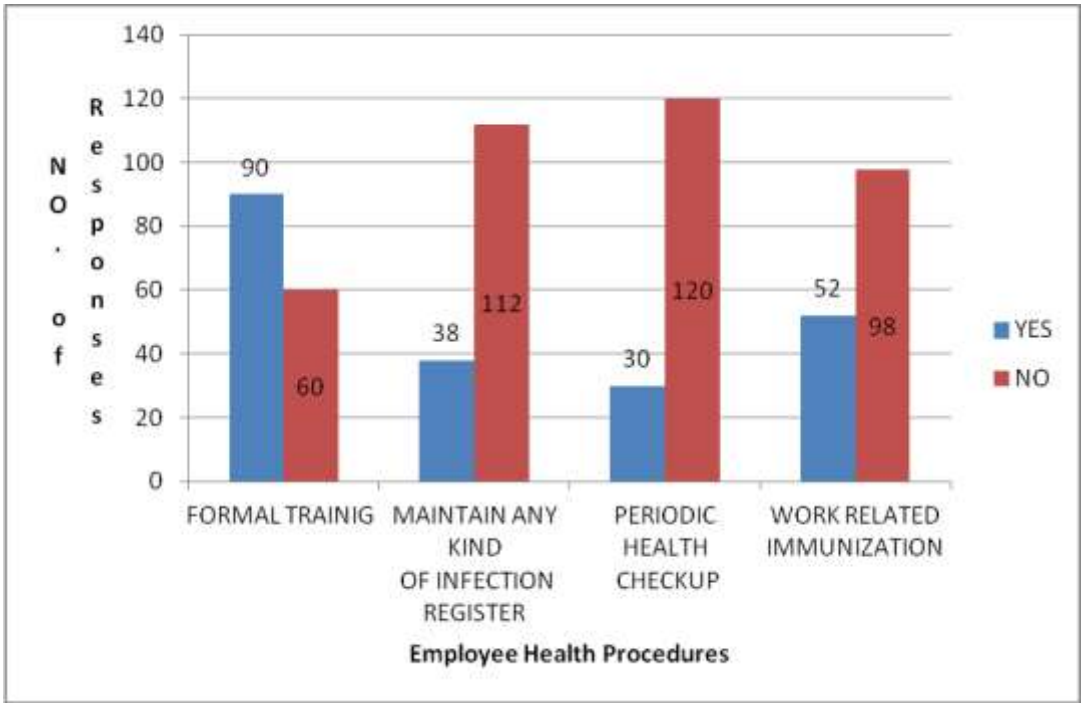
The graph shows that 60 percent of respondents amongst nurses and doctors, 12 percent housekeeping and 70 percent management respondents said that bins with lid are used for waste collection where as 30 percent nurses and doctors, 20 percent housekeeping and 20 percent management responded that bins without lid are used for waste collection in ICU. 10 percent nurses and doctors, 68 percent housekeeping people and 10 percent management believed that most of the waste in ICU is collected in plastic bags. Although both bins with lid and plastic bags are good process to collect the waste but stress should be given to collect waste in bins with lid.

3.2.14 WHETHER INFECTED WASTE IS DISINFECTED BEFORE DISPOSAL (N= 150)



The graph highlights that 90 percent nurses and doctors, 80 percent housekeeping and 25 percent management staff responded that infected waste is not disinfected before disposal while only ten percent nurses and doctors and 20 percent housekeeping said that waste has been disinfected before disposal. Although 75 percent of the management strongly believed that disinfection of the waste is ensured before its final disposal. Proper disposal of the waste is an important step but still proper training and orientation is required.

3.2.15 RESPONSE REGARDING EMPLOYEE HEALTH PROCEDURES AND TRAINING (N=150)



On analysis, only 90 respondents out of N=150 said that they have got formal training on hospital acquired infection control. A total of 38 respondents said that infection rate register is being maintained. Only 30 respondents had undergone periodic health check-up while 120 did not undergo health check- up. Out of 150, only 52 had received immunization relevant to their work.

CHAPTER 4 – DISCUSSION

It has been very well said that "Prevention is always better than cure".

4.1 STRATEGIES FOR PREVENTION OF INFECTION IN HOSPITAL:

There are three main strategies for the prevention of infection in Intensive Care Unit. These are as follows:

- Exclusion of source of infection.
- Breaking the chain of infection.
- Enhancing the host's ability to resist infection.

Exclusion of source of infection and breaking the chain of infection: To exclude the source of infection, health care providers –

- Should avoid direct contact with patients, fomites especially body fluids.
- Should wear barriers such as gloves when contact is necessary
- Should avoid puncturing oneself with any fluid –contaminated instruments.
- Frequent hand washing especially between patients
- Careful handling, cleaning and disinfection of fomites
- Should do possible use of single –use disposable items
- Should do patient isolation for seriously infected patient.

Air flow system play an important role in the dissemination of organisms by airborne route. This can be reduced by isolating patients. Enhancing host ability to resist infection:

Host resistance can be enhanced by boosting immunity and reducing risks factors:

1) Boosting specific immunity-

-Passive immunization provides short term protection

-Appropriate use of prophylactic antibodies prevents infection to an extent. But there is a tendency to misuse antibodies –by using them too often or for long, thereby increasing the selection pressure for the emergence of resistance organism.

2) By choosing inappropriate antimicrobial agents Care of invasive devices is essential to reduce the risk of endogenous infection from skin organisms and from catheters.

4.2 PROBLEMS IDENTIFIED

- Staff Scarcity: Nurse Bed ratio is very low. So, due to scarcity of nurses the ward is not properly maintained and patients do not get individual attention.
- Housekeeping staff was inadequate: So the cleaning is not done properly.
- Improper maintenance of bed.
- Patient: attendant ratio is very high. So there is much noise in the ward thereby creating problems for other patients and the staff.
- Poor laundry and maintenance

4.3 LIMITATIONS OF THE STUDY

- Time is a limiting factor in this study.
- Resistance of staff towards training.
- Resistance towards documentation.

CHAPTER 5 – RECOMMENDATIONS AND CONCLUSION

5.1 RECOMMENDATIONS

- All patient, staff and visitors area of the organization should be included in the infection control program.
- The hospital should provide barrier precautions and isolation procedures that protect patient, visitors, and staff from communicable diseases and protects immuno-suppressed patients from acquiring infections to which they are uniquely prone.
- Gloves, masks, eye protection, other protective equipments, soap and disinfectants are available and used correctly when required.
- Internationally acceptable hand hygiene guidelines are generated by World Health Organization (WHO) for disease control and prevention.
- Proper facilities and adequate resources are provided to support the infection control program. It includes hand washing facilities in all patient care areas and accessible to health care providers

5.2 CONCLUSION

The study revealed that current physical facilities available for infection control are satisfactory but that existing infection control measures practiced in Intensive Care Unit needs improvement and up-gradation. The standard quality care and adequate infection control in Intensive Care Unit can be achieved by:

- The development of an effective surveillance system,
- The development of policies to reduce risk of hospital acquired infection
- The maintenance of a continuing education programme for hospital personnel

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