STUDY ON HOSPITAL ACQUIRED INFECTION IN INTENSIVE CARE UNIT

Dissertation

In

DISTRICT HOSPITAL,MOTIHARI, BIHAR

Government of Bihar (Feb7th– 30th April)

By

JYOTI SHARMA

Under the guidance of

Mrs. Anupama sharma

Post Graduate Diploma in Hospital and Health Management

2011- 2013

CERTIFICATE OF APPROVAL

The following dissertation titled "STUDY ON HOSPITAL ACQUIRED INFECTIONS IN ICU" 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 don't necessarily endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the dissertation only for the purpose it is submitted.

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30 May 2013

Certificate of internship Completion

Letter No- 331 Date: 26.04.13

TO WHOM IT MAY CONCERN

This is to certify that Ms. Jyoti Sharma has successfully completed her internship in our organization from February 7, 2013 to April 26, 2013. During this term she has worked on Infection Control in Intensive Care Unit and New Born Critical Care under the guidance of me and my team at Sadar Hospital, Motihari, Government of Bihar.

We wish her good luck for her future assignments

26/4/13

Dy. Suprintendent
Sadar Hospital, Motihari

Name Dr S.N Singh

Designation Deputy Superintendant
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Certificate from Dissertation Advisory Committee

This is to certify that **Ms.Jyoti Sharma**, 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 " **STUDY ON HOSPITAL ACQUIRED INFECTION IN INTENSIVE CARE UNIT** " in partial fulfilment 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: Jyoti Sharma

Dissertation Organisation: Sadar Hospital, Motiharci, Bihar

Area of Dissertation: Infection Control in Intensive Care unit and New born Critical Care

Attendance: 100%.

Objectives achieved: objectives has been achieved.

Deliverables: deliverables has been delivered.

Strengths: She is very hardworking, sincere.

Suggestions for Improvement: —

26/4/13

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

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Date: 30/4/2013

Place: Sadar Hospital, Motiharci

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I would end this note of thanks by acknowledge the support of all those who took the time out from their busy schedule and contributed invaluable toward the completion of this report. With the help of these fine people and inestimable support and faith of our parents we were able to bring about these results.

Jyoti sharma

CONTENT

CHAPTER TITLE

Introduction

I did my internship from Sadar hospital,motihari,government of Gujarat for the period of three months from February 7 to April 26, 2013.

The objective of internship is to give practical experience to the internee in handling managerial issues, which are likely to come up in day to day administration. The internship equips the internee with necessary skills in managing multiple tasks as they are expected to be engaged in as many departments of the hospital as possible. It also gives an insight about the work culture of the health set up.

Three month of extensive internship provides us with the chance to meet different set of people within and outside the organization. This gives an inside view about the hospital services as a whole. We come to know the practicalities of the healthcare set up that moulds us for the future undertakings.

Summary of job:

To administrate District hospital in coordination with deputy superintendant and improve District Hospital Management and utilization of District Hospital services. Manage non clinical staff, oversee the logistics and upkeep of District Hospital equipments and financial functions of the District Hospital and facilitate Rogi Kalyan Samiti meetings and actions.

Duties and responsibilities:

1. Scheduling, organizing, coordinating and maintaining various departmental activities.
2. Assigning specific duties to each non clinical staff, training them and reassigning their duties from time to time.
3. Supervising punctuality, day to day working, supervision of other staff members, work output to improve overall efficiency and keep unit’s morale up.

4. Planning and work out modalities towards upliftment , preventive maintenance of equipments and vehicles and modernization of the hospital.

5. Maintenance of quality control, quality assurance and TQM of the District Hospital.

6. Analyze utilization of various hospital services, financial outlays and its effective utilization.

7. Identify areas for outsourcing/partnerships and propose innovative ways for improving operating efficiency of the District Hospital.

8. Prepare yearly plan for expenditure after assessment.

9. Carrying out exit interviews, satisfaction surveys (external and internal customer), time motion studies etc. to keep hospital services up to quality standards.

10. Manage human resource including contractual staff in the hospital and analyze further requirement for the same.

11. To manage support services, logistics and supply.

12. Computerization of District Hospital functions.

13. Strenghten District Hospital MIS and report actions taken.

14. Prepare monthly, quarterly and yearly report of hospital.

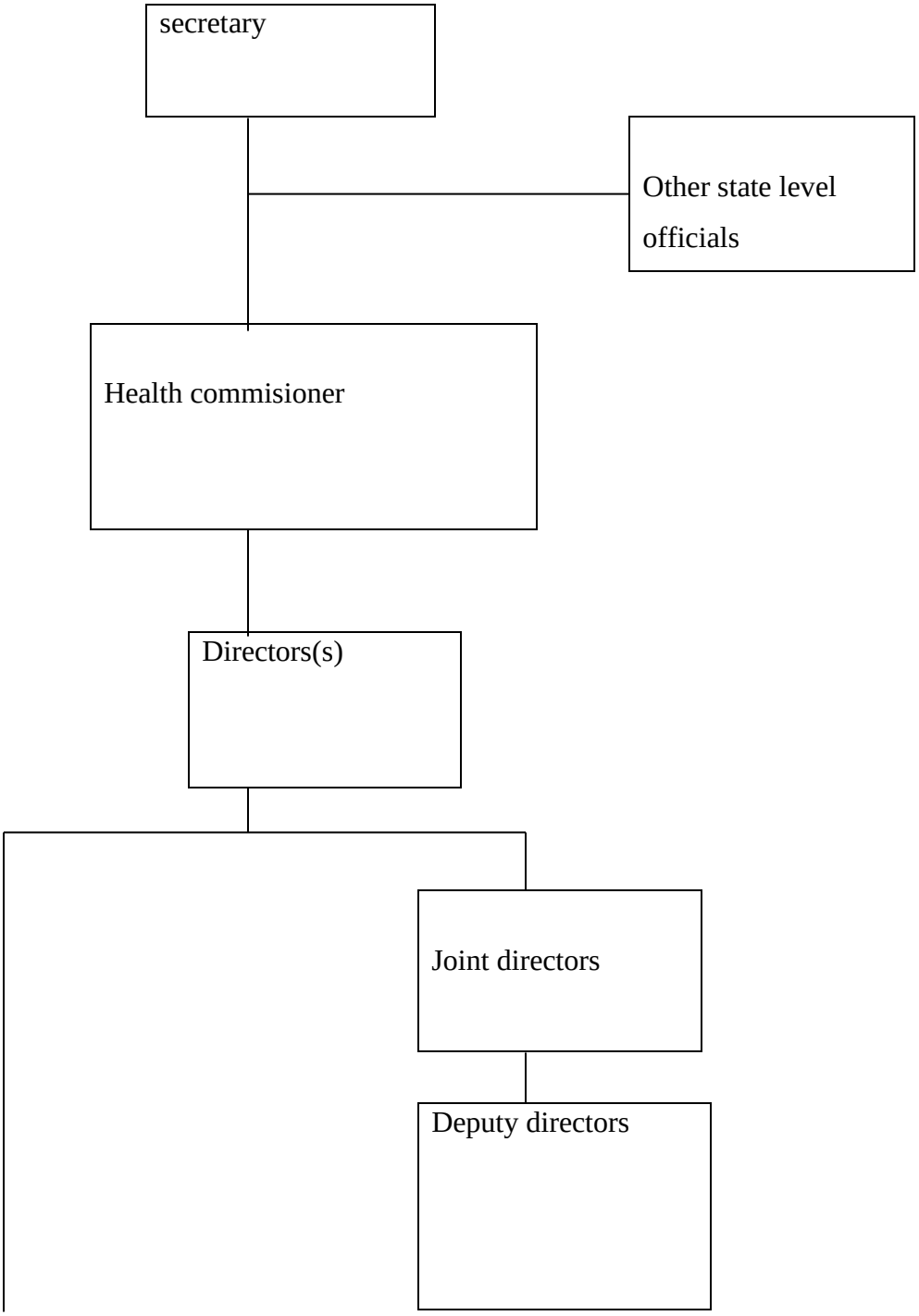
ORGANISATION PROFILE

Department of health welfare is responsible for the healthcare services delivery in the state of biahrtill the village level and is headed by principal secretary. This department through its state health society is also the nodal department for implementing National Rural Health Mission Programmnes of government of india where oit receives funds for disbursement. The state health society ,bihar is headed by an Executive Director. The state funds are also utilised by this department .for healthcare delivery.

The department is currently headed by principal secretary (health) who is the overall Administrative Head. Then there is secretary Health and the Mission Director for NRHM. There are two additional secretaries in the department. Then there are three joint secretaries,three deputy decretaries and three under secretaries in the department. At the directorate level, there is onedirector of health services(DHS) and three additional directors. There is a separate medical education department headed by an additional director.

The district level health chief is the civil surgeon who reports to the regional deputy director. There are nine divisions in bohar . at the district level there is a sadar hospital which is a 50- 150 bedded health facility. The next level is the sub divisional level health facility which is typical upto 75 beds. Below the SDH, there are referral units(also called the community health centres) which are typically 30 bedded facilities and headed by block medical officers. The next in chain are the primary health centres which are 6 bedded units with typically 4 doctors. Then there are additional PHCs which are also 6 bedded units with typically 4 doctors. At the lowest level of health service delivery is the sub – health centres which are typically preventive health service providers.

Department of health and family welfare(state level) & directorate



Divisional joint directors

Specific Managerial Tasks Undertaken

1. Organizing trainings for hospital staff

I prepared training schedule and organized various trainings for the hospital staff. Training was given through powerpoint presentations and demonstrations and records were maintained. Trainings were conducted on the following topics:

Hospital Profile including Scope of services, Mission and Vision

Hospital Committees

Biomedical Waste management

Spillage management

Cardiopulmonary Resuscitation

2. Formulating Hospital Committees and conducting Committee meetings

Eight hospital committees were formulated and committee meetings were organized. In the meetings, problems related to the working of hospital and requirements of NABH were discussed. Minutes of meeting and attendance records were maintained. The following committees were formulated:

1. Quality Assurance committee
2. Hospital Infection control committee
3. Grievance Redressal committee
4. Hospital Safety committee
5. Hospital Ethics committee
6. Drugs Formulary committee
7. Emergency Preparedness committee
8. Medical Audit committee

3. Collection of data and sending reports to State Program Management Unit (SPMU), Gandhinagar.

Data had to be collected and required reports had to be sent regularly.

4. Monitoring HMIS and managing data entry operators

Regular monitoring of the working of HMIS was to be done. It was to be checked if proper entries were being done. Regular meeting with the system manager was to be held. By monitoring and taking

required steps I was able to bring about an increase in the percentage usage of modules under HMIS. Duty list of data entry operators was to be made every month. Their work schedule, timings leave etc. was to be managed and regular monitoring was to be done.

5. Patient and Employee satisfaction surveys

Patient and Employee satisfaction surveys were conducted and collected data was analyzed.

6. Manpower budget

The manpower budget was prepared which included the number of manpower required and their salaries.

EXECUTIVE SUMMARY

Background and objectives:

Hospital acquired infection creates a major problem to the patient admitted to the hospital as well as to health care personnel, affecting the reputation of hospital and making unnecessary cost to patient during the course of treatment. The main objectives of the study is 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 .

Methods:

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.

Results:

Result show that current physical facilities available for infection control are satisfactory but the existing infection control measures practiced in ICU are poor.

Conclusion:

Strict adherence to standard infection control procedures need to be taken under consideration and existing infection control measures in ICU needs improvement and up-gradation.

Key words:

Infection, hospital-acquired infection, infection control, health care providers.

CHAPTER 1

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 immunocompromised, 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. The ICU of District hospital with a bed capacity of 5 has recurrent HAI among the patients admitted in various specialties.

My role on this assignment was to conduct a detailed study on the control measures for HAI in ICU and thus identify the flaws which exist at District hospital.

CHAPTER 2
OBJECTIVES

"A study on control measures in Intensive Care Unit for hospital acquired infection".
The objectives of the study are

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

CHAPTER 3
REVIEW OF LITERATURE

Hospital Acquired Infection

According to Baveja2 the term hospital acquired infection, hospital– associated infection,hospital infection or nosocomial infection(nosocomion,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 displaytwo 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 immunocompromised and others can survive only in human tissues and thus rely upon person-to-person spread in order to disseminate.

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

3.2 CLASSIFICATION OF HOSPITAL ACQUIRED INFECTIONS:

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)

3.3 SOURCES OF HOSPITAL ACQUIRED 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.

3.4 PREDISPOSING FACTORS FOR HOSPITAL ACQUIRED 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

3.5 MODE OF TRANSMISSION:

In the words of Nagoba , hospital acquired infection spreads by various routes asfollows: 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 .

3.7 COMMON HOSPITAL –ACQUIRED 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

3.8 STUDIES AND INCIDENCE CONDUCTED ON HOSPITAL ACQUIRED INFECTION

In the words of Inweregbu and others , intensive care units have the highest prevalence ofhospital-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 per1,000 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 was 45.3 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.

3.9 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

3.10 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.

3.12 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 this programmes

3.12 MANAGEMENT OF HOSPITAL ACQUIRED 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 thebasic 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 aftercontact 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 . The need and importance of hand washing under the following conditions have been supported by controlled studies and adopted by CDC:

- Before all invasive procedures

- Before caring of susceptible patients

- Before and after touching wounds and invasive devices

- After caring for infected patients

- Between contact with patients in high risk areas.

STRATEGIES FOR PREVENTION OF HOSPITAL ACQUIRED INFECTION:

According to Mims28, the three main strategies for the prevention of hospital acquired infection are exclusion of source of infection, breaking the chain of infection and 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 especiallybody fluids.

_ Should wear barriers such as gloves when contact is necessary

_ Should avoid puncturing oneself with any fluid –contaminatedinstruments.

_ Frequent handwashing 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 agentsCare of invasive devices is essential to reduce the risk of endogenous infection from skin organisms and from catheters.

3.14 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.

3.15 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 anddeveloping 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 healthpersonnel 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 4

RESEARCH 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.

Source of data

The study is carried out in the intensive care unit, particularly the Intensive care unit and new born care corner of the district Hospital, Motihari, East champaran. The required data is collected from nurses, doctors, staff of central sterile supply department who is responsible for supplying sterile items to intensive care unit, house keeping staff who work in 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 23 respondents, consisting of nurses, doctors, staff of central sterile supply department (supplying sterile items to medical intensive care unit), house keeping staff who work intensive care unit through questionnaires, personal observation and studying relevant record for infection control maintained in intensive care unit.

Separate questionnaire are given according to category as:

Questionnaire 1 is meant for only nurses and doctors,

There were 15 nurses and 2 doctors (N=17).

Questionnaire 2 is meant for CSSD staff.

There are 4 CSSD staff working for ICU (N=4).

Questionnaire 3 is meant for house keeping staffs who works in ICU.

They are 2 in number (N=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, micro-organisms.

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.

CHAPTER 5

RESULTS

Table.1 Shows physical facilities for infection control available in ICU

SL.NO	FACILITY REQUIRED ACCORDING TO IPHS STANDARDS	PRESENT	ABSENT
1	Doctors change room	Present	
2	Nurses change room	present	
3	Technician change room	present	
4	Sterile storage area	present	
5	Instrument and linen room	present	
6	Trolley bay Present	present	
7	Gas cylinder storage	present	
8	Class 1V staff change room	present	
9	Dirt utitlity	present	
10	Waste store room	present	
11	Isolation room	present	

The table shows that all the physical facilities available for infection control are satisfactory and met the IPHS standard.

Table 2 Documentation done in ICU

SL.NO	PROCEDURE	OBSERVATION
1	There is standard operating manual for ICU	No
2	Culture studies of swabs from ICU floor / equipment are done	Yes
3	Bacteriological testing of water is done	Yes
4	Bacteriological testing of air is done	No
5	Antibiotic policy	No

6	Any protocol for wearing gloves	No

The following observations were made:

No standard operating manual is maintained in ICU.

Culture studies of swabs from ICU floor / equipment are done.

Bacteriological testing of water is done but bacteriological testing of air is not done.

No antibiotic policy is available

No protocol is followed for wearing gloves

FOR NURSES AND DOCTOR

Table 3 The frequency of wet cleaning in ICU n* =17

WET CLEANING	**DAILY**		**WEEKLY**		**MONTHLY**	
	Frequency	percentage	frequency	percentage	frequency	percentage
surface	17	100	-	-	-	-
walls	-	-	4	24	13	76
ICU tables	17	100	-	-	-	-
trolleys	17	100	-	-	-	-

In the study, it was found that hundred percent responded said that surface of ICU, table and trolleys are been wet cleaned daily. Further analysis revealed that, seventy six percent responded that walls are wet cleaned monthly.

Table 4. The frequency of monitoring sterilizing Efficiency of autoclave n=17

FREQUENCY OF MONITORING	STERILIZATION EFFICIENCY	
	frequency	percentage
Daily	5	29
Weekly	9	53
Monthly	3	18
Total	17	100

The above table prevailed that little higher than 1/4th (29 percent) of the respondent reported that the monitoring of sterilizing efficiency of the autoclave was done daily whereas little more than ½ of the respondent reported that sterilizing efficiency of the autoclave was monitored weekly and rest 1/5th responded said that it is done monthly.major discrimination is seen in frequency of monitoring.

Table 5. The frequency of fumigation of ICU and Cleaning the air-conditioner n=17

FREQUENCY OF CLEANING	FUMIGATION		CLEANING OF AIR FILTERS	
	frequency	Percentage	frequency	Percentage
Daily	-	-	-	-
Weekly	1	6	4	24
Monthly	5	29	13	76
Once in two months	9	65	-	-
total	17	100	17	100

The following observations were made:

65% responded that fumigation is done once in two months76% responded that air filters are cleaned monthly.

Table 6. Response of staff regarding hand washing Facility n=17

WHETHER ADEQUATE HAND WASHING FACILITY IS AVAILABLE	FREQUENCY	PERCENTAGE
Yes	16	96
no	1	6
total	17	100

Analysing the above data, prevailed that majority of respondent reported that there were adequate handwashing facilities are available in the hospital whereas only 6 percent reported that they are not adequate.

Table 7.Whether any protocol is followed regarding Hand washing in ICU n=17

WHETHER ANY PROTOCOL IS FOLLOWED FOR HANDWASHING	FREQUENCY	PERCENTAGE
Yes	5	29
No	12	71
total	17	100

According to the data analysis seventy one percent, followed no protocol regarding hand washing.

Table 8 The level of safety measures followed in ICU N=17

LEVEL OF MEASURES	FREQUENCY	PERCENTAGE
Good	6	35
Satisfactory	10	59
Poor	1	6
Total	17	100

On analyzing the above table, on safety measures followed in ICU. Around 2/3th (59

percent) of the respondent said that safety measures taken was only up to the satisfactory level, whereas litle higher than 1/3 (35 percent) found reported to be satisfied on the safety measures followed in ICU.

Table 9: Response of staff regarding the use of double Gloving for seriously infected patient n = 17

USE OF DOUBLE GLOVING	FREQUENCY	PERCENTAGE
Always	7	41
Sometimes	9	54
For infected patients	1	5
Never	_	-
Total	17	100

The 54 percent of the respondent reported that they use double gloving sometimes which is not very satisfactory.

Table 10. The response regarding precautions taken after needle stick injury n=17

PRECAUTIONS TAKEN AFTER NEEDLE STICK INJURY	FREQUENCY	PERCENTAGE
No precautions taken	1	6
No particular protocol followed	-	-
A protocol is followed	-	-
In case of infected patients	10	59
For all the patients	6	35
Total	17	100

The above table reflects that 59 percent respondent take precaution after needle stick injury incase of infected patient only whereas 35 percent of respondent were found to take precautions for all the patients Though it was satisfactory to note from the above table that, respondent are

aware of the needle stick injury but measures should be taken that it should be applied for all the patient with some protocol.

Table 11: response whether staffs decontaminate hand first before removing apron when leaving working area n= 17

DECONTAMINATE HAND FIRST BEFORE REMOVING APRON WHEN LEAVING WORKING AREA	FREQUENCY	PERCENTAGE
Yes	12	71
No	5	29
Total	17	100

On analysing the above table it is found that 71 percent of the staff decontaminate hand first before removing apron when leaving working area whereas 29 percent reported that they do not follow this practise so the proper training of the staff is required.

Table 12 showing the frequency of waste collection in ICU n = 17

FREQUENCY OF WASTE COLLECTION	FREQUENCY	PERCENTAGE
once daily	12	71
Twice daily	5	29
total	17	100

The 71 percent of the respondent responded that frequency of waste collection is once daily.

Table 13. Whether categorization of waste is done while being collected n= 17

CATEGORISATION	FREQUENCY	PERCENTAGE
Yes	17	100
No	-	-
Total	17	100

Analyzing above data , shows that majority of the respondent reported that there were appropriate categorization of waste is done while being collected.

Table 14. Materials used while handling waste n = 1

MATERIAL USED	FREQUENCY	PERCENTAGE
Gloves,masks,apron	11	65
Gloves,apron	6	35
Gloves, masks	-	-
Total	17	100

According to above data available sixty five percentage of respondent use, gloves, mask,apron while handling waste while thirty five percent responded that gloves and aprons are used while handling waste. Results obtained shows that more strict practice of handling waste should be implemented

Table 15. Response regarding container used for waste collection n=17

CONTAINER USED	FREQUENCY	PERCENTAGE
Bin with lid	5	29
Bin without lid	-	-
Plastic bags	12	71
Any other	-	-
total	17	100

The table shows that 71 percent of respondent use plastic bags for waste collection whereas twenty nine percent responded that bins with lids are used for waste collection but stress should be given for waste collection in bins with lids.

Table 16. Response regarding the place of waste storage in ICU n = 17

PLACE OF STORAGE	**FREQUENCY**	**PERCENTAGE**
Dirty utility room	4	24
In a corner of MICU	13	76
Other area	-	-
Unaware	-	-
total	17	100

The 76 percent of the respondent reported that they are using corner of the ICU for waste collection whereas only 24 percent are using dirty utiliy room for waste storage.it depicts that more awareness is required among the staff

Table 17. Response regarding employee health procedures and training N =17

EMPLOYEE HEALTH PROCEDURE	**YES**		**NO**		**TOTAL**	
	frequency	percentage	frequency	percentage	frequency	Percentage
Formal training of Hospital Acquired Infection	5	29	12	71	17	100
Control Maintain any kind of infection rate	4	24	13	76	17	100

register						
Undergo periodic health check-up	3	18	14	82	17	100
Undergone immunization relevant to work	9	53	8	47	17	100

The following oberservations were made:

71% did not get formal training of hospital acquired infection control.

76% responded that infection rate register is not maintained

82% did not undergo periodic health checkup

53% answered that immunization is given relevant to their work.

FOR CSSD STAFF

Table 18. Response of wet cleaning N = 4

WETCLEANING	**DAILY**		**WEEKLY**		**MONTHLY**	
	frequency	percentage	frequency	percentage	frequency	Percentage
Surfaces	4	100	-	-	-	-
Walls	-	-	1	25	3	75
CSSD table	4	100	-	-	-	-

On analyzing the above table, it was found that 100 percent respondent reported that wetcleaning on surfaces and CSSD tables was done daily, where as 25 percent reported that wetcleaning of walls weekly . Similarly 75 percent respondent reported that wetcleaning of walls monthly. It need further deep study that who is the respondents who are reporting affirmative and who are reporting positive.

Table 19. Whether adequate hand washing facility is available in CSSD N = 4

WHETHER ADEQUATE HANDWASHING FACILITY AVAILABLE	**FREQUENCY**	**PERCENTAGE**
Yes	4	100
No	-	-
Total	4	100

Analyzing the above data, prevailed that majority of the respondent reported that there were

adequate hand washing facilities available in the hospital.

Table 20. Whether gloves and apron is used by staff in working area N = 4

WHETHER GLOVES AND APRON IS USED BY STAFF IN WORKING AREA	FREQUENCY	PERCENTAGE
Yes	4	100
No	-	-
Total	4	100

The table depicts that hundred percent wear gloves, masks and apron in the working area.

Table 21: whether sterilizing efficiency of autoclave is monitored N = 4

STERILIZING EFFICIENCY OF AUTOCLAVE	FREQUENCY	PERCENTAGE
Yes	4	100
No	-	-
Total	4	100

This table depicts that sterilizing efficiency of autoclave is monitored routinely.

Table 22 .response of staff who has been infected from any disease excluded from their work or not N=4

WHETHER STAFF INFECTED FROM ANY DISEASE EXCLUDED	FREQUENCY	PERCENTAGE
Yes	-	-
No	4	100
Total	-	-

The table highlights that hundred percent are not excluded from their work in case when found to have infected from any disease.but on analysis it was found that it is practiced strictly because staff voluntarily take off from there work .

FOR HOUSE KEEPING STAFF

Table 23 .The frequency of fumigation of ICU and cleaning the air- conditioner N =2

FREQUENCY OF CLEANING	FUMIGATION		CLEANING AIR FILTERS	
	frequency	percentage	frequency	Percentage
Weekly	-	-	2	100
Monthly	-	-	-	-
Once in two months	2	100	-	-
Depends on case	-	-	-	-
Total	2	100	2	100

The above table shows that frequency of fumigation is done once in two months and cleaning air filters is done weekly.

Table 24. The frequency of waste collection in ICU

FREQUENCY OF WASTE	FREQUENCY	PERCENTAGE

COLLECTION		
Yes	2	100
No	-	-
Total	2	100

The above table shows that waste is collected daily.

Table 25: Categorization of waste while collected from ICU N=2

CATEGORIZATION OF WASTE WHILE BEING COLLECTED	FREQUENCY	PERCENTAGE
Yes	2	2
No	-	-
Total	2	100

The categorization of waste is done by the house keeping staff while collection of waste.

Table 26: Whether gloves, masks and apron is used while collecting waste N = 2

PROTECTIVE MATERIAL	FREQUENCY	PERCENTAGE
Gloves	-	-
Masks	-	-
Gloves and masks	2	2
Gloves,masks and apron	-	-
Total	2	100

Majority of the house keeping staff wear gloves and masks while handling waste.

Table 27. Showing place of waste storage N = 2

PLACE OF WASTE	FREQUENCY	PERCENTAGE

STORAGE		
Dirty utility room	-	-
In the corner of department	2	100
Any other place	-	-
Total	2	100

The above table depicts that waste is collected in the corner of the ICU which is the wrong practice no one is using dirty utility room for waste storage.

Table 28. Whether infected waste is disinfected before disposal N = 2

DISINFECTION	FREQUENCY	PERCENTAGE
Yes	-	-
No	2	100
Total	2	100

The practice of disinfection is not being followed in the hospital so the proper training along with the strict supervision is required.

CHAPTER 6

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 the district Hospital has been in practice for over a long period of time. The study was focused to find out the physical facilities and control measures available for infection control (IC).

Physical facilities for infection control:

Having studied the physical facilities in ICU of the Hospital, it is found that existing facilities available for infection control in ICU are doctor's change room, nurses change room, technician change room, sterile storage area, instrument and linen room, trolley bay , gas cylinder, class IV staff change room, dirty utility room, waste store room, isolation room.

When compared to IPHS standard, the facilities available for infection control in ICU of the Hospital are satisfactory. For patients, one in toilet room plus having a sink in patients room, will support infection control practices. Small cup sinks that challenge proper hand washing should be avoided. Improper placement of sink can add environmental reservoir of contaminants. Sinks need to be convenient and accessible but nearby surfaces.

Documentation:

There was no standard operating manual in ICU.

Culture studies of swabs from ICU floor / equipment is done.

No antibiotic policy is available or followed in ICU.

No protocol is followed for the wearing of gloves.

Bacteriological testing of water is done but bacteriological testing of air is not done

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.

Cleaning, disinfection and sterilization

The study revealed that surfaces in ICU are wet cleaned daily, walls are wet cleaned monthly.

ICU tables and trolleys are wet cleaned daily.

Fumigation is done once in two months.

Cleaning of air filters of air conditioners are done monthly.

Sterilizing efficiency of autoclave is monitored weekly.

Marker to know that the items supplied to ICU have been subjected to complete sterilization is done

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.

Preparation of ICU staff

It is found from the study that according to majority of respondents, there is adequate handwashing facility which is easily accessible to health care providers but no appropriate technique is followed regarding handwashing. Appropriate handwashing technique must be considered for control of hospital infection**. International Federation of Infection Control recommended** hand washing techniques must be followed which is as follows:

- Palm to palm
- Right arm over left dorsum
- Left palm over right dorsum
- Finger interlace palm to palm
- Back of fingers to opposing palm
- Rotational rubbing of thumb
- Rotational rubbing of palms

Safety measures and precaution

The study revealed that according to fifty nine percent respondents (nurses and doctors, N=17), the level of safety measures is satisfactory; seventy one percent always do double gloving for seriously infected patient,

Fifty nine percent (nurses/doctors, N=17), hundred percent(house keeping staff, N=2), take precautions after needle-stick injury only in case of infected patient.Ninety four percent of respondents (nurses/doctors, N=17) wear apron in the working area but not from home.

Seventy one percent of respondents (nurses/doctors, N=17) 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 plastic bags and it is stored in the corner of ICU of separate room Majority of staff (nurses/doctors, housekeeping) responded that the infected waste is not disinfected before disposal.

But **Ministry of Health and Family Welfare** recommended that infected waste should disinfect or decontaminate by the chemical disinfectant right of pathogenic microorganisms. After such treatment, residue can be handled safely, transported, stored or disinfected by recommended methods of destruction or disinfecting of the biologically infected waste such as autoclaving and microwaving. Incineration is the better option for large scale infectious waste management.

Employee health and training

The study revealed that seventy one percent did not get formal training of hospital acquired infection control, eighty two percent did not undergo periodic health check-up and eighteen percent did not undergo health check-up. while seventy six percent responded that infection rate register is not maintained. Although fifty three percent answered that immunization is given relevant to their work. Ninety four percent (nurses/doctors=17) responded that they are excluded from work when they are infected from of any disease. CSSD staff (N=4) and house keeping (N=2) were not excluded from their work in case when found to have infected from any disease.

But 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... 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.

Bennett and Philip also mentioned that 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. Records of the immunization status of employees should be maintained.

CHAPTER 7

SUMMARY

The major findings of the study are as follows:

The physical facilities available for infection control in ICU are satisfactory but the infection control measures practiced in ICU is poor and needs improvements and up-gradation

- No Standard operating manual is maintained in ICU
- Culture studies of swab from ICU floor / equipment are done
- Bacteriological testing of water is done
-Bacteriological testing of air is not done
- No antibiotic policy is available or followed
- No protocol is followed regarding wearing gloves.
-The surfaces are wet cleaned daily; walls are cleaned monthly; tables and trolleys are wet cleaned daily.
- Fumigation was practiced once in two months.
- In the study, seventy six percent (nurses/doctors) responded that air filters of air conditioners are cleaned monthly
- Fifty three percent (nurses/doctors) responded that sterilizing of autoclave is monitored weekly.
- Studies showed that there is adequate hand washing facility which is easily accessible to all health care providers but no protocol is followed regarding handwashing as responded according seventy four percent (nurses/doctors, N=17).
- Majority of staff answered that level of safety measures practiced in ICU is satisfactory, staff wear apron in the working area and it is worn from working area.
- Hand disinfection is carried out by staff members but need some up gradation since no protocol is followed regarding handwashing.
- Hand disinfection of hand by staff is done first and then removes their apron while leaving the working area

- Majority of staff responded that waste is collected once a day from the department
-There is categorization of waste while being collected
- No infected waste is disinfected right at the source according to majority of staff opinion.
- Waste is stored in the corner of ICU before disposal
- Plastic bags are used for waste collection
- Staffs use gloves and masks while handling waste
- Waste is incinerated and taken to municipal collection point
- In the study, seventy six percent (nurses/doctors) responded that accident reporting record is not maintained.

CHAPTER 8

CONCLUSION

Study revealed that current physical facilities available for Infection control are **satisfactory** but that existing infection control measures practiced in ICU are **poor** and needs improvement and up-gradation.

RECOMMENDATIONS

- The training for all the staff should be done periodically to keep them updated about infection control procedures they should follow.
- The strict supervision should be done for the handling of waste and periodic training should be provided for the same .
- Proper disinfection of the waste should be done before disposal which is not in practiced in the hospital.
- Immunization of the personnel is an important component of hospital control programs. Records of the immunization status of employees should be maintained.
- Staff should be protected by appropriate immunization, e.g. Hepatitis B vaccine and tetanus.
- Staff suffering from infection, e.g. viral respiratory infections, septic lesions, should be excluded from contact with patients.

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ANNEXURES

QESTIONNAIRE FOR DOCTORS AND NURSES

CLEANING PROCEDURES

1) How often is wet cleaning of ICU done?

a) Surface – daily/ weekly/ routinely/ if other specify

b) Walls- daily/ weekly/ routinely/ if other specify

c) ICU table – daily/ weekly/ routinely/ if other specify

d) Trolleys- daily/ weekly/ routinely

2) If yes, what antiseptic/ antiseptics are used for it?

a) Soap and water

b) Phenol

c) Dettol

d) Spirit

e) a) & b)

3) How often the fumigation is done in ICU?

a) Weekly

b) Monthly

c) Daily

d) If other , specify – once in two months

e) Never

4) Do you clean the filters of Air Conditioners?

Yes / No

5) If yes, how frequently?

a) Weekly

b) Monthly

c) Daily

d) If others specify

STERILIZATION PROCEDURES

1) Do you have adequate space available for sterilization activities?

a) Yes

b) No

2) Do you monitor the sterilizing efficiency of autoclave?

a) Yes

b) No

3) If yes, how frequently?

a) Weekly

b) Monthly

c) Daily

d) If other specify

4) Do you use any marker to indicate the packs that you received in MICU that have been sterilized?

a) Yes

b) No

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

a) Yes

b) No

PREPARATION OF ICU STAFF

1) Do you have adequate hand washing facilities?

Yes / No

2) Do you follow any protocol regarding hand washing?

Yes / No

3) Do you think hand washing facilities in all patient care areas are accessible to health care providers?

Yes/ No

4) Do you cover the hair fully when entering ICU?

a) Always

b) Sometimes

c) Never

5) Do you wear shoe covers when entering ICU?

a) Always

b) Sometimes

c) Never

6) Do you use disposable gloves and masks ?

Yes / No

7) In case of any accidents like needle- stick injury, spills, etc do you report to -

a) In- Charge of the department or HOD

b) No reporting is done

8) Do you decontaminate the equipment?

a) Yes

b) No

9) Do you wear the apron from the following given areas like from

a)home

b) After entering the department

10) Do you decontaminate your hand first and then remove your apron before leaving working area?

a) Yes

b) No

WASTE MANAGEMENT SYSTEM

1) What is the frequency of waste collection in ICU?

a) Once a day

b) Twice a day

2) Are the staffs given any training regarding waste disposal?

b) No

3) Is there any categorization of waste while being collected?

a) Yes

b) No

4) Does the staff use any of the following while handling waste ?

a) Gloves

b) Aprons

c) Masks

d) All the above

e) None

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

a) Bins with lid

b) Bins without lid

c) Plastic bag

d) If other , specify

7) Where the waste is stored in ICU?

a) Dirty utility room

b) In the corner of department

c) If other , specify

EMPLOYEE HEALTH AND TRAINING

1) Have you been received formal training regarding hospital acquired infection control?

Yes/ No

2) If no, where / how did you learn these procedures?

(a) Nursing or technical curriculum

(b) Verbal instruction of supervisor

(c) Written guidelines

(d) Others if any , specify

3) Do you maintain any kind of infection rate register?

Yes / No

4) Do you undergo periodic health check up?

Yes / No

5) Have you undergone immunization relevant to your work ?

Yes / No

6) Has the staff been infected from any disease excluded from their work?

Yes / No

QUESTIONNAIRE FOR CSSD STAFF

1) How frequently wet cleaning of surface, walls and tables done?

a) Surface - daily/ weekly/ monthly/ if other specify

b) Walls - daily / weekly/ monthly/ if other specify

c) Tables – daily/ weekly/ monthly

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

a) Yes

b) No

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

a) Yes

b) No

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

a) Always

b) Sometimes

c) Never

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

a) Yes

b) No

6) Have you been formally trained in hospital infection control?

a) Yes

b) No

7) If no, where and how did you learn these procedures ?

a) Nursing or technical curriculum

b) Verbal instruction of supervisor

c) Written guidelines

d) If any others, specify

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

a) Yes

b) No

9) Do you have an established recall procedure when breakdown in thesterilization system is identified?

a. Yes

b. No

QUESTIONNAIRE FOR HOUSE KEEPING STAFF WORKING

FOR ICU ONLY

1**) How often is the wet cleaning of ICU done ?**

a) Surface – daily / weekly/ monthly / if other specify

b) Walls - daily / weekly/ monthly/ if other specify

c) ICU table – daily/ weekly / monthly / if other specify

d) Trolleys - daily/ weekly/ monthly

2) If yes, what antiseptic / antiseptics are used for it?

a) Soap and water

b) Phenol

c) Dettol

d) Spirit

e) a) & b)

f) If other , specify

3) How often do you fumigate ICU?

a) Daily

b) Weekly

c) Monthly

d) If other , specify

4) Do you clean the filters of Air Conditioners?

a) Yes

b) No

5) If Yes, how frequently?

a) Daily

b) Weekly

c) Monthly

d) If other specify

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 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) No precautions taken

b) No particular protocol followed

c) A protocol is followed

d) In case of infected patient

e) For all the patients

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

c) Other staff

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) Gloves and masks

e) Gloves, masks and apron

f) 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

e) 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) If no, how did you learn these procedures?

a) Nursing or technical curriculum

b) Verbal instruction of supervisor

c) Written guidelines

d) If any others, specify

24) Do you undergo periodic health check- up?

a) Yes

b) No

25) Have you undergone immunization relevant to your work?

a) Yes

b) No

26) Has the staff been infected from any disease excluded from their work?

a) Yes

b) No

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