Summer Training at
Fortis Memorial Research Institute, Gurgaon
(April 3 to June 2, 2017)

Analysis on the Compliance of the Surgical Team to Hospital Wide Policy to Prevent Surgical Site Infections in FMRI Gurgaon

By
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MBA Hospital & Health Management
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INSTITUTE OF HEALTH MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

CERTIFICATE

This is to certify that Dr Puja Kumari has undergone summer training in Fortis Memorial Research Institute,Gurugram from 3rd April to 2nd June 2017.

The candidate herself completed the project assign to her during summer training. Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish her success in all her future endeavors.

Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affair)

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2nd June , 2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr.Puja Kumari** has undergone a voluntary internship in **"Quality Department"** from **3rd April to 2nd June 2017** at **Fortis Memorial Research Institute, Gurgaon.**

During this period she exhibited a high level of professionalism and a tremendous zest for learning.

We wish **Dr.Puja Kumari** all the best in her future endeavours.

With Best Wishes,

Shivani Dhir

Head- Training and Development

DR SAVITA

Head of the Department

QUALITY

ACKNOWLEDGEMENT

"It is not possible to prepare a project report without the assistance & encouragement of other people. This one is certainly no exception."

At the very onset I would like to extend my gratitude to the esteemed FORTIS MEMORIAL INSTITUTE MANAGEMENT, and all management who helped me during two months of internship.

My deep and warm thanks and regards to DR.**SAVITAA (HEAD QUALITY)** for continuously guiding me in all my work and guiding me through thick and thin at FMRI.

I would like to extend my thanks to DR.LEEKSHMI GEERISH guiding me through the project.

My special word of thanks to my mentor **DR NIRMAL GURBANI** for continuous motivation and guidance not only during summer but also since starting of my course

Regards to **IIHMR UNIVERSITY, JAIPUR** for providing me a platform for such an exposure and knowledge.

I also acknowledge my gratitude, my love , my thanks to my father to my mother and family who stood by me every time emotionally and economically.

Last but not least not to forget the friends without whom this project would nit have been a successful venture.

Thanking You

DR PUJA KUMARI

TABLE OF CONTENT: -

ACRONYMS / ABBREVIATIONS: -

- FMRI – Fortis Memorial Research Institute
- ED – Emergency Department
- CSSD – Central Sterile Services Department
- CT – Computerized Topography
- ECG – Electrocardiogram
- FMS – Facility Management and safety
- HR – Human Resource
- ICU – Intensive Care Unit
- IPD – In-patient Department
- IT – Information Technology
- MICU –Medical Intensive Care Unit
- OPD - Out-patient Department
- OT – Operation Theatre
- DICOM –Digital Imaging and communication in medicines
- RFID – Radio Frequency Identification
- CPOE – Computerized physician order entry
- EMR – Electronic Medical Record
- PHC – Preventive Health Check-up
- FOS – Fortis Operating System

INTRODUCTION

ORGANIZATIONAL PROFILE

FORTIS HEALTHCARE LIMITED is one of the fastest growing and second largest healthcare provider in the country. The healthcare verticals of the company span diagnostics, primary care and day care specialty and hospitals, with an asset base in 11 countries, many of which represent the fastest growing healthcare delivery markets in the world.

Currently, the company operates its healthcare delivery network in Australia, Canada, Dubai, Hong Kong, India, Mauritius, New Zealand, Singapore, Sri Lanka, Nepal and Vietnam with 76 hospitals, over 12,000 beds, over 600 primary care centers, 191 day care specialty centers, over 230 diagnostic centers and a talent pool of over 23,000 people.

Fortis MEMORIAL RESEARCH INSTITUTE

Fortis Memorial Research Institute (FMRI) is a multi-super-specialty, quaternary care hospital with an enviable international faculty, reputed clinicians, including super-sub-specialists and specialty nurses, supported by cutting–edge technology.

A premium referral hospital, it endeavors to be the 'Mecca of Healthcare' for Asia Pacific and beyond. Set on a spacious 11-acre campus with 1000 beds, this 'Next Generation Hospital' is built on the foundation of 'Trust' and rests on four strong pillars: Talent, Technology, Service and Infrastructure. Fortis Memorial Research Institute's comprehensive medical programmed is driven by reputed doctors, super- sub- specialists and specialty nurses committed to combining their exceptional medical expertise, technology and innovation to offer the best treatments.

Vision & Mission

MISSION

"GLOBALLY RESPECTED HEALTHCARE ORGANIZATION RECOGNISED BY CLINICAL EXCELLENCE AND DISCINTIVE PATIENT CARE"

VISION

"SAVING AND ENRICHING LIVES"

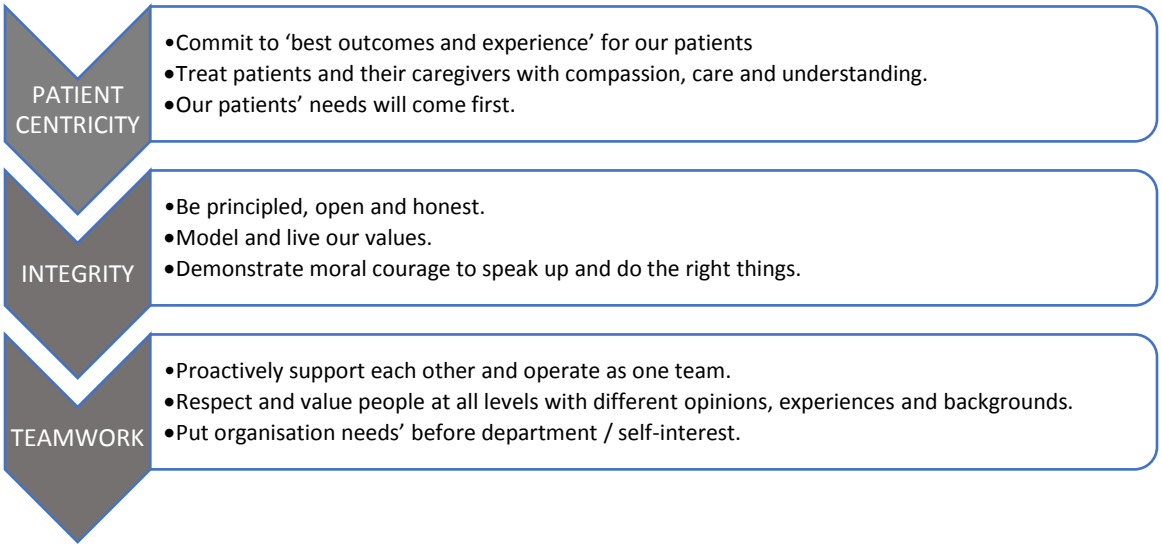
AFFLIATIONS AND ACCREDITION

FMRI believes that the accreditation of hospital's programs & divisions is another big success that bolsters the institute's position in the healthcare domain and will add to its eminent quality medical services.

Fortis Memorial Research Institute is accredited by National Accreditation Board for Hospitals & Healthcare Providers (NABH) and follow the policies of the board to cater to much desired needs of the patients and to set quality benchmarks in healthcare industry.

VALUES

The core values of fortis healthcare are: -



OWNERSHIP	•Be responsible and take pride in our actions. •Take initiative and go beyond the call of duty. •Deliver commitment and agreement made
INNOVATION	•Continuously improve and innovate to exceed expectations. •Adopt a 'can do' attitude. •Challenge ourselves to do things differently.

(FMRI) GURGAON

INFRASTRUCTURE: - With landscaped greens, tranquil water bodies, sculptures, sunlit interiors, Fortis Memorial Research Institute follows a design philosophy aimed at healing. The hospital has been built keeping in mind all round wellness – mind, body and soul. Simultaneously meet simple needs of the caring attendants by means of facilities as the Tummy Luck, Mediatorial, R&R Lounge, Holistic Health, Mamma Mia, Retail Therapy, Crèche.

FLOOR WISE DISTRIBUTION OF DEPARTMENTS: -

BASEMENT	• Engineering and biomedical and contractual staff dining • materials and purchase • PTS blower room • pharmacy,kitchen and general store • MRD • mortuary and nursing training room • parking for staffs and visitors
LOWER GROUND FLOOR	• Radiology and NIC and nuclear medicine with PET CT and Gamma camera. • Emergency,CSSD and in house laundry. • SRLs open laboratory and fortis totipotent RX. • 60OPDs for oncology, paediatrics, orthopedics,neurology and other medical and surgical OPDs. • Staff entry, Fire control room and mammamia
UPPER GROUND FLOOR	• "HEALTH 4U" preventive Health check and Media Mart, Media rent and Fila. • Chicco, bouncing babies, relegate wellness pharmacy and being human, babyoye and fortibakes. • IPD services and international patient services. • Tummy luck subway, Haldiram's and baskin robbins and Whole foods , Crunch box, joost food ventures. • fortiplex- 36seater minitheatre. • VIP lounge and Mother and child, breast clinic and Kitchen and administrative offices.

FIRST FLOOR	• 4 labour delivery suites with 02 labour rooms. • Meditorium- a 111 seat auditory Paediatric Unit with 9 beds • 11 Bedded dialysis unit. • 10 bedded chemotherapy unit and in house blood bank • In house blood bank • pathology lab • Rest and relaxation lounge • 13 neonatal ICU warmers
SECOND FLOOR	• Intensive care unit : 8 ICUs with philips intellivue clinical information portfolio. • Operation theatre:10modular operating rooms (14 in total) • Cathetorization laboratory, single plane and neuro cath lab. • Three endoscopic suites. • Six bone marrow transplant units and 7 beds in liver transplant ICU. • 98 beds in ICU's including NICU.
THIRD AND FOURTH FLOOR	• 23 single beds on third floor and 24 single beds on 4th floor. • 44double beds on 3rd floor and 44 double beds on 4th floor. • Nuclear Medicine Therapy room on 3rd floor. • Discharge Area on each floor.
SIGNATURE ROOM	• One signature apartment. • One maharaja suite room. • Four suite rooms. • Eight deluxe rooms. • Express check in check out. • Executive offices and board rooms.

OVERVIEW OF FMRI HOSPITAL GURGAON DEPARTMENT WISE

OUT PATIENT DEPARTMENT:

The OPD of FMRI is multispecialty center bringing to the patients all the required specialties under the same floor. It consists of the following specialties like cardiology, dentistry, ENT, gastroenterology, endocrinology, internal medicine, child specialist, gynecology, neurology, ophthalmology, orthopedics, psychiatry, pulmonology, rheumatology, urology, radiology lab, nuclear medicine, pathology, it also has home based rehabilitation programmes and rehabilitation centers providing a world class ambience along with patient.

RADIOLOGY:

Fortis can boost upon having one of the most advanced radiology department with skilled technicians and with the latest and most advanced machines. The department has facilities like 64 Slice CT Scan, MRI, Mammography and X-Ray ultrasound.

CARDIAC CATH LAB:

The hospital has 3 Cath labs that function round the clock 24hrs and 7days supported by a sophisticated CCU. It has some world class equipment's like COROSCOPE- by siemens used for electrophysiological monitoring and INNOVA 2000 by GE a digital imaging system, one of its kind in the world.

MSOT (Multispecialty Operation Theatre)

The Operation theatre are located on the 2nd floor of the OPD building having a direct connectivity with ICU so that patient is easily and quickly shifted to and from the ICU. The hospital is equipped with high tech OT's high risk surgical procedures are performed by a dedicated team of experts. There is exclusive OT's for joint replacement and robotic surgery.

At FMRI, there are 14OT's:

1)OT-1: Liver transplant OT	2)OT-2 AND OT-3-Major and general surgeries	3)OT 4 AND OT 5-Cardiac and transplant	4)OT 6 AND OT 7-Neurosurgery
5)OT 8: Minor surgeries	6) OT 9 AND OT 10: ENT and OBS/GYNAE	7)OT 11 AND OT 12-: Orthopaedic surgeries	8)OT 13 AND OT 14: Robotic surgeries

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ZONING:-It is basically dividing the OT area according to the hygiene maintained in the different zones. Here we observed three zones: -

a) DIRTY ZONE i.e. outside corridor, changing rooms.

b) CLEAN ZONE i.e. supply store, scrub area, pre-op room

c) ASEPTIC ZONE i.e. operation theatre, sterile preparation.

This zoning is very essential in OT's as it helps to prevent infection.

ACCIDENT AND EMERGENCY DEPARTMENT: -

The emergency department plays an important role for all the people who are in acute need of immediate care. The department is 6bedded along with 8beds in observational room. Also, there is a procedure room to conduct simple surgical procedures.

ED has special entry, far away from the general entry and is quite spacious in order to allow free movement of stretchers/trolleys from ambulance to emergency room. While bringing the patients from ambulance, TRIAGE is done. So, patients are placed according to TRIAGE beds.

The TRIAGE pattern followed here is:

- One red bed for category 1 patients.
- Two yellow beds for category 2 patients who need to be admitted.
- Remaining category 3 patients are kept in observation Room.

A code blue team is designated which consist of: A Critical care team

- Emergency team
- Cardiology team
- Anaesthetist team

HUMAN RESOURCE DEPARTMENT:

The human resource department deals with the effective management and development of the valuable resource is the human component of the organisation.

FUNCTIONS:

- Development of HR policies and strategies.
- Manpower planning
- Recruitment and selection
- Employee training
- Salary determination
- Performance appraisal
- Personnel data entry
- Consultation and advisory services.
- Grievance handling

MEDICAL RECORD DEPARTMENT

Proper storage and maintenance of medical records. Maintenance of integrity and confidentiality of medical records. Submission of required data to government. Classify the

IT DEPARTMENT

Maintenance of all software's in the hospital. Modification of all the software's as per the requirement of the department. It covers the following modules:

IPD billing	OPD billing	Administration
House keeping	Ward/Nursing	Diet

Visitors Pass	Stores	Purchase
Laboratory information system	Radiology information system	

BLOOD BANK

A blood bank is a bank of blood components, gathered as a result of blood donation or collection stored and preserved for later use in blood transfusion.

LICENSE: - Blood bank of FMRI, Gurgaon is located on first floor. It is NABH and NACO accredited and was able to get the accreditation within six months of the functioning of the hospital. The blood bank has a valid license from Central Drugs Standard Control Organization(CDSCO) and approved by Drug Controller General (INDIA), central license approving authority under Drug and Cosmetic Rules-1945 with further amendments.

The blood bank is run by the FMRI in order to provide blood and blood components to its patients and is licensed by Drug Controller of India.

LABORATORY:-

The laboratory here at Fortis is outsourced to SRL Lab and all the routine investigations are carried out here only. The samples are received from both IPD and OPD patients. The sample is received in boxes from departments and the house keeping staff carries the same. Also, for emergency investigations, a red seal is marked on the sample so as to give it a priority. Also, all the equipment's in the lab are automated i.e. they are linked to computers and so all the test results are automatically transferred in the computer and a report is generated. The laboratory has LIS. It is connected to the HIS of the hospital in which the entire information like- patient's name, IPID or UHID, test to be done and the reports is stored. Also, to maintain employee safety i.e. prevent occupational hazard, when an infected sample or any chemical bottle breaks in the laboratory, HAZMAT (Hazardous Material) team is called and immediately the spillage is cleaned up.

CSSD:-

CSSD stands for central sterile supply department. It is the department that is solely responsible for sterilization of all the instruments used all over the hospital.

CSSD has three zones:

a) Dirty/Receiving area
b) Clean area
c) Sterile area

a) In dirty area, all used instruments from IPD and OPD are received. This movement takes place manually, while it is received through a dumb waiter from OT. Here, an ultrasound cleaner is located. This is a fully automatic machine in which the used instruments are dipped in a solution and are sterilized. This machine produces vibrations which sterilize the instruments. After the above procedure is over, the sterilized instruments are washed under running water. After this, the sterilized instruments are dipped in preserve solution for 10-15 minutes.
b) In clean area, the sterilized instruments are kept packed in a double wrapped green colour cloth.
c) In Sterile area, there is 1 autoclave machine that is used to sterilize the used instruments. It is a double door machine. Through one door the unsterile instruments are loaded and through the other door the instruments are de-loaded after the procedure are over. Temperature is set according to the instrument to be sterilized.

   After the sterilization process is over, the sterilized instruments are packed and batch monitoring labelling is done through a labelling gun. This labelling consists of: -

   - ✓ Expiry Date
   - ✓ Packaging Date
   - ✓ Machine No.
   - ✓ Loading No.
   - ✓ Sterilization Date

ICU: -

ICU is located at the second floor of the IPD building making it accessible to all the outside services like lab, diagnostics, OT's etc.

There are 7 different types of ICU's in the hospital which are as follows:-

• Neurology, orthopaedic, polytrauma	• Cardiology and Transplant
• CTVS	• Medical ICU
• Bone Marrow Transplant	• Paediatrics ICU
• NICU	•

The nursing station is centrally located in the ICU and the nurse to patient ratio in ICU is 1:1or 1:2 as per the requirement.

Also, here at FHN, Barrier nursing is practiced in ICU's so as to minimize the risk of Hospital Acquired Infection (HAI).

For further information can refer to following link:

www.fortishealthcare.com/india/hospitals-in-delhi-ncr..

https://www.fmri.in/about-us/fortis-healthcare-limited

http://www.indiahealthhelp.com/hospital/fortis-memorial-research-institute-gurgaon

PROJECT REPORT

TITLE: An analysis on the compliance of the surgical team to hospital wide policy to prevent surgical site infections in FMRI Gurgaon.

ABSTRACT

Infection has always been a feature of human life and sepsis in modern surgery continues to be a significant problem for healthcare practitioners across the globe. This paper describes the factors that influence surgical wound healing and the risk of surgical site infection.

Nationally, post-operative infections are a primary patient safety concern. Surgical site infections (SSIs) are not a rare outcome, occurring with 2%-5% of clean extra-abdominal and up to 20% of intra-abdominal surgeries. Nationally, each SSI is estimated to increase length of stay by an average of 7 days and result in more than $3,000 in additional charges. Patients with an SSI are also five times more likely to be readmitted and two times as likely to expire.

Surgical site infection describes the epidemiology, definitions, microbiology, pathogenesis and surveillance of SSI. Included is a detailed discussion of pre-, Intra-, postoperative issues relevant to SSI genesis.

It is especially true regarding the implementation of SSI prevention measures. Finally, some of the infection control practices routinely used by surgical teams cannot be rigorously studied for ethical or logistical reasons. It is incented for the use by surgeons, operating room nurses, infection control professionals, anesthesiologists, healthcare epidemiologists, and other personnel directly responsible for the prevention of nosocomial infections.

Patients who develop SSIs are up to 60% more likely to spend time in an intensive care unit, five times more likely to be readmitted to the hospital, and to have twice the mortality rate compared with patients without an SSI. Health care costs are substantially increased in patients who develop SSIs. The goal of the project is to decrease the morbidity and mortality associated with postoperative SSIs by promoting appropriate selection and timing of administration of prophylactic antimicrobial agents.

LITREATURE REVIEW

Studies have often been conducted in narrowly defined patient populations or for specific kinds of operations, making generalization of their findings to all specialties and types of operations potentially problematic. This is especially true regarding the implementation of SSI prevention measures. Finally, some of the infection control practices routinely used by surgical teams cannot be rigorously studied for ethical or logistical reasons (e.g., wearing vs not wearing gloves).

One study carried out depicted that hospitals that were high outliers for SSI had higher trainee-to-bed ratios (0.61 versus 0.25, $p < 0.0001$), and the operations took significantly longer (128.3 ± 104.3 minutes versus 102.7 ± 83.9 minutes, $p < 0.001$). Patients operated on at low outlier hospitals were less likely to present to the operating room anemic (4.9% versus 9.7%, $p = 0.007$) or to receive a transfusion (5.1% versus 8.0%, $p = 0.03$). In general, perioperative policies and practices were very similar between the low and high outlier hospitals, although low outlier hospitals were readily identified by site visitors. Overall, low outlier hospitals were smaller, efficient in the delivery of care, and experienced little operative staff turnover. (2)

Another study quoted that currently published guidelines for antimicrobial prophylaxis. Nominal group process was used to draft a consensus paper that was widely circulated for comment. The consensus positions of the workgroup include that infusion of the first antimicrobial dose should begin within 60 minutes before surgical incision and that prophylactic antimicrobial agents should be discontinued within 24 hours of the end of surgery. This advisory statement provides an overview of other issues related to antimicrobial prophylaxis including specific suggestions regarding antimicrobial selection.

Recent data suggest that attention to intraoperative temperature control and supplemental oxygen administration along with aggressive fluid resuscitation may reduce infection rates [56–59]. Additional research is required before definitive recommendations can be made [60]. There is considerable evidence that aggressive perioperative control of blood sugar with intravenous insulin for patients undergoing cardiac operations reduces SSI rates [61–63]. The risk of SSI appears to be related to the presence of hyperglycemia rather than to a diagnosis of diabetes mellitus. Many of the studies that have supported the development of antimicrobial prophylaxis guidelines are quite old, and antimicrobial susceptibility patterns change over

time. Clinicians need to continue to evaluate current literature and carefully examine susceptibility patterns in their own institutions.

Diabetes and postoperative hyperglycemia were independently associated with development of SSIs. Among known diabetics, elevated hemoglobin ale values were not associated with a statistically significantly increased risk of infection; the mean Ale value was 8.44% among those with infections compared with 7.80% for those without. Forty-two (6%) of 700 patients without prior diabetes history had evidence of undiagnosed diabetes; their infection rate was comparable to that of known diabetics. An additional 30% of non-diabetics had elevated hemoglobin Ale determinations or perioperative hyperglycemia.

Postoperative hyperglycemia and previously undiagnosed diabetes are associated with development of SSIs among cardiothoracic surgery patients. Screening for diabetes and hyperglycemia among patients having cardiothoracic surgery may be warranted to prevent postoperative and chronic complications of this metabolic abnormality.

The incidence of SSIs may be as high as 20%, depending on the surgical procedure, the surveillance criteria used, and the quality of data collection. In many SSIs, the responsible pathogens originate from the patient's endogenous flora. The causative pathogens depend on the type of surgery; the most commonly isolated organisms are *Staphylococcus aureus*, coagulase-negative staphylococci, *Enterococcus* spp. and *Escherichia coli*. Numerous patient-related and procedure-related factors influence the risk of SSI, and hence prevention requires a ‘bundle’ approach, with systematic attention to multiple risk factors, in order to reduce the risk of bacterial contamination and improve the patient's defenses.

Surgical site infection (SSI) is the third most commonly reported nosocomial infection and accounts for 14–16% of all nosocomial infections among hospital inpatients. A successful SSI surveillance programmed includes standardized definitions of infection, effective surveillance methods and stratification of the SSI rates according to risk factors associated with the development of SSI. Surveillance with feedback of information to surgeons and other relevant staff has been shown to be an important element in the overall strategy to reduce the numbers of SSIs.

Wound site infections are a major source of postoperative illness, accounting for approximately a quarter of all nosocomial infections. National studies have defined the patients at highest risk for infection in general and in many specific operative procedures. Advances in risk assessment comparison may involve use of the standardized infection ratio, procedure-specific risk factor collection, and logistic regression models. (8)

Surgical risk factors include prolonged procedures and inadequacies in either the surgical scrub or the antiseptic preparation of the skin. Physiological states that increase the risk of SSI include trauma, shock, blood transfusion, hypothermia, hypoxia, and hyperglycemia. Parameters that may be associated independently with an increased risk of SSI, and that may predict infection, include abdominal surgery, a contaminated or dirty operation, and more than three diagnoses at the time of discharge**.**

Between 5 and 10% of patients undergoing surgery are estimated to develop an SSI with an associated increased length of stay and increase in morbidity and mortality. SSIs place a financial burden of 1 billion pounds per annum on National Health Service resources. The majority of SSIs are preventable. Measures can be taken at the pre-operative, intra-operative and post-operative stage to reduce the risk of developing an SSI.

INTRODUCTION

Before the mid-19th century, surgical patients commonly developed postoperative irritative fever", followed by purulent drainage from their incisions, overwhelming sepsis and often death. It was not until the late 1860s, after joseph Lister introduced the principles of antisepsis, that postoperative infectious morbidity decreased substantially. Lister's work radically changed surgery from an activity associated with infection and death to discipline that could eliminate suffering and prolong life.

Advances in infection control practices include improved operating room ventilation, sterilization methods, barriers, surgical technique and availability of antimicrobial prophylaxis. Despite these activities, SSIs remain a substantial cause of morbidity and mortality among hospitalized patients. This may be partially explained by the emergence of antimicrobial-resistant pathogens and the increased number of surgical patients who are 'elderly and have a

wide variety of chronic, debilitating or immunocompromising underlying diseases. Thus, to reduce the risk of SSI, a systematic but realistic approach must be applied with the awareness that this risk is influenced by characteristics of the patient, operation, personnel, and hospital.

Infections that occur in the wound created by an invasive surgical procedure are generally referred to as surgical site infections(SSIs). SSIs are one of the most important causes of healthcare associated infections(HCAIS). However, it is important to recognize that SSIs can range from a relatively trivial wound discharge with no other complication to a life-threatening condition. Other clinical outcomes of SSIs include poor scars that are cosmetically unacceptable, such as those that are spreading, hypertrophic or keloid, persistent pain and itching, restriction of movement, particularly when over joints.

. Surgical site infections make up approximately one-fifth of Health care-associated infections (HCAIs), and at least 5% of patients undergoing open surgery develop an SSI. Surgical site infections are probably the most preventable HCAI but have been neglected time and again. SSI constitute the second most common category of adverse events-approximately 20 percent of all nosocomial infections—and rank third with respect to cost.

TYPES OF SURGICAL SITE INFECTIONS

An SSI typically occurs within 30 days after surgery. The Centers for disease control and prevention describes 3 types of surgical site infections:

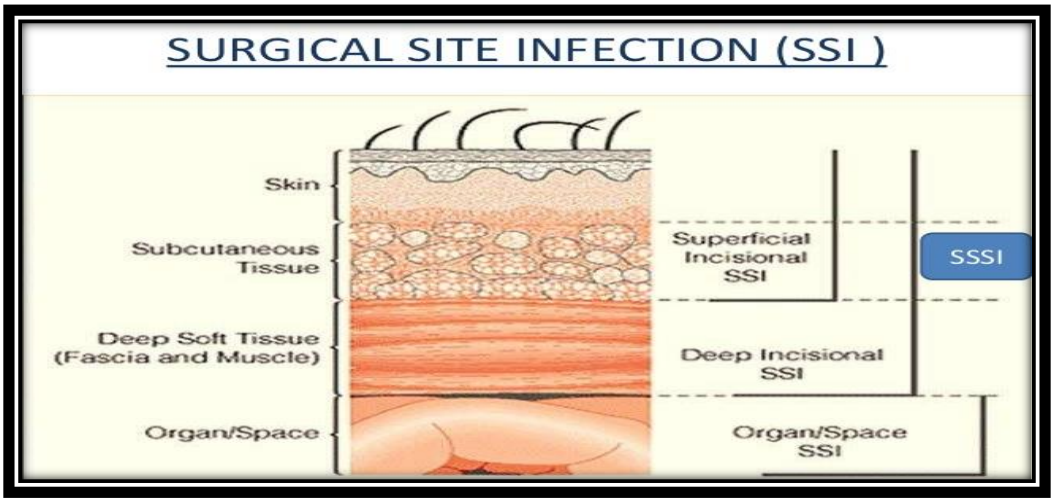
- Superficial incisional SSI. This infection occurs just in the area of the skin and subcutaneous tissue where the incision was made.

- Deep incisional SSI. This infection occurs beneath the incision area in muscle and the tissues surrounding the muscles.

    - Deep incision primary (DIP)—SSI identified in a primary incision in a patient who has had an operation with 1 or more incisions.

- Deep incision secondary (DIS)—SSI identified in a secondary incision in a patient who has had an operation with more than 1 incision.

Organ or space SSI. This type of infection can be in any area of the body other than skin, muscle, and surrounding tissue that was involved in the surgery. This includes a body organ or a space between organs. involving any part of the body opened or manipulated during the procedure, excluding skin incision, fascia, or muscle layers.



SIGNS AND SYMPTOMS OF SURGICAL SITE INFECTION

Any SSI may cause redness, delayed healing, fever, pain, tenderness, warmth, or swelling. These are the other signs and symptoms for specific types of SSI:

- A superficial incisional SSI may produce pus from the wound site. Samples of the pus may be grown in a culture to find out the types of germs that are causing the infection.

- A deep incisional SSI may also produce pus. The wound site may reopen on its own, or a surgeon may reopen the wound and find pus inside the wound.

- An organ or space SSI may show a discharge of pus coming from a drain placed through the skin into a body space or organ. A collection of pus, called an abscess, is an

enclosedarea of pus and disintegrating tissue surrounded by inflammation. An abscess may be seen when the surgeon reopens the wound or by special X-ray studies.

PATHOGENESIS

Microbial contamination of the surgical site is a necessary precursor of SSI. Microorganisms may contain or produce toxins and other substances that increase their ability to invade a host, produce damage within the host, or survive on or in host tissue.

For example, many gram-negative bacteria produce endotoxin which stimulates cytokine production. In turn, cytokines can trigger the systematic inflammatory response syndrome that sometimes lead to multiple system organ failure.

One of the most common causes of multiple system organ failure in modern surgical care is intra-abdominal infection. Certain strains of clostridia and streptococci produce potent exotoxins that disrupt cell membranes or alter cellular metabolism.

Pathogen Sources: Endogenous

- Patient flora – skin
  – mucous membranes
  – GI tract
- Seeding from a distant focus of infection Background:

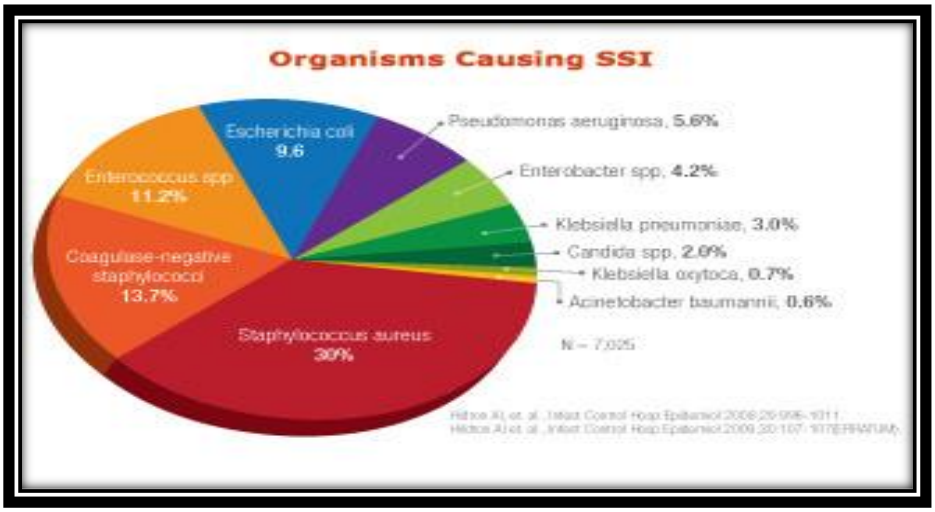
Pathogenic sources: Exogenous

- Surgical Personnel (surgeon and team)
  – Soiled attire
  – Breaks in aseptic technique – Inadequate hand hygiene
- OR physical environment and ventilation
- Tools, equipment, materials brought to the operative field

ORGANISMS CAUSING SURGICAL SITE INFECTION

- Staphylococcus aureus 30.0%

- Coagulase-negative staphylococci 13.7%
- Enterococcus spp. 11.2%
- Escherichia coli 9.6%
- Pseudomonas aeruginosa 5.6%
- Enterobacter spy 4.2%
- Klebsiellosis pneumoniae 3.0%
- Candida spp. 2.0%
- Klebsiellosis oxytocin 0.7%
- Acinetobacter Baumann 0.6%



EMERGING CHALLENGES : Challenges in detecting SSIs:

• Lack of standardized methods for post- discharge/outpatient surveillance

– Increased number of outpatient surgeries

– Shorter postoperative inpatient stays Antimicrobial Prophylaxis

• Increasing trend toward resistant organisms may undermine the effectiveness of existing recommendations for antimicrobial prophylaxis.

IMPORTANT MODIFIABLE RISK FACTORS:

- Antimicrobial prophylaxis
  - – Inappropriate choice (procedure specific)
  - – Improper timing (pre-incision dose)
  - – Inadequate dose based on body mass index, procedures >3h, or increased blood loss
- Skin or site preparation ineffective
  - – Removal of hair with razors
- Colorectal procedures
  - – Inadequate bowel prep/antibiotics
  - – Improper intraoperative temperature regulation
- Excessive OR traffic
- Inadequate wound dressing protocol
- Improper glucose control
- Colonization with pre-existing microorganisms
- Inadequate intraoperative oxygen levels.

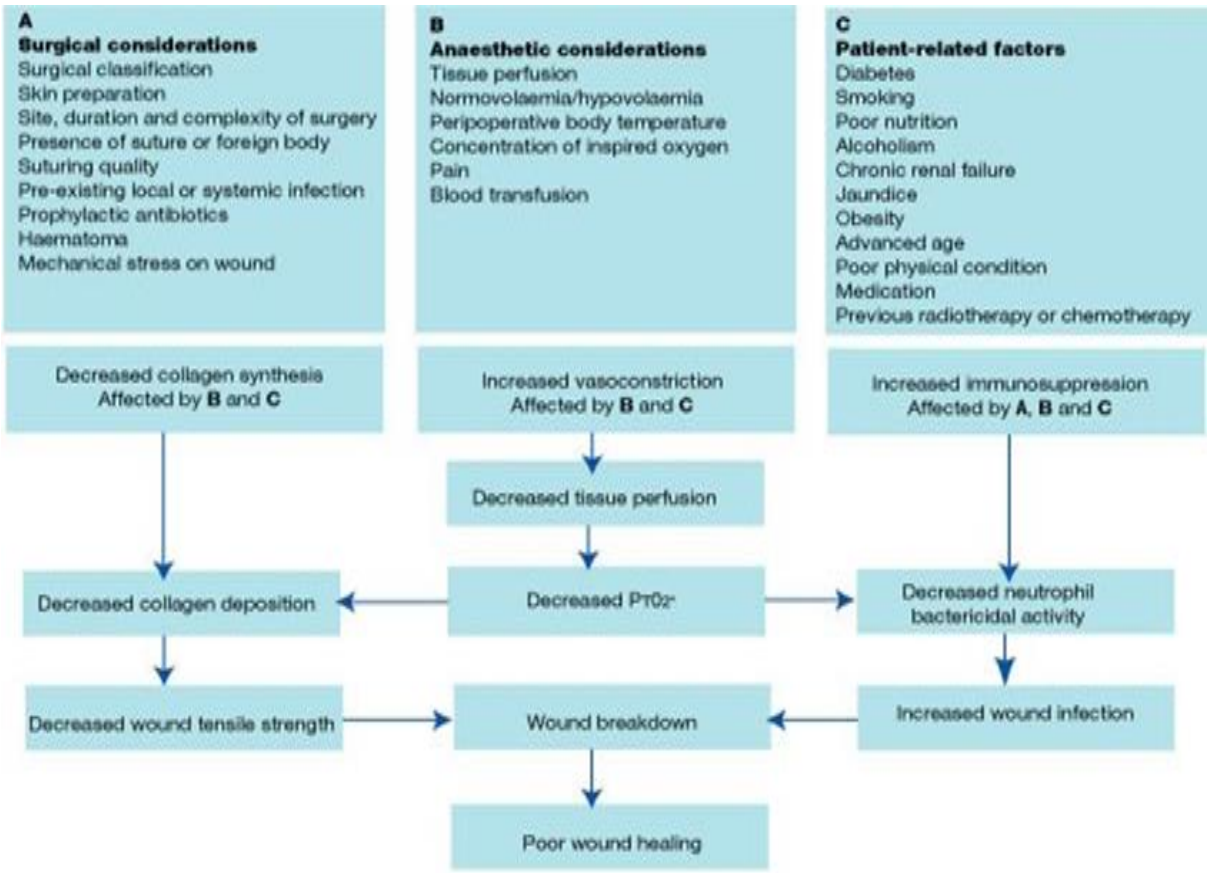
These are other risk factors for SSIs:

- Having surgery that lasts more than 2 hours
- Having other medical problems or disease
- Smoking and Having cancer
- Having a weak immune system, having diabetes and Having abdominal surgery

FACTORS INFLUENCING SSI

Many factors influence surgical wound healing and determine the potential for, and the incidence of infection. The level of bacterial burden is the most significant risk factor but

modern surgical techniques and the use of prophylactic antibiotics have reduced this risk



MANAGEMENT OF SURGICAL SITE INFECTION

Most SSIs respond to the removal of sutures with drainage of pus if present and occasionally there is a need of debridement and open wound care. Many complications of postoperative cases do not represent infection but exudation of tissue fluid or an early failure to heal, which is common in patients with a high body mass index.

It is likely that over 15% of postoperative cases are treated with antibiotics, possibly inappropriately, something which can contribute to the problem of antibiotic resistance.

AIM OF THE STUDY:

To study the reasons and causes behind the prevalence of surgical site infection by observational method and to reduce the incidence of surgical site infection.

OBJECTIVE OF THE STUDY

To study, compare, analyse and improve the compliance of surgical team to hospital wide policy to prevent Surgical Site Infection.

NEED OF THE STUDY

In the previous years at FMRI it was observed that the cases of SSI were at surge.

So, top management wanted to curb the SSI rate. In view of curbing the rate of SSI top management decided to study the root causes for the menace of SSI. So, a study was conducted to know the root causes of the menace and then decide the further action.

RESEARCH QUESTION

- Can ski be treated?
- What are some of the things that hospitals are doing to prevent SSI??

RESEARCH METHODOLOG

STUDY DESIGN: Prospective study

STUDY AREA: The observations were made on all the 14-operation theatre of fortis memorial research institute, Gurgaon.

STUDY POPULATION: All the patients undergoing surgeries in the month of April in FMRI, Gurgaon.

SAMPLE SIZE: 65 **SAMPLE METHOD**: purposive sampling.

SAMPLING CRITERIA: Departments were shortlisted according to the prevalence of SSI in the last year.

DATA COLLECTION TOOL: Surgical site infection checklist.

TIME PERIOD: 20days

PARAMETERS FOR THE STUDY

Preoperative	**Intraoperative**	**Postoperative**
Hair removal and technique	Environment of OT	Sterility of dressing
Serum blood glucose & HbA1c levels	Sterilization assurance	
Antiseptic showering	Surgical attire and drapes	
Part preparation- solution, technique & time	asepsis and surgical techniques	
Hand/forearm antisepsis	Patient's parameters	
Management of infected personnel		
Administration of prophylactic antibiotic		

Compliance with AMS protocol		

PARAMETERS TO BE STUDIED

PREOPERATIVE PHASE:

(a) Preoperative antiseptic showering: A preoperative antiseptic shower or bath decreases skin microbial colony counts. Chlorhexidine gluconate containing products require several applications to attain maximum antimicrobial benefit, so repeated antiseptic showers are usually indicated. Even though preoperative showers reduce the skin's microbial colony counts, they have not definitively been shown to reduce SSI rates.

(b) Preoperative hair removal: Preoperative shaving of the surgical site the night before an operation is associated with a significantly higher SSI risk than either the use of depilatory agents or no hair removal.

(c) Patient skin preparation: Several antiseptic agents are available for preoperative preparation of skin at the incision site. Before the skin preparation of patient is initiated, the skin should be free of gross contamination. The patient's skin is prepared by applying an antiseptic in concentric circles, beginning in the area od proposed incision.

(d) Preoperative hand/forearm antisepsis: Members of the surgical team who have direct contact with sterile opening field or sterile instruments or supplies used in the field wash their hands and forearms by performing a traditional procedure known as scrubbing immediately before donning sterile gown and gloves. Surgical team should not be wearing any jewellery in order to reduce the risk of surgical site infection.

(e) Management of infected personnel: Surgical personnel who have active infections are colonized with certain microorganisms have been linked to outbreaks

or clusters of SSI. Thus, it is important that healthcare organizations implement policies to prevent transmission of microorganisms from personnel to patients.

(f) **Antimicrobial prophylaxis:** Surgical antimicrobial prophylaxis (AMP) refers to a very brief course of an antimicrobial agent initiated just before an operation begins. AMP is not an attempt to sterilize tissues, but a critically timed adjunct used to reduce the microbial burden of intraoperative contamination to a level that cannot overwhelm host defences. To maximise the benefits of AMP, Time the infusion of antimicrobial should be maintained.

INTRAOPERATIVE MEASURES:

(a)Operating room environment: Operating room air may contain microbial-laden dust, lint, skin squares or respiratory droplets. The microbial level in operating room air is directly proportional to the number of people moving about in the room. Therefore, efforts should be made to minimize personnel traffic during operations.

Operating room should be maintained at positive pressure with respect to corridors and adjacent areas. Positive pressure prevents airflow from less clean areas into more clean areas.

(b) Surgical attire and drapes: The term surgical attire refers to scrub suits, caps, shoe covers, mask, gloves, gowns. All these attire and drapes are wearing by the surgical team in order to minimize the rate of infection.

(c) Asepsis and surgical technique: Rigorous adherence to the principles of asepsis by all scrubbed personnel is the foundation of surgical site infection prevention. Others who work in close proximity to the sterile surgical field, such as anaesthesia personnel who are separated from the field only by the drape barrier also must abide but these principles.

Excellent surgical technique is widely believed to reduce the risk of SSI. Such techniques include maintaining effective haemostasis while preserving adequate blood supply, preventing hypothermia, gently handling tissues and appropriately managing the postoperative incision.

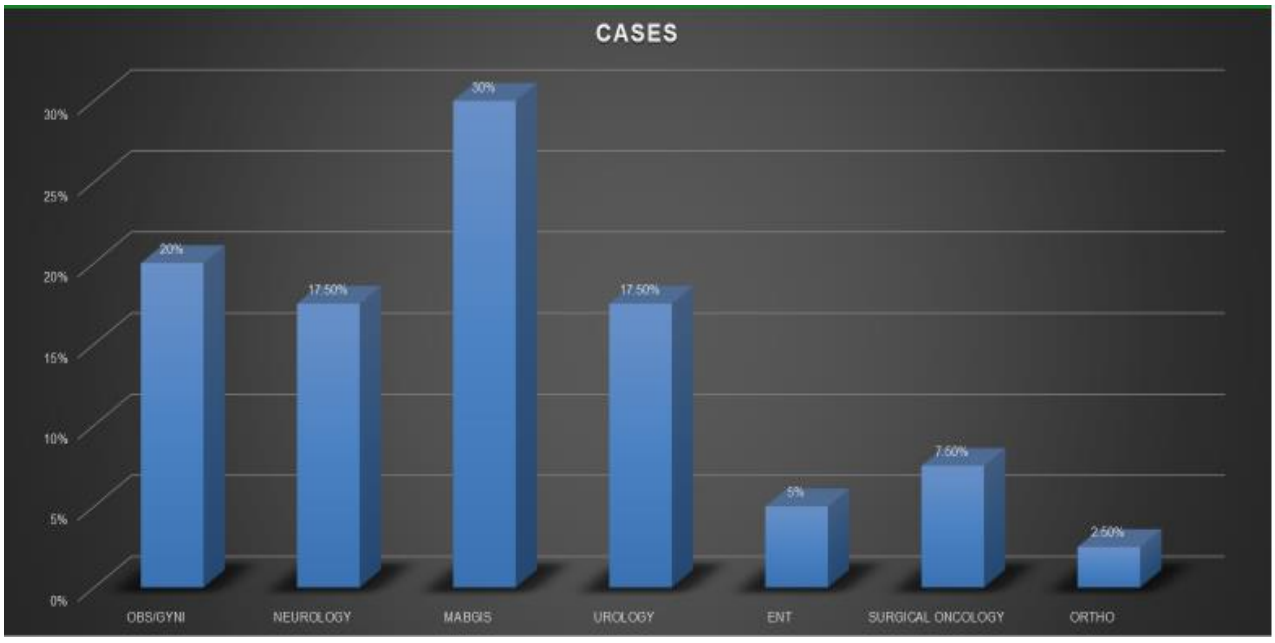
(d) Patient's parameter: The body temperature of the patient should be maintained above 36C.Hypothermia in surgical patients defined as a core body temperature below 36C, may result from general anaesthesia, exposure to cold, or intentional cooling is done to protect the myocardium. Randomized control trail is needed to establish that measures which improves wound space oxygenation can reduce SSI risk.

POSTOPERATIVE MEASURES

Sterility of dressing: When a surgical incision is closed primarily, as most are, the incision is usually covered with sterile dressing for 24 to 48hours. It has been recommended to use sterile gloves and equipment when changing dressings on any type of surgical incision.

DATA ANALYSIS

DISTRIBUTION OF CASES:

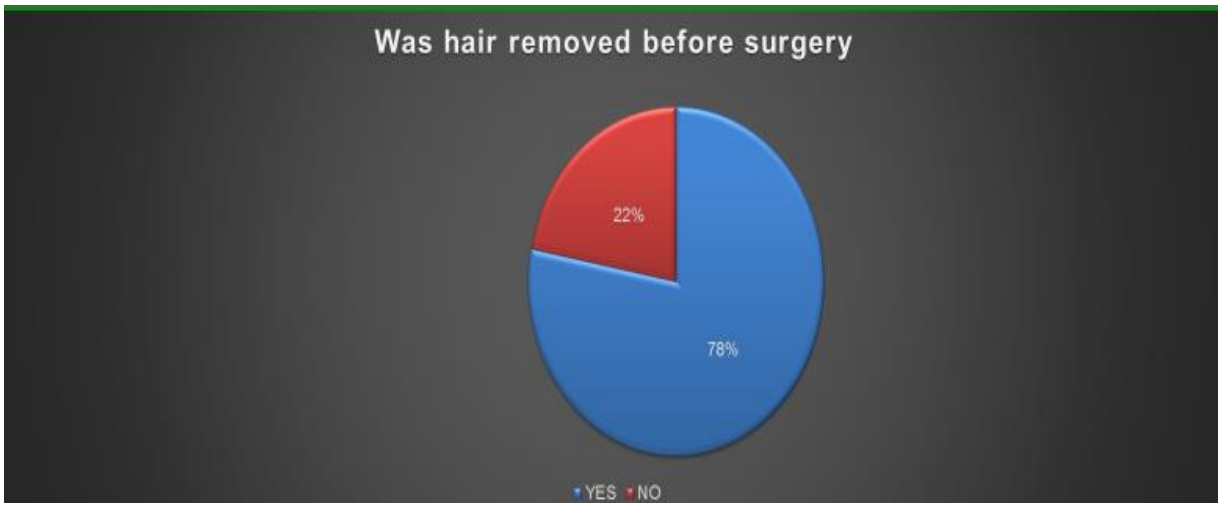


Highest number of cases recorded is in MABGIS followed by OBS/GYNI, neurology, oncology and ortho and ENT.

PREOPERATIVE MEASURES:

PREOPERATIVE HAIR REMOVAL AND TECHNIQUE

(1) PART PREPRATION:

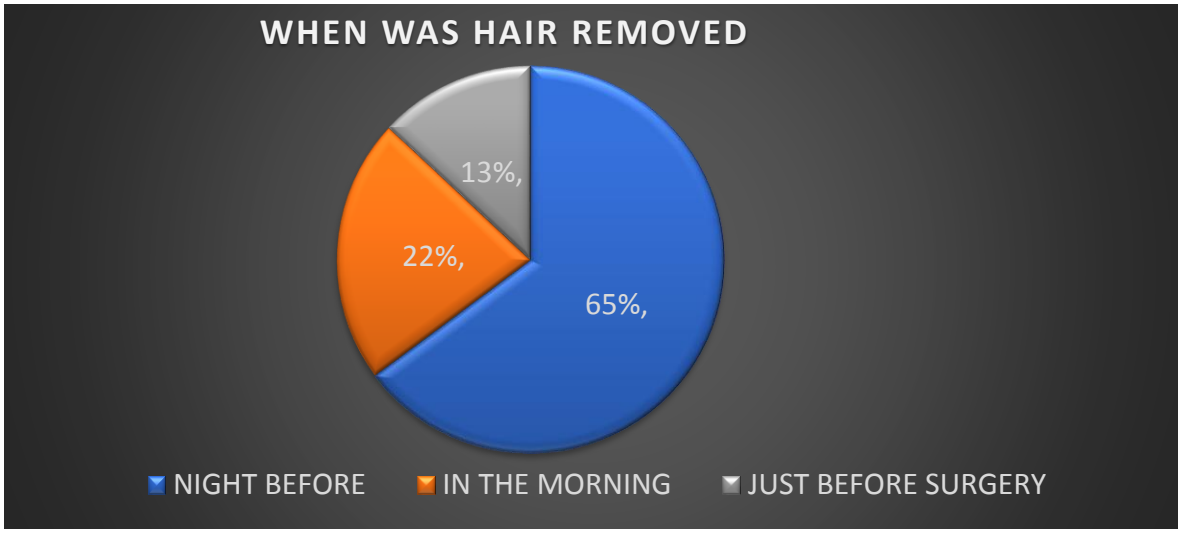


INTERPRETATION:

78% of cases hair was removed before the surgery.

22% of cases hair was not removed before the surgery.

(2)



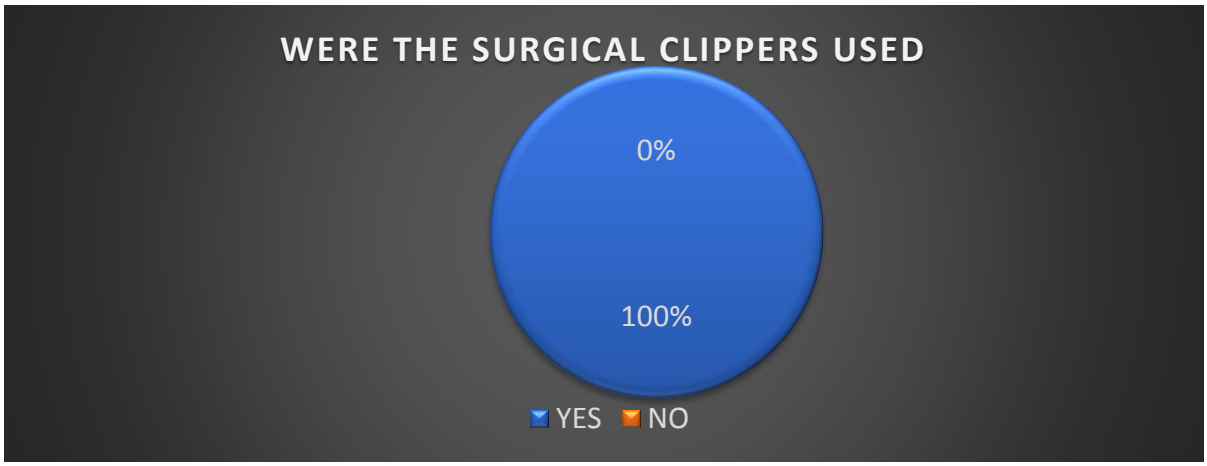
INTERPRETATION:

65% of cases hair was removed a night before.

22% of cases hair was removed in the morning.

13% of cases hair was removed just before the surgery.

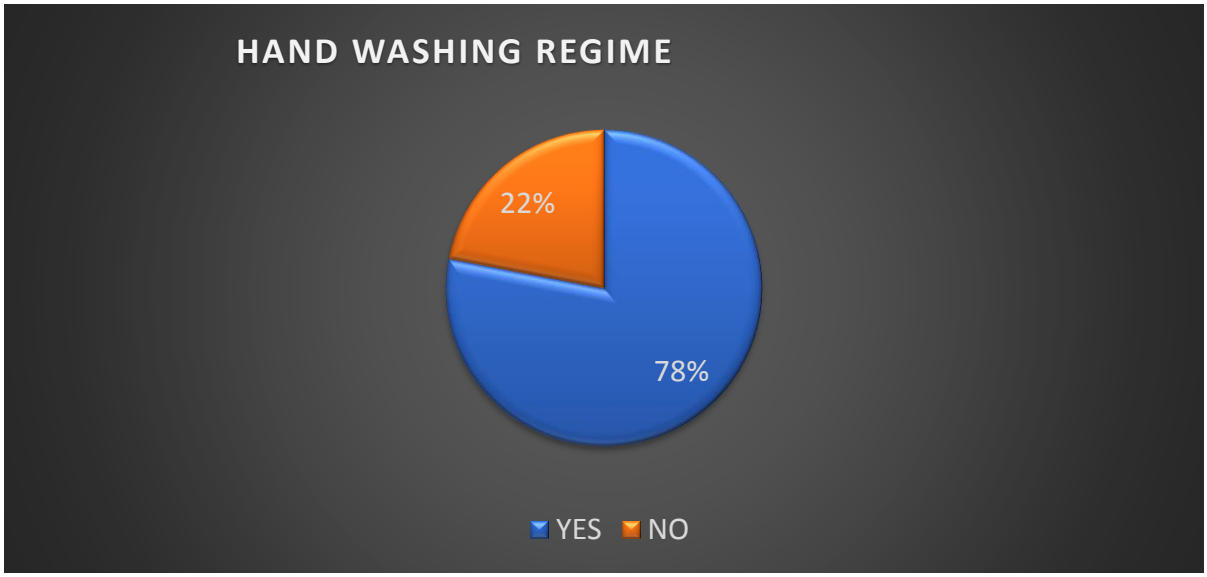
(3)



INTERPRETATION:

100% of cases surgical clippers were used.

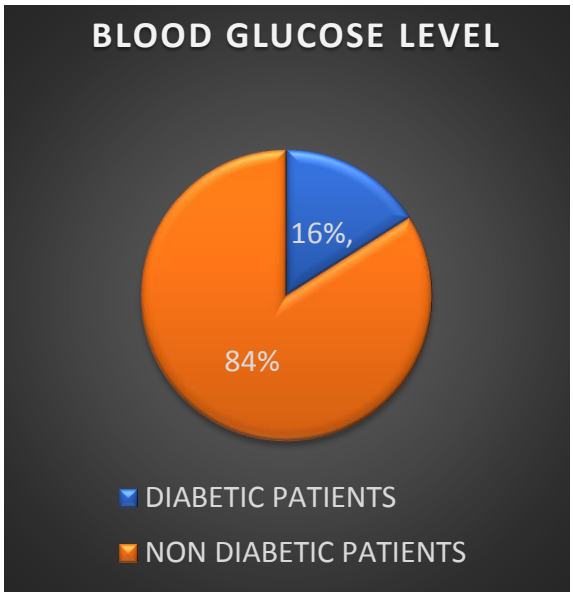
HAND FOREARM ANTISEPSIS:

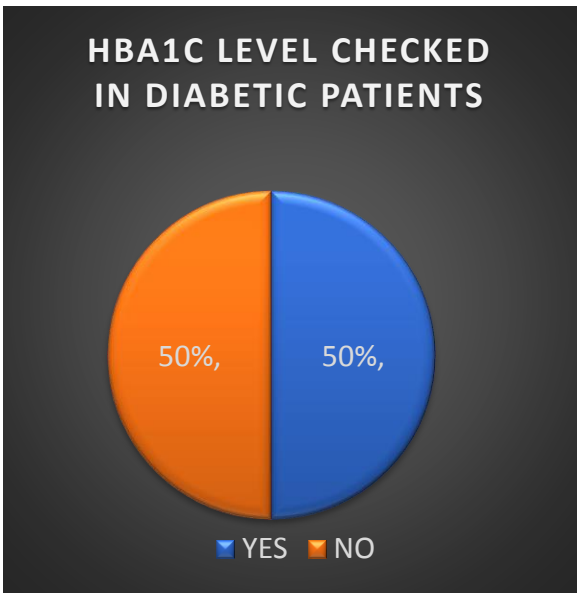


INTERPRETATION:

Compliance for hand washing regime followed is 78%.

BLOOD GLUCOSE LEVELS:





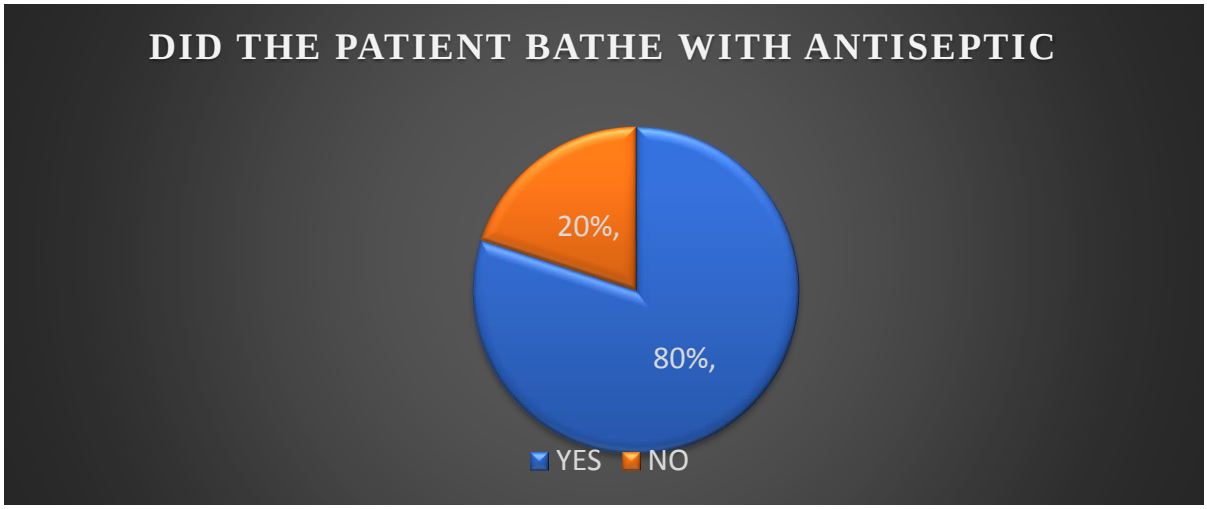
INTERPRETATION

In 16% cases blood glucose level is measured for diabetic patients.

HbA1c was done only for 50% of the diabetics.

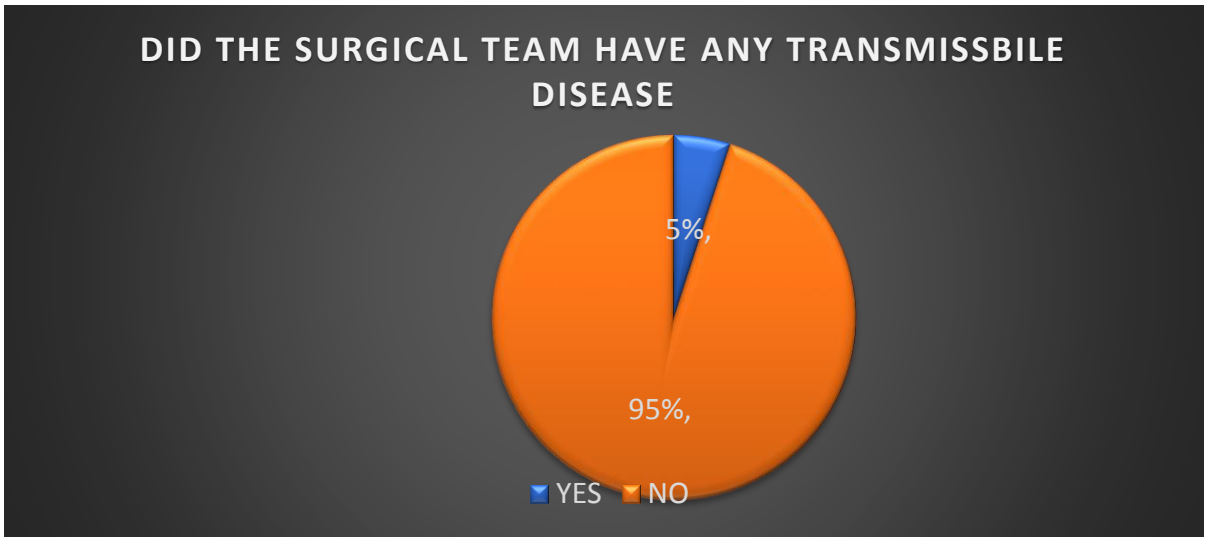
The values for HbA1c were high in all the cases

PREOPERATIVE ANTISEPTIC SHOWER:



INTERPRETATION

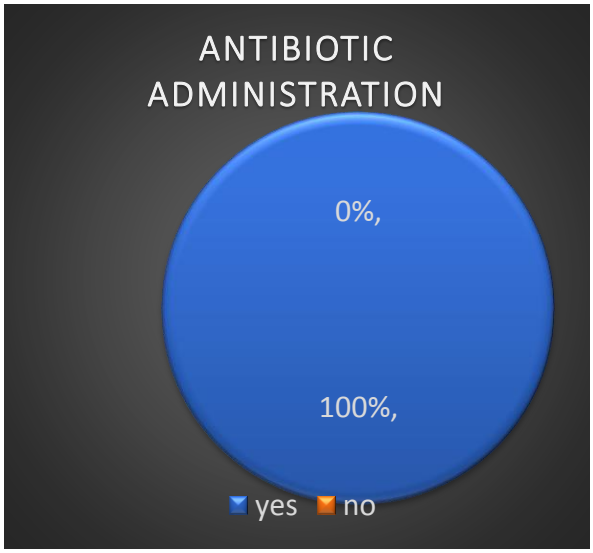
Compliance observed for patient's antiseptic bath was 80%.

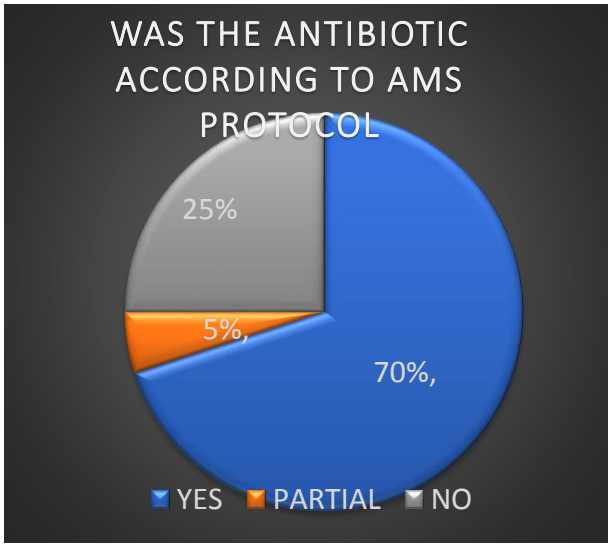


INTERPRETATION

Only 5% of the surgical team had transmissible disease.

PROPHYLACTIC ANTIBIOTIC ADMINISTRATION





INTERPRETATION

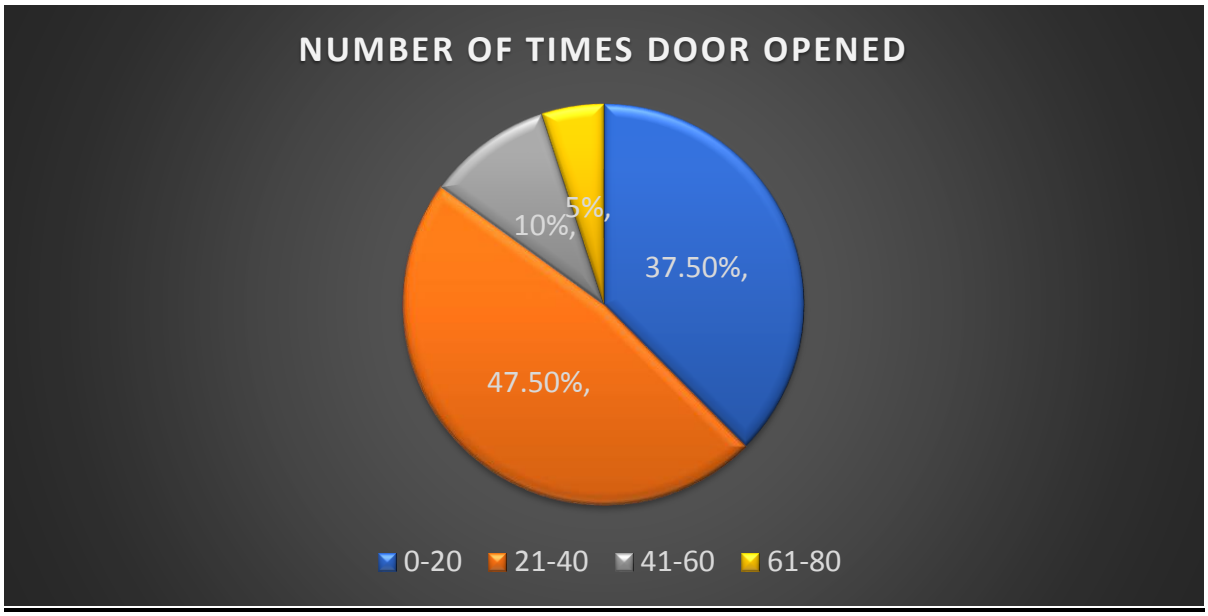
Compliance of antibiotic administration observed was 100%.

70% compiled with the AMS protocol.

5% was partial

25%did not follow the protocol.

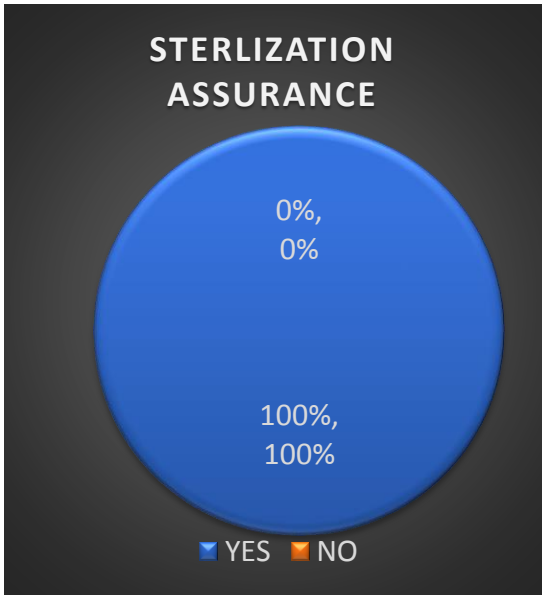
INTRAOPERATIVE MEASURES

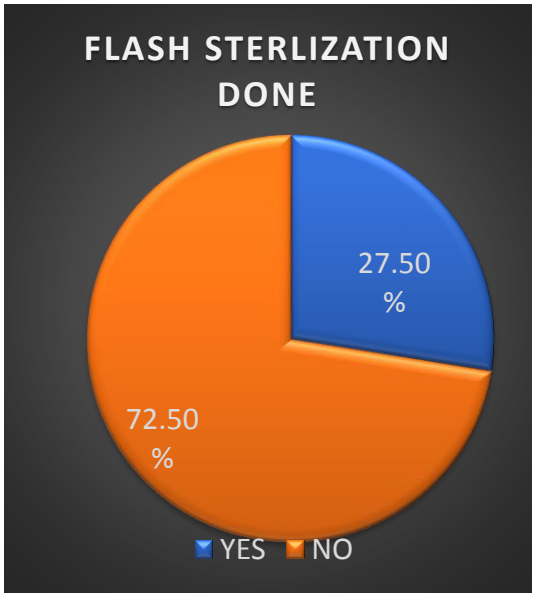


INTERPRETATION:

Highest number of times the door opened was 80 (craniotomy case)

STERLIZATION ASSURANCE:





INTERPRETATION:

Sterilization assurance compliance is maintained at 100%

Flash sterilization was done in 27.50%.

✦Department- OBGY, Neuro

SURGICAL ATTIRE AND DRAPES:

INTERPRETATION

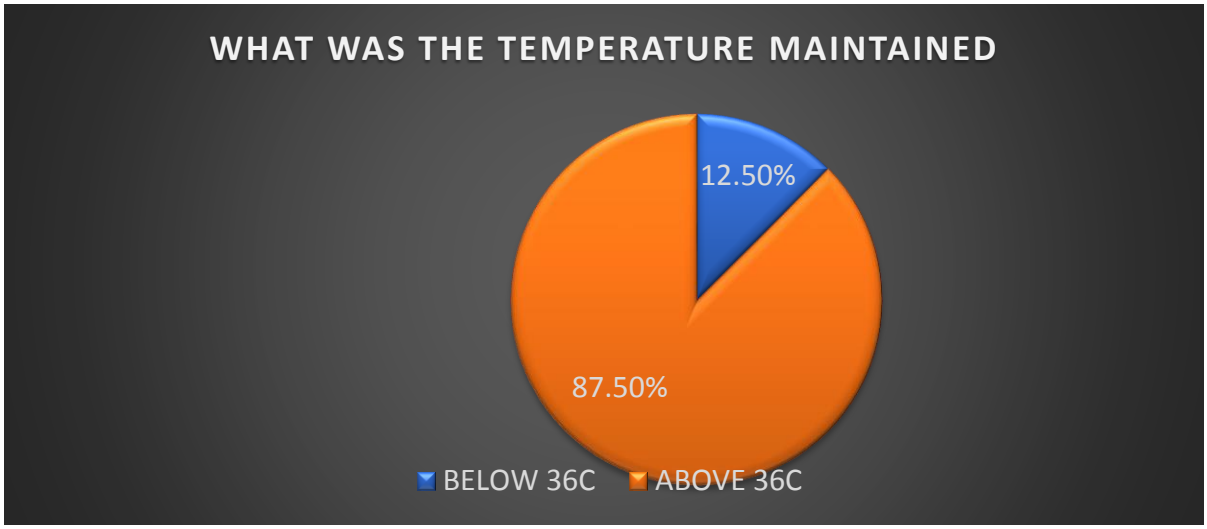
Compliance observed was 60%.

✧Worn over mouth is 40%.

ASEPSIS AND SURGICAL TECHNIQUES

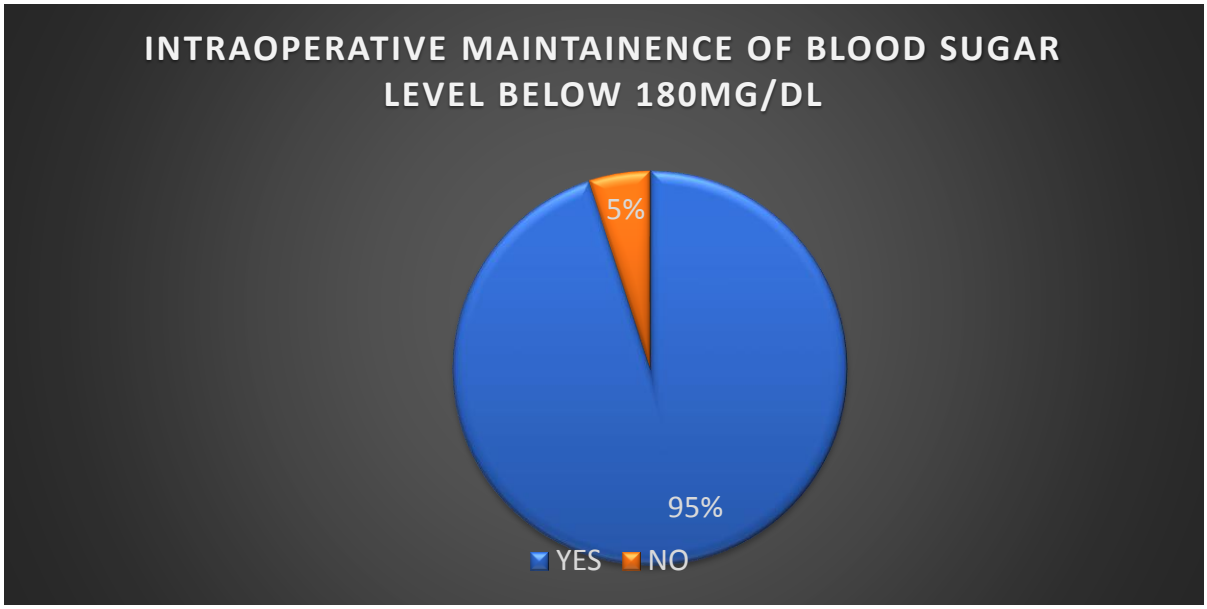
INTERPRETATION

- **Multiple surgeons, not scrubbed, leaning on the patient and the surgeon.**
- **Circulating nurse touched the surgeon's gown, but did not change.**
- **Surgeons touched the non-sterile part of the patient, and didn't change the gloves**



INTERPRETATION

Compliance was observed in 87.50% cases.



INTERPRETATION

Compliance observed for intraoperative maintenance of blood sugar level below 180mg/dl maintained is 95%

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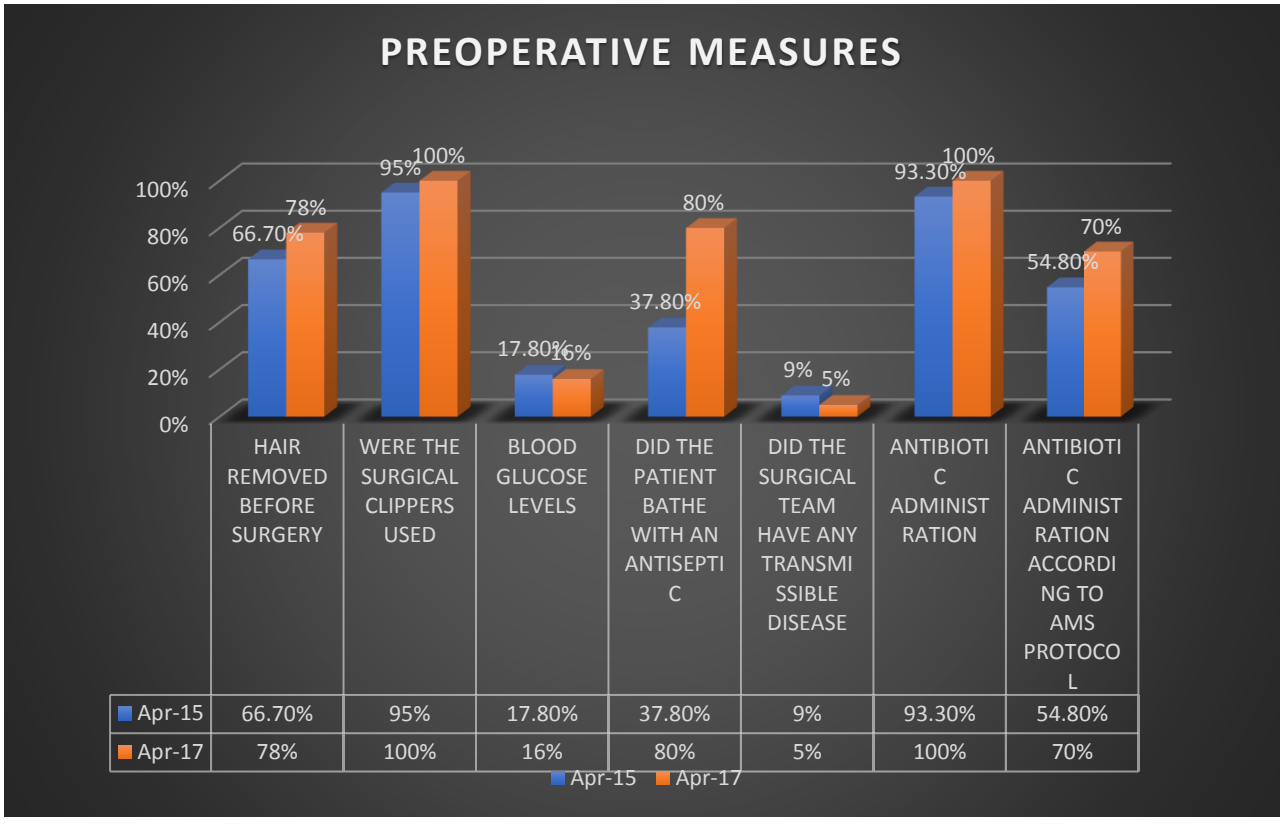
POSTOPERATIVE MEASURES

INTERPRETATION

Sterility of dressing maintained and dressing changed with clean hands is 100%

COMPARISON OF THE STUDY DONE IN 2015 AND 2017 AND ANALYSIS

CATEGORY 1- PREOPERATIVE MEASURES

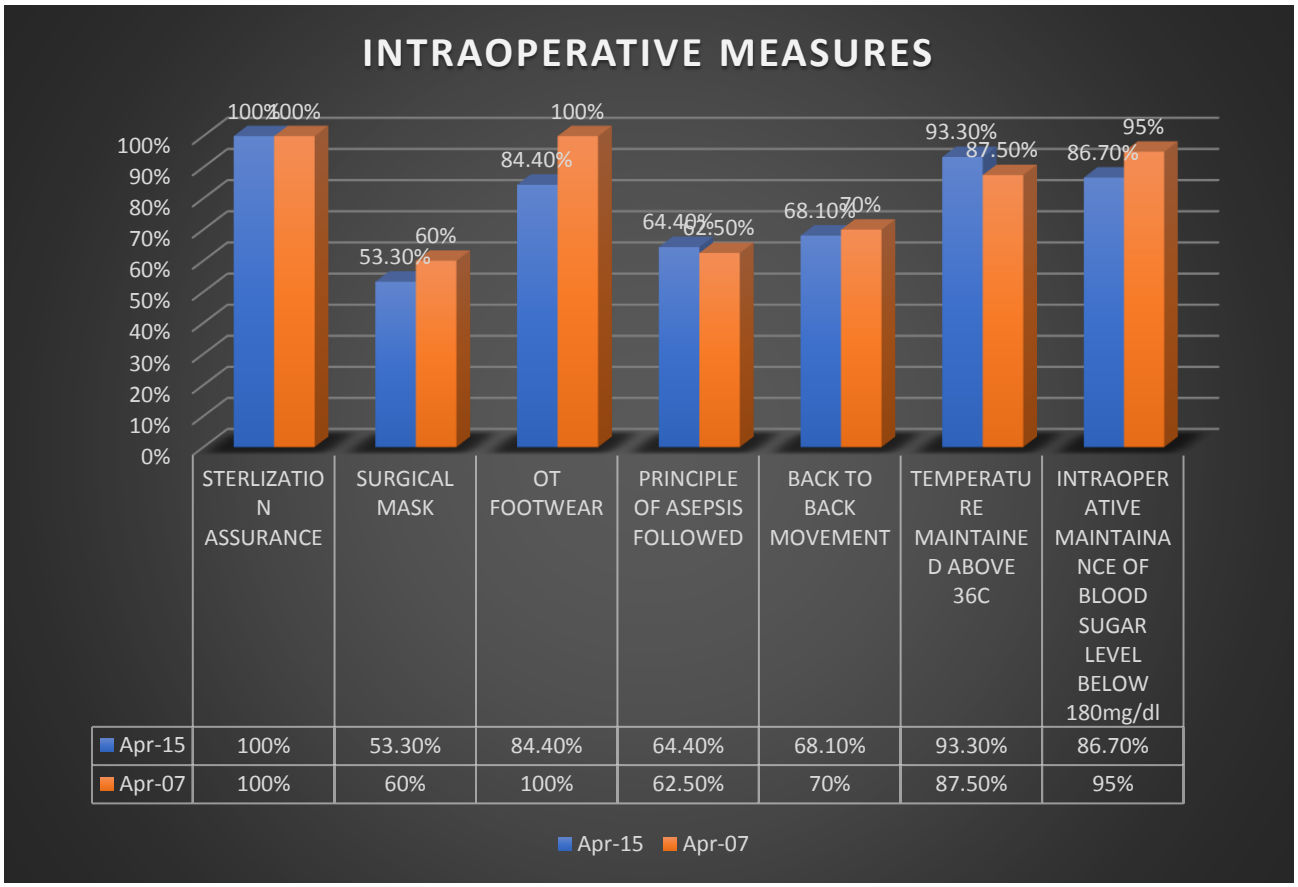


INTERPRETATION:

Compliance for all the parameters in the preoperative has increased as compared to the previous study in 2015. It suggests that the intervention of the management for improvement has been successful.

Compliance for blood glucose levels and transmissible disease of surgical team has decreased in the comparative study. Intervention plan has to be renewed for increase in compliance

CATEGORY 2: INTRAOPERTATIVE MEASURES.

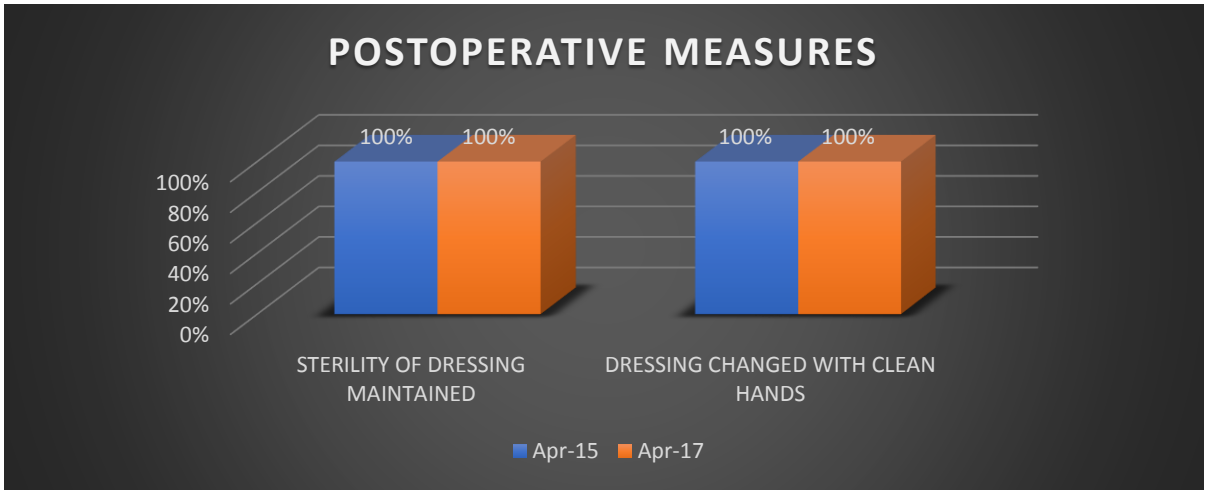


INTERPRETATION:

All the parameters showed constant increase in the compliance after the intervention plan by the management.

Principles of asepsis followed and temperature maintained above showed decrease in the compliance for which specific actions and interventions need to be employed.

CATEGORY 3: POSTOPERATIVE MEASURES



INTERPRETATION: The only parameter in the postoperative measure showed constant performance in both the study years

CONCLUSION

- Reducing patient harm by minimizing surgical site infection is important and the response to our simple interventions has been encouraging with the improvements in the preoperative and intraoperative parameters.
- Antimicrobial prophylaxis is a critical prevention strategy – Right agent, right dose, right timing, right duration – Redosing
- Surgical site infection are common and costly complications that increase morbidity and mortality in hospitalized patients.
- A broad array of patient and procedural factors affect the risk of surgical site infection.
- A multi-factorial and multi-disciplinary approach is needed for SSI prevention.
- However in order for prevention strategies to be successful, a team approach within each facility is necessary to ensure that best practices are implemented consistently.

KEY LEARNING POINTS:

1. Gained knowledge regarding preoperative, intraoperative and postoperative procedures in operation theatre.
2. Learned about the preoperative procedure including the work of anesthesia team starting from accessing the patient till the surgery ends.

3. OT bed utilization and timely transfer of patients to other wards .
4. Time management of surgeries in OT reducing the delay in surgeries.
5. Sterlization protocol of various instruments , the mini CSSD at the OR complex.

RECOMMENDATIONS

(A) Staff members must wear surgical masks from the time sterile supplies are opened throughout the entire surgical procedure.

(B) Staffs should not be wearing jewellery and totally confined or removed.

(C) Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation.

(D) Surgical personnel should be educated and encouraged who have signs and symptoms of a transmissible infectious illness to report conditions promptly to their occupational health service personnel.

(E) Administer a prophylactic antimicrobial agent only when indicated and select it based on its efficacy against the most common pathogens causing SSI for a specific operation.

(F) Keep operating room doors closed except as needed for passage of equipment, personnel, and the patient.

(G) Handle tissue gently, maintain effective hemostasis, minimize devitalized tissue and foreign bodies (i.e., sutures, charred tissues, necrotic debris), and eradicate dead space at the surgical site.

(H) Protect with a sterile dressing for 24 to 48 hours postoperatively an incision that has been closed primarily.