Summer Training at
Fortis Memorial Research Institute,
Gurgaon

Study on Prevention of Surgical Site Infection in Operation Theatre

By
Ashima

Under the guidance of
Dr. Arindam Das

MBA Hospital and Health Management
2015-2017

The IIHMR University, Jaipur
2016

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Ashima** student of MBA in Hospital and Health Management from The IIHMR University, Jaipur has undergone summer training at **Fortis Memorial Reaserch Institute, Gurgaon from 4th April 2016** to **2nd June 2016.**

The candidate has successfully carried out the study designated to her during summer training and her approach to the study has been sincere, scientific and analytical.

The summer training is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Col (Dr) Ashok Kaushik
Dean, Academic and Student Affairs
The IIHMR University, Jaipur

Mr. Arindam Das
Associate Professor
The IIHMR University, Jaipur

Fortis MEMORIAL
RESEARCH INSTITUTE
GURGAON

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2nd June'16

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Ashima** has undergone a voluntary internship in **"OT Department"** from **4th April'16 to 2nd June'16.**

During her training **Dr. Ashima** exhibited a high level of professionalism and a tremendous zest for learning.

We wish Dr. Ashima all the best in her future endeavors.

With Best Wishes,

Ritu Verma
Head- Human Resources

Head of the Department
Associate General Manager-OR
Fortis Memorial Research Institute
Gurgaon

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1. Acknowledgement

“Mentoring is a brain to pick, an ear to listen and a push in the right direction”

I would take the opportunity to acknowledge the people without whom this project wouldn’t have seen the light of the day. In our effort towards the realization of the project work, I have drawn on the guidance of many people who facilitated in shaping and remodeling the project.

I got the opportunity to pursue my summer internship from Fortis Memorial Research Institute, Gurgaon. It was an opportunity to work with one of the best health care service providers

I would seriously like to mention the significant role in project mentoring and help during the course of summer training by my mentor

I would like to thank my mentor and guide Mr. BRP Unnithan , Associate General Manager, Operation Theater, Fortis Memorial Research Institute, Gurgaon and Mr. Arindam das Associate Dean Research, IIHMR, Jaipur for providing an opportunity to carry out the project work and utilizing the facilities available. Without their valuable guidance and consistent support, this project would not have got underway.

I’m thankful to all staff and doctors of Fortis Memorial Research Institute , Gurgaon for being there to guide me for the entire period of my summer internship, for helping me improve the quality of my work and for helping me identify areas where I lack and work upon them.

Last but not the least I would thank OT department staff for their supportive attitude and also thankful to all those who have directly or indirectly encouraged me and supported me to complete this project.

2. Abbreviations

FMRI - Fortis Memorial Institute Research Institute

HICC – Hospital Infection Control Committee

CDC – Centre of Disease Control and prevention

AMS – Antimicrobial stewardship

OT – Operation Theater

OR – Operation Room

MTP – Medical Termination of Pregnancy

MABGIS – Minimal Access Bariatric and Gastro Intestinal Surgery

OBGY – Obstetrics and Gynecology

ENT – Ear nose and throat

CDSCO – Central Drugs Standard Control Organization

ICU – Intensive Care Unit

HAI – Hospital Acquired Infection

MRI – Magnetic Resonance Imaging

BME – Bio Medical Engineering

MPM – Multi parameter monitor

3. Organization Profile

3.1 Fortis Healthcare limited

It is a leading, pan Asia – pacific, integrated healthcare delivery provider. The healthcare venticals of the company span diagnostics primary care, day care speciality and hospitals, with an asset base in 11 countries, many of which represent the fastest – growing healthcare delivery markets in the world. 288 beded, 11 acre, multisuper speciality quaternary.

Currently, healthcare delivery network are in Australia, Canada, Dubai, Hong kong, India, Mauritius, New Zeland, Singapore, Sri Lanka, Nepal and Vietnam with 76 hospitals, over 12000 beds, over 600 primary care centres, 191 day care speciality centres, over 230 diagrostic centres and a talent pool of over 23000 people. Fortis Health care is driven by the VISION of becoming a global leader in the integrated healthcare delivery space and the larger purpose of saving and enriching live through clinical excellence.

It also provides patient services Nuclear medicine, Cardiac imaging, laboratories, Fibroscans, cardiology, Bi – plane cardiac cath lab, electrophysiology, Neurosciences, orthopedics, gynecology, obstetrics, pediastrics, matertnity services, diagnostic services, paediatric ophthalmology, neurophthalmology, internal medicine, general surgery, urology, nephrology, gastroenterology, mental health, behavioural sciences, rehabilitative services, pulmonology, IVF.

LOGO

Fortis MEMORIAL RESEARCH INSTITUTE

It defines commitment, excellence in healthcare delivery system. It also tells human values. Two nurturing hands tell caring of human life, Red dot depicts Indian culture, green colour explain healing and wellbeing and wellness, red colour tell focus, enthusiasm and dynamic zeal.

Mision : To provide quaternary care to the community in a compassionate, dignified and a distinctive manner.

Vision : To be the ultimate healthcare destination “Mecca of medicine.”

Values of Fortis healthcare limited : Patients centricity: Commit to best out comes and experience for our patients. Treat patients and their caregivers with compassion, care and understanding. Our patients need will come first.

Integrity: Be principled, open and honest. Model and liver open our values. Demonstrate moral courage to speak up and do the right things.

Teamwork: Proactive support each other and operate as one team. Respect and value people at all levels with different opinions, experience and background best organization needs before department self interest.

Ownership: Be responsible and take pride in our action. 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.

List of Hospitals of the Fortis Healthcare Limited:

Amritsar	Amritsar	Fortis Escort Hospital
Bangalore	Bannerghatta Road	Fortis Hospital
Bangalore	Cunningham Road	Fortis Hospital
Bangalore	Nagarbhavi	Fortis Hospital
Bangalore	Rajajinagar	Fortis Hospital
Bangalore	Seshadripuram	Fortis Hospital
Chennai	Adyar	Fortis Malar Hospital
Dehradun	Dehradun	Fortis Escorts Hospital
Faridabad	Faridabad	Fortis Escorts Hospital
Gurgaon	Sector- 44	Fortis Memorial Research Institute
Jaipur	Jaipur	Fortis Escorts Hospital
Kangra	Kangra	Fortis Hospital
Kolkata	Rash Behari Avenue	Fortis Hospital & Kidney Institute
Kolkata	Anandapur	Fortis Hospital
Mohali	Mohali	Fortis Hospital
Moradabad	Moradabad	Fortis Vivekanand Hospital
Mumbai	Vashi	Fortis Hiranandani hospital
Mumbai	Kalyan	Fortis Hospital
Mumbai	Mulund	Fortis Hospital
Mumbai	Mahim	S.L. Raheja Hospital
Mysore	Mysore	Fortis Cauvery Heart Hospital
New Delhi	Greater Kailash II	Fortis La Femme
New Delhi	Shalimar Bagh	Fortis Hospital
New Delhi	Vasant Kunj	Fortis Flt. Lt. Rajan Dhall Hospital
New Delhi	Okhla Road	Fortis Escorts Heart Institute & Research Centre
Noida	Noida	Fortis Hospital
Raipur	Raipur	Fortis Escorts Heart Centre

3.2 Fortis Memorial Research Institute Gurgaon

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 endeaveurs 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 the four pillars Talent, Technology, Infrastructure and Services.

Talent: FMRI comprehensive medical program is driven by reputed doctors, super- sub specialists and specialty nurses, all committed to integrating their exceptional medical expertise, technology and innovation to offer best in class treatment.

Technology: FMRI has a complete spectrum of diagnostic and therapeutic technology, including several technologies that are first in the world, first in the Asia and first in India.

- Radiology Therapy: first in world- A collaboration between leading technology inventors Hanin lab and Elektn.
- 3- Tesla Digital MRI- World's first digital broadband MRI
- Stem Cell- India's first stem cell lab in a hospital in collaboration with Totipotent Rx, a US based cell therapy company.
- Open Lab- India's first over see through glass lab with instant collection and real time processing of blood samples.
- C- ICU- An advanced patient management system with two- way audio visual communication. It allows clinicians to access patients 24X7. First of it kind in the world.
- 256 Slice CT- A state of the art 256 Slice Brilliance CT Scanner with the ability to capture an image of the entire heart in just two heart beats.
- Bi- Plane Cath Lab – State of the art Bi- plane cardiac cath lab to address cardiac and vascular interventions.
- Brain Suite- One of its kind CT based Brain suite, equipped with intra- operative CT for brain and spine.
- Time of flight PET CT- An installation with time of flight (TOF) reconstruction for exceptional image quality. Has the ability to detect lesions as small as 0.1 inches.
- Voice Modulator & Integrated Operating Rooms – Two modular operating rooms integrated with equipment and controlled by common control panel.

Infrastructure: With landscaped greena, tranquil water bodies, sculptures, sunlite interiors, FMRI 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 attendantds by means of facilities as the Tummy Luck, Meditorium, R&R lounge, holistic health, mamma mia, retail therapy, health 4 U, creche, spa and fortiplex, to meet the simple needs of caring attendants.

(1) Observational Learning

1. **Basement consist of :**
   Engineering and Biomedical department
   Contractual staff dining
   Materials and purchase department
   PTS blower room
   Stores pharmacy, kitchen & general stores
   Radiation oncology
   MRD
   Mortuary
   Nursing training room
   Parking for staff and visitors

2. **Lower ground floor consist of:**
   Radiology with: Asia's first digital broadband 3 Tesla MRI and 256 Slice CT scan with skylight.
   Nuclear medicine with PRT – CT & Gamma camera
   Emergency
   CSSD In home laundry
   SRL's open laboratory
   Swimming pool & sauna and steam
   60 OPDs for Oncology, Pediatrics, Orthopedics, Neurology and other Medical and Surgical OPDs
   Staff entry, Fire control room
   Mamma mia

3. **Upper groung floor consist of:**
   Spa, salon & fitness centre
   Health 4U preventive health care
   Retail therapy- Titan eye plus, Fila, Being human, Chicco, Mom & Me, Religare wellness pharmacy, medimart,
   Tummy luck- Subway, Haldiram's, whole foods, joost food ventures, baskil robbins
   Fortiplex- 36 seater mini theatre
   VIP lounge
   Mother and child, breast clinic and IVF
   Kitchen
   Administrative office

4. **First Second and Third Floor consists of:**
   Labour delivery room 4
   Meditorium 111 seated auditorium
   Nightingale ward 40 bedded
   High dependency unit 9 beds

Dialysis unit 11 units
Chemotherapy unit 10 units
Inhouse blood bank
Pathology Lab
Rest & Relaxation Lounge 76 recliners & 31 cubicals
Neonatal ICU 13 units
Well baby nursery
ICUs 9
Clinical information portfolio(ICIP) OT 11 modular Operating Rooms

5. **Clinical infrastructure:**

Operation Theater 11
Cath Labs 2
LINAC 2
LDR 4
Delivery rooms 2
Endoscopy Suites 3
Nightingale ward 40
Double bed rooms 88
Single bed rooms 47
Deluxe rooms 8
Suites 4
Signature Apartments 1
NICU & Nursery 18
Dialysis 11
Chemotherapy 10
Pre & Post Cath 12
ER Beds 14
Labour Beds 14
Pre- OP 6
Pre & post Endoscopy 5
ICU beds 98
Operating rooms 11
Operating beds 288

SERVICE: Woven into the fabric of the hospital are innovative services, where every patient has been made to look after our patrons so that they feel cared
Angel: A welcoming face at the hospitality desk to make visitors feel comfortable
Genie: A friendly and helpful companion to assist patients navigates the hospital
Concierge: Afacilitation desk to assist patrons with various needs in and outside the hospital

Motto:
“Best is the least we can do”

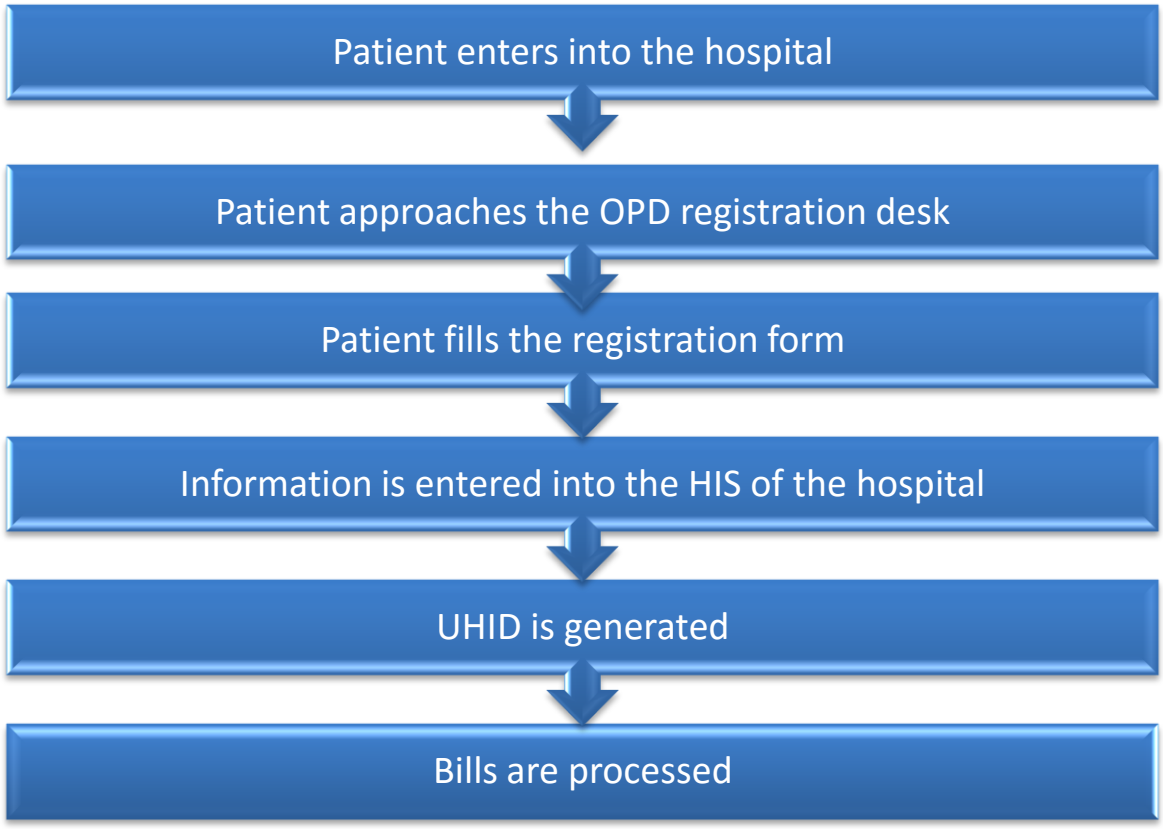
3.3 Departmental Profile

3.3.1. Out Patient Department:

Functions:

- Reception
- Information
- Appointment
- Registration – OPD, Diagnosis
- Billing – OPD, Diagnostic, Emergency
- Report/ Document Delivery
- Customer Feedback

Registration Process of OPD:



3.3.2. IT Department:

Functions:
It maintains all the software of the hospital. Modifications of the software are as per the requirement of the department. It covers the following modules

- OPD billing

- IPD billing
- Administration
- House keeping
- Ward/ Nursing
- Diet
- Visitor's pass
- Store
- Purchase
- Radiology information
- Laboratory information system

3.3.3 Medical record Department:

Functions:

- Storage, maintenance of medical records.
- Maintenance of integrity and confidentiality of medical records.
- Submission of required data to the government.
- Classify the medical files as per ICD-10.
- Obtaining missing patient files.

3.3.4 Human Resource Management:

Functions:

- Development of HR policies and strategies
- Manpower planning
- Recruitment and selection
- Employee training
- Salary determination
- Performance appraisal
- Personal data entry and record maintenance
- Consultation and advisory services to management and employees
- Grievance handling

3.3.5. Operation Theatres:

The operation theatres are located on the 2nd floor of the OPD building having a direct connectivity with ICU 2nd floor so that patient can be easily and quickly shifted to and from ICU.

At FMRI there are 11 OTs

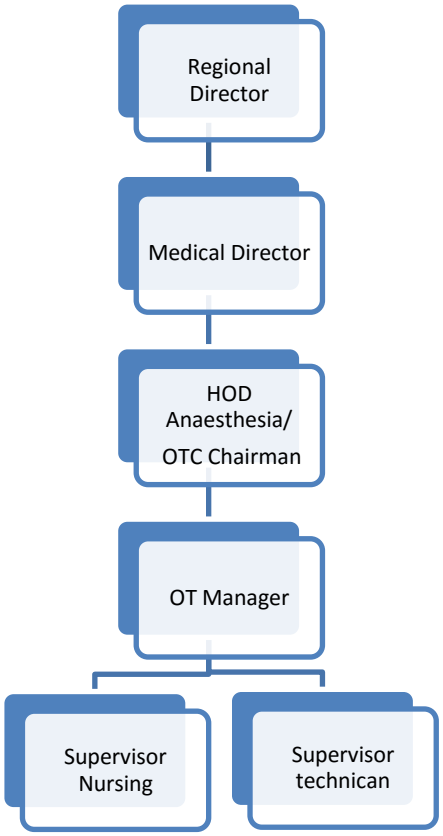
- OT 1&4 – Cardio surgery OT
- OT 7&8 – Neurosurgery OT
- OT 6 - Orthopedics
- OT 10 – General , day care and emergency cases
- OT 9 – Day care , Gyne and Obstr cases
- OT 2 & 3 – Oncology and gastro cases
- OT 5 – MABGIS(Minimal Access Surgery)
- OT 11- General day care

Zoning – Zoning is basically segmenting OT area according to the hygiene maintained in different zones, here three different zones were observed:

1) Dirty zone: Outside corridor, changing room
2) Clean Area: Supply store, scrub area, Pre-operative room
3) Aseptic Zone: OT, sterile preparation

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

FMRI OT SOP: ORGANOGRAM



OR Complex – FMRI (Zoning of complex with colour code)

	CLEAN ZONE
	PROTECTIVE ZONE
	STERILE ZONE
	DIRTY/CONTAMINATED ZONE

Infection control in OTs:

OT being such a sensitive area of a hospital, proper infection control mechanisms need to be followed in there. So, for the same, after every surgery they mop & clean the OT with 0.4% virex & for fogging of OT they use 1% virex for infected cases they use 2% virex.

Also, to maintain proper hand hygiene there are 3 scrubbing sections:

1) Scrubbing station 1 is in between OT 6 &7
2) Scrubbing station 2 is in between OT 4 & 5
3) Scrubbing station 3 is in between OT 1 & 2

For hand washing and scrubbing. Micro shield & betadiene scrub is used. Sterilization of instruments CSSD is there where all the instruments are properly sterilized and send back to the OT. To make this process more effective, a DUMB WAITER is used which is a lift which connects CSSD and OT.

The used instruments are first cleaned in instrument processing room in OT.
It is then packed in a double wrapped green cloth. This pack is placed on the dumb waiter in dirty area of OT. It is received on the dumb waiter dirty area of CSSD. Then it is sterilized, packed in the CSSD and a biological indicator is placed in the pack. It is the send from the dumb waiter in sterile area of CSSD. It is received in the dumb waiter in sterile area in OT.

Moreover for equipments required during emergency in OT an autoclave and ultrasound machine is there wherein the instruments are sterilized and used. The surgeries are generally conducted from 8:00 AM to 8:00 PM, except in the case of emergency. Also, the Time duration for a patient to be kept in pre-operative room is half an hour and one hour for Post- operative room. This is as per the FOS, but it may vary with the severity of the case.

3.3.6. ICU (Intensive Care Unit):

ICU is located at second floor of the IPD building making it accessible to all the outside services like lab, diagnostics, OT's etc.
These are 7 different types of ICU's in the hospital which are as follows:

- Neurology, Orthopedic, Polytrauma
- Cardiology & transplant
- CTVS

- Medical ICU
- Bone Marrow Transplant
- Pediatric ICU
- NICU

The nursing station is centrally located in the ICU and the Nurse to patient ration in ICU is 1:1.
Also, here at FMRI, barrier nursing is practiced in ICU's so as to minimize the risk of the Hospital Acquired Infection(HAI).

Equipments used in ICU:

- Ventilators
- Intra Aortic Balloon Pump (IABP)
- Suction
- Inter Costal Drainage System (ICD)
- Portable Ultrasound (if needed)
- DVT Pump (Deep Vein Thrombosis)
- Bi-pump to give oxygen to the patient.

  There are 98 beds out of which 52 are ventilator equipped and 6 are isolation beds.
  Quality Indicators are:
  - CRBSI
  - VAP
  - SSI
  - Returned to ICU within 48 hours
  - Needle stick injury

3.3.7 Radiology

- Asia's first ingina's 3 Tesla MRI
- 256 Slice iCT scan with skylight
- 5 Ultrasound Machine:
  2 Ultrasound machine on upper ground floor
  1 Ultrasound machine in health4
  1 Ultrasound machine in gynecology department
- 3X-ray machine (Philips)
- 3 portable X Ray machines
- 1 CT scan (256 slices) iCT Philips
- 3 Tesla MRI machine
- 1 CRI
- 1 Mammography

- 1 Bone Densomatery
- 3 printers
- 1 technologist room
- 1 reporting room
- X ray console room
- 1 patient lounge
- 1HOD room
- 1fluoroscopy room
- 2 changing room

Manpower:

- 1 chief technician
- 1 supervisor
- 17 technician

3.3.8 Accidental and Emergency Department (ED)

The emergency department in a hosoital plays a very important role for all people who are in acute need of immediate care like chest pain, stroke, accident cases, trauma cases etc.

The Emergency Department at FMRI is a 6 bedded along with 8 beds in observation room. Also, there is a procedure room to conduct simple surgical procedures.

Emergency Department has separate entry, far away from the general entry and is quite spacious in order to allow free movement of stretchers / trolleys from ambulance to the emergency room.

While bringing in the patient from the ambulance, TRIAGE is done before hand by the staff nurse at the Emergency Department reception and so patients are placed according to the triage beds:

The TRIAGE patterns followed here is:

a) Red bed for category 1 patient – Critically ill patient
b) Yellow beds for category 2 patients who need to be admitted
c) Remaining category 3 patients are kept in observation room

There are centralized ambulance systems in the Emergency department, the movement of which depends on the central emergency call centre at FMRI. The Fortis group of hospital in Delhi NCR has a centralized ambulance call centre at Fortis Escorts, Okhla(105010) where all the calls for requirement of ambulance are received and depending on the location of the case, the nearby branch is contracted, a case ID is given and then the ambulance is sent to the location.

A crash cart is available in the emergency which provides a one place storage of all emergency medications required which saves the precious time during treatment. A code blue team is designated which consist of four sub teams

a) Critical care team
b) Emergency team
c) Cardiology team
d) Anesthesia team

Accessibility with other Departments:

The Emergency Department is located on the ground floor, making it quite accessible to the other departments, the diagnostic department is next right to the Emergency department but the ICU and OT are at the second floor and it takes 4-6 minutes to reach there.

Moreover, there is a direct inter – communication system between Emergency department and other services like blood bank, Lab, Diagnostic, ICU etc. It is all linked through HIS and Intercom services.

The staff in the Emergency department are:

a) Nurses
b) Doctors
c) CMO
d) Paramedical staff
e) Ground staff – GDA/ Housekeeping
   Generally the patient to nurse ratio is 1:1, but team work approach is always followed wherever the emergency patient arrives.
   The emergency department has the following equipments per bed:
   Defibrillator, suction machine, ECG, Cardiac Monitor, Oxymeter, Ventilator, Syringe pump (for the accuracy of dosage)

3.3.9 CSSD

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

CSSD has 3 zones:

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

Dirty area/ Receiving area:

In dirty are all used instruments from around the hospital are received after they are washed and cleaned. This movement takes place manually, while it is received through a dumb waiter from the OT. Here an ultrasound cleaner is located. This is a fully automated machine in which the used instruments are dipped in a solution and are sterilized under 40 degree Celsius for 15-20 minutes. This machine produces vibrations which sterilizes the instruments. After the above procedure is over the sterilization instruments are washed under running water. After this the instruments are dipped in preserve solution for 10- 15 minutes.

Clean area:

In clean area sterile instruments are kept packed in a double wrapped green colour cloth.

Sterile area:

In sterile area there is one autoclave machine that is used to sterilize the use instruments. It is a double door machine. Through one door the used instruments are loaded and through other door the instruments is de loaded after the procedure is over.

Two temperatures are set in this machine according to the instruments to be sterilized:

1. 120 degree Celsius – Under this temperature 20 minutes is the sterilizing time, 15 minutes is the dry time and 3 minutes is the pulsing time (pulsing time is a procedure by which the air present in the machine is moved out and the steam is brought in).
2. 134 degree Celsius – Under this temperature 7 minutes is the sterilizing time, 3 minutes is the pulsing time and 10 minutes is the dry time.

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

- Expiry date
- Packaging date
- Machine number
- Loading number
- Sterilization date

3.3.10 Blood bank:

Blood is vital to human body and about can 5.5 Lt is present in a person. It carries all nutrients, oxygen and metabolism throughout the body, but sometimes a life may be at stake due to blood loss/ infection.

A blood bank is a collection and storage facility where blood is later used for blood transfusion. The term “Blood Bank” typically refers to a division of a hospital where the storage of blood

product occurs and where proper testing is performed (to reduce the risk of transfusion related adverse events). However it sometimes refer to a collection center and indeed some hospitals also perform collection.

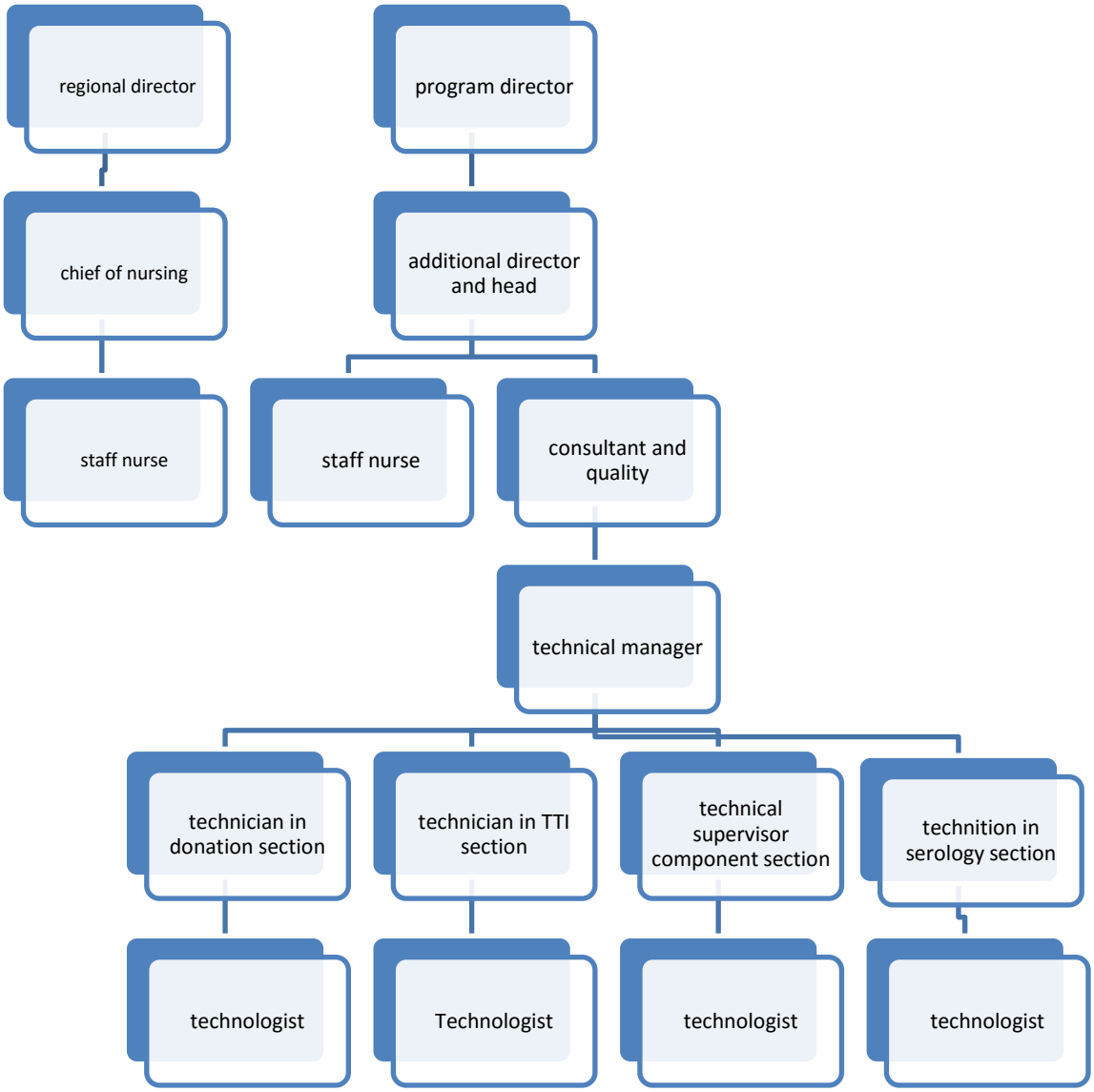
LICENSE: Blood bank of FMRI, Gurgaon is located on the first floor. It has both NABH and NACO (National AIDS control organization) accreditation and was able to get the accreditation within six months of the functioning of the hospital. The blood bank has a valid license from central drugs standard control organization (CDSCO) and approved by the 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 (a Fortis group hospital) in order to provide blood and blood components to its patients and is licensed by the drug controller of India.

The blood bank area is of 181 square meters & has separate rooms each for:

- Registration and medical examination room (air conditioned) there are well lit rooms fully furnished with adequate number of chairs and examination table.
- Donor motivation and counseling area (air conditioned) with a counselor
- Blood donation area is a well lit and air conditioned room having three fully motorized donor couches and having computerized bar coding system for a donor data entry.
- Refreshment room (air conditioned).
- Component preparation room – air conditioned room with maintained temperature of 20-25 degree Celsius and humidity below 60% and having Quarantine refrigerator for untested blood.
- Lab for TTI marker is well lit air conditioned room having maintained temperature and humidity.
- Lab for blood group serology is air conditioned and having marked area for grouping and cross matching, antibody detection.
- Specific area for sterilization and washing.
- Store & record room

Organogram for transfusion medicine department



3.3.11 Laboratory:

The laboratory here at Fortis Hospital is outsourced to SRL lab and all the routine investigations are carried out here only. The staff strength is 30 – 40 with 3 people during night. The samples are received from both OPD & IPD patients and a prescription is not always required to get a test done until unless the history of the patient has to be traced back. This sample is received in boxes from respective OPD & IPD department and the housekeeping staffs carry the same. Also for emergency investigations a red seal is marked on the sample as well as on the prescription of the patient 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 report is generated. The laboratory has laboratory investigation system (LIS). This LIS is connected to the HID of the hospital in which all the information like patients name IPID or UHID test to be down and the reports stored. Once the report is

generated, it is reviewed by the authorized person and then only it is made available in the LIS or send to the patient. Moreover, there is no telephonic communication of reports result, only during urgent or emergency cases report is spelled out and that too twice to ensure proper communication. Quality check and the calibration of the equipment is carried out twice in a day for quality assurance. 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.

List of equipments used in laboratory are:

Biomedical analyzer, cell counter, urine routine analyzer, immune assay analyzer, centrifuge, microscan, baetec,tissue processor, microtone balance glycosylated haemoglobin analyzer (D10), sample mixer, microscopes, pipettes.

(2)Project Report: Study on prevention of Surgical Site Infection in Operation Theater

Preamble:

Surgical care is an integral part of health care throughout the world, probable 234 million operations performed annually (1). However, surgical care is also associated with a considerable risk of complications and death.

The practice of surgery is very demanding—patients must be scheduled, staff issues dealt with, and numerous other details must be worked out each and every day. With such a high level of activity, there is a tendency to cut corners to fit everything in to the daily schedule; unfortunately, when this occurs, something is compromised. In the area of infection control, any lack of compliance with published guidelines can result in a significant risk for SSIs, disease transmission and patient safety.

Surgical site infections (SSI) are the second most commonly reported nosocomial infection(2) They account for approximately a quarter of all nosocomial infections. They have been responsible for the increasing cost, morbidity and mortality related to surgical operations and continue to be a major problem even in hospitals with most modern facilities and standard protocols of preoperative preparation and antibiotic prophylaxis. SSI rates has varied from a low of 2.5% to a high of 41.9%(3).

A SSI may range from a spontaneously limited wound discharge within 7-10 days of an operation to a life-threatening postoperative complication, such as a sternal infection after open heart surgery(4).

Most SSI are caused by contamination of an incision with microorganisms from the patients own body during surgery.

Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site (5).

Particularly, SSI can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material.

A study on the incidence and nature of in-hospital adverse events has shown that 1 in every 150 patients admitted to a hospital dies as a consequence of an adverse event and that almost two thirds of in-hospital events are associated with surgical care(6).Surgical site infections (SSIs) remain one of the most common causes of serious surgical complications(7); they account for 14% to 17% of all hospital-acquired infections and 38% of nosocomial infections in surgical patients(8,9).

Each SSI is associated with approximately 7-10 additional postoperative hospital days and patients with an SSI have a 2-11 times higher risk of death, compared with operative patients without an SSI(10,11).

SSIs occurs when a bacteria is present within a wound. The bacteria may be transferred by contact from surgeons or nurses' hands, the bacterial could be airborne during surgery, and or the patient may come in contact with bacteria after surgery. The most common forms of bacteria that cause surgical site infections include streptococcus pyogenes, and staphylococcus aureus (About Surgical Care Improvement Project Information, 2007). There are different reasons as to why surgical patients get infected after

In a nested-cohort study carried out in a 750-bed tertiary- care hospital in North Carolina, US, elderly patients with SSIs due to *Staphylococcus aureus* were at increased risk of mortality (odds ratio – OR: 5.4), increased post-operative hospital days (2.5-fold increase) and increased hospital charges (2.0-fold increase) compared with controls (uninfected elderly patients)(12).

According to Nichols, (2001) it is impossible to point out exactly where the SSI come from and how they can be prevented, the researcher closely examines ways of preventing SSIs to save the patient from the pain of going through another surgery (if the surgery has to be repeated), or the torture of having the post operation wound for longer than necessary. Aseptic knowledge and techniques are the basis of SSIs prevention therefore the researchers aim is to research and educate the nurses on the right ways and procedure to follow in hospitals. Researchers also believe the knowledge will save patients extra pain and long hospital stay.

Problem Statement:

People rely on their healthcare system for the maintenance and improvement of health, which often involves care in the hospital setting. Although most patients believe that the healthcare system provides the good quality and safe care, it is estimated that four out of every one hundred hospitalized patients suffers a serious adverse event, many of which are avoidable. In the Institute of Medicine report it is estimated that between 44,000 and 98,000 deaths per year result from adverse events(13). In comparison, there are approximately 45,000 deaths yearly from auto accidents.

Sixty-nine percent of adverse events and deaths in healthcare are due to an error in management and thus are potentially preventable. These types of errors, which include diagnostic failures, treatment errors, errors in prevention, and others including communication failure and equipment failure(14). Some of these errors lead to perioperative infections, a major cause of patient injury, mortality, and healthcare cost. An estimated 2.6 percent of nearly 30 million operations are complicated by surgical site infections (SSIs) each year.

According to the National Nosocomial Infections Surveillance (NNIS) system reports, SSIs are the third most frequently reported nosocomial infection, accounting for 14–16% of all nosocomial infections among hospitalized patients(15). Surgical site infections are a common complication of care, occurring in 2–5% of patients after clean extra-abdominal operations (e.g., thoracic and orthopedic operations) and in up to 20% of patients undergoing intra-abdominal

procedures. When surgical patients with nosocomial SSI died, 77% of the deaths were reported as related to the infection, and the majority (93%) were serious infections involving organs or spaces accessed during the operation. There is a huge gap between the protocols followed by the staff of the hospital and that of the guidelines given by Centres of Disease Control and Prevention, 1999.

The care bundle approach is an accepted method of packaging best, evidence-based measure into routine care for all patients and common to many guidelines for the prevention of SSI. This includes methods for preoperative hair removal (where appropriate), antibiotic prophylaxis, avoidance of perioperative hypothermia, management of perioperative blood glucose, effective skin preparation and many more. This care bundle, when not followed, has lead to increasein case of SSI. There is a huge non abidance by the health care workers on this front. Only after observing the degree and reasons of non abidance, measures to improve abidance of protocol by the health care workers could be formulated to prevent SSI.

An estimated 40–60% of SSIs are preventable with appropriate use of prophylactic antibiotics.(16) Overuse, under use, improper timing, and misuse of antibiotics occurs in 25–50% of operations. A large number of hospitalized patients develop infections caused by Clostridium difficile, and 16% of this type of infection in surgical patients can be attributed to inappropriate prophylaxis use alone(17). Inappropriate use of broad spectrum antibiotics or prolonged courses of prophylactic antibiotics puts all patients at even greater health risks due to the development of antibiotic-resistant pathogens. In addition to the proper use of prophylactic antibiotics and good surgical technique, other factors under the control of the operative team have been demonstrated to affect significantly the risk of SSI.(16) These other factors include preventing hypothermia during the procedure, maintaining high levels of inspired oxygen, controlling serum glucose within certain limits, avoiding shaving the operative site, and other basic prevention strategies. All of these preventive measures provide opportunities for improvement in most hospitals.

Literature Review:

Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site(5).

SSIs occurs when a bacteria is present within a wound. The bacteria may be transferred by contact from surgeons or nurses' hands, the bacterial could be airborne during surgery, and or the patient may come in contact with bacteria after surgery.

The most common forms of bacteria that cause surgical site infections include streptococcus pyogenes, and staphylococcus aureus (About Surgical Care Improvement Project Information, 2007).

There are different reasons as to why surgical patients get infected after surgery; Infections may be caused by endogenous or exogenous sources. Most SSIs are caused by the patient's own bacterial flora. The most common micro organisms causing surgical site infection are

Staphylococcus aureus (20 percent), Coagulase negative staphylococcus (14 percent) and Enterococcus (12 percent) (Bonnie, 2003).

There are different types of bacteria that cause SSI's that may reach the wound and cause an infection. These bacteria may come from the patient's skin or from the environment such as soil, air, or water; for example, many gram- negative bacteria produce endotoxin which stimulates cytokine production. In turn, cytokine can trigger the system inflammatory response syndrome that sometimes leads to multiple system organic failure. Infections may also come from the instruments used during surgery. Other bacteria's may come from the body within where they normally live without doing any harm (Mangram, Teresa, Michele, Leah, William, 1999, 25).

SSI is associated with a mortality rate of 3%, and 75% of SSI- associated are directly attributable to the SSI.(24)
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.(25)
In a baseline U.S. study, selection of the right antibiotic was averaged at 64%, the right timing of antibiotic administration within 60 min of skin incision was at 83% and cessation of surgical antibiotic prophylaxis within 24h was at 44%.(26)
Kirkland et al.showed that patients who developed SSI have 60% more changes of prolonged intensive care unit stay, fivefold increased risk of readmission to the hospital and two-times higher rate of mortality compared to patients who had no SSI.(27)

Particularly, SSI can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material

There are 3 different types of surgical site infection defined by the Centers for Disease Control and Prevention (CDC): *superficial* infections, *deep incisional*infections and infections involving *organs or body spaces*(18) .

Surgical site infection classification:

1) **<u>Superficial Incisional SSI</u>**

Infection occurs within 30 days after the operation and infection involves only skin or subcutaneous tissue of the incision and at least one of the following:
1. Purulent drainage, with or without laboratory confirmation, from the superficial incision.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
3. At least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat and
superficial incision is deliberately opened by surgeon, unless incision is culture-negative.
4. Diagnosis of superficial incisional SSI by the surgeon or attending physician.
Do not report the following conditions as SSI:
1. Stitch abscess (minimal inflammation and discharge confined to the points of suture penetration).
2. Infection of an episiotomy or newborn circumcision site.
3. Infected burn wound.
4. Incisional SSI that extends into the fascial and muscle layers (see deep incisional SSI).

2) Deep Incisional SSI

Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves deep soft tissues (e.g., fascial and muscle layers) of the incision and at least one of the following:
1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site.
2. A deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms: fever (> 38oC), localized pain, or tenderness, unless site is culture-negative.
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of a deep incisional SSI by a surgeon or attending physician.

3) Organ/Space SSI

Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation *and* infection involves any part of the anatomy (e.g., organs or spaces), other than the incision, which was opened or manipulated during an operation and at least one of the following:
1. Purulent drainage from a drain that is placed through a stab wound into the organ/space.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space.
3. An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of an organ/space SSI by a surgeon or attending physician.

The degree of surgical site contamination at the time of surgery influences the probability of surgical site infection.
According to the presence and degree of contamination, wounds can be classified as: "clean wounds", "clean-contaminated wounds", "contaminated wounds", "dirty or infected wounds" (18,19,20).
Infection rates in the four surgical classifications have been published in many studies. Before antibiotic prophylaxis was routinely used, the rates were about 1-2% for clean wounds, 6-9% for clean-contaminated wounds, 13-20% for contaminated wounds and 40% for dirty wounds. As the level of bacterial burden is the most significant risk factor for SSIs, the use of prophylactic antibiotics has markedly reduced this risk(21), particularly with surgical procedures at high risk of infection, such as those involving the gastrointestinal tract (22).

Microbiology of surgical site infections:
Effective perioperative care is imperative for the prevention of SSIs and must address the microorganisms most likely to be encountered during the planned procedure(23).
S. aureus from the patient's own skin microbial flora is the most common pathogen isolated from postoperative wound infections in clean surgical procedures.(23)

S. aureus, coagulase-negative staphylococci, Enterococcus species and Escherichia coli (E. coli) are the most frequently isolated pathogens in SSIs and the presence of each is determined primarily by the anatomical location and inherent contamination of the surgical site(23).

A major concern associated with the prevention of SSIs is the emergency of antibiotic-resistant bacteria. An increase in antibiotic resistance has occurred specifically with vancomycin-resistant

E. coli and imipenem – and quinolone- resistant Pseudomonas aeruginosa. The recent emergence of S. aureus species with a decreased sensitivity to vancomycin is alarming, especially because S. aureus infections are common among SSIs.(23)

Risk factors for SSI development:

Risk factors for the development of an SSI correspond with wound, procedural and patient variables that are significantly associated with and act as valid predictors for the development of an infection after a surgical procedure. The risk factors associated with SSIs are started in (Table 1)(23).

Table 1: Patient and operation risk factors for SSI(23)

Patient	Operation
• Age • Nutritional status • Diabetes • Smoking • Obesity • Steroids • Altered immune system • Length of preoperative stay • Coexistent infections at a remote body site	• Duration of surgical scrub • Skin antisepsis • Preoperative Clipping • Preoperative skin preparation • Duration of operation • Antimicrobial prophylaxis • Operating room ventilation • Wound class • Inadequate sterilization of instruments • Foreign matter in the surgical site • Surgical drains • Surgical techniques

There are many more risk factors which need to be further investigated.

Research Question:

Is there abidance of protocols by Health care workers/ surgical team to prevent Surgical Site Infection.

Objective:

The primary goal of the study is investigate the prevalence, causes, management and outcomes of surgical site infections in OT department at Fortis Memorial Research Institute, Gurgaon.

Specific objectives:

To study to analyse the abidance of protocols / guidelines by Health care workers/ surgical team to prevent Surgical Site Infection. This includes Doctors, nurses and technicians engaged in all operration theatres.

Research Methodology:

Study Design:

Observational study

Study population:

Patients, undergoing surgery,from 4th April to 2nd June 2016 in Fortis Memorial Research Hospital, Gurgaon.

Study Area:

288 bedded FMRI (11 Operation Theaters)

Sample Method:

Purposive Sampling.

Sample size:

57 Patients were observed during the summer training.

Data collection tool:

Checklist was prepared as per the Guidelines for prevention of surgical site infection-1999. It consists preoperative, intraoperative and postoperative measures to prevent surgical site infection.

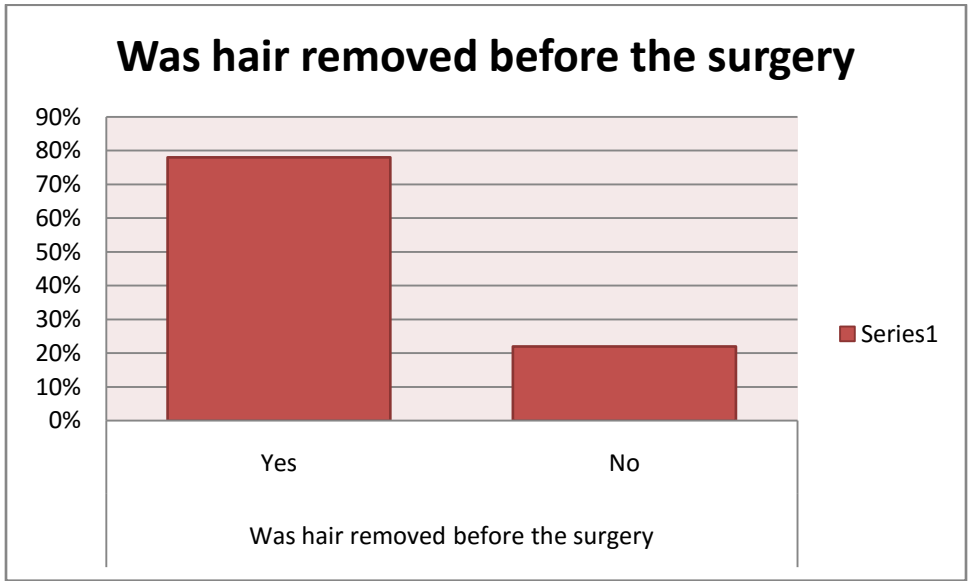
Observational and Analysis:

- Total 57 surgeries were taken as sample.
- 4-5 surgeries from different departments(Nephrology, ENT, Oncology,Orthopaedics, Urology,Obstetrics & Neurosurgery,MABGIS) were obsereved as per the checklist prepared, according the Guidelines for prevention of SSI,1999.
- Preoperative measures were observed in ward and preoperative room before the patient reached the Operation Theater.
- Intraoperative measures were observed in the Operation theater (OT).
- Postoperative measures were observed after the patient was shifted from OT to ward.

1) **Preoperative Strategies:**

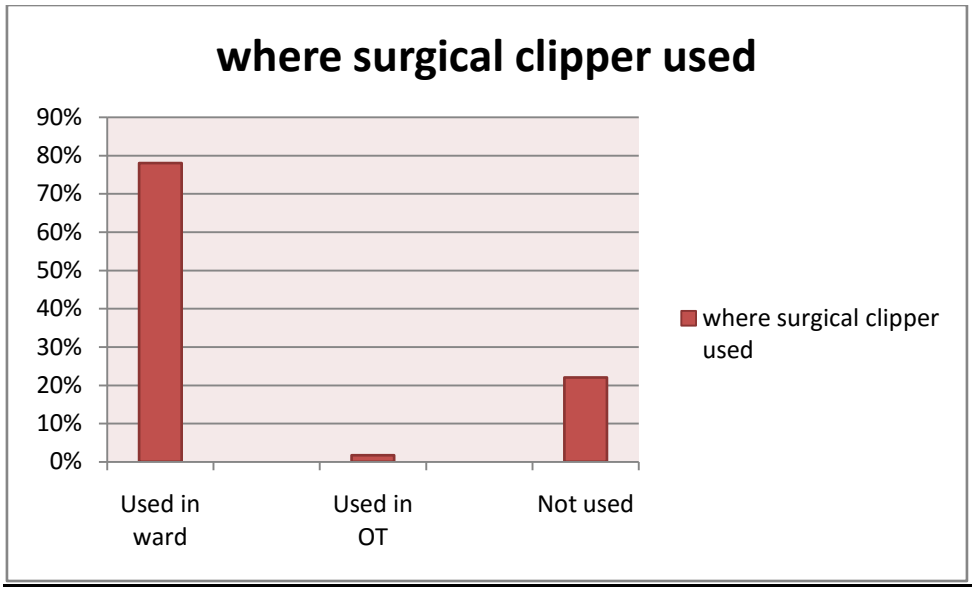
Preparation of patient:
Preoperative skin preparation: The preoperative skin preparation of both the patient and the surgical team are essential in the prevention of SSIs. The mainstays of these recommendations are preoperative showering and skin antisepsis of the patients and scrubbing for the surgical team.

a) **Preoperative hair removal:**
It is recommended that if hair removal is necessary, the use of clippers or depilatory agents is preferable over shaving to reduce the risk of surgical site contamination. Clipping hair immediately before an operation also has been associated with a lower risk of SSI than shaving or clipping the night before.



Interpretation:
Preoperative hair removal was done in 79% cases. 22% of cases reported to hospital clean shaved, hence not applicable for next parameter.

Interpretation:
In 1% case hair removal was done just before the surgery and in 22% cases in morning.



Interpretation:

In 79% cases which were applicable, hair was removed using surgical clippers, in ward

In 1% case clipper used in OT. Other were clean shaved.

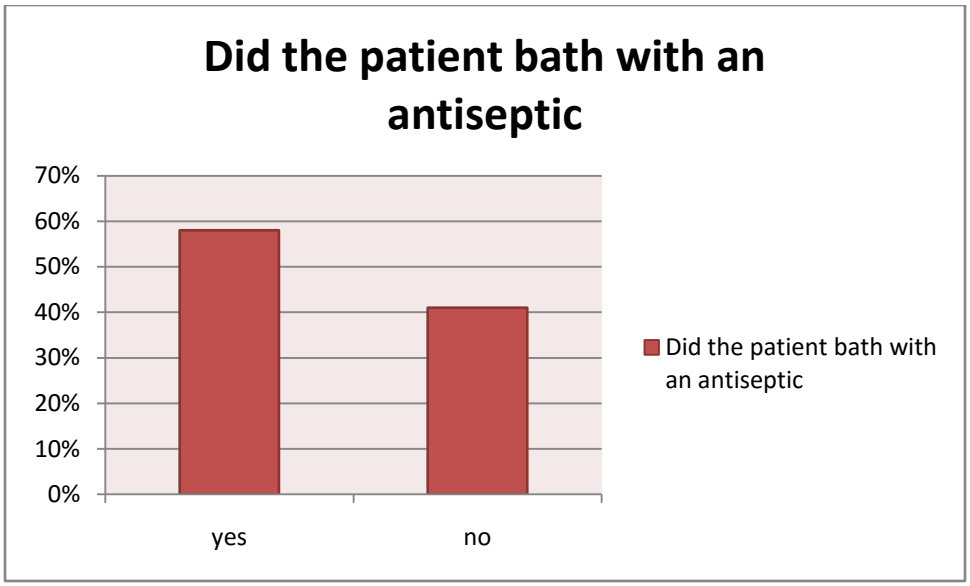
b) Preoperative Showering:

It is recommended that preoperative showering by the patient the day before surgery because most SSIs are associated with skin flora.

Showering with an antiseptic or detergent agent can significantly decrease skin microbial counts. Using Chlorhexidine has been shown to reduce skin bacterial counts as much as 9 folds, whereas povidone-iodine and triclocarban soap reduces skin bacterial counts 1.3 fold and 1.9 fold.

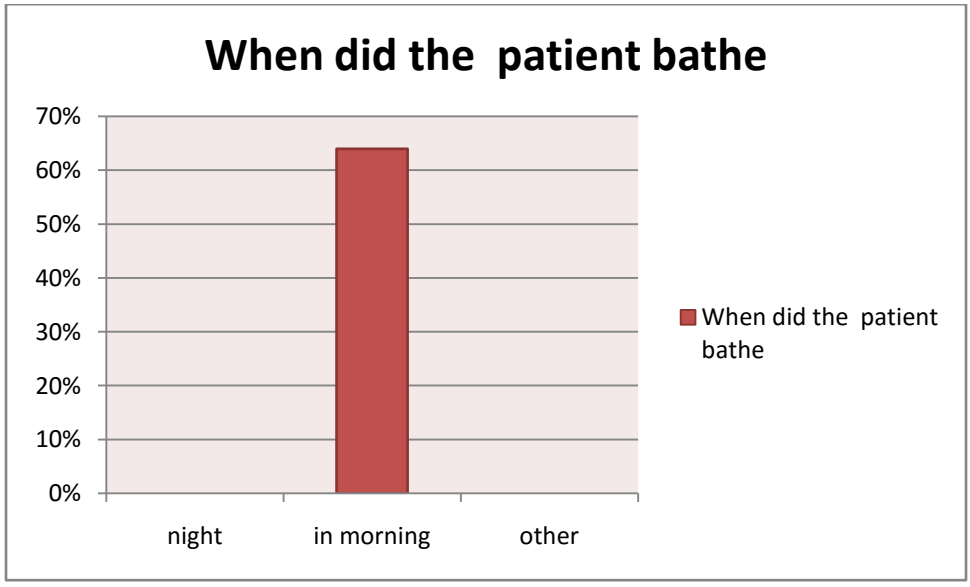
Skin antisepsis: Many agents are available for use as skin antiseptic agents and are, in general, combinations of iodophors, chlorhexidine gluconate (CHG), Parachlorometaxylenol (PCMX)and alcohol. Understanding the mechanism of action of each of these agents is critical to choosing the best agent for antisepsis.

The antibacterial action of iodophors occur by penetration of the bacterial cell wall, allowing iodine entry.The Bactericidal activity of CHG accurs by disrupting the cytoplasmic membrane. PCMX exerts its effects by in activating bacterial enzymes. Alcohol primarily denatures proteins.



Interpretation:

59% of cases were showered with an antiseptic solution before surgery.

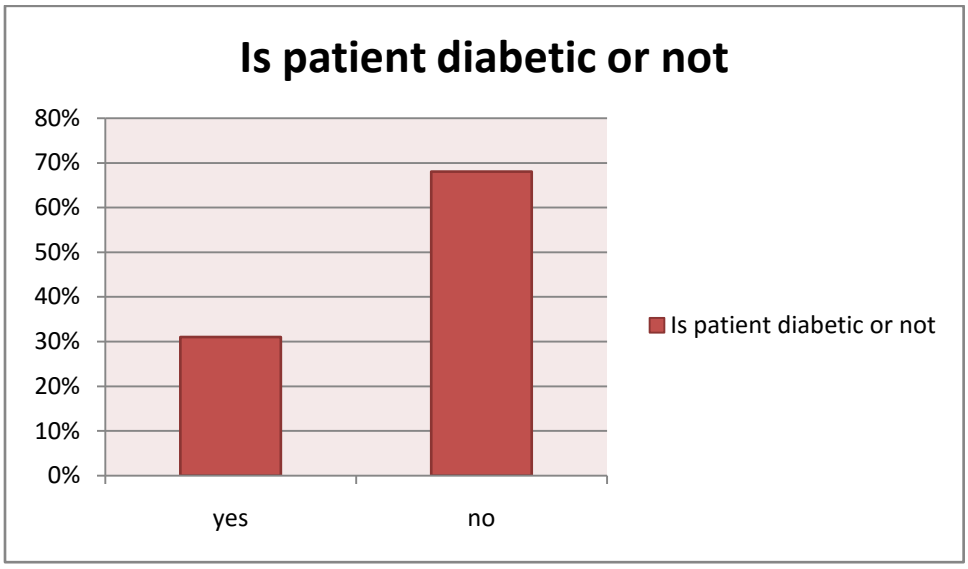


Interpretation:

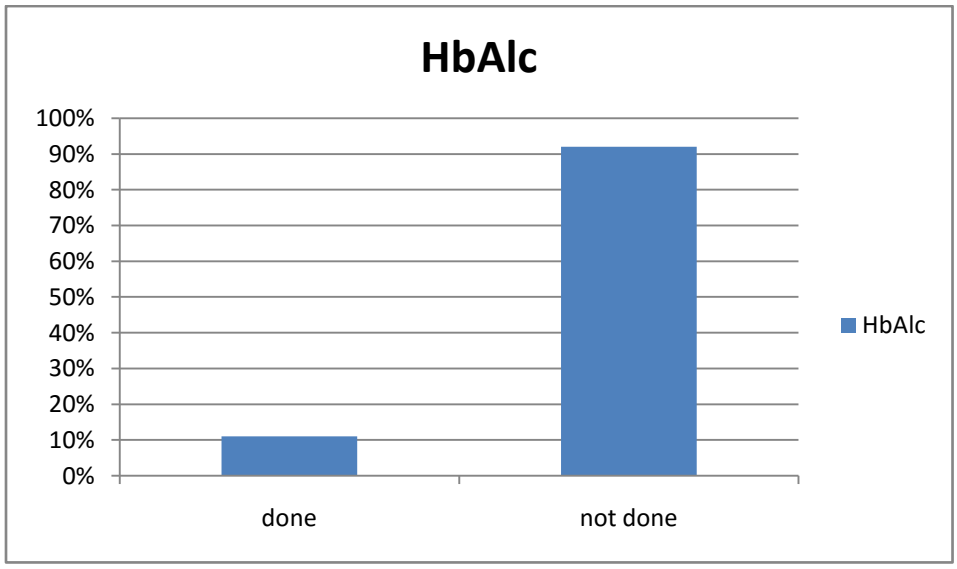
100% cases showered in morning before the surgery

c) Pre- and perioperative glucose control:

Elevated blood glucose levels in the postoperative period are associated with an increased risk for developing an SSI. Therefore, it is crucial to control blood glucose levels in patients with diabetes before they undergo surgical procedures and to avoid hyperglycaemia during the procedures.
High level of HbAlc increases the risk of developing SSI.
Increased blood glucose levels (>180 mg/dl) during any procedure also predisposes the patient for developing SSI.

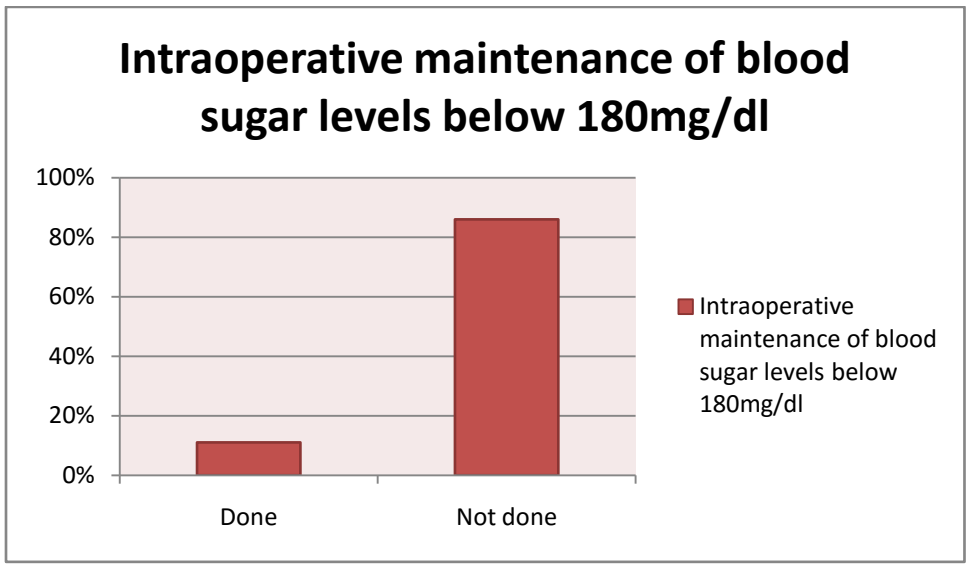


Interpretation:
Out of 57 cases, 30% were diabetics.



Interpretation:

HbA l c levels were checked in 11% of cases.



Interpretation:

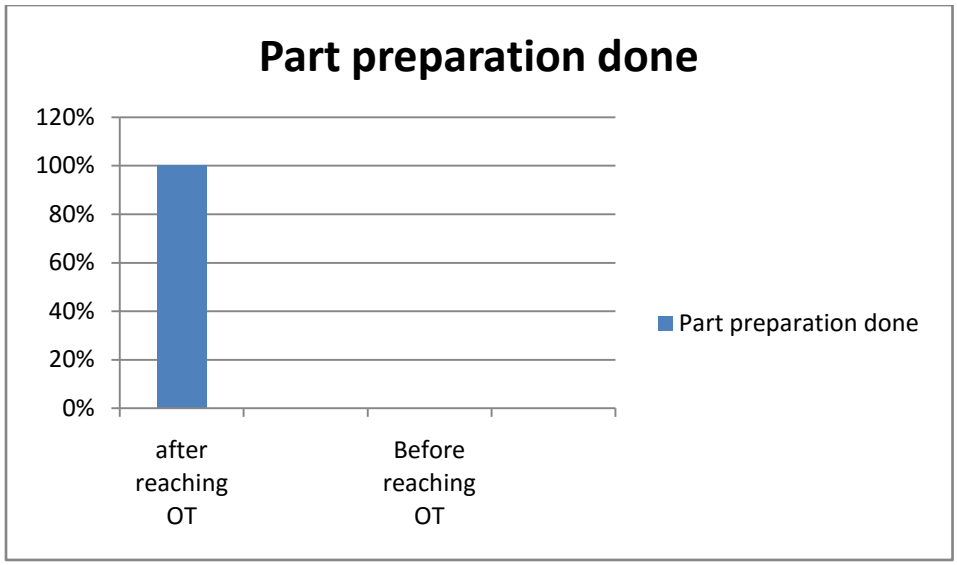
Intraoperative blood sugar level were maintained in 11% cases , other were not applicable

Preoperative part preparation and solution and technique:

Part preparation before the surgery reduces the risk of developing SSI.

Only HICC approved agents should be used for part preparation.

Part preparation is done in concentric circles or starting from incision site to the periphery.

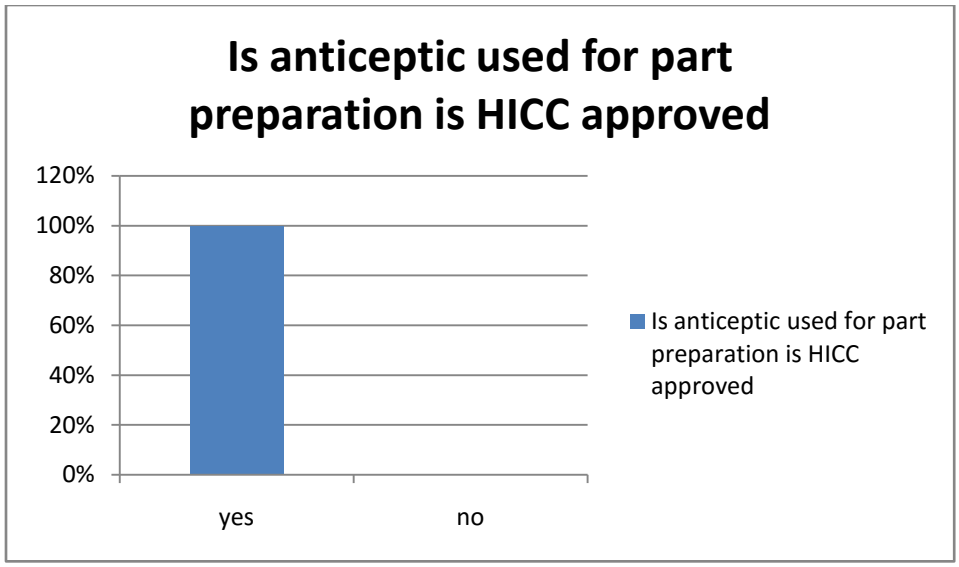


Interpritation:

100% of cases part preparation done after reaching OT.

Interpretation:

Incision site was washed and cleaned in 100% of cases.

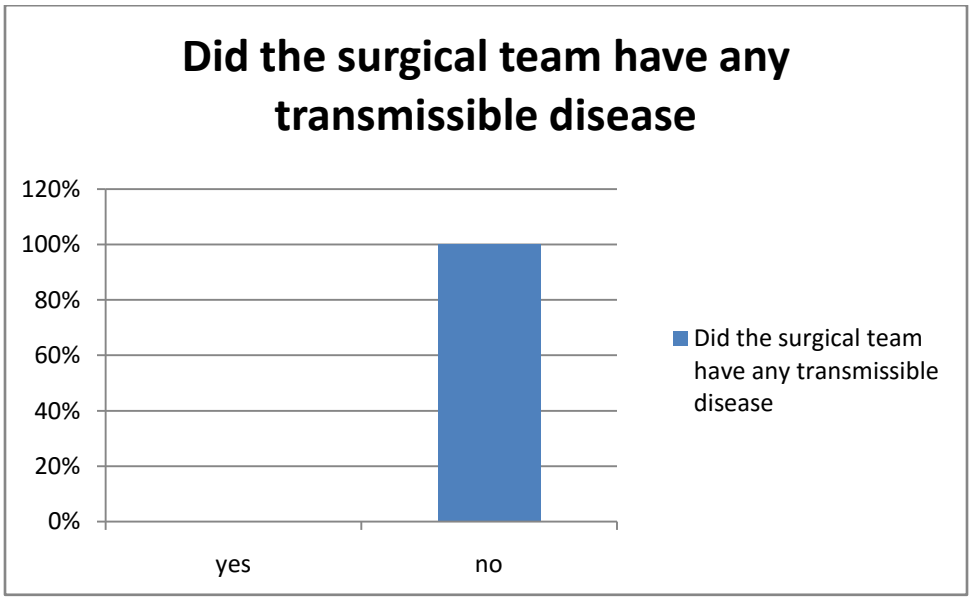


Interpretation:

The antiseptic used for part preparation was 100% according to the HICC approved list .

d) Management of infected personnel:

When surgeon is having any transmissible disease, the surgeon must take an off or not perform any surgery as it increases the risk of SSI. The surgeon and surgical team must take appropriate precautions when having any transmissible disease.

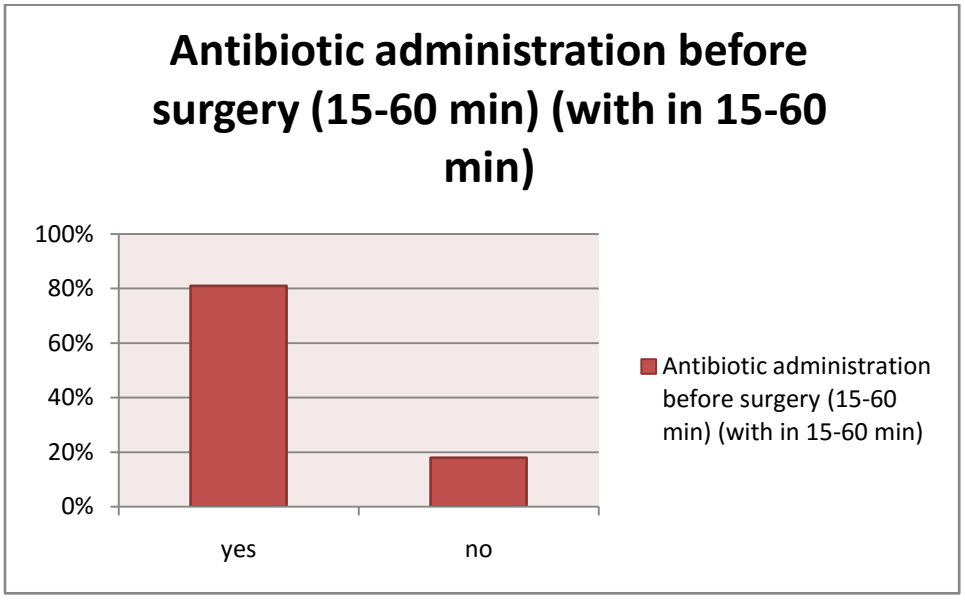


Interpretation:

In 57 cases , no transmissible disease found.

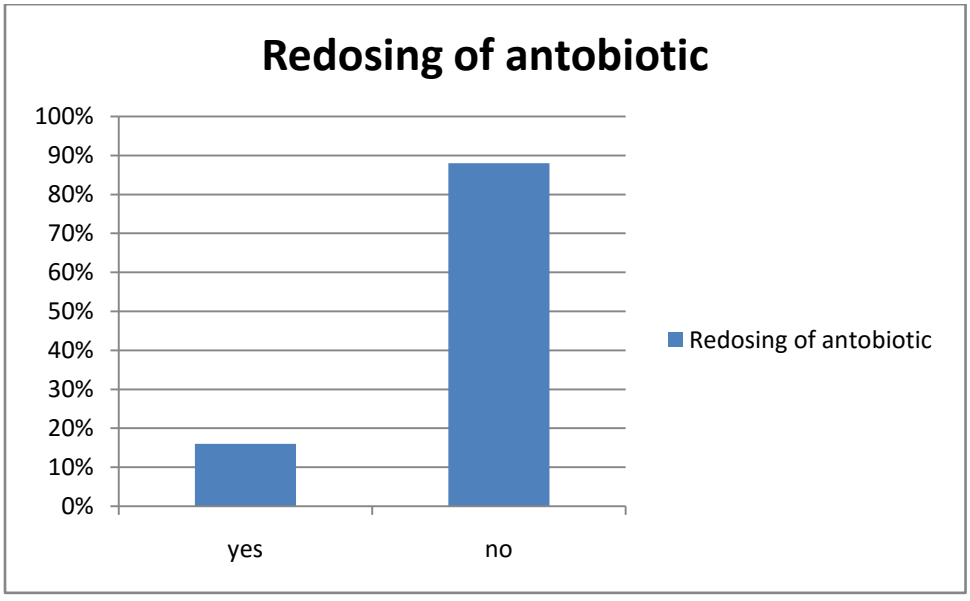
e) Antimicrobial Prophylaxis:

Prophylactic antibiotic must be administered before each surgery to reduce the risk of SSI. Re-dosing of antibiotic must be done if the duration exceeds 4 hours.



Interpretation:

Prophylactic antibiotic was administered in 80% of cases as other were not applicable.



Interpretation:

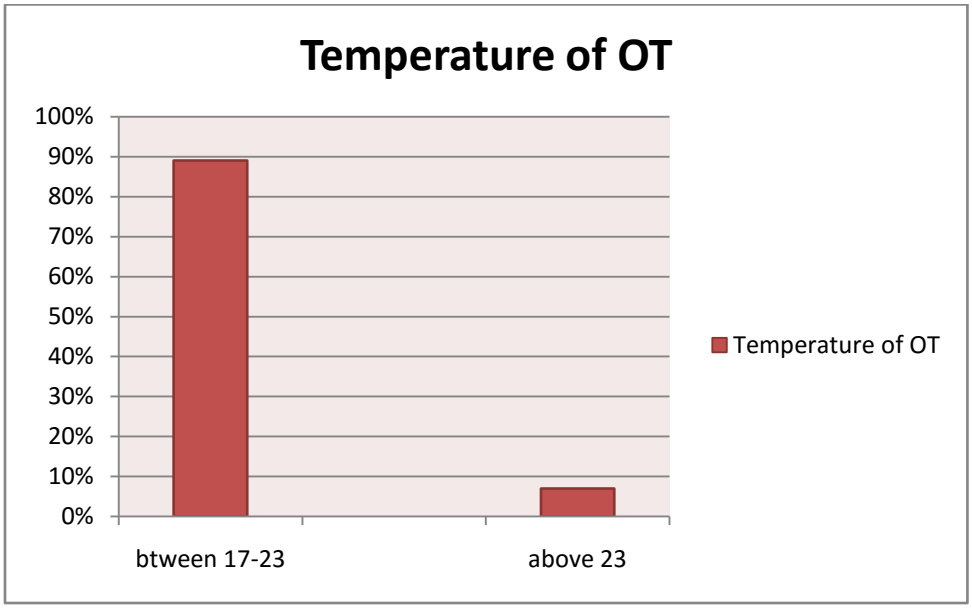
Re-dosing of antibiotics was done in 16% cases as in others not applicable.

2) Inra-operative Strategies:

a) Environment of OR:

Temperature of OR:

Temperature of Operating room must be between 17 and 23 degree C .

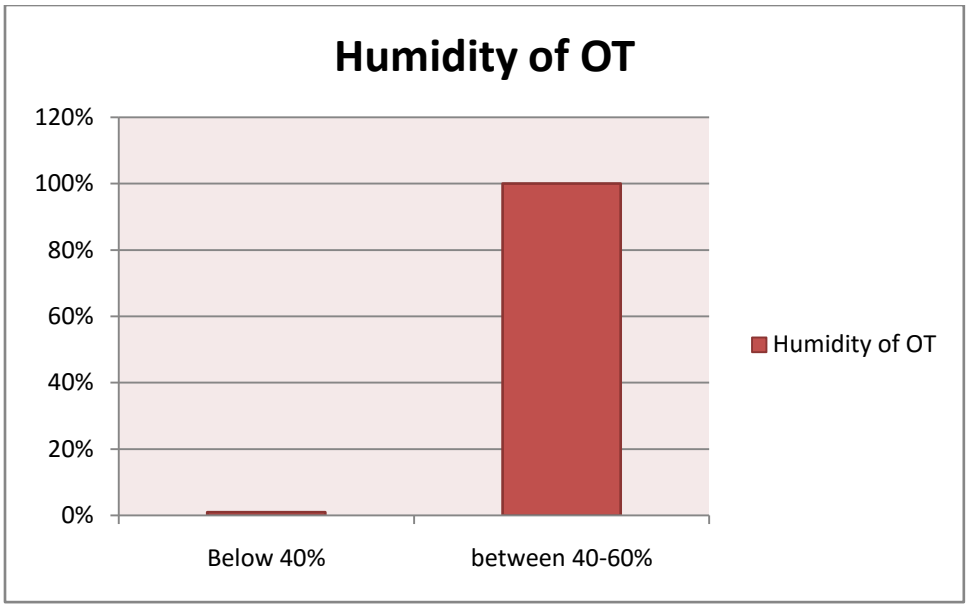


Interpretation:

In 89% of cases OR temperature was between 17-23 degree C.

Humidity of OR:

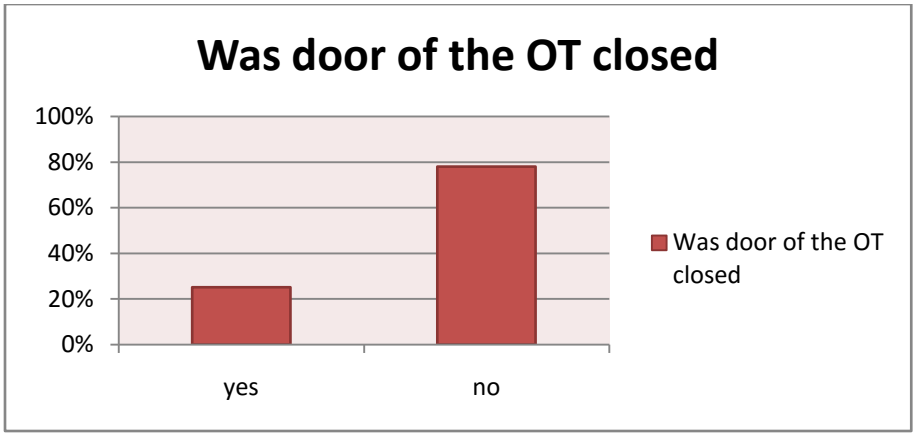
Humidity must be between 40-60%.



Interpretation:
Humidity in OR between 40-60% is 99% and 1% below 40%.

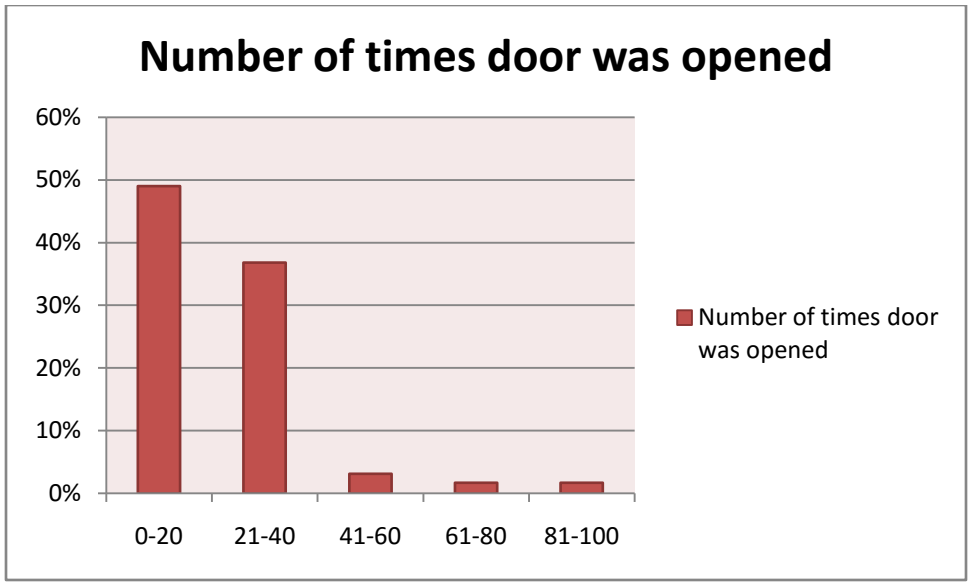
b) Doors of OR:

Door of OR must be kept closed. Door could be opened only for passage of patients, equipments and surgical team.



Interpretation:

Only 21% of doors were kept closed throughout the surgery and 79% was opened.



Interpretation:

Mximum times door opened was between 0-20 i.e.49%and between 21-40 = 36.8%.

c) Surgical attire and drapes:

Wearing of surgical mask during operations prevent potential microbial contamination, hence SSI is prevented.

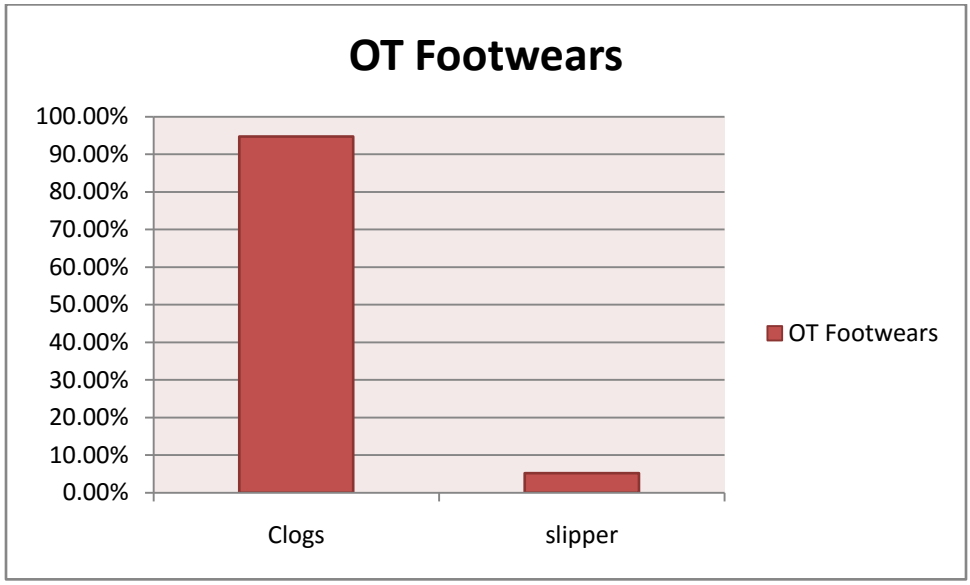
OT foot wears protect the surgeons from potential infections in OR.

Head caps reduce contamination of surgical field by organism shed from the hair and scalp and hence SSI is prevented.

All the members of the surgical team must wear sterile gloves to prevent SSI.

Interpretation:

Surgical mask was worn over nose 87.7%, worn over mouth 7%, worn below mouth3.5%



Interpretation:

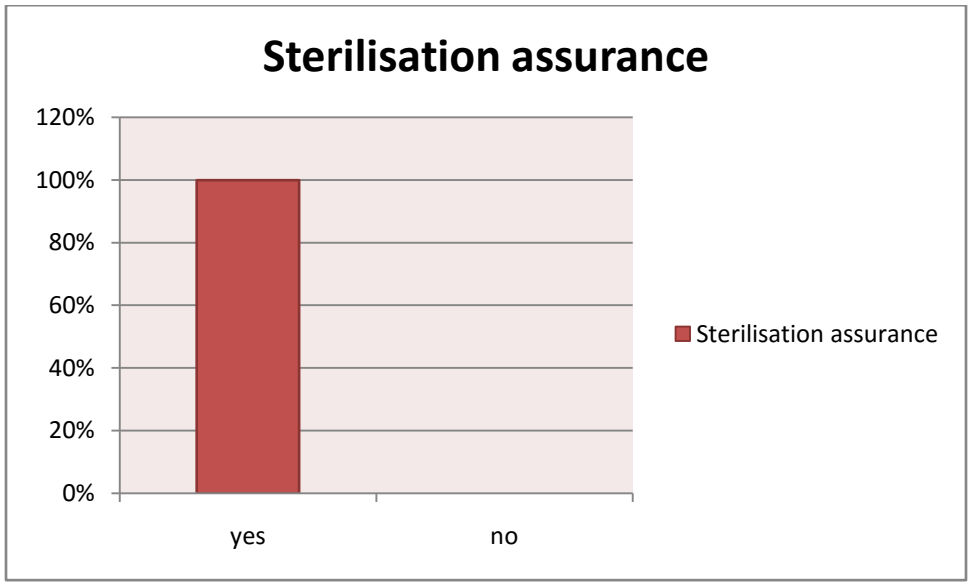
Proper OT footwears were worn in 94.7%cases

Interpretation:

Wearing head caps was observed to be 85% , but in 15% hair were out.

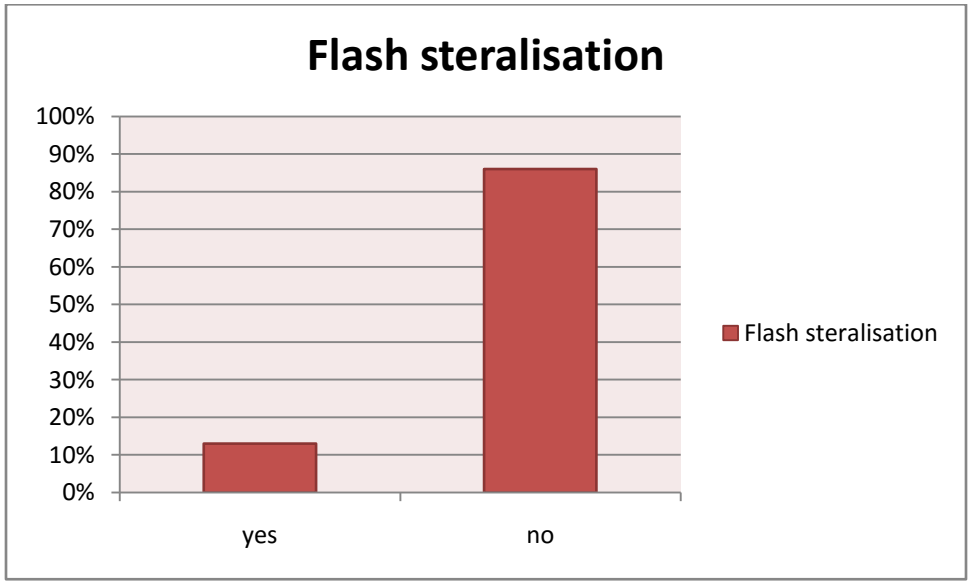
d) Sterilisation assurance:

Inadequate sterilization of surgical equipments results in SSI outbreak.
Flash sterilization only for patient care items that will be used immediately.
Flash sterilization is done to use dropped instrument .



Interpretation:

Sterilization assurance is observed 100%.



Interpretation:

Use of flash sterilization 13%, and non use 86%.

e) Use of mobile phones in OT:

Mobile phones should not be used in ot it may be source of infection. Mobile phones have been the source of communication within the hospital. According to a resent research by Ulger, Esan, Dilek, Yanik, Gunaydin and Leblebicious (2009, 1-2) hospital operating rooms (OR) and intensive care units (ICU) are the workplaces that need highest standard of hygiene, also the same requirements for the personnel working there and the equipment used by them. They did not do a direct comparison of transmission rate of bacteria from surface to hands. Risk of infection involved in using mobile phones in the OR has not yet been determined as there are no cleaning guidelines available that meet hospital standards. However,mobile phones are used routinely all day long but not cleaned properly as healthcare workers may/do not wash their hands as often as they should. They found out that healthcare workers hands and their mobile phones were contaminated with various types of microorganisms. Mobile phones used by healthcare workers may be the source of nosocomical infections in hospitals

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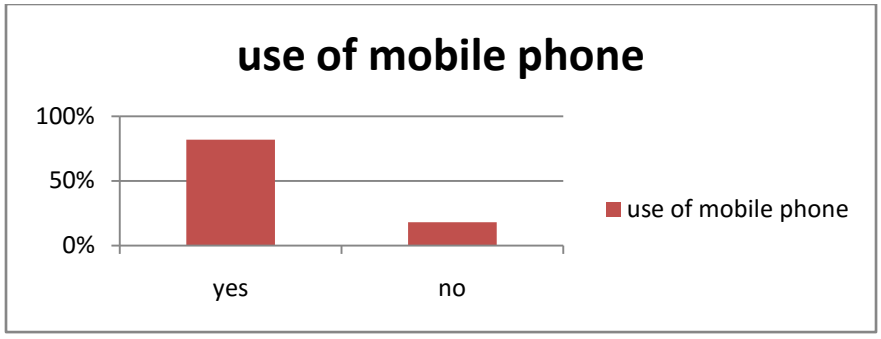
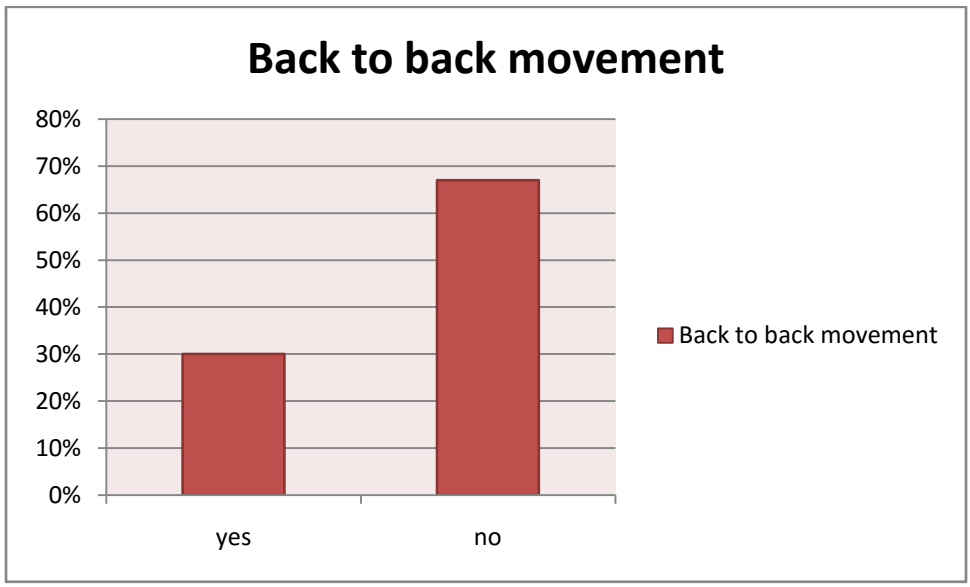


Interpretation:

Mobile phone in OR in 82% cases.

f) Back to back movement:

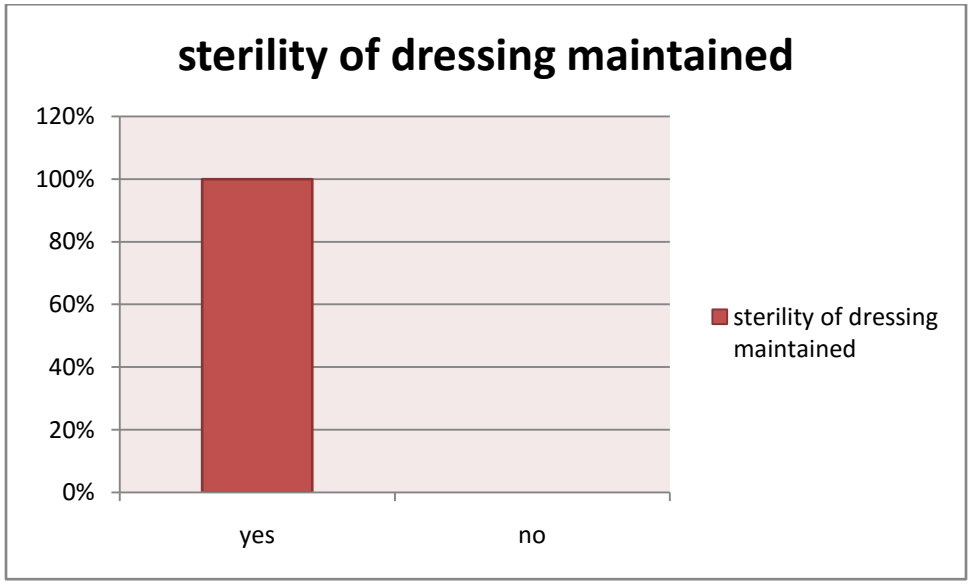
Back to back movement must be thoroughly followed while changing positions to prevent SSI. Less movements must be there in OT .

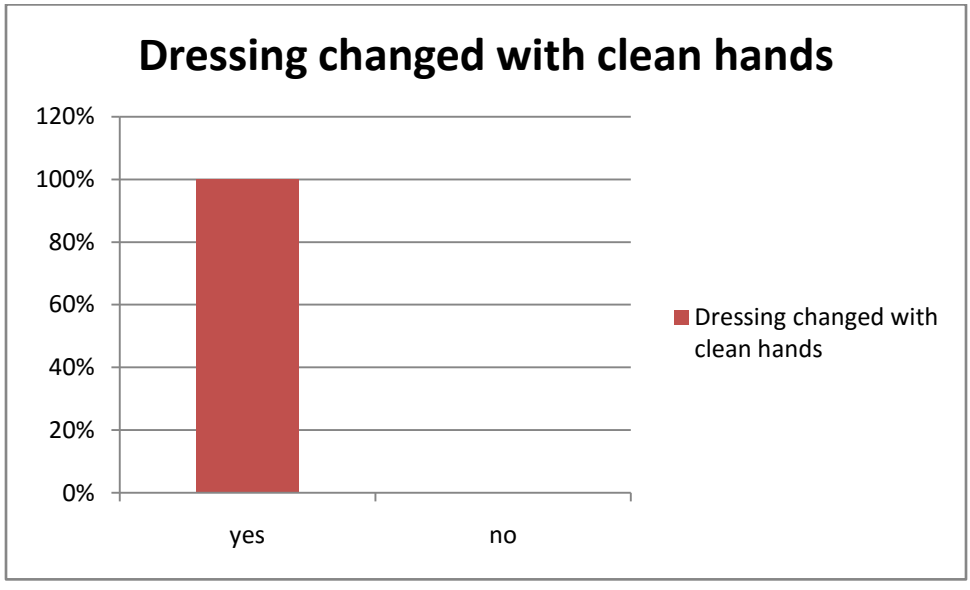


Interpretation:

Back to back movement was seen in 30% cases.

3) **Postoperative strategies:**
   a) **Sterility of dressing:**
   Sterile dressing must protect the incision for 24-48 hours.
   Hands must be washed before after changing the dressing and any contact with surgical site.





Interpretation:

Sterility of dressing was maintained in 100% cases.

Change of dressing with clean hands in 100% cases.

Results:

1) **Preoperative strategies:**
   a) Pre operative hair removal – 79%
      Clipper used – 100%
      Just before surgery – 1%
      In morning – 22%
      In night – 57%

   b) Pre operative showering
      Patient bath with antiseptic – 59%
      In morning – 100%

   c) Pre operative glucose control
      Diabetic – 30%
      HbAlc levels done – 11%
      Intra operative blood sugar level maintained – 11%

   d) Part preparation
      After reaching OT – 100%
      Incision site washed & clean – 100%
      HICC approved antiseptic – 100%

   e) Management of infected personael
      Any transmissible disease in surgical team (no) – 100%

   f) Antibiotic prophylaxis
      Administered – 80%
      Redosing – 100%

2) **Intra operative strategies:**
   a) Environment of OR
      Temperature of OT- 90%
      Humidity of OT – 100%

   b) Door of OR – 21%

   c) Surgical attire & draps

Surgical mask – 87%
OT Footwears – 94.7%
Headcaps – 85%
Surgical gloves – 100%

d) Sterilization assurance – 100%
e) Used of mobile phone in OR – 82%
f) Back to back movement – 30%

3) Postoperative strategies

Stertility of dressing maintained – 100%
Dressing changed with clean hand - 100%

The average abidance of protocol by health care workers/ surgical team for prevention of SSI at FMRI, Gurgaon is 72.8%.

Recommendations:

Based on the findings, it is recommended that:

1. The surgical cases encountered at the hospital should be properly group or colour codes can be used according to wound class at the ward to avoid cross transfer of infections. Such demarcations should be strictly adhered and not flouted.

2. Strict surgical technique should be adhered to, in the theatres during surgery.

3. The infection prevention and control team should consistently be supplied with needed logistics so they can maintain the highest possible standards of hygiene at the wards, in theatres, and the hospital environment at large.

4. The number of people, as well as the opening and closing of doors of the operating rooms should be restricted to reduce contamination.

5. Seminars must be conducted on Antimicrobial Stewardship and then post test studies should be conducted so as to monitor its sustenance by the Quality department.

6. HbAlc levels must be tested for all the patients undergoing surgeries and required precautions must be taken if these levels are beyond permissible limits.

7. An automatic system should be installed for the maintenance of optimal temperature and humidity in OT as per the hospital policy and a regular check must be done by a member of the OT committee.

8. A checklist should be made including all the parameters leading to increased SSIs with the help of the anaesthetist, surgeons and nurses and assurance of incorporation of this checklist in patient's medical record before surgery and making sure that it followed.

9. All guidelines and protocols must be followed for all the patients undergoing surgeries to prevent SSI.

10. A survey should be done by interviewing all the members of the surgical team/ health care workers to know the reasons, why there is non abidance and then to work on these reasons a committee should be formed who can discuss and make a solution to their problem and then these solution should be implemented in the hospital to reduce SSI.

Conclusion:

The study revealed that the average abidance of protocol by health care workers/ surgical team for prevention of SSI at FMRI, Gurgaon is 72.8%. SSI can be prevented if health care workers/ surgical team abide all guidelines laid out by CDC.

The quality of management of SSI at the hospital was good and in line with standard protocols, Mortality rate was low but in some variables non abidance has been observed only few variables were followed 100% by the health care workers / surgical team. There is huge gap between what is been followed and the guidelines or protocol to prevent SSI.

To prevent the incidence of SSI above recommendation should be followed so that there is abidance of protocol by the health care workers / surgical team. Hospital must work on this for the welfare of patients and reduce SSI.

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