

SUMMER PLACEMENT
In
MAX SUPER SPECIALITY HOSPITAL, SAKET, NEW DELHI

(April 3rd to June 2nd, 2015)

REPORTS ON:

1. Critical Analysis of Infection Control Measures and Compliance factors in Dialysis Unit.
2. Marketing Strategic Model of Revenue Escalation for Medical Tourism.
3. The Supply Chain and Distribution Management Study of Central Pharmacy.
4. Brain Death Declaration and its Medico legal Aspects (Review Study).
5. Enabling technologies for achieving best practices in CSSD.
6. Bill Till Date (BTD) - Process (Descriptive Study).

By

Dr. SUSHMA .R. PATHAK

MBA Hospital and Health Management

2014-2016



Institute of Health Management Research, Jaipur

CERTIFICATE

This is to certify that Dr. Sushma R. Pathak has undergone her Summer Training in Max Super Speciality Hospital, Saket, New Delhi from 3rd April, 2015 to 2nd June, 2015. The candidate herself carried out all the studies related to her Summer Training. Her approach to the study has been scientific and analytical.

The Summer Training is partial fulfilment of the course requirement recommended for the award of Master of Business Administration in Hospital and Health Management Degree.

I wish her success in all her future endeavours.



Col. (Dr.) Ashok Kaushik

Professor, Dean (Academics and Student Affairs)

IIHMR University,

Jaipur



Dr. Suresh Joshi

Professor

IIHMR University,

Jaipur

SUMMER TRAINING CERTIFICATE:

This is to certify that Sushma. R. Pathak, student of IIHMR University, Jaipur, Batch- 19th, has successfully completed her Summer Training of 2 months from 2nd April 2015 to 3rd June 2015.

She has done the following projects under the guidance of Dr. Gaurav Sharma in various departments of MAX Super Speciality Hospital, Saket, New Delhi :-

1. Critical Analysis of Infection Control in Dialysis Unit.
2. Marketing Strategic Model of Revenue Escalation for Medical Tourism.
3. Enabling technologies for achieving best practices in CSSD.
4. The Supply Chain and Distribution study of Central Pharmacy.
5. Brain Death Declaration and its Medico legal Challenges.
6. Bill till Date – Process.

The project on evaluation fulfils all the stated criteria and the student's findings are her original work.

I hereby certify her work as excellent/good/satisfactory to the best of my knowledge.



Dr. Gaurav Sharma

Deputy Medical Superintendent,

MSSH, Saket, New Delhi

Date: 2nd June, 15

Dr. Gaurav Sharma
Deputy Medical Superintendent
Max Super Speciality Hospital
1, Press Enclave Road, Saket
New Delhi - 110017

CERTIFICATE OF COMPLETION

This is to certify that

Dr. Sushma R Pathak

has been associated as an

INTERN

with the department of

HOSPITAL ADMINISTRATION

for a period of

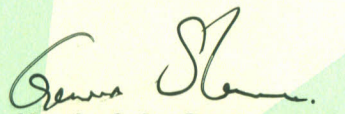
3rd April 2015 to 2nd June 2015

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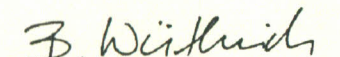
Max Super Specialty Hospital,

Saket, New Delhi

"The Internship/Observership course is a Max certified course not
affiliated to any National/International society".


Head of the Department


Dr. Shubnum Singh
Dean - Nursing, Allied Health, & Wellness Programs
Max Healthcare, New Delhi


Ms. Brigitte Wuethrich
General Manager
Max Institute of Medical Excellence
Max Healthcare

ACKNOWLEDGEMENT:

Summer Training is successful largely due to the effort of a number of dextrous people who have always given their valuable advices or lent a helping hand. I sincerely appreciate the inspiration; support and guidance of all those people who have been instrumental in making this summer training a success.

I, **Dr. Sushma .R. Pathak**, the student of **IIHMR University, Jaipur**, consider it as privilege and honour to work as a summer trainee at **Max Super Speciality Hospital, Saket, New Delhi** for 2 months.

At this juncture, I feel deeply honoured in expressing my sincere thanks and gratitude to my **Mentor, Dr. Gaurav Sharma, Deputy Medical Superintendent, MSSH, Saket, New Delhi** for the confidence bestowed in me and for making resources available at right time and providing valuable insights leading to successful completion of my projects during summer training.

I also wish to extend a special thanks to **Chambesh Kumar, Deputy Head, Finance (IP Billing)**, for their aspiring guidance, invaluable constructive criticism and friendly advices during the training period.

I am sincerely grateful to **Kirti Dahiya, Deputy Head Marketing**, for sharing their truthful and illuminating views on a number of issues related to the project.

I am obliged to all the staff members of **Institute of Renal Sciences, MSSH, Saket, New Delhi** for the valuable information provided by them in their respective fields. I am grateful for their co-operation during the course of my training period.

I express my heartfelt appreciation to **IIHMR University** for arranging the summer training and owe my profound gratitude to my **College Mentor Dr. Suresh Joshi, Professor IIHMR University, Jaipur**, who helped me throughout for solving various doubts and queries.

A million thanks to all the **employees of MSSH**, without whose cooperation the training would not have been successful. At the end, I would like to thank my family and friends for being a constant source of inspiration to me.

Dr. Sushma R. Pathak

ABBREVIATIONS:

Sr. No	Abbreviation	Meaning
1.	BBV	Blood Borne Viruses
2.	BSI	Blood Stream Infections
3.	CAUTI	Catheter Associated Urinary Tract Infections
4.	CAPD	Continuous Ambulatory Peritoneal Dialysis
5.	CDC	Centres for Disease Control and Prevention
6.	CKD	Chronic Kidney Disease
7.	CLABSI	Central Line Associated Blood Stream Infection
8.	CPRS	Computerised Patient Record System
9.	CSSD	Central Sterile Supply Department
10.	CVC	Central Venous Catheter
11.	ESRD	End Stage Renal Disease
12.	HBV	Hepatitis B Vaccine
13.	HCV	Hepatitis C Vaccine
14.	HD	Haemodialysis
15.	HDF	Haemodiafiltration
16.	HIA	Hospital Acquired Infections
17.	HIS	Hospital Information System
18.	ICP	Infection Control Practitioners

19.	ICU	Intensive Care Unit
20.	IP	In Patient
21.	IPS	International Patient Services
22.	JCI	Joint Commission International
23.	KTP	Kidney Transplant Patient
24.	MRSA	Methicillin Resistant Staphylococcus Aureus infections
25.	MSSH	Max Super Speciality Hospital
26.	NABH	National Accreditation Board for Hospitals and Healthcare Providers
27.	OPD	Out Patient Department
28.	PD	Peritoneal Dialysis
29.	PPE	Personal Protective Equipment
30.	THOA	Transplant of Human Organs Act
31.	VAE	Ventilator Associated Events
32.	VAP	Ventilator Associated Pneumonia
33.	VRE	Vancomycin Resistant Enterococci

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OBSERVATIONAL HOSPITAL LEARNINGS:

SUMMER TRAINING:

Summer Training is an intrinsic part of MBA HM course and is done after the completion of 1st year for duration of 2 months. During this period, the student is expected to use the things he/she has learned in the organisation and put them into practice. This way the student gains work experience in their field of study. The gained experience will be helpful to finish the final year of study.

SUMMER INTERNSHIP (Dissertation internship):

Summer Internship is mostly done by students who are in their final year. With this kind of internship a student does research for a particular organisation. The company can have something that they feel like they need to improve, or the student can choose a topic within the company themselves. The results of the research study will be put in a report and often will have to be presented.

PURPOSE OF SUMMER TRAINING:

1. Provides an opportunity for hospital exposure at ground situations.
2. Helps in identifying the issues and problems for a manager to resolve, based on the knowledge and competency.

INTRODUCTION:

HOSPITAL PROFILE:



Max Healthcare Institute is a healthcare institute based in New Delhi. The Institute is a wholly owned subsidiary company of Max India Limited. Established in 1985, Max India

Limited is a Public Limited company listed in the BSE and NSE with more than 37,000 shareholders.

The institute operates eleven centres in Delhi, NCR and neighbouring Punjab region, providing health care services in more than 30 disciplines.

Max Healthcare commenced operations in 2001 with the intention to provide comprehensive and world-class healthcare services in India.

Performance, Trust and Service excellence are enshrined in Max India Group's Vision, Mission and Values. In addition to these 'life-centred' businesses, Max India manufactures speciality products for the packaging industry through its division- **Max Speciality Products (MSP)**. MSP too has a strong service excellence orientation that strives on building long lasting partnerships.

Max's focus is "completely satisfying customer needs profitably" by using DMAIC and Lean methodology.



OBJECTIVES:



The Logo Story:



The **cross** is the accepted symbol for Healthcare the world over. It is a truly fitting symbol for a group that endeavours to enhance the quality of life through healing and care. Green signifies closeness to nature and symbol of life.

With over **1900 beds** and **11 top hospitals** in Delhi-NCR, Punjab and Uttarakhand, **2100 world-class doctors** and **9300 support staff**, Max Healthcare is one of the leading chains of hospitals in India. With **525 ICU beds** & the most advanced technology, our state-of-the-art infrastructure is rated the best in North India thereby making Max Healthcare one of the best hospitals in India.

RECENT CHANGES:

Max India, the flagship company of New Delhi-based serial entrepreneur Anajit Singh, on January 2015 approved a three way demerger of its insurance, healthcare and specialty films with holding companies being created for each of them.

The existing company **Max India** will be renamed **Max Financial Services** and the other two businesses will be listed post the demerger, while newly created Max India will manage the investments in health & allied business.

Max Ventures and industries will manage the investment activity in the group's manufacturing arm.

MAX SUPER SPECIALITY HOSPITAL, SAKET, NEW DELHI:

Located in the heart of South Delhi, Max Super Speciality Hospital, Saket (a unit of Devki Devi Foundation), is one of the premier names in health care domain in the world. **Quality, medical & service excellence and detailing are the pillars of this institution.**

Designed by internationally renowned architect Mr. Richard Wood and constructed in accordance with globally-accepted standards for hospitals, quality is our top priority. A **550-bedded** healthcare facility, we are approximately 15km from New Delhi Railway Station and 12km from the Domestic Airport. The Hospital is divided into **two wings**, one is **East Wing** and another is **West Wing**.

AWARDS AND ACCREDITATIONS:

1. Certification of GREEN OT:

Bureau Veritas (BV), a European Standards organisation awarded the Green OT certification to Max Healthcare. Max Super Speciality Hospital Saket is the first hospital ever in the country to receive this prestigious accolade. The certificate recognizes its adherence to the highest quality and safety parameters for patients and healthcare workers in the highest infection-prone zone in a hospital, i.e., operation theatres.

2. NABL

3. NABH

4. NABH Accreditation for Blood Bank

5. FICCI Healthcare and Excellence Awards

6. D L Shah Award on “Economics of Quality”

7. ISO 90001:2000 and ISO 14001:2004

Max Super Speciality Hospital, Saket, is multi-speciality NABH and ISO accredited hospital, owned and operated by Max Healthcare Institute Limited (MHIL).

MODE OF DATA COLLECTION:

- Appointments with the HODs were set by the mentor and a circular was issued to all the HODs.
- Data collection involves discussion with the HODs on the managerial issues and talking to the other staff members and following the records.

Sources of Data:

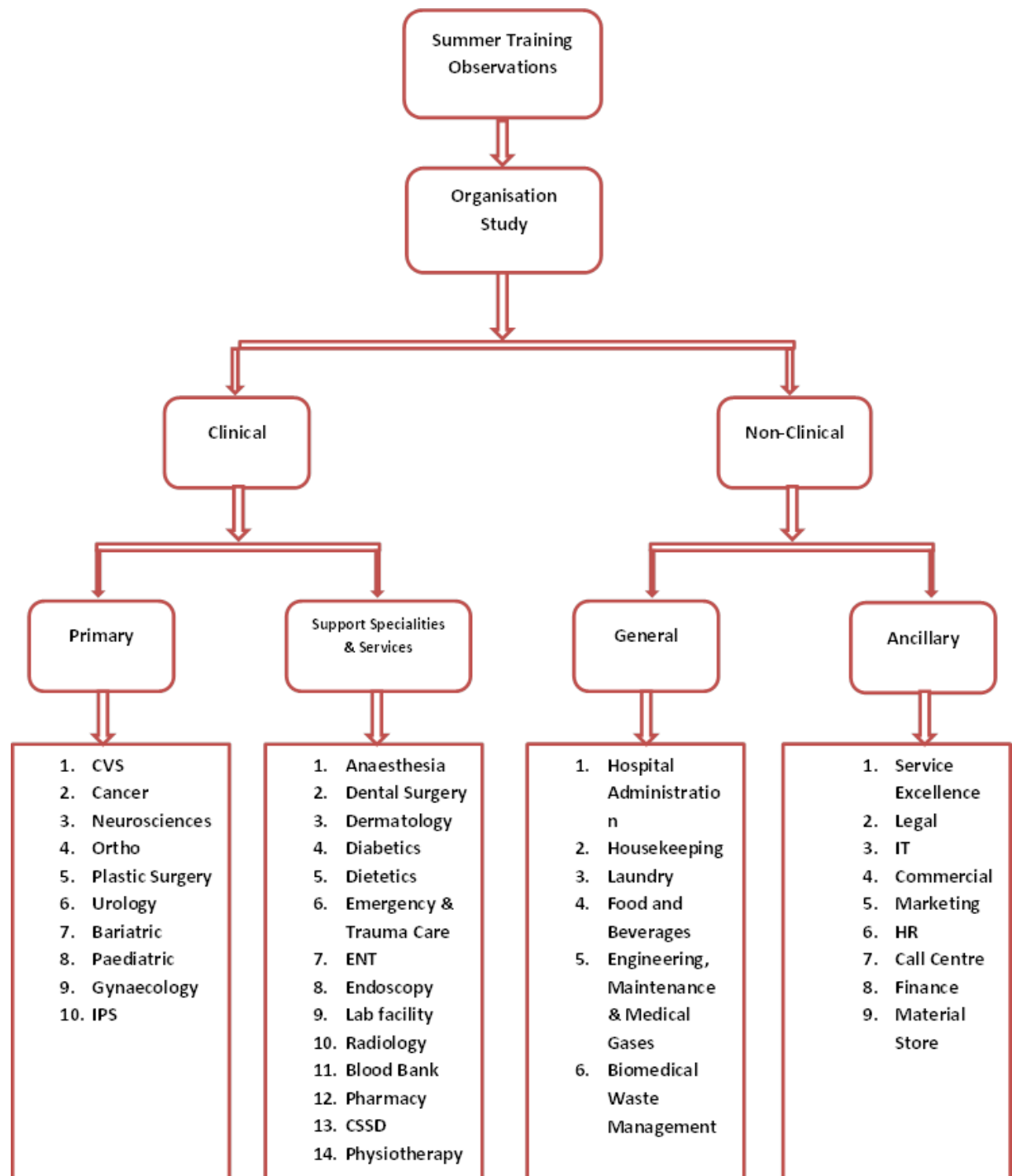
Primary data collection via direct observations, interviews, recordings:

- By interacting with the HODs, managers and other staff members.
- By interacting and observing the patients' and their attendants.
- By direct observations

Secondary Data:

- Through registered records
- Through website of the hospital
- Literature available related to hospitals like magazines, pamphlets, CDs, brochures, written documents.

The various departments of the MSSH, Saket is divided as follows –



Recently Max has implemented INSTITUTE wise formation of different specialities.

Max Super Speciality Hospital, Saket provide the highest level of professional expertise and world class healthcare in all the major disciplines of

1. Cardiology
2. Oncology
3. Orthopaedics & Joints Replacement Surgeries
4. Paediatric Cardiology & Oncology
5. Neurosciences
6. Obstetrics & Gynaecology including IVF
7. Aesthetic & Reconstructive Surgery
8. Minimal Access, Metabolic & Bariatric Surgery
9. Urology & Renal Transplants
10. ENT

1. Max Heart and Vascular Institute:

Max Heart and Vascular Institute is a tertiary care centre designed to provide the highest level of professional expertise and patient care in India and its neighbouring countries. The Institute is equipped with cutting edge technology, digital flat panel Cath Lab, State of art OTs, apex tertiary level coronary services provided by onsite medical consultant to handle acute MI, preventive care services, advanced diagnostic services including 64 slice 'Phillips Brilliance' CT scanner and comprehensive nuclear medicine facilities.

Services offered at Max Heart and Vascular Institute –

- Heart Check-up Packages
- Non Invasive Cardiology and Diagnostics
- Invasive and Non Invasive Interventional Cardiology
- Electrophysiology, Pacemaker, and Arrhythmias Services
- Cardiac Surgery
- Paediatric Cardiology and Paediatric Cardiac Surgery
- Vascular Intervention and Surgery

CATH LAB:

Catheterization laboratory or Cath lab is an examination room with diagnostic imaging equipment used to visualize the arteries of the heart and the chambers of the heart and treat any stenosis or abnormality found.

Diagnostic procedures performed include:

- Angiography
- Electrophysiology study (EPS)
- Cath study

Out of these, angiography and Cath study are done in Cath lab 1 and EPS is done in Cath lab 2. Lab 1 is termed as Pro Labs and Lab 2 is termed as General Labs. There are 7 beds and approximately 20 procedures are performed per day.

Other procedures:

- Percutaneous Transluminal Coronary Angioplasty
- Peripheral Transluminal Angioplasty
- Radio Frequency Ablation
- Permanent pacemaker Implantation
- Intra Cardiac Defibrillation
- Closure of some congenital heart defect

Units of Cath Lab:

- Cath lab 1
- Cath lab 2
- Technical room
- Observation room
- Technician room
- Store room and utility room
- Washing station

Location:

Cath lab is located on the first floor with the vicinity areas as:

- Emergency Department
- Operation Theatre
- Cath recovery
- Coronary care
- CTVS OT
- SICU, PICU, MICU

Staffing:

- 9 interventional cardiologists
- 19 nurses
- 9 technicians
- 1 person from store
- Appointment scheduling
- Doctors schedule summary
- Patient billing (OP, IP)
- Insurance management
- Patient visit summary and records movement
- Preventive health program registration and scheduling

Steps in patient registration process:

1. Patient meets the PCE/PCC and fills the registration form and gives detail if already registered.
2. Patients' details entered in HIS
3. Patient invoice generated with registration no and service details
4. Payment of the bills (if cancellation of procedure—refund provision)
5. New service tariff is generated and intimated o IT for incorporation into HIS.
6. Manual invoices are generated and updated with IT if system not working.

2. Max Cancer Centre:

The Max Cancer Centre at MSSH, Saket provides holistic integrated Cancer care. Max Cancer Centre is the first facility in northern India to acquire Novalis Tx for IMRT/IGRT, Radiosurgery, SRS/SRT.

The Max Cancer Centre is the Combination of these **three sub categories-**

1. Surgical Oncology
2. Radiation Oncology
3. Medical Oncology

The services provided at Max Cancer Centre-

- Diagnostic, Curative, Palliative and others for cancers affecting Head & Neck, Lung, GI, Breast, and Others
- Paediatric Oncology including Leukaemia, Brain Tumours, Lymphomas
- Haemato-Oncology
- Neo adjuvant and Adjuvant Chemotherapy
- Immunotherapy
- Palliative Chemotherapy
- Autologous and Allogeneic bone marrow transplant / Peripheral blood stem cell transplants
- Tumour Board

ONCOLOGY:

Day Ward/ Day Care provides care for the people who need to receive treatment during day and do not require staying as in- patients. It provides chemotherapy (40-50 patients/day).

There are 9 beds and 8 recliners and 4 dummy beds. Before chemotherapy is commenced the patient is assessed to understand the planned consents and willing to undergo procedures. The department consists of the following rooms:

- CT Simulator room
- Treatment planning verification room
- .Mould and Cast room
- Rooms for director and physicist
- Committee room

3. Max Institute of Neurosciences:

Max institute of Neurosciences is a super speciality tertiary care centre providing the highest level of professional expertise and leadership in all major disciplines of neurosciences.

Services provided –

- Advanced Brain Tumour Centre
- Minimally Invasive Spine Surgery Centre
- Stroke centre
- Special clinics for Epileptic, Neuromuscular and Movement Disorders

Technologies used –

- India's first Brain Suite – Most advanced Neuro Operation Theatre
- Zeiss Pentero Microscope
- Latest Flat Panel DSA
- Iso centric C arm

4. Max Institute of Orthopaedics and Joint Replacement Surgery:

Max Institute of Orthopaedics and Joint Replacement Surgery is a state of art specialised healthcare facility which provides the highest levels of professional expertise and patient care with intent of early mobilization and minimal discomfort.

Recently the Max Healthcare has changed the Institute's name to **Max Institute of Musculoskeletal Sciences (MIMS)**.

Services offered –

- Computer assisted joint replacement surgery
- Total Knee Hip Replacement Surgery
- Foot and ankle surgery
- Hand, Shoulder and Elbow surgery
- Spine Surgery
- Sports Medicine

PHYSIOTHERAPY AND REHABILITATION CENTRE:

- Walk in patients from OPD and referred patients after surgeries are sent to Physiotherapy Department to perform post-operative exercises.
- 380- 390 patients per day (Domestic + International)
- **Manpower:** 27
- **Shifts:** 3 shifts (8 hours)
- **Rehabilitation** includes Speech, Psychological, Nutritional, Physiotherapy treatments

5. Max Institute of Aesthetic & Reconstructive Surgery (Plastic Surgery):

Aesthetic Surgery offers an endless array of options to hold improve one's appearance and function. Most aesthetic surgeries as we practice today have an in-built element of functional correction.

Here at MSSH, Saket, latest technologies like Laser, Ultra pulse Laser and Electro Sonic Liposuction.

List of Procedures –

1. Eyelid Surgery(Blepharoplasty)
2. Brow lift / Forehead lift
3. Face lift (Rhytidectomy)
4. Facial Implants (Chin, Cheek, Jaw)
5. Lip Augmentation
6. Nose Shaping(Rhinoplasty)
7. Abdominoplasty (Tummy Tuck)
8. Hair Restoration Surgery
9. Injectable wrinkle fillers (Hyaluronic acid and Others)
10. Botulinum Toxin Injection (Botox)
11. Breast Lift (Mastopexy)

6. Max Institute of Urology & Renal Sciences:

Max Institute of Urology & Renal Sciences provides highest level of care and support to the patients. The institute is fully equipped for all endoscopic and laparoscopic urological surgeries.

Services Include –

- Uro-Oncology (Kidney, Bladder and Prostate Cancer)
- Endo-Urology (Endoscopic / Laser surgery of prostate, stones etc.)
- Reconstructive surgery
- Renal Transplantation –
- Laparoscopic Urological Surgery
- Andrology (Sexual Dysfunctions and Male Infertility)
- Endoscopic Surgery for prostate

7. Max Med Centre & Max Specialty Clinic (Eye Care & Dental Care):

(Speciality OPDs and dedicated centre for Dental Care and eye care of one's preventive & primary healthcare requirement)

Services offered –

- LASIK (Wave front and Standard LASIT)
- Eye Ultrasound
- Glaucoma Diagnostic & Surgery
- Cornea Diagnostic and Surgery
- Retina & Vitreous Diagnostic
- Lasers and Surgery
- Squint Surgery
- Plastic surgery of eye
- Cataract Surgery

Dental Care Services –

- Common ailments encountered in Dental Care:
- Caries or Cavities
- Abscesses
- Gingivitis or Gum Diseases
- Bad Breath
- Loosing of tooth
- Leukoplakia or white patches
- Cancer of Mouth

Other Specialities –

- ENT (Including Cochlear and BAHA Implants)
- Internal Medicine
- Pulmonology
- Dermatology
- Gastroenterology
- Rheumatology

ENT and Ophthalmology gas OPD counters at MSSH, Saket but the surgeries and minor procedures are performed at Max Shalimar Bagh, Delhi.

8. Max Institute of Minimal Access, Metabolic & Bariatric Surgery:

The Department of Minimal Access Surgery at MSSH, Saket endeavours to provide the best healthcare and rehabilitation services.

This institute is a first of its kind in the subcontinent and an international centre of excellence. It is dedicated to performing surgeries using minimal access utilization techniques like Key Hole Surgery and Spider Surgery.

Services Provided –

- Managing Morbid Obesity
- Inguinal Hernia Repair
- Incision/Ventral Abdominal Wall Hernia Repair
- Appendicectomy
- Laparoscopic Advanced Biliary Surgery
- Management of Benign & Pancreatic Cysts

9. Max Institute of Paediatrics:

Institute of Paediatrics is dedicated to provide state-of-the-art care in various paediatric specialities.

It has a team of well trained and highly experienced paediatricians and paediatric surgeons.

Services Provided –

- Paediatric Surgery
- Paediatric Pulmonology
- Paediatric Gastroenterology and Hepatology
- Paediatric Cardiology and Cardiac Surgery
- Paediatric Oncology
- Paediatric Neurology
- Paediatric Nephrology
- Paediatric Endocrinology
- Development and Adolescent Paediatrics

10. Max Institute of Obstetrics & Gynaecology:

The Institute of Obstetrics & Gynaecology delivers world class healthcare services for women. It is committed to highest standards of Medical and Patient Care with focus on service excellence.

Services Provided –

- Preconception Counselling
- Genetic Counselling
- Antenatal care
- High Risk Pregnancy Care
- Natural And Caesarean Birth
- Painless Birth
- Post-Natal Care
- Infant Care
- Reproductive Healthcare
- Infertility treatment
- Menopause Care

- IVF (In-Vitro Fertilization)
- Family Planning & Contraception
- Minimal Invasive Surgery

Education Programme –

For pregnant women the institute hold the following special Classes-

- Prenatal Classes
- Postnatal Classes
- Infant care and Breast Feeding Classes

LABOUR ROOM:

Average 3 deliveries per day

1:1-→ Nurse patient ratio

3 recovery beds and 26 normal gynae beds

Shifts: 3 (morning, evening, night)

11. International Patient Services:

MSSH, Saket has a department dedicated to International Patient Service which takes care of all the healthcare related and other requirements of patients and their companions coming to India.

The MSSH, Saket is amongst very few hospitals in India with an **International Patient Lounge**. The International patient services team ensures the smooth, timeless and flawless services on arrival of the patient. The Max Healthcare not only adheres all the local rules & regulations but also the international benchmarks and protocols.

Services Provided –

1. Query resolution (Including Tele-consultation)
2. Travel Arrangements
Airport Pick-up facility
Tours and Travels
3. **Single window of contact:**
Max healthcare provides single window of contact – ‘Relationship Manager’ to its international patients. The relationship manager helps the patient from the time of admission to discharge.
Relationship Manager Helps patients and their companion for all requirements like accommodation, shopping, interpreters, currency exchange, wire transfers etc.
4. **Interpreter services:**
The MSSH, Saket has both male and female, Arabic speaking, interpreters in the hospital. Interpreters for other languages are arranged as per requirement.
5. **Accommodation Arrangements:**

MSSH, Saket also make arrangements of Hotel and Guest Houses for the patients coming to the Hospital.

Value added services:

- Visa Arrangement facility
- Foreign Region Registration Office registration facility
- Currency exchange and wire transfer facility
- Internet connectivity and calling card facility
- Car Hire Facility
- Choice of International Cuisine is offered
- Regular update on patient's progress
- Post discharge query handling
- Conference call services

Alliance Partners:

- BUPA
- Metlife Alico
- International SOS, India
- Vanbreda International
- GMC Services
- East West Rescue
- AXA Assistance
- Cigna International
- Seven Corners Inc.
- Medicines Sans Frontieres
- AETNA

12.Max Institute of Medical Excellence (MIME):

This is formed to enhance the training sessions of the employees and give them up to date knowledge and latest trends. It organises Mock drills, Workshops and Seminars to promote quality health services. It also provides opportunities to junior doctors for fellowship programmes and DNB programmes.

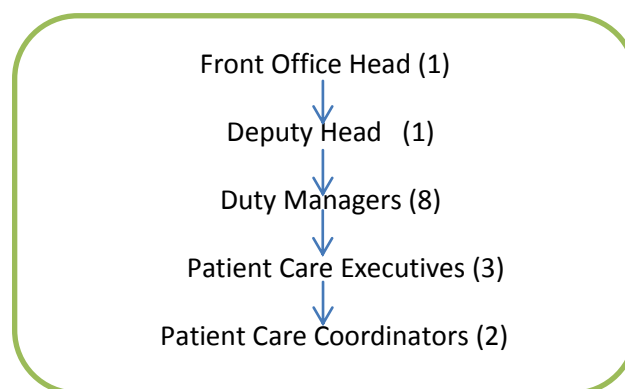
GENERAL FINDINGS:

FRONT OFFICE:

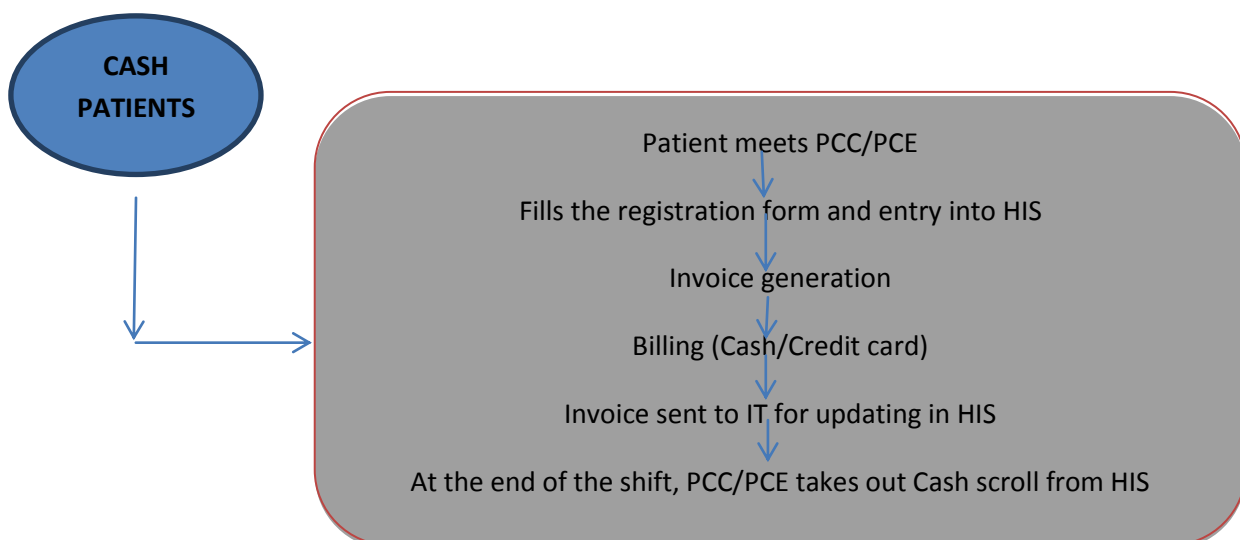
- Front office is the first point of contact between the hospital and its patients.
- Services offered by the Front Office:
- Inpatient and Outpatient registration
- IP admission and discharge
- Medical alert details

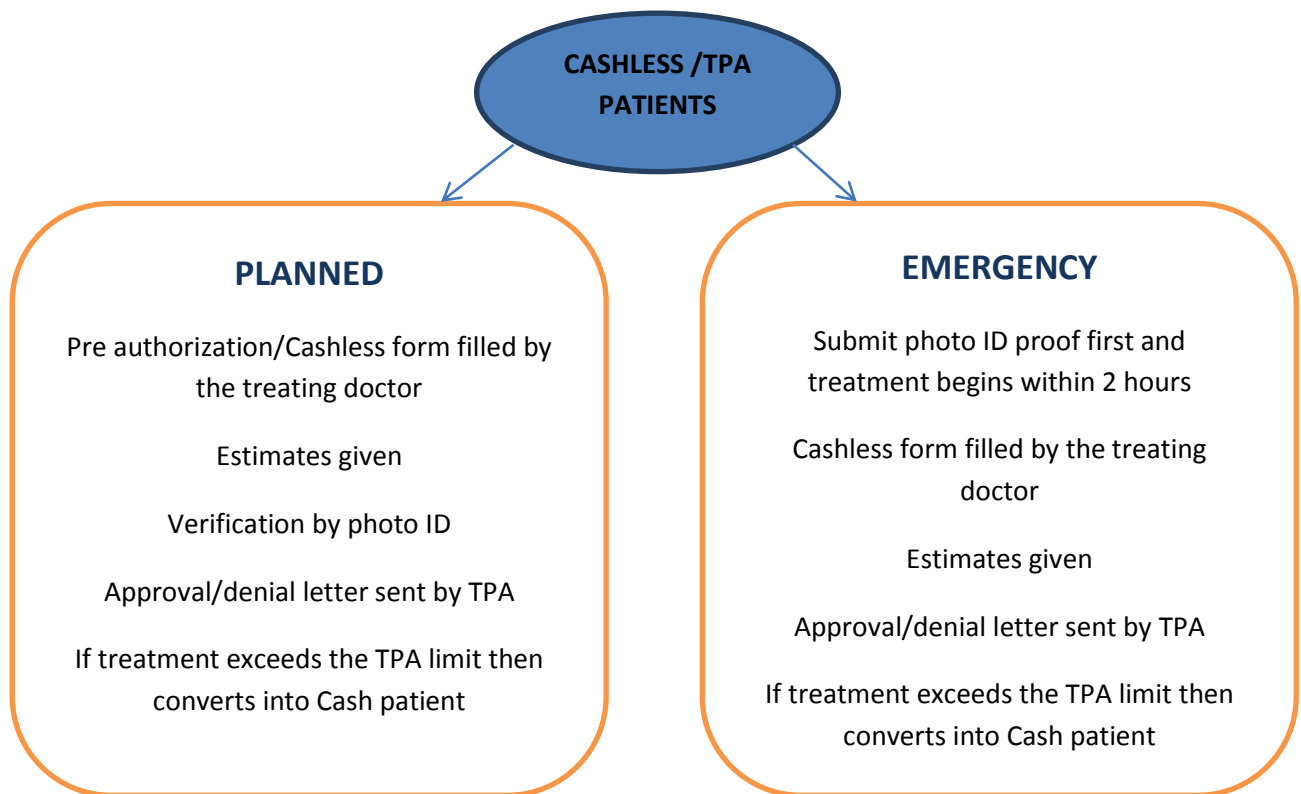
- Appointment scheduling
- Doctors schedule summary
- Patient billing both IPD and OPD
- Insurance Management Patient visit history
- Medical records movements
- Appointments for diagnostic tests
- Preventive health programme for registration and scheduling

Organogram of the department:



Patient Registration Process:





OUT PATIENT DEPARTMENT SERVICES:

Each institute of Max Saket hospital has its own OPD area as well as IPD area/ Day care area wherever applicable.

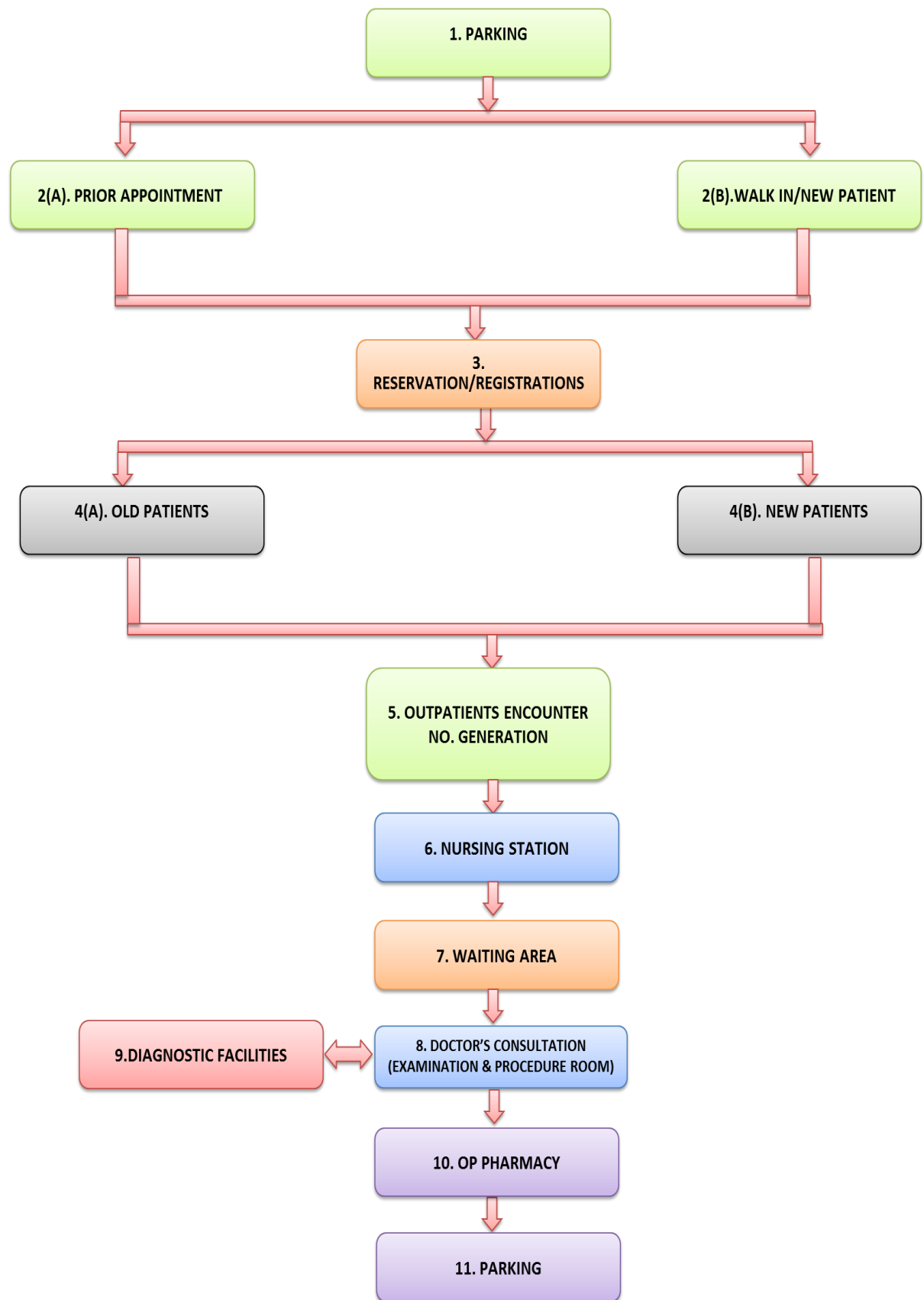
Every OPD has a procedure room and its own Front Desk.

Appointments are centralised and are recorded on the Hospital Information Management System. As soon as appointments are fixed, a text message is sent to the patient confirming the appointment, and a reminder message is sent on the day before appointment. No walk in patient is turned away and the staffs try to accommodate these patients between the appointments already scheduled for the day.

Each OPD waiting area has the capacity to handle 70-100 patients.

For Chairperson and senior Doctors, a junior doctor does the initial assessment of the patient, which not only reduces the workload of the senior doctors but also gives junior doctors an opportunity to learn from the best brains in the industry.

The general process flow that is followed in all the OPDs is as follows:



IN PATIENT DEPARTMENT (IPD):

IPD is distributed over 5 floors (2nd -6th) in the East wing of Max Saket including a total of **525 ICU** beds.

- Every bedside has:
- Details of Nurse, Consultant and Mentor written at the top of every bed.
- Room equipment checklist (side rails, oxygen, suction)
- Important instructions

- The **rooms available** in the IPD have the following structures of bed per room:
- 6 in 1
- 4 in 1
- 2 in 1
- Single deluxe room
- VIP suite

Every floor has **Central Nursing Station** with:

- **Board of information** covering designations and contact numbers of duty officers, Administration staff, Support staff. It also contains Nurses' name with designation and shift timings.
- Crash Cart parked next to the nursing station
- COWs- Computer on Wheels (4)
- Cup boards with forms (down time form, investigation track sheet, blood request form, PAC sheet, Informed consents, inventory files and registers)
- Medication room(2) with one pantry
- Record room
- Bio medical waste

Steps during the process flow of new patient in IPD:

1. IPD receives intimation call from the department from where patient is referred.
 2. Duty doctor is informed.
 3. Room allotment by floor mentor.
 4. Patient admission and vitals are checked by the nurse.
 5. Physical assessment is done.
 6. History is taken.
 7. Concerned doctor is informed and medications and instructions are entered in CPRS (Computerised Patient Record System), reviewed by IPD pharmacy.
 8. Patient bill is consolidated at IP billing.
 9. Discharge intimation given by the doctor and is processed by nursing staff.
 10. Clearance by pharmacy required.
 11. Discharge TAT – 30 minutes for cash patients.
-
- Nurse to bed ratio- 1:4 or 1:6

- Ground duty assistants (GDAs) - 2-3 in every shift
- Average length of stay (ALOS) for normal laparoscopic surgeries—2 to 3 days
- Quality Indicators are: Patient fall, Hypoglycaemia, Needle stick injuries.

INTENSIVE CARE UNIT (ICUs):

- ICUs are distributed in both the wings. Critical care services with ventilators, monitors, ECG machine, oxygen cylinders are provided here. Staff works in 3 shifts providing 24x7 cross monitoring.
- Nurse patient ratio—1:1 for ventilator patients and 2:1 for non-ventilator patients
- Separate material room and record maintenance after discharge
- The following ICUs have been visited:
 1. **Medical ICU**
 2. **Surgical ICU**
 3. **Neuro stroke ICU**
 4. **Neuro HDU**
 5. **CTVS ICU**
 6. **Ortho HDU** (High Dependency Unit)
 7. **PICU and NICU** (Paediatric and neonatal)
 8. **ISICU** (Interventional stroke)

EMERGENCY DEPARTMENT:

This department is considered as the Show case of the hospital as it provides all the emergency response, management and patient care. It is located at the ground floor with its own dedicated entrance and operated for 24x7. It is an accredited Emergency Medicine training centre of George Washington University, USA.

Department is divided into 4 areas:

1. Resuscitation room
2. Monitoring area
3. Observation area
4. Walk in area

Process flow steps:

1. Patient comes in the triage and the admission request is filled by Emergency Medical Officer.
2. EMO takes the initial assessment. The records will include patient complaint, vital signs, allergies, treatment prior to arrival to E.R.
3. Treatment begins, if required specialist is called.
4. If the patient is stabilised, he/she is discharged otherwise admitted

Ambulances: 2 ACLS (Advance Cardiac Life Support with CCTV camera for tele medicine) and 4 BCLS (Basic Cardiac Life Support).

Patients are either transferred to other departments or are discharged within 4 hours. MSSH, Saket had made a world record for the management of MI patient in ER from entrance to the balloon time in Cath lab in less than 35 minutes.

Response time:

- EMO response time <1 min
- Consultant response time <60 min
- Code blue response time <3 min
- Ambulance response time <10 min

Infrastructure:

- Total 16 bedded triage
- Resuscitation suite- 1bed
- Urgent care area – 4 beds
- Observation area- 9beds
- Clinical decision area – 2 beds
- Doctors work station is located in the centre of the urgent care area
- Store room is located behind the reception. Medications are filled twice a day and stock of two days is kept in advance for Sunday. Narcotics are also available and kept in safe.
- Hospital Information System and CPRS
- COWs
- Waiting area

Staffing:

- Senior consultant (EMO) -2
- Team leader -1
- Emergency physicians -3
- Nurses: Male 4-5 and Female 2-3
- Receptionist -2
- GDA- 2
- Para medical staff for ambulance
- Security personnel

OPERATION THEATRE COMPLEX:

There are total 23 Operation Theatres in MSSH, Saket.

Operation theatre complex of **East wing** is located on first and second floor. It has 11 operation theatres assigned to various departments. Cardiac, Oncology, Bariatric Surgeries, Gynaecology and Plastic surgeries are performed in these operation theatres. Operation theatre complex of **West wing** is located on the first floor. It has 12 operation theatres for various departments like Orthopaedics, Neurology and General Surgeries.

A new OT is coming in West Wing and constructions are going on.

Organization of staff:

The **staff** of the O.T is organised into 4 groups:

Anaesthetist and Surgeons, Nursing Staff, Technicians, Support Staff

Hierarchy:

ORGANOGRAM OF SURGEONS:

Director of Speciality
↓
HOD
↓
Senior Surgeons
↓
Surgeons (including J.R and Trainee)

ORGANOGRAM OF NURSING STAFF:

Nursing Supervisor
↓
Team Leader
↓
Staff Nurse

ORGANOGRAM OF TECHNICIANS:

Chief Technician
↓
Team Leader
↓
Technician

KEY POINTS:

- Separate pre-operative and post-operative areas (4 beds each)
- Separate material store and pharmacy for OT
- 6 scrub stations in each OT complex
- Staff to OT table area – 2:1 (for super specialised – 3:1) (1:1 technician ratio)
- High turn over time – 20 minutes in between operations
- Shifts: 3 (morning, evening, night)
- TSSU (Theatre Sterile Supply Unit) and changing room present.
- Separate record maintenance and PACs inclusion and monitoring.
- 70% utilization of OT is there.

STEPS in Process flow:

1. OT booking is done prior to the surgery and Patient preparation is done.
2. SIGN IN --- TIME OUT---- SIGN OUT
3. Post-operative care and medications.

Department of Laboratory Medicine:

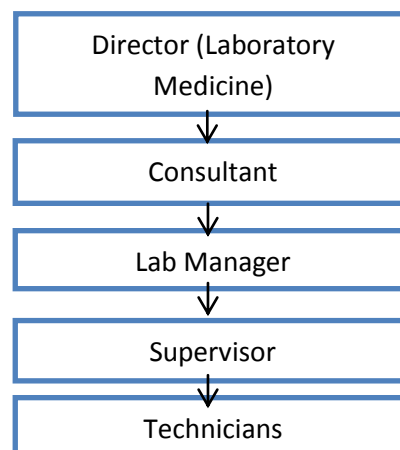
MSSH, Saket has a central lab for all the 12 branches of Max Healthcare. This lab is ISO 9001:2000 certified. It is open 24 hours a day. It's a high tech lab with fully automated instruments which are directly interfaced with hospital information system. Facility for emergency tests and sample collection from home is also available.

In the Central Lab there are different departments, these are –

- Biochemistry
- Serology
- Haematology
- Histopathology
- Clinical Pathology
- Microbiology
- Immunology

Unique feature of this lab – This lab has BSL-3(Biological Safety Level-3).

Hierarchy:



Process Flow –

1. Patients' sample is collected at sample collection unit.
2. Bar-coding is done for each sample for identification.
3. Then it comes to pathology lab
4. Here different tests are done accordingly
5. After testing, reports are sent to main OPD, from where patients collect their reports.
6. In upcoming software update patients will be able to see their test reports online also.

Blood Bank:-

MSSH, Saket has its own Blood Bank. Blood bank administration ensures that all the blood groups should be available every in the blood bank. For this the hospital asks patient's attendants to give replacement for the blood given. The blood bank receives 40-50 units of blood per day. It maintains a stock of 250 Units/day of each blood group.

Blood Bank consists of –

1. Reception Area
2. Donation Area
3. Apheresis Area
4. Component Room
5. Transfusion Transmitted Infection (TTI) Room
6. Storage Area
7. Issue Counter

Staff of Blood Bank consists of 1 HOD, 2 Blood Bank officers, 1 Technician Supervisor, 16 technicians, 2 staff Nurse, 2 Computer Executives, and 4 GDA.

Bio Medical Engineering-

- The department of biomedical engineering deals with the purchase, installation, commissioning, training on operating, handling and maintenance of all the medical equipments in all the areas and departments of the hospital.
- The Department also deals with the in-house calibration of equipment.
- Gas Manifolds are also handled by the biomedical department.

The Areas Included are:

- All Wards
- All Operation Theatres
- All ICUs
- Patients Rooms
- Radiology
- Triage
- Blood Bank
- Nuclear Medicine
- Cardiac Non Invasive Diagnostics
- Medical Gases
- Medical Furniture
- LINAC

Objective:

- To maintain assets list
- To conduct preventive maintenance for biomedical equipments.

- To ensure timely repair of biomedical equipments & medical Furniture.
- To conduct calibration/validation of biomedical equipment.
- Preventive maintenance for Medical Gas Equipment.
- Allotment of AMC and CMC contracts.

The Department of Biomedical Engineering consists of following staff-

Regional Manager, Deputy Manager, Medical Gas Supervisor, Senior Biomedical Engineer, Biomedical Engineer, Medical Gas Technician, Junior Biomedical Engineer.

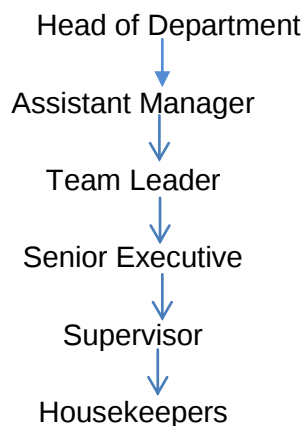
Housekeeping Department:

The Housekeeping department is responsible for four main processes-

1. Infrastructure Cleaning- It includes
 - a) Interior Cleaning
 - b) Exterior Cleaning
2. General and Biomedical waste Handling
 - a) Waste collection process-
 - b) Waste Treatment and Disposal Process-
3. Linen And Uniform Management
 - a) Linen Management
 - b) Uniform Management

Laundry Process
4. Interior Decoration-

Hierarchy-



Radiology Department –

The Radiology Department of MSSH, Saket is equipped with ultramodern machines.

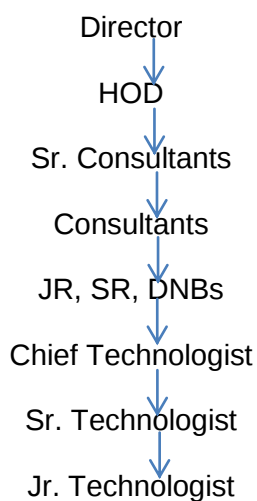
Procedures done in the department are –

1. X-Ray (plain and routine fluoroscopic procedures i.e. Barium studies)

2. Ultrasound (Ultrasonography and Doppler studies)- 4 machine stations
3. Mammography - 1 station
4. Dexascan – 1 station
5. Special Imaging Techniques like-
 - a) CT Scan (Computerised Axial Tomography)
 - b) MRI (Magnetic Resonance Imaging)

Procedure Name	No. of Procedures Per Day
X—Rays	250-300
MRI, CT Scan	40-50
USG	100
Mammography, Deaxscan	15-20
Procedures	4-5

Hierarchy-



Radiology Department consists of:

- Reception area- Counter areas for appointment and billing
- Waiting room with general facilities
- Diagnostic room
- Cancelling room
- Changing room
- Film processing room
- Radiologist office
- Report collection room

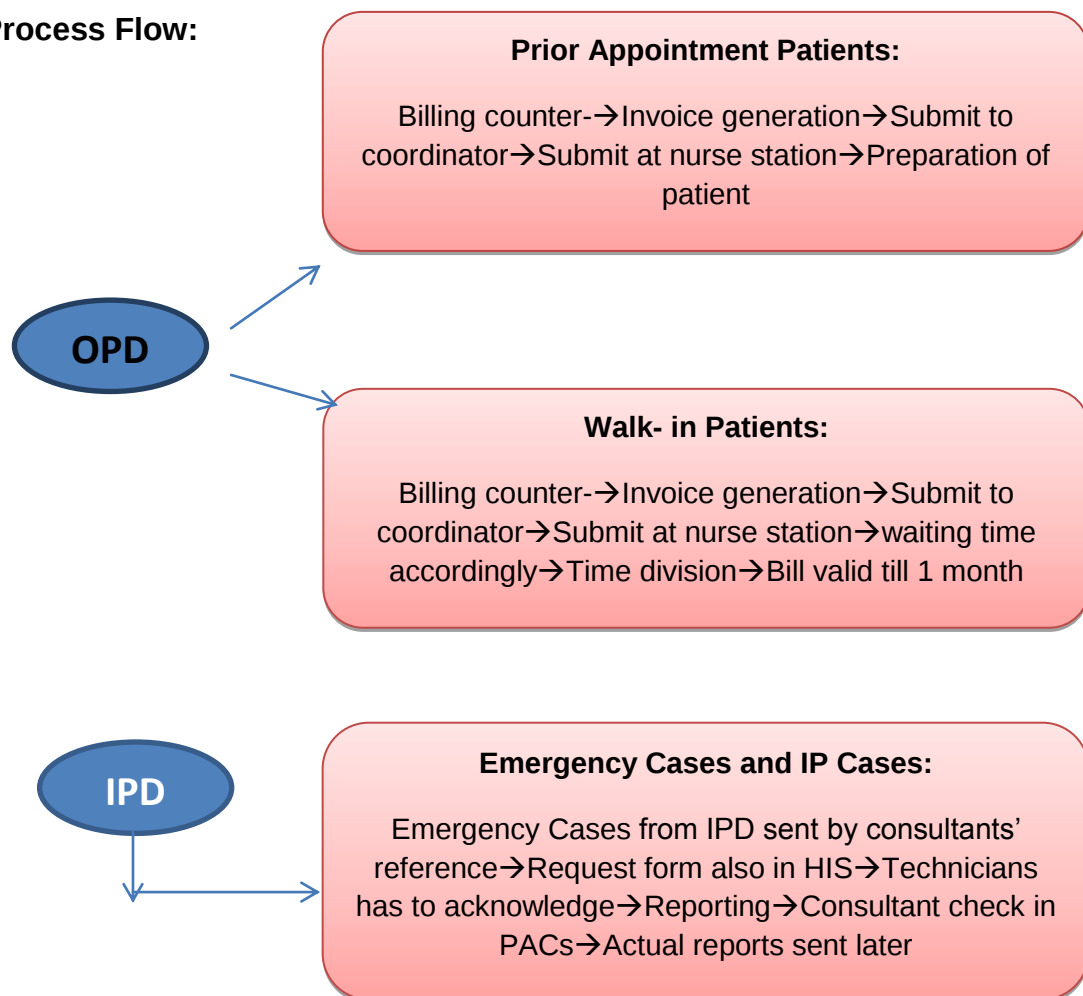
Main OPD hours: 8 am to 6pm and after 8 pm only IPD and Emergency patients are taken.

TATS for REPORTING:

For USG --- 8am to 12pm (same day) then report is ready and collected by 5 pm

For Tests --- If tests are performed before 12 pm then reports are ready by evening and if done after 12pm, reports will be delivered next day 11am.

Process Flow:



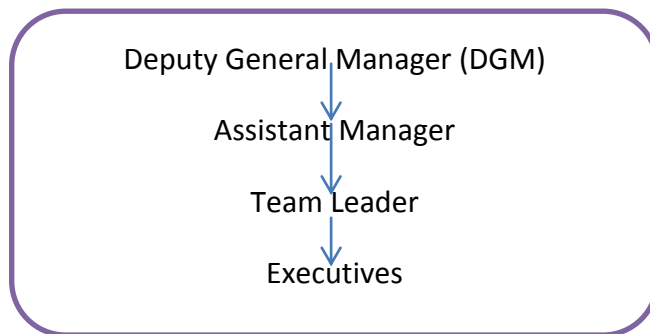
Appointment patients are given preference whereas walk in patients has to wait. Emergency, doctor's referred patients or ICU patients scan is done as soon as possible.

FOOD AND BEVERAGES AND DIETETICS:

Food and beverages department deals with supply of food to the patients sometimes to the patients' attendant and during the various conferences and meetings in the organization.

Although food and beverages department at the Max healthcare is outsourced to the SODEXO food services but controlling power is with Max employees.

ORGANOGRAM:



The department consists of 1 Head Chef from Max, 26 Chefs from Sodexo, 72 stewards from Sodexo.

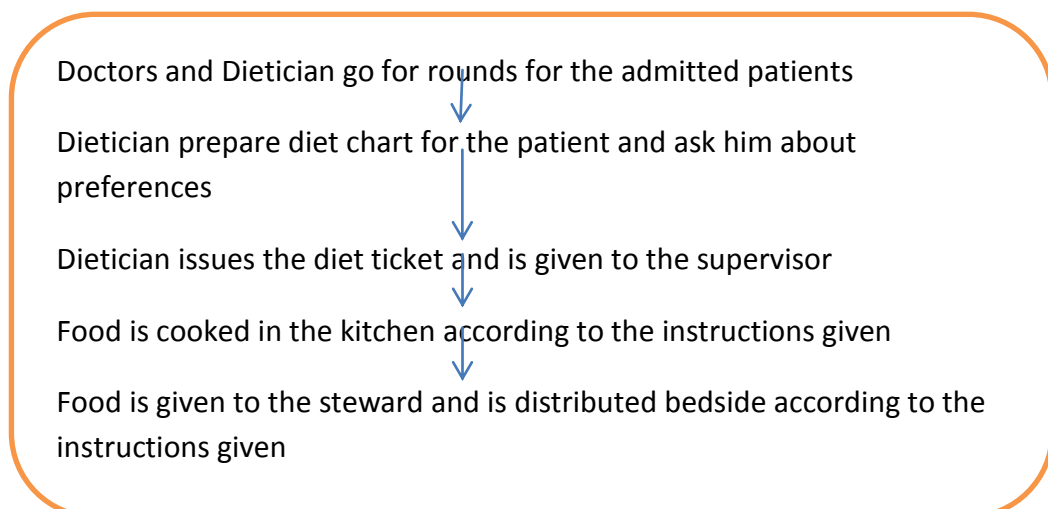
Dietician -> 25 of Max

Max Chef keeps check on quality of food provided to the patients and make sure dieticians have checked the food for IPD patients.

Other than Sodexo there are various other food outlets:

- Sagar Ratna
- Café Coffee Day
- Subway
- Quality Express (Royalties are being charged from these outlets)

SUPPLY PROCESS OF FOOD TO THE PATIENTS:



Time Table for the diet of the patient:

7-8 AM	Breakfast
10.30-11:30 AM	Soups/Beverages
1-2 PM	Lunch
4-5 PM	Evening tea
6-7 PM	Soup
8-9 PM	Dinner

- Dinner of the same day, breakfast and lunch of the next day are decided prior in the evening and diet tickets are issued by the dieticians and given to the chef.
- Apart from these, If patients wants to have something extra, those can be provided to the patient after consulting dietician, but for an extra charges.

Different Menu offered is:

- a) Indian menu
- b) Afghani menu for Middle East patients
- c) Continental menu
- d) No onion no garlic menu for Jain patients

QUALITY DEPARTMENT:

It is divided into 3 main types:

- 1. Medical Quality Department**
- 2. Nursing Quality Department**
- 3. Service Quality Department**

1. Medical Quality Department:

The main office is located at Okhla Corporate Office (PAN MAX) and is headed by the director followed by Vice President.

MSSH, Saket has Zonal office of Medical Quality who monitors the working of Assistant managers and executives.

The different Indicators of Medical Quality are:

- Falls
- Nosocomial Infections
- Phlebitis
- Medication errors
- Near miss (incident might have occurred)
- Needle stick injury

- Pressure sores
- Hypoglycaemia
- Adverse drug reactions
- Blood transfusion and related errors
- Infection outbreak
- Sentinel events→ wrong patient, wrong surgery, wrong side, foreign bodies left inside body cavities.
- Code Blue-> Rapid Response Team
- Mortality
- Readmissions within 14 days of discharge → Return to Emergency within 7 days
- Return to O.T within 7 days
- Return to ICU within 7 days

2. Nursing Quality Department:

This department helps to maintain the quality nursing care.

There are total 7 indicators of nursing quality:

1. Patient falls
2. Medication errors:
 - Prescription error → by Doctor
 - Dispensing error → by Pharmacist
 - Administration error→ by Nurses
 - Documentation error→ BY Nurses
3. Pressure sores (outside→ before admission and inside→ after admission sores are formed)
4. Hypoglycaemia
5. Needle Stick injuries
6. Healthcare associated infections (CLABSI, CAUTI, VAP, and SSI)
7. Phlebitis

3. Service Quality Department:

It deals with the quality of services provided by the hospital in form of feedbacks.

Feedback forms are kept in suggestion boxes in each department and are collected daily. These are then divided into positive and negative feedbacks. Suggestions are also considered as negative feedbacks and are raised in Board Meetings for improvements.

After getting the negative feedbacks from the various departments, within 24 hrs the respective departments are intimidated about the negative feedbacks and further rectifications and improvements are started. Root cause analysis is done by the managers to understand the main cause and the problem is solved in 72 hours.

The problem is resolved and closure of the case is done by providing proper training and counselling by the Managers.

Ways to collect the feedback:

- a) Through feedback forms
- b) Through Blogs
- c) Directly to the quality manager

Issues can be related to:

- Behaviour of the staff, nurses, doctors
- Cleanliness
- Food quality
- Medication errors
- Delay in any services

Everyday Quality manager goes for rounds in each and every department and inspect the quality issues and keep encouraging quality care services.

Security Department-

The security department is an eye and ear of every organization acting as a liaison between management and staff. The department is having one control room on B1 (Basement 1) of East Wing.

Functions of Security Department-

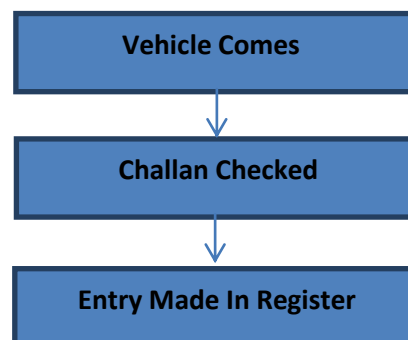
1. Security Management-

- Selection of people (Guards and Supervisors)
- Deploying of Security staff
- Checking of people entering the hospital
- Turnout and grooming of security staff
- MLC handling
- Dispute Management

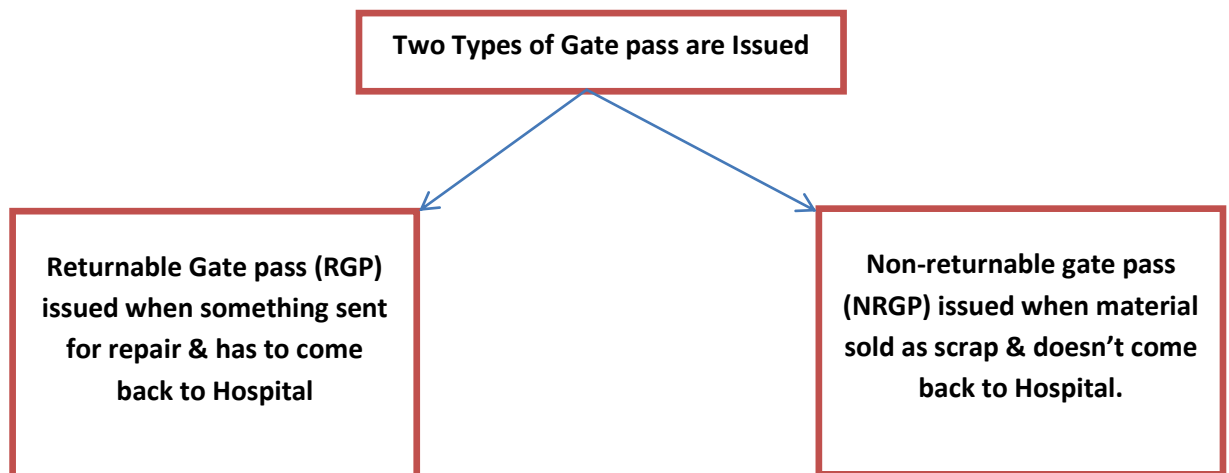
2. Material Management-

This includes the management of both incoming and outgoing materials.

- a) **Incoming Materials-** The incoming materials are received either from a company or a contractor to Max. The Process followed is-



b) Outgoing Materials-



3. Disaster Management-

There are six emergency codes according to which the security department works.

1. Red – Fire
2. Black – Bomb Threat
3. Blue – Cardiac arrest
4. Yellow- External Disaster like earthquake
5. Violet- Violent Patient
6. Pink – Missing Patient

4. Valet Management –

- Helps to optimally utilize the parking space
- Within a time frame of maximum 7 minutes, vehicle is handed over to customer when asked for in porch.

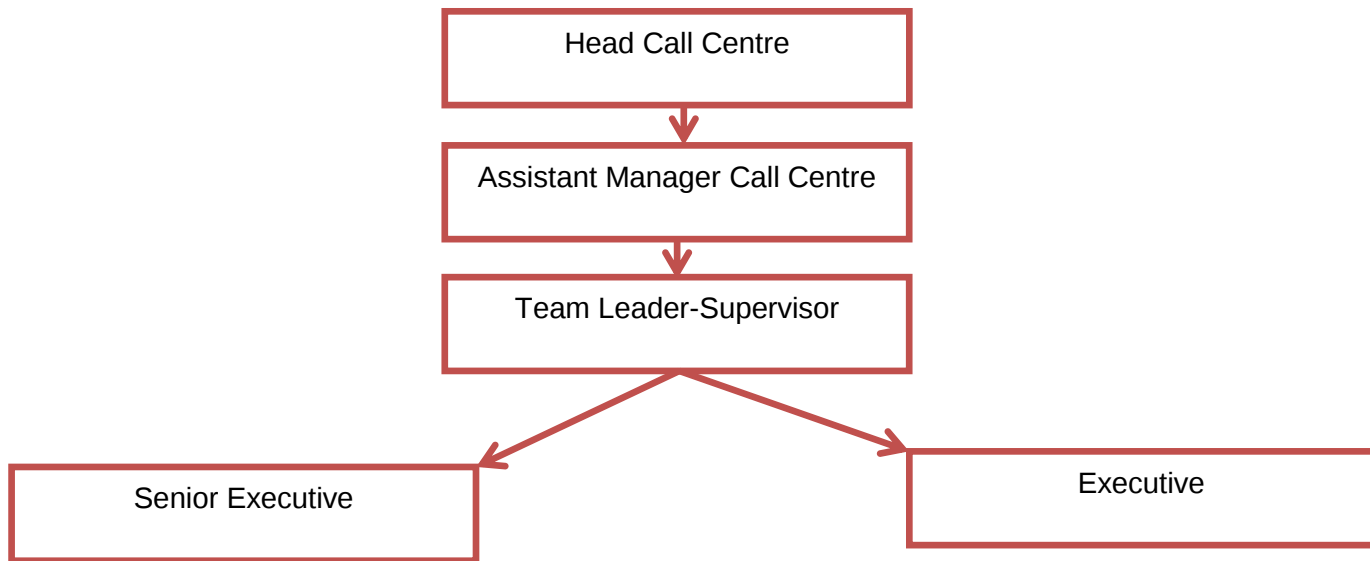
Call Centre -

Call centre of MSSH, Saket operates 24*7. It is centralized patient contact centre for saket. It can be used as information centre for all the customers.

Call Centre deals with –

- Doctor's Appointment
- Health Check ups
- Radiology and diagnostic appointments
- Patient's Information
- Doctor's Information
- Employee's Information
- Speciality Information
- Other department information
- Handles internal emergency also e.g. Code Blue

Main Board line number is 26515050



Currently the MSSH, Saket is using two soft wares for its working.

1. HIS-Hospital Information System
2. CPRS- Computerised Patient Record System

Modules of HIS are –

1. Outpatient
2. Inpatient
3. Physician
4. Laboratory
5. Emergency
6. Administration
7. MIS Reports
8. IP Billing

CPRS is designed for the clinicians.

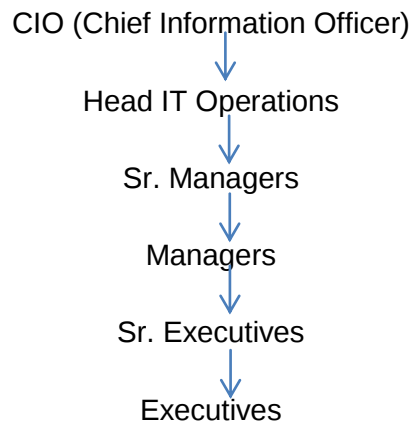
The IT department uses two types of servers for the running of these two softwares-

1. Application Server
2. Production Server

The MSSH, Saket also uses some need based and departmental soft wares also like-

1. For the HR management the Hospital uses the ERP software named as “DISHA”.
2. For the imaging services the PACS software by GE is being used.
3. For Stock management IMAC software is being used.
4. ASSIST software is being used for the problem solving within the departments.

Hierarchy-



Marketing Department –

The MSSH, Saket is having its internal Marketing Department. The department is divided into 4 primary categories.

1. Domestic Marketing
2. International Marketing
3. Branding and communication
4. Sales

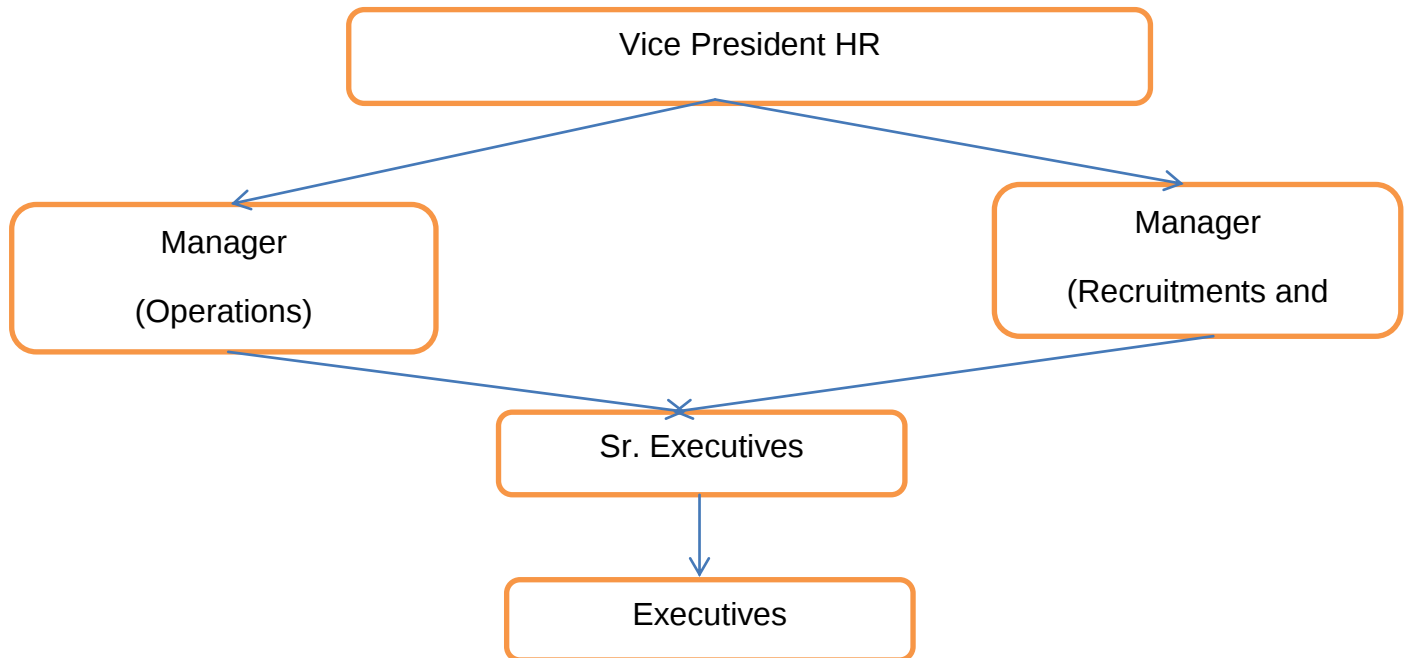
Human Resource Management Department-

Human resource management department is a function designed to maximize employee performance in service of their employer's strategic objectives. HR is primarily concerned with how people are within the organizations, focusing on policies and systems.

Following are the policies undertaken by the Human Resource Management Department-

- Human Resource Planning Policy
- Job profile format
- Recruitment Policy
- Training and Development Policy
- Induction and Orientation Policy
- Performance Appraisal Policy
- Complaint and Grievances Redressal policy
- Disciplinary Policy
- Medical Discount Policy
- Annual Medical Check-up policy
- Clinical credentialing & privileging policy
- Nursing credentialing & privileging policy

Hierarchy –



OUTSOURCED DEPARTMENTS:

- **MRD (MEDICAL RECORD DEPARTMENT)** → By StarBic
- **BIO MEDICAL WASTE MANAGEMENT** → By Synergy Bio Medical Waste Management Pvt limited
- **Lower Staff of Housekeeping** → by BVG India
- **Lower Staff of Security** → by INNOVISSION

Departments mainly in Okhla Corporate Office of Max Healthcare:

- FINANCE
- LEGAL COMPLIANCE
- BUISNESS DEVELOPMENT
- SEVICE EXCELLENCE
- COMMERCIALS

PROJECT REPORT 1:

TITLE:

CRITICAL ANALYSIS OF INFECTION CONTROL MEASURES AND COMPLIANCE FACTORS IN DIALYSIS UNIT OF MAX SUPERSPECIALITY HOSPITAL, SAKET, NEW DELHI

INTRODUCTION/ BACKGROUND:-

Patient safety is the foundation of high quality health care in any hospital. More than 3 lakhs patients receive dialysis in India every month .Out of it, 2000-2200 number of dialysis occur per month at Max Hospital, Saket, New Delhi. To maintain the quality care and best practice performances, Infection Control Measures and Guidelines play a crucial role.

NEED/RATIONALE:-

The Critical Analysis of Infection Control Measures focuses on the application of safety principles to dialysis facilities. The author reviews the implemented Infection Control Measures and analyse the data on high –risk safety areas within dialysis facilities.

PROBLEM STATEMENT:-

What is the effectiveness of Infection Control Measures in Dialysis Unit of Max super Speciality Hospital, Saket , New Delhi?

OBJECTIVES:-

1. To assess the implemented Infection Control Measures in dialysis unit at Max Super Speciality Hospital, Saket, New Delhi.
2. To examine the compliance of Infection Control Measures used in Dialysis Unit via auditing.
3. To critically analyse the effectiveness of Infection Control Measures followed by various levels of health care professionals in Dialysis unit.

STUDY DESIGN:-

Subjective Research Design

REVIEW OF LITERATURE:-

Standard Precautions are the system of infection control practices that apply to all patients, regardless of their suspected or confirmed infection (or colonisation) status, in any setting where healthcare is delivered.

They are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents. They are designed to protect both patients and healthcare workers (HCW's).

Standard Precautions include:

1. Hand hygiene
2. Use of appropriate personal protective equipment (PPE) to provide a barrier to contact with blood, body fluids, non-intact skin or mucous membranes
3. Immunisation of healthcare workers
4. Use of aseptic technique to reduce patient/client exposure to microorganisms
5. Management of sharps, blood spills, linen, and waste to maintain a safe environment
6. Routine environmental cleaning.

• **Infection Control Precautions for Dialysis Services** are more stringent than Standard Precautions and are designed to prevent transmission of blood borne virus's (BBVs) and bacterial pathogens including Multi-Resistant Organisms (MROs), in dialysis settings.

• They include all the components of Standard Precautions as well as:

1. Routine serological testing
2. Hepatitis B vaccination
3. Surveillance for infections
4. Additional cleaning procedures
5. The management of equipment, medications and consumables.

What is Dialysis?

It is a process of removing wastes and excess water from the blood and is used primarily as an artificial replacement for lost kidney. It can be used for both acute stages and chronic renal failures. Thus, Dialysis is regarded as the holding measure until kidney transplantation occurs.

Working Principle:

Dialysis works on the principle of diffusion of solutes and ultra-filtration of fluid across semi-permeable membrane.

Types:

There are two main types of Dialysis:

1. **Primary types** including Haemodialysis, Peritoneal Dialysis and hemofiltration.
2. **Secondary types** including Haemodiafiltration and Intestinal Dialysis.

Hemodialysis removes wastes and water by circulating blood outside the body through an external filter called dialyzer which is a semi-permeable membrane.

-Blood is cleaned directly through a closed extracorporeal circuit

-Blood is accessed via

- Arterio-venous fistula (AVF)
- Arterio-venous graft (AVG)
- Percutaneous central venous catheter

Peritoneal Dialysis: Wastes and water are removed from the blood inside the body using the peritoneum as a natural semi-permeable membrane. Water travels across peritoneal membrane to reach into abdominal cavity.

Hemofiltration: It is similar to Hemodialysis but the principle is different. The blood is pumped through a dialyzer or hemofilter but no dialysates is used. It is done by using a pressure gradient. It is generally used for acute cases.

Haemodiafiltration: It is the combination of Haemodialysis and Hemofiltration.

Intestinal Dialysis: It is rarely used and is alternative method in which dietary supplements in form of fibers are provided which is digested in colon.

Home Care Settings:

- The incidence of infection in home care patients, other than those associated with infusion therapy e.g. central venous catheter-related bloodstream infections, is not well known.
- Transmission risks during home care are presumed to be minimal. The main transmission risks to home care patients are from an infectious healthcare provider or contaminated equipment; providers also can be exposed to an infectious patient receiving home care including blood contact through percutaneous or mucosal exposures.

• The following precautions should be considered for home care settings:

1. Utilise Standard Precautions particularly aprons and gloves for contact with non-intact skin (e.g. draining wounds, pressure ulcers), or if the patient is faecal incontinent or has diarrhoea).
2. Use Contact Precautions for patients known to be infected or colonised with an MRO.
3. Limit the amount of reusable patient-care equipment that is brought to the home of patients infected or colonised with a MRO. This includes clinical bags/boxes which may be left in the vehicle, and only the items used for patient care are carried into the home.
4. If non-critical patient care equipment (e.g. stethoscopes) cannot remain in the home, clean and if necessary disinfect items before removing them from the home OR place reusable items in a plastic bag for transport to another site for subsequent cleaning and disinfection
5. Transmission based precautions, other than good personal hygiene, do not need to be taken by the patient or their family/carers whilst at home.

General Strategies:

- All patients must be taught aseptic technique with emphasis on proper hand hygiene, to reduce the risk of contamination. This should include:
- Rigorous exit site and catheter care including daily inspection of the exit site.
- Clean no-touch technique for dialysis exchanges.

RELEVANT FACTS:

Cleaning (and disinfecting) non-critical surfaces in patient-care areas are part of Infection Control Precautions for Dialysis Services (refer Section titled Infection Control Precautions for Dialysis Services).

Water and Dialysis Fluids: Every week, haemodialysis patients are exposed to ~400 L of water used for the production of dialysis fluids. Therefore, chemical and microbial

contaminants must be removed from the water to minimise the risk of chemical and pyrogenic reactions.

This is generally achieved through systems that involve the pre-treatment of municipal water (or other sources e.g. surface-fed water), a final purification process (**reverse osmosis{RO}**), and a hydraulic circuit for the distribution of purified water.

The microbial contaminants most frequently found in dialysis water are bacteria and their degradation products, such as endotoxins. The presence of bacteria, which may release endotoxins, demands vigilance in a dialysis centre water purification system and dialysate delivery systems.

Biofilms: Gram negative water bacteria are commonly found in water supplies used for haemodialysis. Under certain circumstances these microorganisms can persist and multiply in aqueous environments associated with haemodialysis equipment. These bacteria can adhere to surfaces and form biofilms (glycocalyxes), which are difficult to eradicate.

- Once a biofilm is formed, the penetration barrier provided by the polymeric matrix, along with increased microbial resistance, reduces the efficacy of disinfectants.
- Regular disinfection of the entire fluid path is necessary to prevent the formation of biofilm. Control strategies are designed not to eradicate bacteria and biofilm, but to reduce their concentration to relatively low levels and to prevent their regrowth.

LOGISTICS:-

1. Can be performed in-center or at home.
2. Patients dialyze for 3-4 hours thrice weekly (Open ward setting).
3. Unit schedules can run up to 4 shifts per day depending on census.
4. Dialyzers re-used for same patient up to 10 treatments.
5. Nurse/Technician to patient ratio is 1:1 to 1:4 depending on acuity.

DISINFECTION PROCEDURES:-

-Patient station surfaces

- Any soap
- Between each patient shift

-Medical Equipment

- Hospital disinfectant (low level)
- Between patient use

-Blood spills

- Tuberculocidal/1:100 bleach (intermediate level)
- Immediate

DISCUSSION:

DIALYSIS SAFETY PRIORITIES:-

Dialysis facilities are complex organisations that involve providers from multiple disciplines and use advanced technology to care for patients with multiple serious illnesses. As organisations become more complex, the possibility for errors increases and potential risks must be identified and prioritized.

Some risks are readily apparent in dialysis facilities. The following are the key areas of safety risk, and adverse events have been reported in each area:-

1. Water quality
2. Membrane reuse
3. Infection control

WATER QUALITY:-

1. Double RO (Reverse Osmosis) filtration plant is present in dialysis unit itself.
2. RO is a water purification technology that uses a semipermeable membrane to remove larger particles from drinking water. In it, an applied pressure is used to overcome osmotic pressure, a colligative property, which is driven by chemical potential, a thermodynamic parameter.
3. 120 litres of water is used per dialysis.
4. TDS (Total dissolved solids) is maintained at 1 to 3 and is tried to kept below 5ppm.
5. Purified water is not stored but is online i.e.it keeps on circulating.

PROCESS:-



NOTE:-

When Master unit stops, slave unit starts working.

MEMBRANE REUSE:-

1. Reprocessing dialyzers for reuse in the same patient was popularising 2 to 3 decades ago to allow widespread use of the more biocompatible and lower flux counterparts.
2. In the case of dialyzer reuse, the main concern has been the risk to life, but other issues have been raised, such as risk for infection and pyrogenic reactions, toxicity from disinfectants, reduced dialyzer performance, impaired removal of large molecules, and the validity of the dialyzer blood volume measurement as a criterion for assessing dialyzer function.
3. The ratio of **discard to product** water is 40:60.
4. **Fibre Bundle Volume** ideally is 80 ml and here it is kept at 70 ml and if less than 70ml then reprocessing is failed.
5. There are total **57 programming steps** during membrane reuse process.

INFECTION CONTROL:-

There are various Infection control risks such as:-

1. Design flaws
2. Inadequate hand hygiene
3. Faulty machine and equipment disinfection
4. Housekeeping errors
5. Inadequate waste management.

These risks have been associated with outbreaks of unusual bio-pathogens as well as transmission of Vancomycin –resistant enterococcus and hepatitis B and C viruses.

A survey report from the National ESRD Patient Safety Initiative compiled a ranked list of safety issues. **The top 5 safety issues** were as follows:-

1. Patient falls
2. Medication errors(including from dialysis prescription, allergic reactions to medication omissions)
3. Access- related events (clotting , infiltrate , poor blood flow, cannulation difficulty)
4. Dialyzer errors (incorrect dialyser or dialysate and equipment related sepsis)
5. Excess blood loss or prolonged bleeding.

Safety hazards are latent and can be grouped into 2 broad categories:-

1. Failures of safety measures
2. Failures of policies (which include content errors and failures of implementation and compliance)
3. The safety guidelines and regulation policies for Infection Control are established and available by NABH.

INFECTION CONTROL MEASUREMENTS:-

- Perform hand hygiene (11 step with soap and water)
- Use personal protective equipment (PPE) i.e. gloves, masks, foot cover.
- Follow safe injection practices
- Catheter management
- Tubing and its management
- Ventilator care
- Medication management
- Nursing Care
- Waste management with color coding system i.e.:-
 1. **Yellow bags :**
For infected waste, gauze, cotton or any other object in contact with body fluids, human body parts, etc.
 2. **Red bags :-**
Plastic wastes such as catheter, injections, syringes, tubing, I.v bottles
 3. **Blue bags :-**
All types of glass bottles and broken glass articles outdated and discarded medicines.
 4. **Black bags :-**
Needles without syringes, blades, sharps and all metal articles
 5. **Sharp container :-**
Used needles and blades with blood and all sharp articles
- **Housekeeping (linen management) :-**
-Infected and used linen is separately collected in yellow bags and are sent to laundry for disinfection. It also plays a vital role in cleaning the RO filters.

METHODOLOGY:-

Sampling method: Simple random sampling

For assessing the implemented activities for Infection control in Dialysis Unit at MSSH, Saket, all the documented data of past 6 months is taken i.e. from October 2014 to March 2015.



For checking the compliance of the activities performed in Dialysis unit, Periodic Audit is done. Checklist is prepared and Internal Periodic Auditing is carried out for Infection Control measures.



From the auditing results, 3-4 compliance factors are selected. The compliance of those factors is determined by analysis. Checklists are made and primary data of around 340 patients are collected by observations and auditing.



Finally the results of the compliance are interpreted and critical analysis of Infection Control Measures in Dialysis Unit is performed.

	Dialysis Checklist Auditing Making Dialysis Safer for Patients	
<u>Infrastructure-Checklist</u>		
<u>A: Dialysis Room</u>	YES	NO
(a) Adequate Space for Dialysis machine along with bed/Couch as per the guideline	Yes	
(Such space shall not be less than 4.5 m2 for each patient).		
(b) Are Sero positive Patients taken separately?(PICTURE ATTACHED)	Yes (isolated room)	
<u>B: Resuscitation</u>		
(a) Is the Crash Cart Checklist –Updated (22/04/2015) (All the necessary documents and pictures attached)	Yes (contents not complete)	
(b) Is there an easy access to the crash cart?	Yes (in front of dialysis room)	
(c) When was the crash cart sealed (26/03/2015)	Yes	
(d) Is the defibrillator charged and checked.	Yes	
(e) Is the defibrillator checked in every shift?	Yes	
(f) Is there a working laryngoscope present?	Yes	
(g) Is the Emergency drug tray complete?	Yes	
<u>C: Is the facility for Separate Water Treatment Room available</u>	Yes	
<u>D: Reprocessing Room</u>		
(a) Is there a policy for Reuse of Dialyzers Present?		No (They take it arbitrary i.e 15 times average)
(b) Separate facility for Reprocessing and reuse of sero positive Dialyzers is present		No (Criteria of single and multiple use)
(c) Is there adequate ventilation present in the reprocessing room?	Yes	

(d) Is there some specific criteria for Reuse of Dialyzer?	Yes (If current volume is <70 ml then no reuse)	
(e) Protocol for Patient identification for Dialyzers.	Yes (Labelling for single or multiple use and economic status of patient)	
<u>E: Drainage System</u>		
(a) Is the drainage system for effluents monitored regularly	Yes (via pit cleaning, once a week)	
(b) Planned Preventive Maintenance records for Drainage System.		No
<u>RO-Water-Checklist</u>		
(a) Record of Monthly Surveillance Cultures of RO-Water sent to Department of Microbiology.	Yes	
(b) Record of Daily Testing of RO Water.	Yes	
(c) Daily Record of Monitoring of TDS		No (previously via machine but currently machine not working so manually testing with no daily records)
(d) Is the TDS monitored onsite.	Yes (But not on daily basis with no record)	
(f) Is the Ultra Violet-Testing present?		No
(g) Records of testing of Ph value (Portable meter)	Yes	
(h) Is the RO-water Hardness Testing done onsite?	Yes	
<u>Disinfection-Checklist</u>		
<u>A:Before Beginning Routine Disinfection of the Dialysis System</u>		

(a) Used Blood tubing and dialyzer to be removed from Dialysis Machine.	Yes	
(b) Tubing and Dialyzer to be discarded safely.	Yes	
(c) No visible soling/Blood on the Surfaces	Yes	
(d) Priming Bucket to be emptied.	Yes	
(d) Transport all the reuse equipment safely to the washing area for disinfection.	Yes	
<u>B:Routine Disinfection of the Dialysis Station-After patient has left station</u>		
(a) Disinfection to all surfaces in the dialysis station.	Yes (GDA performed all activities)	
(b) All surfaces to air –dry.	Yes	
(c) Priming Bucket to be emptied and disinfected.	Yes (But over filled and kept wit clean ones)	
<u>Process –Checklist</u>		
<u>A:Checklist for Catheter Connection and Disconnection</u>		
(a) Use of PPE(Mask/ Gloves, Gowns)	Yes	
(b) Hand Hygiene performed	Yes	
(c) Aseptic Conditions to be followed for removal of Catheter from blood line	Yes	
(d) Catheter hub to be scrubbed	Yes(with betadine)	
(e) Antiseptic-Hub should be allowed to dry	Yes	
(f) Connect catheter to blood lines following Aseptic conditions	Yes	
(g) Remove Gloves and perform Hand Hygiene	Yes	
<u>B:Checklist for Catheter Exit site care observations</u>		
(a) Use of PPE (Mask/ Gloves, Gowns)	Yes	
(b) Hand Hygiene performed.	Yes	
(c) Skin Antiseptic to be applied appropriately.	Yes(with betadine and sterillium)	
(d) Skin Antiseptic to be dried.	Yes	
(e) Do not touch the exit site.	Yes	
(f) Application of Antimicrobial Ointment and dressing to be applied aseptically.	Yes	
(g) Remove Gloves and perform Hand Hygiene.	Yes	
<u>C:Checklist for Hand Hygiene Opportunities in Dialysis</u>		

(a) Before touching the patient		
Prior to entering station to provide care to patient	Yes(sanitizer)	
Prior to contact with vascular site	Yes(Hand washing)	
Prior to adjusting or removing cannulation needles	Yes(hand washing with soap)	
(b) Prior to Aseptic Procedures		
Prior to cannulation or accessing catheter	Yes(Hand Washing)	
Prior to performing catheter site care	Yes(hand washing)	
Prior to parenteral medication preparation	Yes(sanitizer)	
Prior to administering IV medications	Yes(sanitize)	
(c) After body fluid exposure risk		
After exposure to any blood or body fluids.	Yes(H.W)	
After contact with other contaminated fluids.	Yes(H.W)	
After handling used dialyzers, blood tubing or prime buckets.	Yes(H.W)	
After performing wound care.	Yes(H.W)	
(d) After touching a patient		
When leaving station after performing patient care.	Yes(Sanitize)	
(e) After touching patient surroundings		
After touching dialysis machine.	Yes(sanitize and if more contaminated H.W)	
After touching other items within dialysis station.	Yes(sanitize)	
After using chair side computers for charting.	Yes(sanitize)	
After leaving station.	Yes(H.W)	
After removing gloves.	Yes(H.W)	
<u>D:Others</u>		
(a) Is there sufficient supply of alcohol based hand sanitizer?	Yes	
(b) Is there sufficient supply of soap at hand washing stations?	Yes	
(c) Is there a sufficient supply of paper towels at hand washing stations?	Yes	
(d) Is there a visible access to hand washing sinks or hand sanitizer.	Yes	

From the checklist, we tried to focus all the key areas both clinical and non-clinical which play crucial role in assessing the Infection Control Measures.

These focus key areas are:-

1. Infrastructure checklist

2. RO Water checklist
3. Disinfection checklist
4. Process checklist
5. Others

AUDIT AGENDA:

Audit Location: Dialysis Unit, MAX Super Speciality Hospital, Saket, New Delhi110 017, India		Audit Period: 2015-April-17-2015-April-24	
Audit Type: Periodic Audit		Audit Topic: Infection Control Audit in Dialysis Unit	
Mentor: Dr. Gaurav Sharma		Shift Times: <i>09.00 am – 6.00 pm</i>	
Contact points : Dialysis Unit Manager, Technician,Supervisor , Nursing Team Leader, GDA s, Support Staff		Auditor(s): Dr.Sushma Pathak	
Scope: MAKING DIALYSIS SAFER FOR PATIENTS BY MONITERING AND CHECKING MEDICAL AND SUPPORTIVE SERVICES RELATED TO DIALYSIS, HIGH QUALITY PREVENTIVE & REHABILITATIVE CARE FOR NORMAL AND SERO POSITIVE PATIENTS, INFECTION CONTROL GUIDELINES AND CHECKLIST FOR OUTPATIENT AND INPATIENT HAEMODIALYSIS PATIENTS.			
Key Audit Objectives		4. To assess the implemented Infection Control Measures in dialysis unit at Max Super Speciality Hospital, Saket, New Delhi. 5. To examine the compliance of Infection Control Measures used in Dialysis Unit. 6. To critically analyse the effectiveness of Infection Control Measures followed by various levels of health care professionals in Dialysis Unit.	
Focus Areas: • INFECTION CONTROL MEASURES AND GUIDELINES			
Process Area: • Top Management • Management Representatives of Dialysis Unit • Administration and Disinfection Process • Infection Control Committee and Infection Control Nurse • Medical Stores, Stocks and Utilities • Bio Medical Engineering & Statuary Comoliance • Housekeeping • Process Areas - Blood Bank& Nursing • Maintainence-Waste management and RO Water Treatment			

Date : 2015-April 17 to 2015-April 24

Seri al No.	Key Findings	Protocol/Guidelines	Recommendations and Suggestions
1.	Attendant as a source of Infection: Every patient has at least 1 attendant accompanied. Proper precautions are maintained for staff and patient. But there is no specific hygiene protocol for the attendants. They come in direct contact with the patient and they touch instruments and equipment and remain there for 4 hours. They neither use hand hygiene practices nor follow PPE. They might bring or suffer from Nosocomial Infections.	The attendants should wait outside till dialysis is completed. If needed, they should follow hand hygiene protocols and PPE.	Nursing Team Leader and Supervisor has to ensure compliance and monitoring for the same.
2.	Over filled Dustbins: Dustbin near hand hygiene sink is overfilled with used tissues and comes in contact with water near sink. Some of the tissues were on floor. It might cause floor infection and bacterial infections to staff, attendants and patients.	Dustbins should be kept slightly away from sink. All nurses, technician, GDAs and support staff have been instructed to keep the tissues inside the dustbin. Any deviation should be reported to HOD.	Respective supervisors have been tasked with compliance. Waste management team should do surprise inspections for the same. Any deviation is reported to HOD.
3.	GNB was found growing during the month of March 2015: Gram Negative Bacilli was found growing in dialysate fluid culture report.(Report attached)	GNB uses dialysing fluid as their main source of nutrients. The number of micro-organisms should not exceed 200 CFU/ml. Aseptic conditions and Infection Control guidelines should be followed properly.	Both the water and the dialysate should be tested microbiologically at least once a month or immediately following a pyrogenic reaction or septicaemia in a patient undergoing dialysis, as well as after any modification of the water treatment or distribution system.
4.	TDS monitoring machine not		This is an important issue as water plays a crucial role in

Date : 2015-April 17 to 2015-April 24

Serial No.	Key Findings	Protocol/Guidelines	Recommendations and Suggestions
	working: TDS monitoring machine for recording TDS is not working. So recording of TDS is done manually for which there is no supervised update for manual record.	TDS of Dialysis Unit is maintained below 5ppm (Mostly 3 ppm). Periodic monitoring is done to check its maintenance via machine.	haemodialysis. Machine should be repaired immediately. Technician and supervisor should take actions to repair machine immediately. If readings are taken manually then supervised record should be maintained.
5.	Contamination via Encicarb Containers: (a). Used Encicarb containers were taken with open lids without precautions and kept together with un used ones. (b). Housekeeping employee wait till all Encicarb containers are emptied and then collect together. These might cause infections as used containers are kept with unused ones and containers are kept for longer period of time.	Used containers should be taken with close lids and are kept separately. Housekeeping must visit and take the used containers after every shift. These will reduce the chances of infection and maintain aseptic environment.	Housekeeping is outsourced by BVG India Ltd. Housekeeping supervisors should go for surprise visits at random timings to check the staffs are working properly or not. Any deviation should be reported to HOD and Head of Housekeeping.
6.	Seepage on walls of Dialysis Unit:: Seepage points were found just near to patient's bed as well as dialysis machine. This can cause fungal infections to patients, machines, dialyser, air borne infections to staff and attendants.	All areas of seepage need to be cleaned and seepage resistant paint has to be done with help of engineering and maintenance department. Waterproofing of all the areas has been done.	Staffs have been briefed to report any seepage in any corner of the unit. Prompt action need to be administered for the same.
7.	Error in supply and working of Printer and printing paper in Crash Cart: Printer working and printer paper are present in a disruptive manner since last 6 months in Crash Cart	Crash Cart provides emergency help and kit in dialysis unit. It is sealed and locked and is inspected time to time .Proper	Nursing head and supervisor need to continuously check the supply of printing paper and technician for proper working of printer for defibrillator. Any deviation is reported to

Date : 2015-April 17 to 2015-April 24

Serial No.	Key Findings	Protocol/Guidelines	Recommendations and Suggestions
	daily checklist. (last 6 months checklist added)	defibrillation inspection and record of working is established via printer. So printer must be in working condition.	maintenance and supply department.
8.	Hand Hygiene Error: - One of the nurses was found operating mobile phone with gloved hands. - One of the nurses was roaming in and out of dialysis unit with gloves in hand.	Hand Hygiene guidelines by NABH are followed in dialysis unit. The concerned staff person needs to be counselled as these might serve as source of infections.	This matter has been taken very seriously and training cum briefing sessions regarding Hand Hygiene protocols are being held every day from 1:30-2:00 PM everyday where infection control/biomedical waste/medical policy topics are being discussed daily for staff training. Attendance for the same is mandatory for all staff on shift and the same is being maintained in dialysis unit with the nursing supervisor.
9.	Errors in HYPOKIT checklist and STOCK list: Expiry dates are not mentioned in Hypo kit checklist for various items.	Expiry dates need to be mentioned in the Hypo kit checklist for proper monitoring.	Nursing staff and team leader should continuously check and mention the expiry dates in the checklist.
	b. Expired Dextrose 50% 25 ml injection was found expired in stock list.	Items about to expire should be consumed first and continuous checking of expired drugs is needed by stock manager.	It needs to be monitored seriously as it might affect health of patient. Nursing staff need to check before consuming. Continuous inspection is done by stock manager and supervisor.
10.	Deficiency of items in dressing trolley : Mostly there is disruptive supply of EUSOL, HELAX spray, betadine	Dressing trolley needs to be equipped with all the	Nursing staff and supervisor should inform the stock manager and demand for the

Date : 2015-April 17 to 2015-April 24			
Serial No.	Key Findings	Protocol/Guidelines	Recommendations and Suggestions
	ointment and FAIRLE gauge in dressing trolley since last six months. (documents attached)	essential items. Up to date fulfilment is to be done whenever needed.	early fulfilment of the same.
11.	Housekeeping issues in reprocessing room : Reprocessing room is cleaned weekly. As it is used all throughout 24 hrs, it needs to be cleaned at least twice a week.	Housekeeping staff should clean reprocessing room at least twice a day as it is used all throughout the day for membrane reuse. Also floor cleaning is needed.	The cleaning shifts should be flexible according to the need and on demand basis. Housekeeping staff should make flexible shifts.
12.	Drainage issues: There is 24 hrs continuous running of drainage system. Pit cleaning is done weekly. RO waste water and dialysis waste water is drained in the same pit. So from hospital point of view, it might affect the hygienic conditions.	There must be separate drainage system for RO and dialysis water. It reduces the chances of secondary infections and the waste water of RO can be utilized for floor cleaning and washing purpose.	Maintenance department should try to create separate drainage system for RO waste water and dialysis waste water.

Various documents and pictures as proofs and facts in Auditing are attached in annexures.

From the auditing, we have selected **4 compliance factors:-**

1. Hand Hygiene Techniques
2. Patient Identification
3. Needle Stick Injuries
4. Hospital Acquired Infections (CAUTI, ABSSI AND CAUTI)



These factors are used to determine the compliance percentage and examine the effectiveness of Infection Control Measures at MSSH, Saket, New Delhi.



With the results obtained from the compliance findings, Critical Analysis of Infection Control in Dialysis Unit is performed.

EXAMINING THE COMPLIANCE:

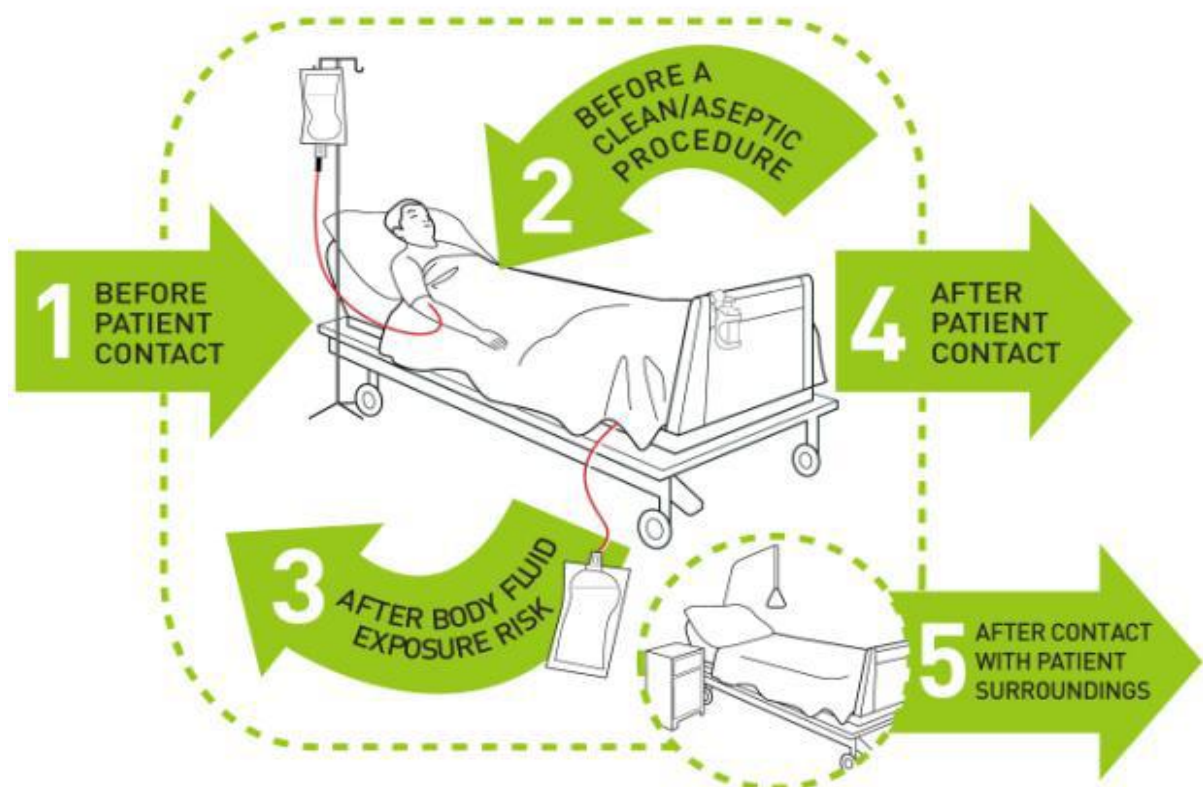
1. HAND HYGIENE TECHNIQUES:

Hand hygiene by healthcare workers is essential to reduce the risk of transmission of many pathogens associated with healthcare. Hand hygiene can be performed by washing hands with soap and water or applying alcohol hand rub.

Hands are the most common vehicle for transmission of organisms and “hand hygiene” is the single most effective means of preventing the horizontal transmission of infections among hospital patients and health care personnel.

Measuring adherence to hand hygiene:

Direct observation is considered the gold standard for measuring healthcare worker adherence to hand hygiene guidelines. Hand hygiene audits are undertaken weekly by wards and monthly by other clinical departments.



Audit Standards:

The standards used for the hand hygiene audits are based on the World Health Organisation's recommendations for the “Five Moments for Hand Hygiene” (WHO, 2009) now modified to 11 steps.

COLLECTION OF PRIMARY DATA:

For checking the compliance in Hand Hygiene, a checklist is prepared and **340** observations were recorded. **3 major criteria** are selected i.e. Rub, Wash, Missed. Under each of them, **5 parameters** are selected i.e. before patient touching, before asepsis, after touching body fluids, after patient touching, after surroundings.

Template for HAND HYGIENE checklist is as follows:-

CONTENTS				Actions	
No of patients	S. No.	Indications	Rub	Wash	Missed
1	1	Before-Patient Touching			Y
	2	Before-Asepsis			Y
	3	After Touching Body Fluid		Y	
	4	After Patient Touching	Y		
	5	After Surroundings		Y	

Total 340 observations at different timings at various shifts are recorded in a time span of 1 month in Dialysis Unit.

The filled checklist with 340 recordings is attached in annexures.

ANALYSIS AND INTERPRETATIONS:

The following are the analysis and interpretations based on the findings:

The overall total number of patients under different categories viz is as follows:

NUMBER WISE TOTAL DISTRIBUTION:

After recording the 340 observations, the following analysis is done. Key findings for the individual parameters are along with the graphs.

Hand Hygiene Criteria	Before-Patient Touching	Before-Asepsis	After Touching Body Fluid	After Patient Touching	After Surroundings	Total	Percentage
Rub	175.00	138.00	143.00	166.00	164.00	786.00	46.24
Wash	83.00	142.00	169.00	82.00	58.00	534.00	31.41
Missed	82.00	60.00	28.00	92.00	118.00	380.00	22.35
Total	340.00	340.00	340.00	340.00	340.00	1700.00	100.00

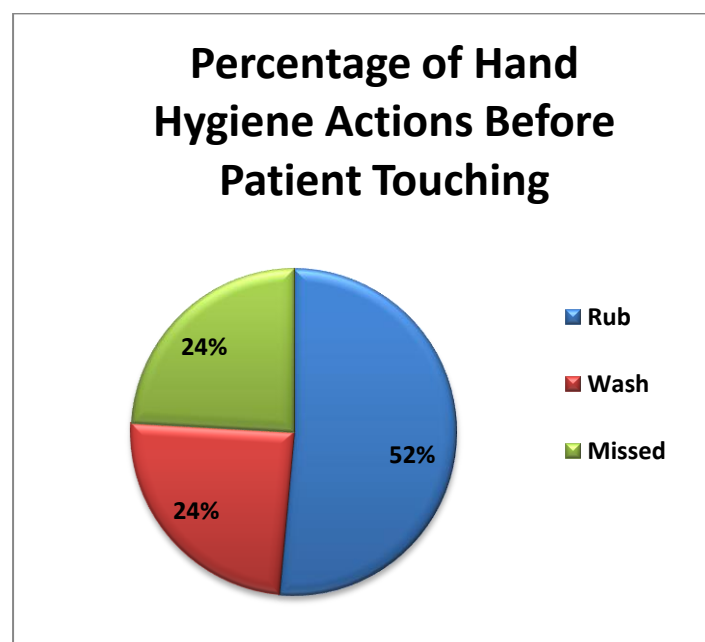
PERCENTAGE WISE TOTAL DISTRIBUTION:

Contents	Percentage	Percentage	Percentage	Percentage	Percentage	Percentage
Hand Hygiene Criteria	Before-Patient Touching	Before-Asepsis	After Touching Body Fluid	After Patient Touching	After Surroundings	Average
Rub	51.47	40.59	42.06	48.82	48.24	46.24
Wash	24.41	41.76	49.71	24.12	17.06	31.41
Missed	24.12	17.65	8.24	27.06	34.71	22.35
Total	100	100	100	100	100	100

INDIVIDUAL ANALYSIS OF EACH PARAMETER:

1. BEFORE PATIENT TOUCHING:

Hand Hygiene Criteria	Before-Patient Touching (%)
Rub	51.47
Wash	24.41
Missed	24.12



KEY FINDINGS:

We can evaluate from the findings that before patient touching, mostly **RUB** is performed during hand hygiene practises.

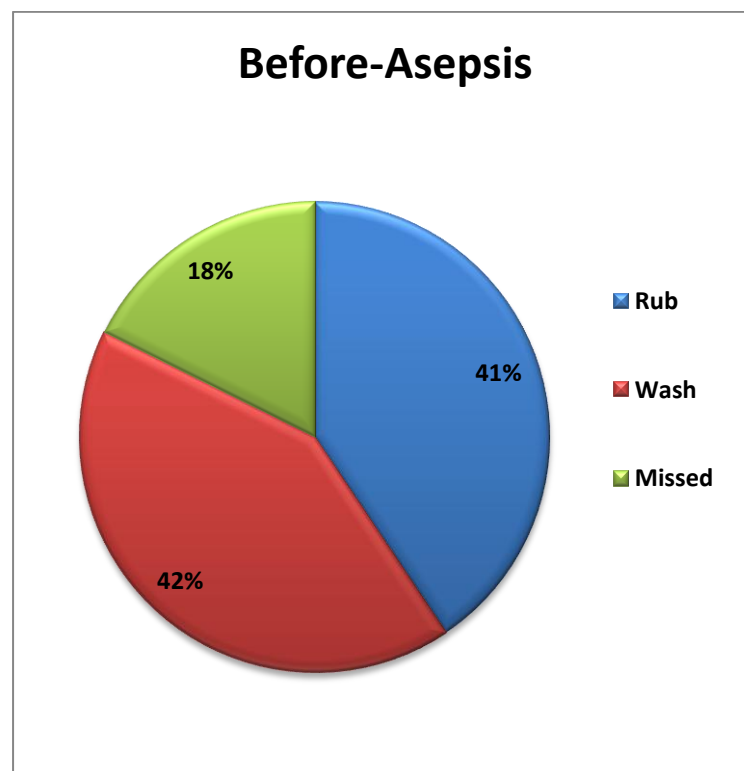
Rest two i.e. WASH and MISSED are performed almost equally besides RUB.

Ideally before touching patient WASH and RUB are recommended by WHO Hand Hygiene Protocol.

24% MISSED can affect the protocol and can influence the Infection control compliances.

2. BEFORE ASEPSIS:

Hand Hygiene Criteria	Before-Asepsis (%)
Rub	40.59
Wash	41.76
Missed	17.65



KEY FINDINGS:

We can evaluate from the findings that before Asepsis, mostly **WASH** is performed during hand hygiene practises.

Ideally, before Asepsis WASH and RUB are recommended as per need by WHO Hand Hygiene Protocol.

Here, we can note that MISSED has decreased (from 24 % to 18 %) as compared to before patient touching.

This contributes in enhancing the compliance of Infection Control measures.

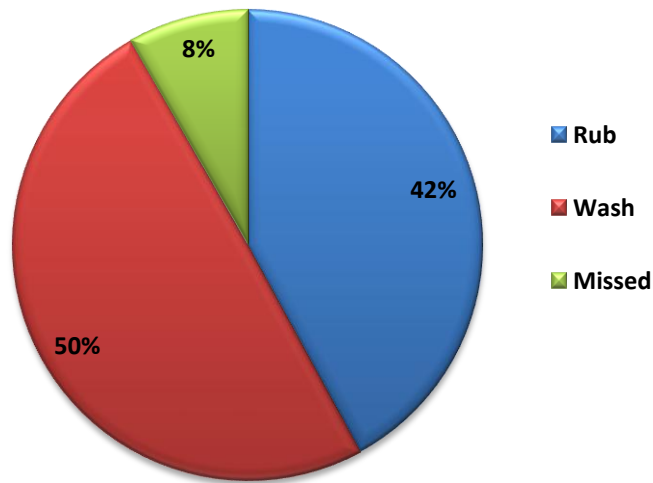
3. AFTER TOUCHING BODY FLUIDS:

Hand Hygiene Criteria	After Touching Body Fluid (%)
Rub	42.06
Wash	49.71
Missed	8.24

KEY FINDINGS:

We can interpret from the findings that after touching Body Fluids, mostly **WASH** is performed during hand hygiene practices.

After Touching Body Fluid



Ideally, WASH and RUB are recommended as per need by WHO Hand Hygiene Protocol.

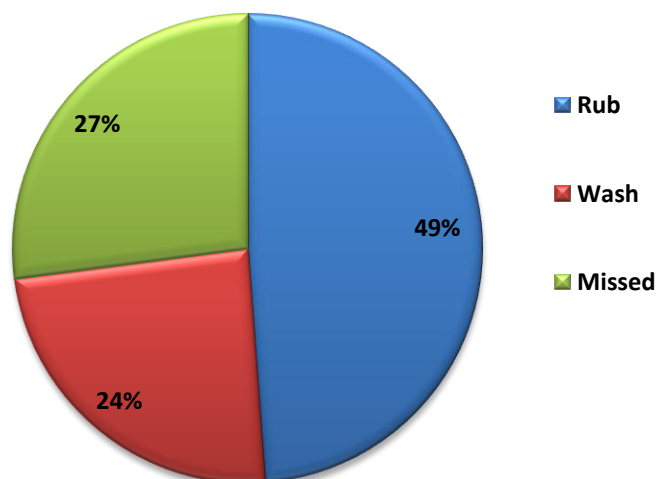
Here, we can note that MISSED has decreased (from 18 % to 8 %) as compared to before Asepsis.

Also, we can note that there are huge precautions taken after touching body fluids (as RUB and WASH contributes to around 92%).

4. AFTER TOUCHING PATIENT:

Hand Hygiene Criteria	After Patient Touching (%)
Rub	48.82
Wash	24.12
Missed	27.06

After Touching Patient



KEY FINDINGS:

We can interpret from the findings that after touching patients, mostly **RUB is** performed during hand hygiene practises.

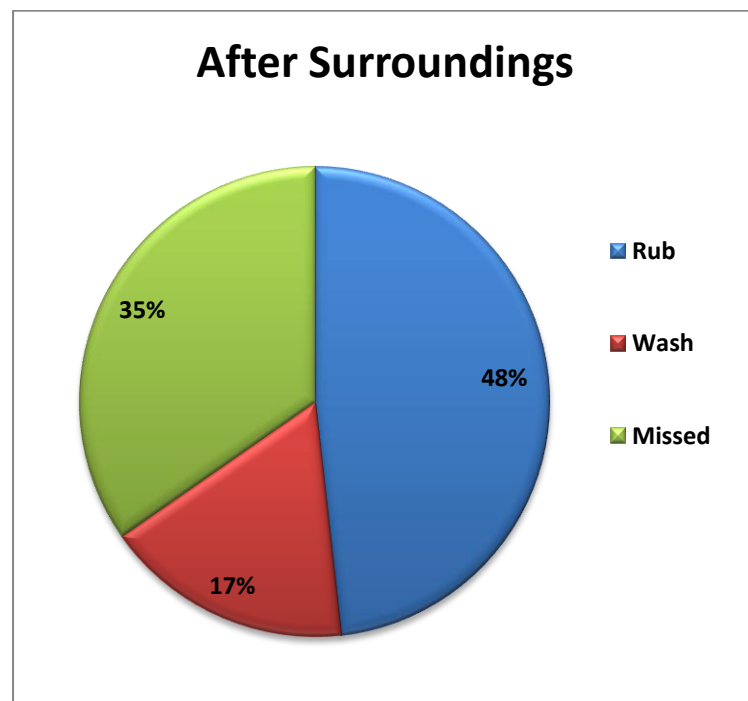
Ideally, WASH and RUB are recommended as per need by WHO Hand Hygiene Protocol.

Here, we can note that MISSED has increased again (from 8 % to 27 %) as compared to previous parameters.

WASH is least in number. 27% MISSED can affect the WHO Protocol and can influence the Infection control compliances.

5. AFTER SURROUNDINGS:

Hand Hygiene Criteria	After Surroundings (%)
Rub	48.24
Wash	17.06
Missed	34.71



KEY FINDINGS:

We can interpret from the findings that for after surroundings, mostly **RUB is** performed during hand hygiene practises.

Ideally, WASH and RUB are recommended as per need by WHO Hand Hygiene Protocol.

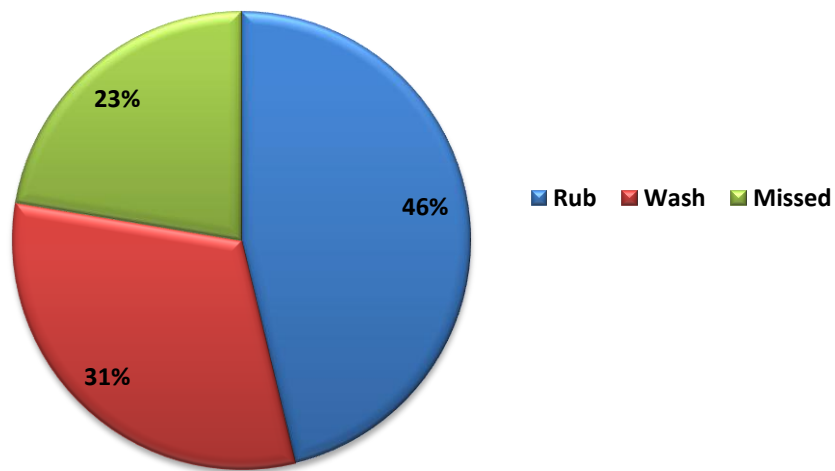
Here, we can note that MISSED has increased again (from 27 % to 35 %) as compared to previous parameters and is maximum amongst all readings.

35% MISSED can affect the WHO Protocol and can influence the Infection control compliances.

OVER ALL HAND HYGIENE PERCENTAGE:

Hand Hygiene Criteria	Overall Hand Hygiene Percentage
Rub	46.24
Wash	31.41
Missed	22.35
Total	100.00

Overall Hand Hygiene Percentage



KEY FINDINGS:

1. Thus with this examination of compliance for hand hygiene the results are maximum for Rub followed by Wash and Missed. Since the **Missed are least** and are at borderline ranges, the compliance is high for Hand Hygiene Practices.
2. In overall findings pie chart, we can interpret that 23% MISSED is there whereas 46% RUB and 31% WASH are there. Thus **the overall compliance including RUB and WASH contributes to 77%** which is an appreciable compliance for Infection Control Measures in Dialysis Unit.
3. **Amongst the 23% MISSED**, maximum is for after surroundings followed by after touching patients and before touching patients. These come under **LTFS (LOOK, TOUCH, FEEL, and SMELL)** which is different from the Infection Control Quality Indicators of Hand Hygiene Protocol.
4. Also compliance of Infection Control can never be 100%. Thus, the net results of 77% are appreciable results and thereby the **compliance is HIGH** for Infection Control Measures in Dialysis Unit of MSSH, Saket, New Delhi.
5. Individual maximum and minimum values for each parameters in respect to 3 primary actions performed for Hand Hygiene Measures can be understand best from the below table :

SERIAL NO.	PARAMETERS	MAXIMUM	MINIMUM	MISSED VALUES (%)
1.	Before-Patient Touching	RUB	MISSED	24%
2.	Before-Asepsis	WASH	MISSED	18%
3.	After Touching Body Fluid	WASH	MISSED	08%
4.	After Touching Patient	RUB	WASH	27%
5.	After Surroundings	RUB	WASH	35%

2. PATIENT IDENTIFICATION:

Patient Identification plays a vital role in determining the compliance for Infection Control in Dialysis Unit. Any error in this step leads to deterioration of quality services and leads to compliance failure.

Here, at MSSH, Saket, **PATIENT IDENTIFICATION POLICY** has been formulated and is used for correct patient identification.

PURPOSE OF POLICY:

This policy provides guidance to the staff to ensure the correct identity of all patients at all times to minimize the risk of misidentification and adverse outcomes of care.

This policy applies to all patients who are in receipt of care or treatment from Max Healthcare staff and this involves the following patient groups:

- All inpatients (including those waiting in the trolley area of the Emergency Department undergoing assessment and investigations prior to admission).
- Patients receiving treatment/consultation on Outpatient basis.
- Patients attending for day care treatment in Day Care Units.

PROCESS FOR IDENTIFYING PATIENT WITH ID BAND:

- The staff should ensure that all inpatients must wear the ID Bands.
- Before any intervention or procedure is carried out, it is the responsibility of the member of staff undertaking the intervention or procedure to confirm the patient's identity.
- No procedure should be performed if the patient has no ID band.

- Where it is necessary to remove a patient's ID band, for whatever reason, it is the responsibility of the member of staff removing the wristband to ensure that it is replaced immediately. If this is not possible, then they are responsible for making sure the reason for removal is documented in the patient's notes.
- At least **two identifiers** (e.g. patient's full name and date of birth) must be used to verify a patient's identity. **Neither of these identifiers should be the patient's room number or location.**

Identifiers used for identification in Max Healthcare:

- First and Last Name of the Patient spelt in full – Initials are NOT PERMITTED
- Max UHID
- Date of Birth
- IP No

Steps to identify the patients:

There are three steps to identify patients. These should be undertaken in the following Order (if the first is not possible, undertake the second, etc):

- By asking the patient to tell you their name and date of birth. Check this is compatible with the patient's ID band.
- If the patient is unable to tell their name or in case of **comatose patients**, refer to the ID band and, if possible verify the information by asking family member, attendant or another member of the clinical staff who knows the patient.
- By asking the patient's relative to identify the patient by name and/or date of birth.

EXCEPTIONS TO THE POLICY:

There are some situations where a patient may not wear an ID band:

- The band causes skin irritation
- The patient removes ID band

If a patient is unable to wear an ID band due to their clinical condition an alternative method of identification, where possible, should be sought, e.g. label affixed to the patient's gown.

METHODOLOGY:

For determining the compliance of Patient Identification, the following steps are followed:

1. First, the Hospital Policies for Patient Identification is followed and various parameters have been identified.
2. By considering those parameters, Checklist is prepared and observations are recorded.
3. Total data of **365 observations (sample size)** are recorded in duration of 1 month. (The same sample size for Hand Hygiene Compliance i.e. normal patients plus **25 observations for Allergic patients**).
4. The compliance is checked on the basis of presence or absence of respective parameters by analysing the data.
5. Based on the total number of correctly performed steps for Patient Identification, correctly identified patients and wrongly identified patients are calculated.
6. Interpretations are made and key findings are recorded.

Template for checklist of Patient Identification:

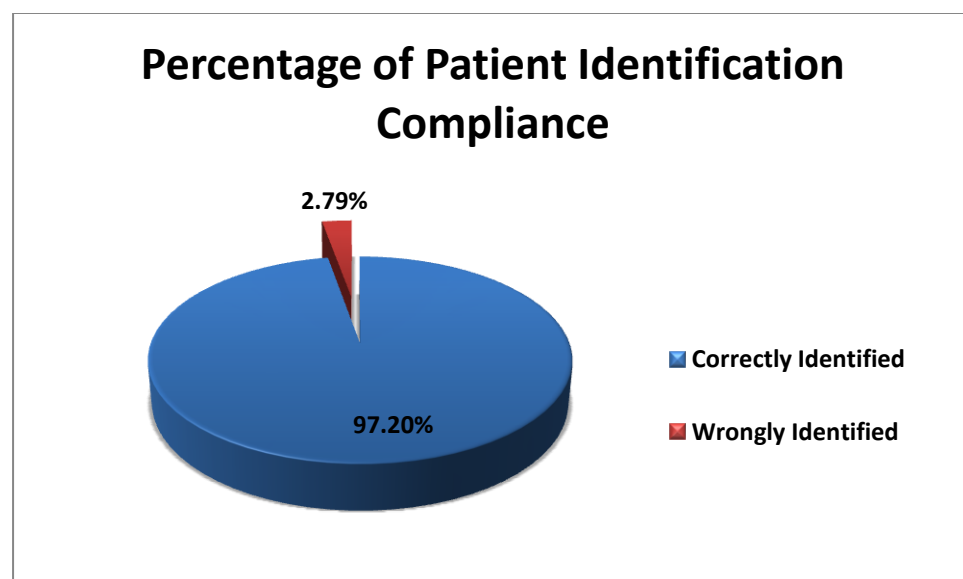
S.No.	Parameter	Observation
		Yes/No
1	Check for all in patients to wear a white ID(Identification Band) for safety	
2	Check contents of white ID band present	
3	Max UHID No.	
4	IP No.	
5	Patient's First Name	
6	Patient's last Name	
7	Date of Birth	
8	Age/Sex	
9	Check for Red Bracelet- To be worn by patients with known allergies	
10	Check for Allergy Name to be written in capital letters on the Red ID band	
11	Check for Red and White band to be on the same wrist of the patient	

The recordings of the observations of each patient are attached in the annexure.

	Parameter	Total	
S.No.		Yes	No
1	Check for all in patients to wear a white ID(Identification Band) for safety	331	9
2	Check contents of white ID band present	331	9
3	Max UHID No.	331	9
4	IP No.	331	9
5	Patient's First Name	331	9
6	Patient's last Name	331	9
7	Date of Birth	331	9
8	Age/Sex	331	9
9	Check for Red Bracelet- To be worn by patients with known allergies	23	2
10	Check for Allergy Name to be written in capital letters on the Red ID band	23	2
11	Check for Red and White band to be on the same wrist of the patient	23	2
		2717	78

From these findings, we calculated total number of correctly identified steps performed during patient identification both for normal white band and for re band i.e. Allergic patients.

PARAMETERS FOR PATIENT IDENTIFICATION	Percentage
Correctly Identified	97.20%
Wrongly Identified	2.79%



KEY FINDINGS AND INTERPRETATIONS:

1. Thus with this examination of compliance for Patient Identification, the results are maximum for **correctly identified patients** and is 97% which is commendable.
2. It directly gives a picture of **remarkable accountability and sense of responsibilities** of various staff members starting from Front desk, Nursing, Doctors to AMS, DMS, MS of the hospital.
3. The remaining **3% errors** occur at primary stages which can be detected and rectified in later stages of patient identification during the Dialysis procedure.
4. Thus, correct Patient Identification helps to **reduce any errors related to misidentification** in sample collection, surgeries, drugs administration, bed allocations, billing etc.
5. Thus, MSSH, Saket is performing efficiently in terms of Patient Identification in Dialysis Unit and its **compliance (97%) is appreciable**.

3. NEEDLESTICK INJURIES:

Every day, health care workers are exposed to dangerous and deadly blood borne pathogens through contaminated needle sticks, sharps, or splash exposures. It is one of the greatest risks faced by the frontline health care worker. Yet, these exposures have often been considered “part of the job.”

Needle stick injuries and other sharps injuries are among the most common and serious risks to healthcare workers. Sharps injuries are primarily associated with occupational transmission of hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).

More than 20 other infections can be transmitted through needle sticks, including syphilis, malaria, and herpes (Centres for Disease Control and Prevention [CDC], 1998a). At least 1,000 health care workers are estimated to contract serious infections annually from needle stick and sharps injuries (International Health Care Worker Safety Centre, 1999).

The highest risk of injury is from blood-filled hollow-bore needles. They accounted for 63% of the needle stick injuries from June 1995-July 1999 (NIOSH, 1999).

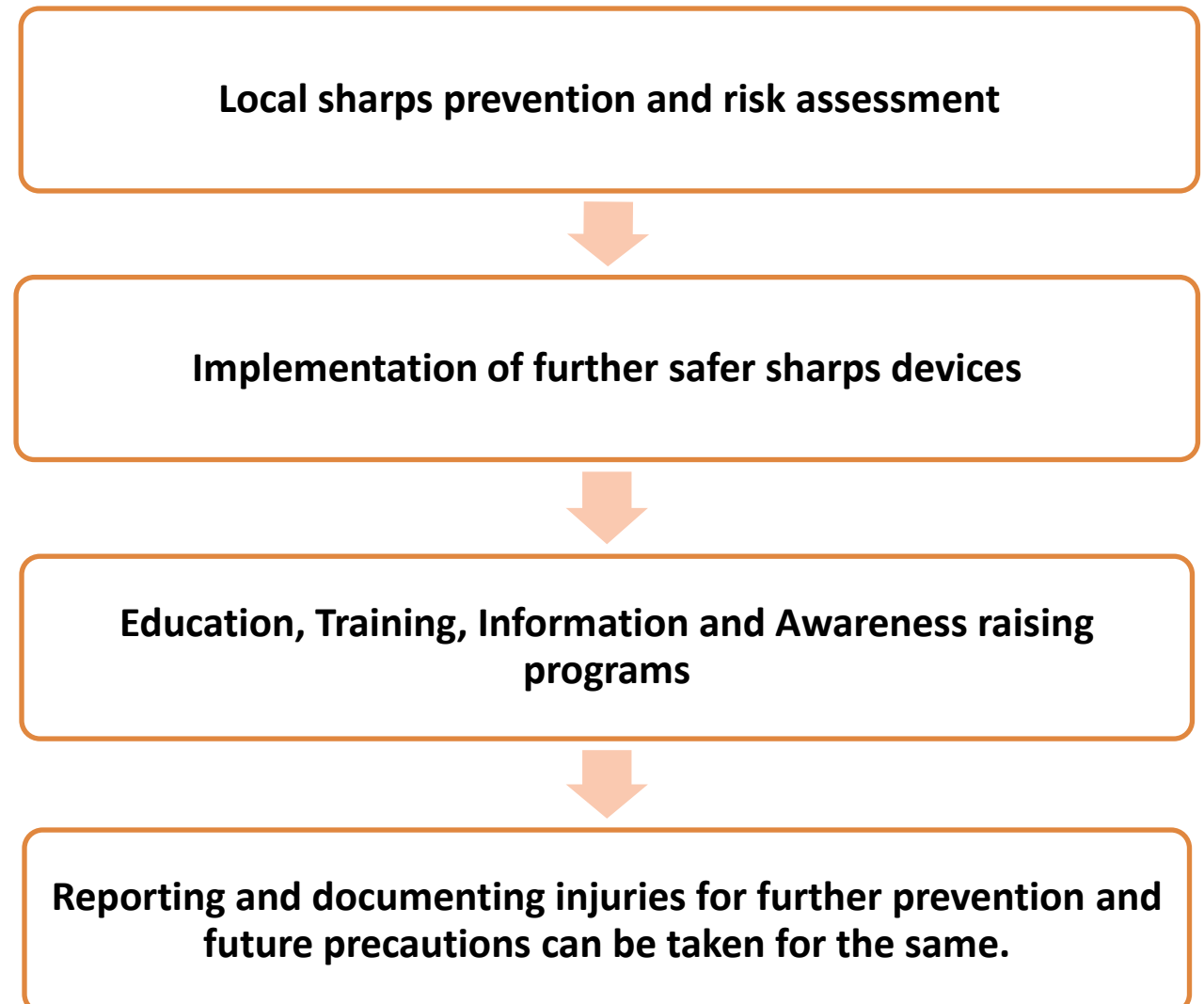
New regulations come into force on 11 May 2013, called the Health and Safety (Sharps Instruments in Healthcare) Regulations 2013. The Needle stick Safety and Prevention Act was signed into law in November 2000 and became effective in April 2001.

In Dialysis Unit, catheterization and haemodialysis involves frequent usage of needles. Hence, Needle stick injuries play a significant role in determining the Infection Control Measures.

Here at MSSH, Saket, 4 needle stick injuries are reported in totality in the past 6 months (as per hospital data provided). Thus, this number itself indicates an appreciable compliance for Needle stick injuries.

Compliance is monitored through the **Health, Safety and Environmental Governance Committee of hospital along with Infection Control Committee.**

Key areas where MSSH, Saket is focusing for enhancing the compliance of Needle stick Injuries are summarized below:



Compliance and Training Issues:

There is a clear relationship in the literature between risk, compliance and training. Good training will improve compliance with safe workplace and reduce the risk of Needle stick Injury.

All healthcare staff should be vaccinated for HBV. All Needle stick Injury events should be registered and carefully documented.

Documentation and Recordkeeping:

The first step for the needle stick committee is to identify and document where and why Needle stick and sharps injuries are occurring. There are various tools to assist in this task including: **the sharps injury log, the OSHA 300 Log, a survey, and a workplace walk-through.**

Promptly reporting a needle stick and starting PEP can protect you in the future.

Sharps Injury Log helps to:

- Analyse injury frequencies by specific attributes like work units, devices, and procedures.
- Identify high-risk devices and procedures.
- Identify injuries that could be prevented.
- Evaluate the efficacy of newly implemented safe devices.
- Share and compare information and successes with other institutions.

Workplace Walk-Through:

A walk-through, which is a workplace inspection, is a crucial way to identify workplace hazards. Walk-throughs should be regularly planned and conducted by the needle stick prevention committee or Infection Control Committee.

The walkthroughs should be conducted during work hours, during different shifts, and unannounced by ICN.

FACTS AND RECOMMENDATIONS:

- Needlestick and/or Safety Committees or Infection Control Committee should regularly review the sharps injury log.
- By learning which types of devices are involved in injuries, it is possible to determine which devices are not safe and must be replaced.
- While reviewing the log, certain departments or units may seem to have a high number of injuries. Armed with that information, interventions can be made within that unit to determine why they are sustaining so many injuries.
- Recognize that short staffing and other work organization issues might contribute to needle stick injuries. Adequate staffing might help prevent needle stick injuries
- Information from the log will help to identify specific interventions, such as increased training, stocking additional safer devices, and increased staffing.
- After analysing the log data, the committee should identify high priorities for action, especially to eliminate the highest risk devices and prevent the highest risk and most frequently occurring injuries.

Strategies to Prevent Injuries:

- Provide training for key staff in how to deal with needles. i.e. wear appropriate gloves, use tongs and discard needles in approved sharps containers
- Always wear gloves and use tongs to pick up garbage
- Do not reach with your hands for objects you can't see.
- Perform routine sweeps of areas where there is a risk of discarded needles
- Instruct staff to never dispose of needles in regular garbage
- Install CSA sharps containers in public areas as appropriate
- Promote immunization for Hepatitis B.

4. HEALTHCARE ASSOCIATED INFECTIONS (CLABSI and CAUTI):

Health care-associated infections, or HAIs, are infections that people acquire while they are receiving treatment for another condition in a health care setting.

HAIs can be acquired anywhere health care is delivered, including inpatient acute care hospitals, outpatient settings such as ambulatory surgical centers and end-stage renal disease facilities, and long-term care facilities such as nursing homes and rehabilitation centers.

HAIs may be caused by any infectious agent, including bacteria, fungi, and viruses, as well as other less common types of pathogens.

These infections are associated with a variety of risk factors, including:

- Use of indwelling medical devices such as bloodstream, endotracheal, and urinary catheters
- Surgical procedures
- Injections
- Contamination of the health care environment
- Transmission of communicable diseases between patients and healthcare workers
- Overuse or improper use of antibiotics

Magnitude of the Problem:

HAIs are a significant cause of morbidity and mortality. At any given time, about 1 in every 25 inpatients has an infection related to hospital care. These infections cost the health care system billions of dollars each year and lead to the loss of tens of thousands of lives. In addition, HAIs can have devastating emotional, financial and medical consequences.

A majority of hospital-acquired HAIs include:

- Urinary tract infections
- Surgical site infections
- Bloodstream infections
- Pneumonia

Doctors use many types of invasive devices and procedures to treat patients and to help them recover. Infections can be associated with the devices used in medical procedures, such as catheters or ventilators. These include:

- Central line-associated bloodstream infections (CLABSI)
- Catheter-associated urinary tract infections (CAUTI)
- Ventilator-associated pneumonia (VAP)
- Surgical site infections (SSI)

Out of these, the study will focus on CLABSI and CAUTI only.

CLABSI (Central line-associated bloodstream infection):

(CLABSI) is a primary bloodstream infection (BSI) in a patient that had a central line in place at the time of or within the 48- hour period before the development of the BSI.

The intravenous device infection rate is calculated by the following formula:

Intra-vascular device infection rate:

$$\frac{\text{Number of CLABSI in a month}}{\text{Number of central line days in that month}} \times 1000$$

CLABSI occurs during Changing of central line at the time of admission and MRSA Screening was not done. Here, large body vessels are used for central lining.

During Dialysis, central lining and fistula making is done which is the prime cause for CLABSI.

DIAGNOSTIC CRITERIA OF CLABSI (based on CDC Criteria):

Criteria1: Patient has a recognized pathogen cultured from one or more blood cultures and organism cultured from blood not related to an infection at another site (urine/respiratory/wound/etc culture should not have same pathogen).

Criteria2: Patient has at least one of the following signs or symptoms:
fever (>38 C), chills, or hypotension also two consecutive blood cultures should be positive.

Criteria3(for neonates and infants): Patient < 1 year of age has at least one of the following signs or symptoms:
fever (>38°C, core) hypothermia (<36°C, core), apnea, or bradycardia .

CAUTI (Catheter Associated Urinary Tract Infections):

In Dialysis Unit, Urinary Tract Infections are the primary HIA s. Urinary tract infections (**UTI**) are defined using Symptomatic Urinary Tract Infection (**SUTI**) criteria, Asymptomatic Bacteremic UTI (**ABUTI**), or Urinary System Infection (**USI**) criteria.

- CAUTI is caused due to prolonged Catheterization. If change of catheter is done before the stipulated time of 14 days and cultures come positive then they are observed to be a common finding attributing to UTI.

UTI rate is calculated as follows:

Urinary tract infection rate:

Number of urinary catheter associated UTI in a month X 1000

Number of urinary catheter days in that month

Complications associated with CAUTI cause discomfort to the patient, prolonged hospital stay, and increased cost and mortality. It has been estimated that each year, more than 13,000 deaths are associated with UTIs.

DIAGNOSTIC CRITERIA:

Catheter-associated UTI (CAUTI):

1. A UTI where an indwelling urinary catheter was in place for >2 calendar days on the date of event, with day of device placement being Day 1, **AND** an indwelling urinary catheter was in place on the date of event or the day before.
2. Patient has at least **one** of the following signs or symptoms:
 - Fever (>38.0°C)
 - Suprapubic tenderness
 - Costovertebral angle pain or tenderness
3. Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of $\geq 10^5$ CFU/ml. All elements of the UTI criterion must occur during the Infection Window Period.

NOTE:

Here, at MSSH, Saket, there are **no single cases of CLABSI and CAUTI** are detected since last **6 months** (as per hospital data). This clearly indicates the accuracy and highly accurate compliance in Dialysis Unit of MSSH, Saket.

CONCLUSION:

CRITICAL ANALYSIS OF INFECTION CONTROL MEASURES AND COMPLIANCE DETERMINATION:

In the beginning, the study started with 3 primary objectives:

1. To assess the implemented Infection Control Measures in dialysis unit at Max Super Speciality Hospital, Saket, New Delhi.
2. To examine the compliance of Infection Control Measures used in Dialysis Unit via auditing.
3. To critically analyse the effectiveness of Infection Control Measures followed by various levels of health care professionals in Dialysis unit.

STUDY METHODS AND OUTCOMES:

By adopting individual methodology and implementing various strategies for analysis and interpretations all throughout, we have done Internal Periodic Audit for assessing the implemented Infection Control Measures. Later, 4 compliance factors are shortlisted and compliance of those is examined individually with different methodology and Analysis method. At the end, the effectiveness of Infection Control Measures is estimated.

The study has determined that Dialysis unit of MSSH, Saket is performing **efficiently** with all the basic as well as advanced methods and measures to prevent Infections.

The study has come across various strengths and few weaknesses of the working of Infection Control in Dialysis Unit:

1. STRENGTHS:

The study gives all the necessary information related to various Infection Control measures in Dialysis starting from Environmental general infrastructure to Human felicitated methods.

- a) Compliance rate is **100% for CLABSI and CAUTI** where no single case is reported in the past 6 months which proves that ICN and committee are working best to reduce HAIs.
- b) Compliance rates of **Patient Identification** are maximum i.e. **97%** which gives evidence that this factor has maximum compliance. **Misidentification** and its related errors are least in the hospital. **Patient Identification Policy** formulation and its effective implementation is evident from it at various levels of staffing starting from front office till doctors and Medical Superintendents.
- c) **Needle stick injuries** are **6 in number in the past 6 months** indicating the **OSHA** policy implementation and properly following of the same. Also it indicates the precautions taken against sharps and the awareness amongst the staff related to it.
- d) **Hand Hygiene protocols** are purely human centred and the compliance of the same varies tremendously. With total dialysis of **60-70 per day at MSSH, Saket**, it becomes very difficult to monitor and maintain sustainability for each patient. Besides this still the **compliance is 77%**

which is appreciable. But further steps and modification of protocols could result in enhancing the same.

2. WEAKNESSES:

- a) There is **no system based method** to evaluate the compliance of Infection control measures. **I.T interventions and soft wares** are needed to analyse the daily workup for Infection control measures.
- b) Also various **environmental and general factors** like TDS monitoring, Multi usage dialysers, Sewage, Surveillance culture reports were not working up to the mark (results from auditing).
- c) The compliance of **human centred measures** like Hand washing and Patient identification varies a lot. There is no single system to check these human centred systems. Since observations are the gold standards for the same, there is **biasness and lack of efficiency** in the results.
- d) **23%** Missed cases in Hand Hygiene and **3 %** in Patient identification indicate the lack of compliance.
- e) **6 cases of Needle stick and no case of CLABSI CAUTI** indicates that hospital is working hard on these factors to prevent HIAs.
But is the hospital working in sustainable rate?
How long it took to eliminate these numbers?
Is the hospital laced for other HAIs besides these?
Do all the cases are recorded or documented or its just figures?
Do they follow the legal, ethical and social protocols?

These questions are research questions and further studies can be done on the same to measure the **authenticity and accountability** of the Staff and hospital authorities

COMMENT SECTION:

- a) Medium strength of evidence for **computerized systems** is there. Everything is human centred with less maintenance of record log.
- b) **Over use of dialysers and antibiotic regime** could be future research topics.
- c) **Cost effective** implementation and Maintenance of such Infection Control Measures has not been discussed here.
- d) Few services like Housekeeping, Water Supply, Linen, Biomedical Waste management are **outsources departments**. Various norms and authenticity of their working and compliance is not discussed here.
- e) **One single system** which could be the combination of both Human centred and system based should be formulated to maintain sustainability and achieving long standing goals of efficient working of Infection Control Measures and its Compliance determination consistently.

ANNEXURES AND APPENDIX:

DOCUMENTS OF AUDIT:

SERIAL NO.	KEY FINDINGS	DOCUMENTS
1	Attendant as a source of Infection	Observations and picture attached
2	Over filled Dustbins	Picture attached and random observations in 1 week
3	GNB was found growing during the month of March 2015	Infection control surveillance culture report
4	TDS monitoring machine not working	Machine not working, picture attached and R O checklist of last 6 months attached
5	Contamination via Encicarb Containers	Random observation in 1 week and Picture attached
6	Seepage on walls of Dialysis Unit	Picture attached and random observations in 1 week
7	Error in supply and working of Printer and printing paper in Crash Cart	Crash Cart checklist of last 6 months attached
8	Hand Hygiene Error	Hand hygiene checklist attached with 4 ,5 observations at random timings
9	Errors in HYPOKIT checklist and STOCK list regarding expiry of drugs	Hypo kit checklist and stock check list of past 6 months attached
10	Deficiency of items in dressing trolley	Dressing Trolley checklist of last 6 months attached
11	Housekeeping issues in reprocessing room	Housekeeping schedule and shift detailed document and picture attached of floor and reprocessing unit
12	Drainage issues	Maintenance department checklist and drainage record attached of past 4 months

Patient Identification analysis:-

	Parameter	Total	2795
S.No.		Yes	No
1	Check for all in patients to wear a white ID(Identification Band) for safety	331	9
2	Check contents of white ID band present	331	9
3	Max UHID No.	331	9
4	IP No.	331	9
5	Patient's First Name	331	9
6	Patient's last Name	331	9
7	Date of Birth	331	9
8	Age/Sex	331	9
9	Check for Red Bracelet- To be worn by patients with known allergies	23	2
10	Check for Allergy Name to be written in capital letters on the Red ID band	23	2
11	Check for Red and White band to be on the same wrist of the patient	23	2
Total		2717	78

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- EMBASE
- EBM Reviews (OVID)
- PubMed
- Medline
- Medline in-process and other non-indexed citations
- Centres for Disease Control and Prevention (CDC)
- National Institute for Health and Clinical Excellence (NICE)
- Caring for Australasians with Renal Impairment (CARI) guidelines
- UK Renal Association
- National Kidney Foundation Disease Outcomes Quality Initiative (NKF KDOQI)
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PROJECT REPORT 2:

TITLE:

MARKETING STRATEGIC MODEL OF REVENUE ESCALATION FOR MEDICAL TOURISM AT MAX SUPER SPECIALITY HOSPITAL, SAKET, NEW DELHI.

INTRODUCTION/BACKGROUND:

Healthcare Industry globally is changing rapidly and becoming more complex, particularly in developing nations. Initially, patients follow their traditional method of visiting to their respective hospitals at their nearby localities. Here, healthcare providers had operated as **semi-monopolies** with an unlimited flow of customers and guaranteed revenues. Now, customers have greater choices and this had led to more competition.

Healthcare services are being offered through a **Retail Oriented Marketing Model** and they have to market their services to increasingly discriminating customers.

This healthcare consumerism has boosted “Medical Tourism” concept worldwide which is very popular these days.

Medical tourism, also called **medical travel or health tourism** is a term initially coined by travel agencies and the mass media to describe the rapidly-growing practice of travelling to another country to obtain healthcare.

Various Asian countries like Thailand, Malaysia, Singapore, India, etc. are promoting medical tourism aggressively.

Medical value travel is the term that has been chosen to refer to the practices or trends of patients seeking healthcare beyond boundaries. The keyword taken is ‘value’ since a patient seeks value when they choose to undertake travel for healthcare. The term value is also of importance in this context since the practice of medical tourism adds and generates value for the country under consideration.

MAX Super Speciality Hospital, Saket, New Delhi is one of the leading Healthcare providers offering Medical Tourism in Delhi-NCR region.

Key words: Healthcare, Private players, Traditional, Medical Tourism, Revenue Escalation

REVIEW OF LITERATURE:

1. Medical tourism or health care tourism is fast growing multibillion-dollar industry around the world. It is an economic activity that entails trade in services and represents the mixing of two of the largest world industries: **Medicine and Tourism**.

2. Whereas tourism has slumped during recession, Medical Tourism remained unaffected as patients in developed countries realised that they can avoid paying high medical costs in their home countries.
3. **Reasons for Medical tourism :**
 - a. Much cheaper rates or those treatments such as Ayurveda or yoga therapies and allopathy which are not available in one's own country. Such services typically include elective procedures as well as complex specialised surgeries such as joint replacement (knee/hip), cardiac, urology and transplant of major organs, dental or cosmetic surgeries.
 - b. Availability of latest technologies and growing compliance on international standards.
 - c. Less visa restrictions and language barriers in India
 - d. Leisure aspects typically associated with travel and tourism are also included in such medical travel trips.
4. India has a **2% share** of the global health tourism market. According to provisional statistics 6.29 million foreign tourists arrived in India in 2011 (An increase of 8.9% from 2010) and in 2012 there is an increase of 16.2 % from 2011.
5. According to a study carried under the **Confederation of Indian Industry (CII)**, medical tourism in India is projected to become a US \$2.3 billion industry with an annual growth rate of 30% in 2012 from 12% (2002). India's medical tourism selling slogan "**First World Treatment at Third world Prices**" is very effective and popular campaign in all over the world. Delhi/NCR has emerged as a perfect destination for medical tourism in India. The government as well as private players are keenly assessing the potential and means to tap the same. Many private players established high-tech hospitals and are providing health care facilities; which matches the highest standards of healthcare delivery worldwide.
6. In India, **Delhi NCR and Chennai** are two primary hubs for quality based Medical Tourism and Chennai is considered as India's Health Capital.

OBJECTIVES:

- a. **General Objective:** To formulate the marketing strategic model of revenue escalation for medical tourism at MSSH, Saket, New Delhi.
- b. **Specific Objective:** To assess and review the revenue generation and to provide an optimization model for higher revenues and streamlining of operational procedures at MSSH, Saket, New Delhi.

RATIONALE/ NEED:

1. Healthcare services across the globe vary significantly. Unavailability of quality healthcare in many countries across the world creates the need to look beyond the. There is often disparity across countries in the socio economic conditions where despite the paying capacity; patients may not be able to access quality healthcare, simply due to the lack of availability. Many African countries, South American countries, and even the Middle East nations fall under this category.

2. In developed countries, medical tourism often provides an alternate way for uninsured or underinsured patients to obtain economical treatment. It can help bring down the waiting period significantly and help provide treatment to patients who require urgent medical care. Growth of medical tourism is likely to promote the expansion and modernisation of health facilities in developing countries. Medical tourists can access specific procedures like complex surgeries, specialised treatments for chronic diseases, and other methods of focussed care.
3. There are surgeries and procedures that are not covered under the insurance ambit, for instance, cosmetic surgeries and dental treatments. Medical tourism offers a viable option in such cases too. With growing concerns of rising medical costs, aging population, increase in lifestyle related diseases, coupled with factors such as increasing healthcare awareness among people, medical tourism can help reduce the burden of disease considerably and help people receive the timely and appropriate care they need.
4. In 2005 there were only 2 JCI accredited hospitals present in India, where this number has radically changed to 23 in 2015.

METHODOLOGY:

The population of MSSH Saket was sorted out of Max Saket and Max Shalimar Bag data of last fiscal year i.e. from April 2014 to March 2015. In every month the population was around 450 to 520, so the **total population size analysed is 5139**. The project primarily focussed on the **Inpatient department** and have analysed the data of the same.

For analysis we have followed the following **steps:-**

1. First the country wise revenue was calculated and data was arranged in descending order. Out of it, top 10 revenue generating countries were selected
2. Then the country wise total number of patients in descending order was calculated. Out of it we selected the top 10 countries. Total Number of International Inpatient treated in MSSH, Saket is 5139.
3. Then the monthly total revenue generation and total number of patients were calculated.
4. After this an analysis to get the speciality wise number of patients and revenue were performed.
5. The percentage share of each speciality in the total revenue was calculated.
6. Then the top 7 specialities and their share in total revenue were drawn.
7. Countries which provide the maximum share for medical tourism in India were selected. Then the global burdens of disease of these shortlisted countries based on the WHO reports were carried out.
8. Then a comparison was drawn between our super specialities and the global burdens of disease of these countries.
9. SWOT analysis was done on the gathered data.
10. Now strategies were formed for these countries which were the part of opportunity.

DISCUSSION:

1. The study proceeds from estimating the total number of foreign tourist arrivals in India.



2. Out of it, the total foreign tourist arrivals for medical treatment is estimated in India. It helps to estimate the scope of medical tourism and further its future possibilities.



Total Foreign Tourist Arrivals (FTA) vs FTAs for medical treatment in India



Source: 'India tourism statistics 2012', Ministry of Tourism website, accessed 25 July 2014

KEY FINDINGS:-

- In 2012, **U.S and UK** were responsible for the highest number of FTAs in India.
- However, the number of FTAs for medical treatment from these two countries was significantly less, at **3.4 percent** of the total medical FTAs.
- **Bangladesh** and other neighbouring underdeveloped countries on the other hand were responsible for approximately 50 percent of the total number of medical tourists.



- Out of the total pool, top 10 source countries of FTAs in India are estimated. This helps to target the top most revenue generating countries and helps to form the new market for the countries having least revenues.

Top 10 source countries of FTAs in India, 2012



Source: 'India tourism statistics 2012', Ministry of Tourism website, accessed 25 July 2014

KEY FINDINGS:-

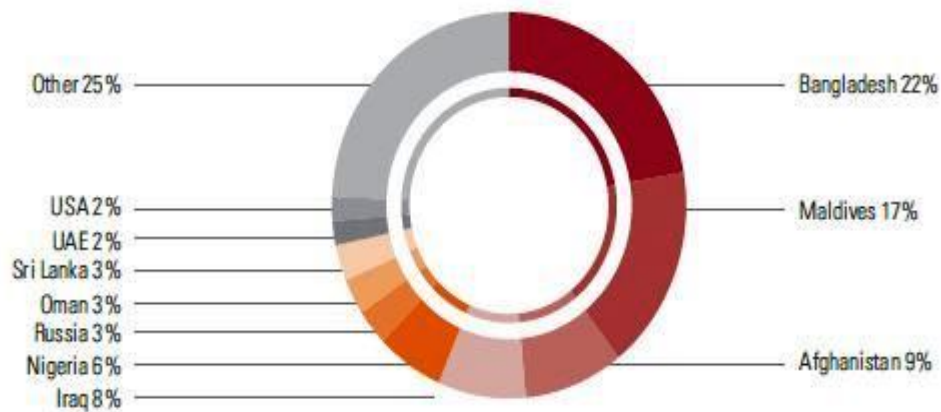
- Bangladesh** accounts for the highest number of medical tourists owing to the lack of quality healthcare infrastructure and unavailability of skilled manpower in their country. Moreover, India is a convenient option because of its physical proximity and similarity in culture, food and language.
- SAARC countries** in particular (namely Afghanistan, Pakistan, Nepal, Bhutan, Bangladesh, Maldives and Sri Lanka) are a major source of medical tourists owing to the physical proximity and political co-operation agreements.
- The SAARC countries have been an important source of medical tourists for India. Factors like proximity, direct air connectivity, and cultural connect help establish India as a preferred destination for medical tourism for patients from the region.
- With regional cooperation treaties in place, there is a mutual consent between these countries to promote each other as medical tourism destinations in a symbiotic fashion. For instance, **Maldives** has recently suggested that medical tourists coming to India for their treatment should be encouraged to travel to Maldives for rejuvenation purposes.



- Top 10 countries are shortlisted and their nationality wise breakups of FTAs for Medical treatment are selected. This helps to compare the revenue generating countries of Max Hospital Saket with the overall National breakups. It thereby

helps in focusing the countries which are not coming to MSSH, Saket but are contributing to overall revenue for medical tourism in India. It helps to focus on **NEW MARKET** formation.

Nationality wise break-up of FTAs for medical treatment purpose in India, 2012



Source: 'Indian Healthcare Services', J.P. Morgan Asia Pacific Equity Research, 12 March 14

*Note: Country wise share adds up to 99%

KEY FINDINGS:

- The nationality wise break ups for top 10 countries estimated that Bangladesh contributes to the maximum amount. Maldives, Afghanistan, Iraq, Nigeria, Russia, Sri Lanka follow Bangladesh. Thus, these are the Marketing targets for Medical Tourism in India.
- **The leading destinations** of medical tourism in the country are **Andhra Pradesh, Karnataka, New Delhi, Kerala, Tamil Nadu, and Maharashtra.**
- Due to the establishment of some of the earliest medical schools in the southern states of India, healthcare infrastructure available here is of high standards.
- This also resulted in the creation of a pool of clinical schools and entrepreneurial skills made available to the medical tourism industry to help facilitate growth at a faster pace than the rest of the states.



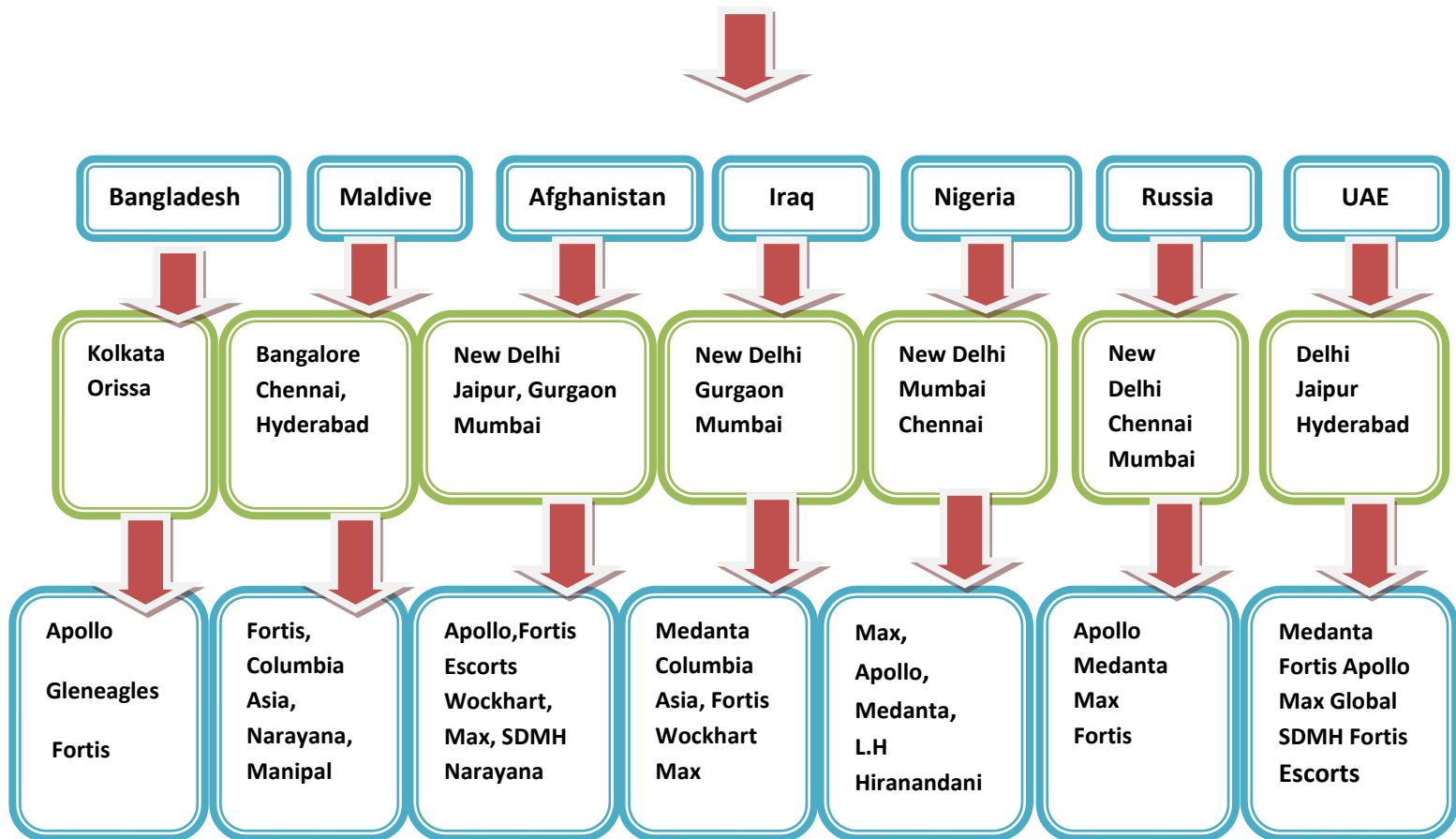
5. **Marketing strategy** begins with identifying the target market followed by the need and the primary focusing area i.e. BURDEN OF DISEASE (BOD). BOD helps to compare the top specialities of MSSH, Saket and its complementary countries. It also helps to evolve various Branding and Marketing strategies for promoting MSSH, Saket's specialities to this New Market.

Top 7 nationality wise countries for Medical Tourism with their Burden of Diseases:-

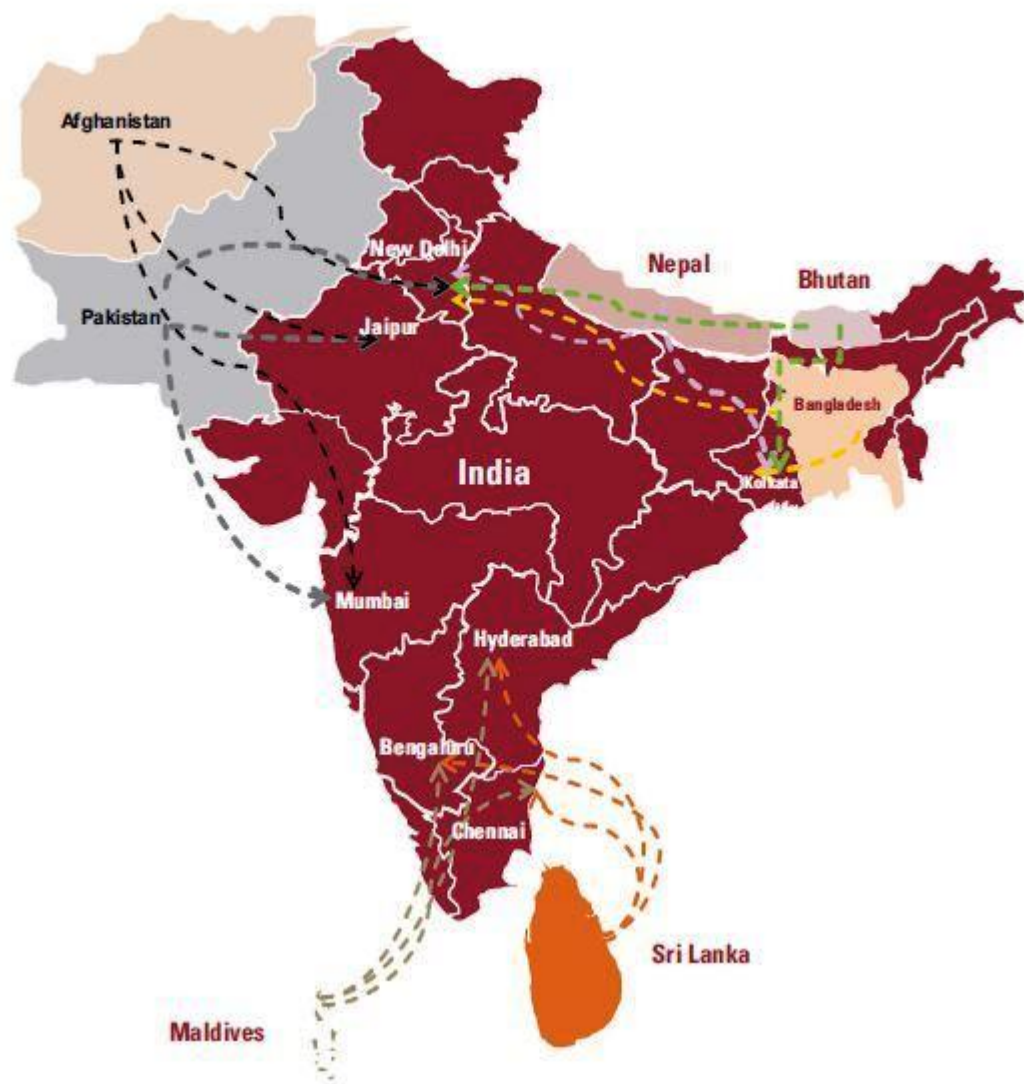
COUNTRIES	BURDEN OF DISEASES
1.Bangladesh	Cardiovascular disorders, Neuropsychiatric disorders, Cancers, Renal Sciences Disorders, General Surgeries, Musculoskeletal disorders
2.Maldives	Neuropsychiatric disorders, Cancers, Cardiovascular disorders, Orthopaedic disorders
3.Afghanistan	Cancers, Renal Sciences Disorders, General Surgeries, Musculoskeletal disorders, Cardiovascular disorders, Paediatric surgeries
4.Iraq	Cardiovascular disorders, Cancers, Neuropsychiatric disorders, Orthopaedic disorders
5.Nigeria	General surgeries, Kidney disorders, Cancers, Orthopaedic disorders, Cardiovascular disorders
6.Russia	Cardiovascular disorders, Cancers, Orthopaedic disorders
7.UAE	Cardiovascular disorders, Neuropsychiatric disorders, Pulmonary disorders, Bariatric surgeries

COMPITITORS AND ALTERNATIVE DESTINATIONS FOR MEDICAL TOURISM BESIDES MSSH, SAKET, COUNTRYWISE:

MEDICAL TOURISTS' BREAKUP:



PASSAGE AND SAARC COUNTRIES DISTRIBUTION IN INDIA :



KEY FINDINGS:

- The **leading destinations** of medical tourism in the country are **Andhra Pradesh, Karnataka, New Delhi, Kerala, Tamil Nadu, and Maharashtra**.
- Due to the establishment of some of the earliest medical schools in the southern states of India, healthcare infrastructure available here is of high standards.
- This also resulted in the creation of a pool of clinical schools and entrepreneurial skills made available to the medical tourism industry to help facilitate growth at a faster pace than the rest of the states.

ANALYSIS:

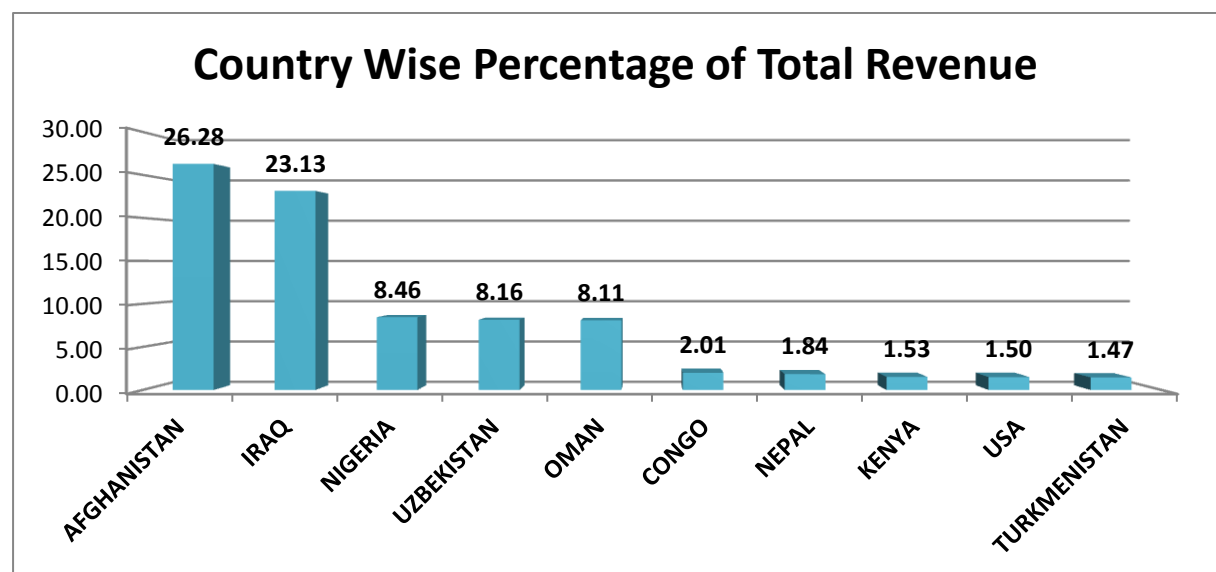
The MSSH, Saket is a leading provider for medical tourism in Delhi NCR region the average revenue generated by International Patient Services Department ranges between 8-10 crores monthly.

We have analysed the data of MSSH Saket only out of Pan Max data of last fiscal year i.e. from April 2014 to March 2015. We primarily focussed on the Inpatient department and have analysed the data of the same. According to methodology the following steps were carried out.

Step 1:-

Top 10 Revenue Generating Countries-

Country	Total Country wise revenue	Percentage of Total Revenue
AFGHANISTAN	26,32,05,502	26.28
IRAQ	23,16,98,563	23.13
NIGERIA	8,47,50,971	8.46
UZBEKISTAN	8,17,43,556	8.16
OMAN	8,12,51,044	8.11
CONGO	2,00,98,815	2.01
NEPAL	1,84,68,227	1.84
KENYA	1,52,92,189	1.53
USA	1,50,72,850	1.50
TURKMENISTAN	1,47,01,887	1.47

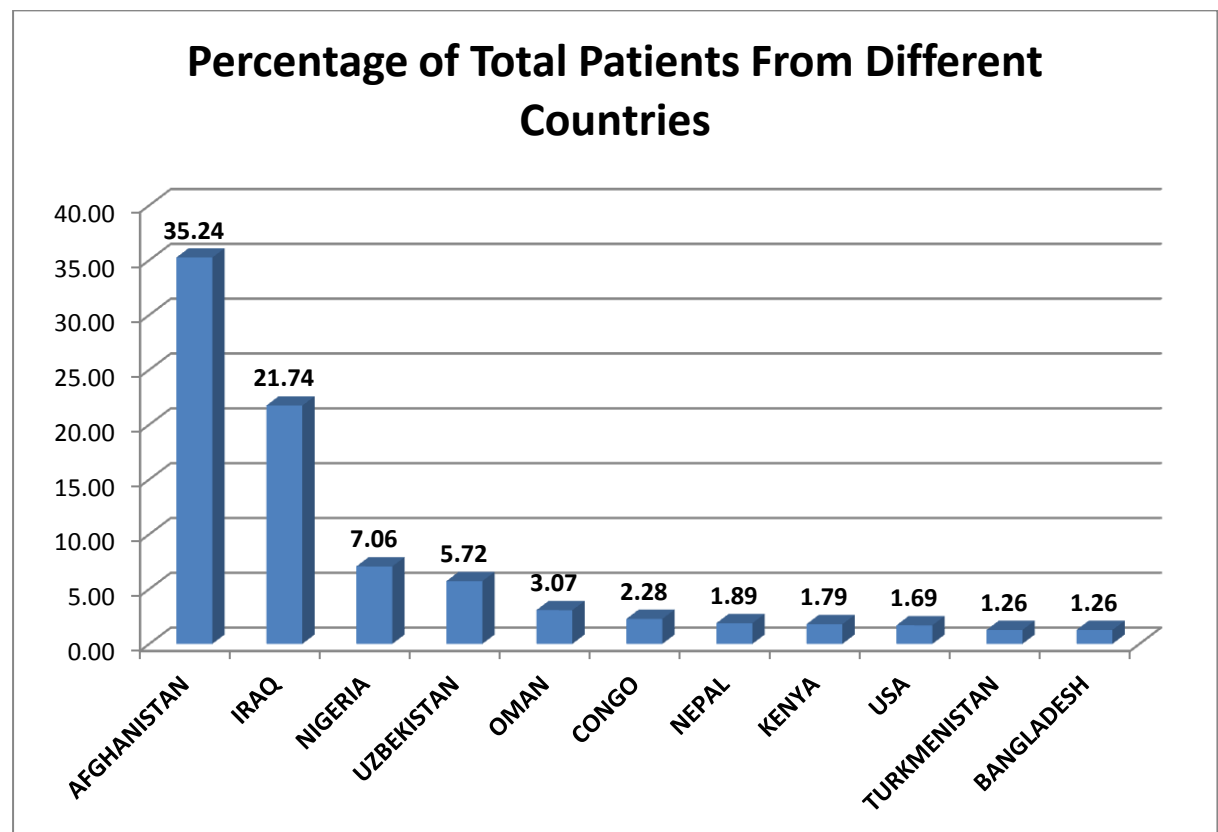


Step 2:-

Top 10 Countries in terms of Total Number of Patients -

Rank	Country	Total No. of Patients	Percentage of Total Patients
1	AFGHANISTAN	1811	35.24
2	IRAQ	1117	21.74
3	NIGERIA	363	7.06
4	UZBEKISTAN	294	5.72
5	OMAN	158	3.07
6	CONGO	117	2.28
7	NEPAL	97	1.89
8	KENYA	92	1.79
9	USA	87	1.69
10	TURKMENISTAN	65	1.26
10	BANGLADESH	65	1.26

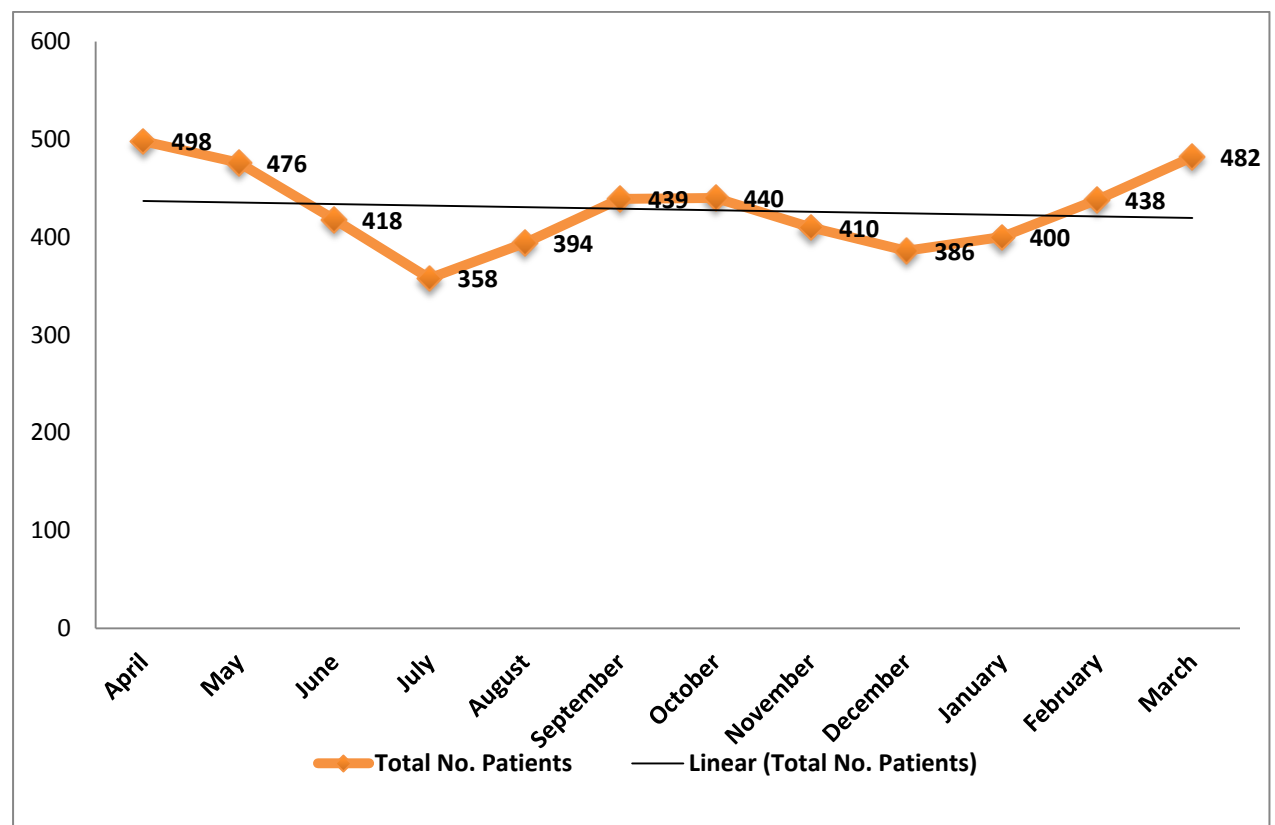
Total Number of International Inpatient treated in MSSH, Saket – 5139

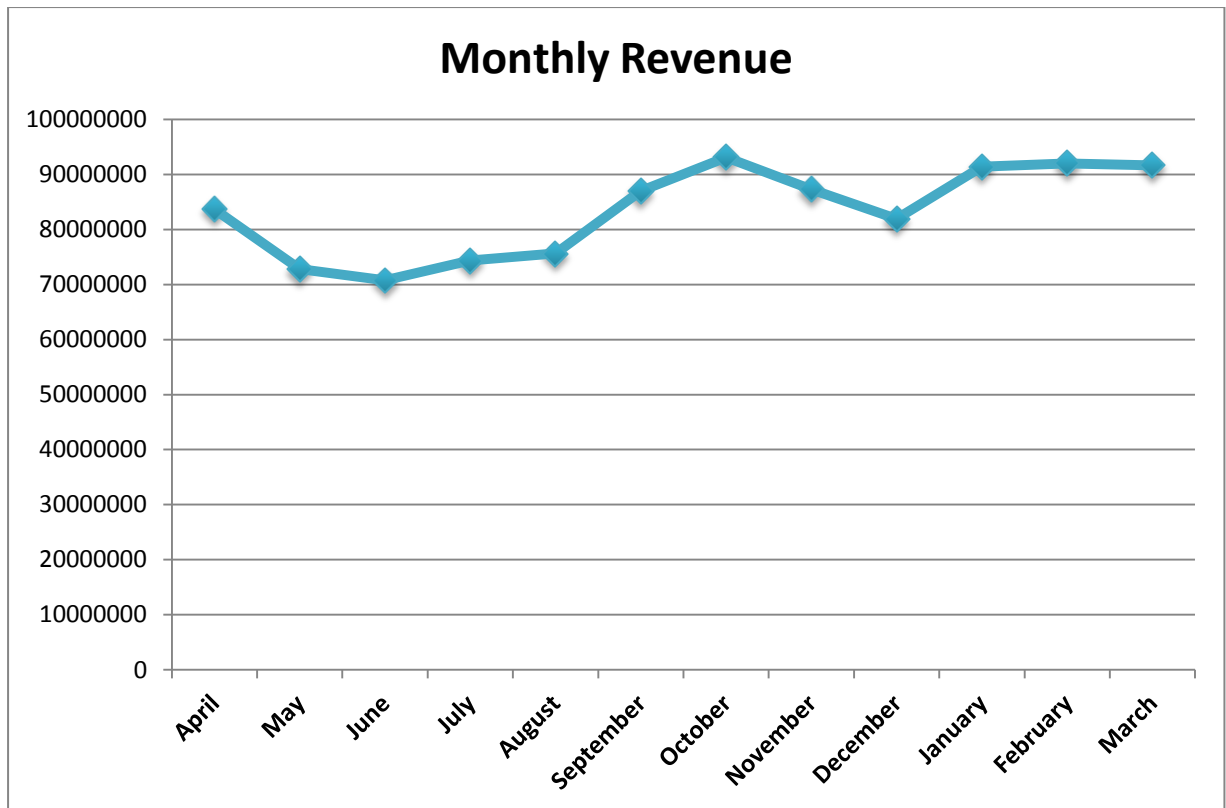


Step 3:-

Monthly distribution of total Number of Patients and Revenue Generated:-

Month	Total No. Patients	Revenue
April	498	8,36,90,509
May	476	7,27,88,558
June	418	7,07,51,780
July	358	7,43,43,663
August	394	7,56,17,771
September	439	8,69,62,105
October	440	9,31,14,909
November	410	8,72,87,909
December	386	8,19,27,607
January	400	9,13,87,988
February	438	9,20,06,286
March	482	9,16,60,575
Total	5139	100,15,39,660

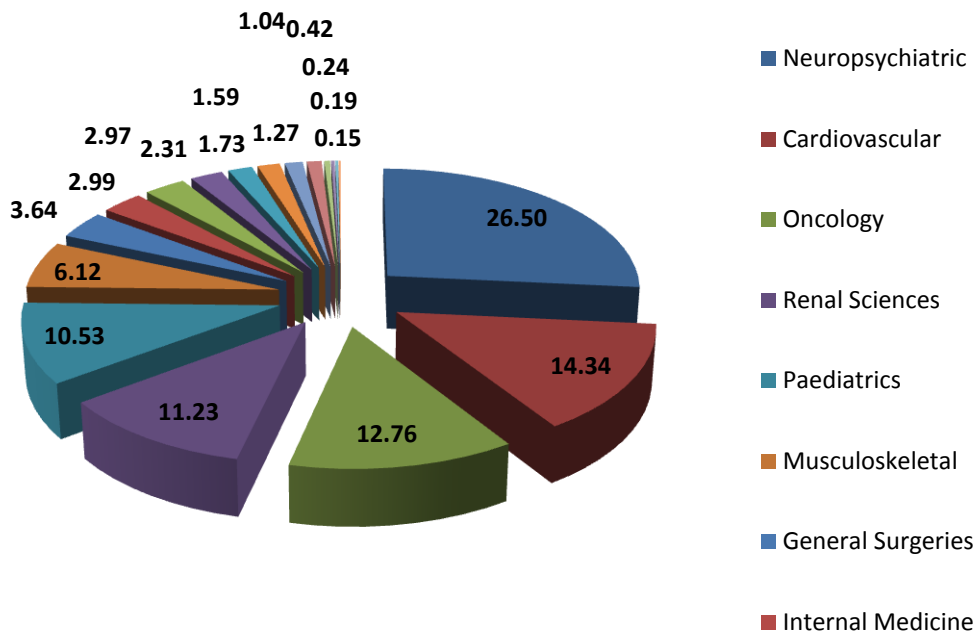




Step 4-

Speciality	Percentage of Total Revenue	Total Revenue
Neuro Sciences	26.50	26,74,82,027
Cardiovascular	14.34	14,47,20,432
Oncology	12.76	12,88,39,749
Renal Sciences	11.23	11,33,55,008
Paediatrics	10.53	10,62,39,634
Musculoskeletal	6.12	6,18,20,849
General Surgeries	3.64	3,67,05,080
Internal Medicine	2.99	3,01,35,701
Plastic Surgeon	2.97	2,99,50,698
Obs. And Gyn.	2.31	2,33,14,665
ENT Specialist	1.73	1,74,27,435
Gastroenterology And Hepatology	1.59	1,60,84,598
Minimal Access Metabolic Bariatric Surgery	1.27	1,27,95,800
Pulmonologist	1.04	1,05,38,524
Others	0.42	41,97,007
Endocrinologist	0.24	24,05,299
Nuclear Medicine	0.19	18,68,336
Ophthalmologist	0.15	14,92,005
Total		

Percentage Share of Each Speciality



Rank	Speciality	Percentage of Total Revenue	Total Revenue
1	Neuropsychiatric	26.5	26,74,82,027
2	Cardiovascular	14.34	14,47,20,432
3	Oncology	12.76	12,88,39,749
4	Renal Sciences	11.23	11,33,55,008
5	Paediatrics	10.53	10,62,39,634
6	Musculoskeletal	6.12	6,18,20,849
7	General Surgeries	3.64	3,67,05,080

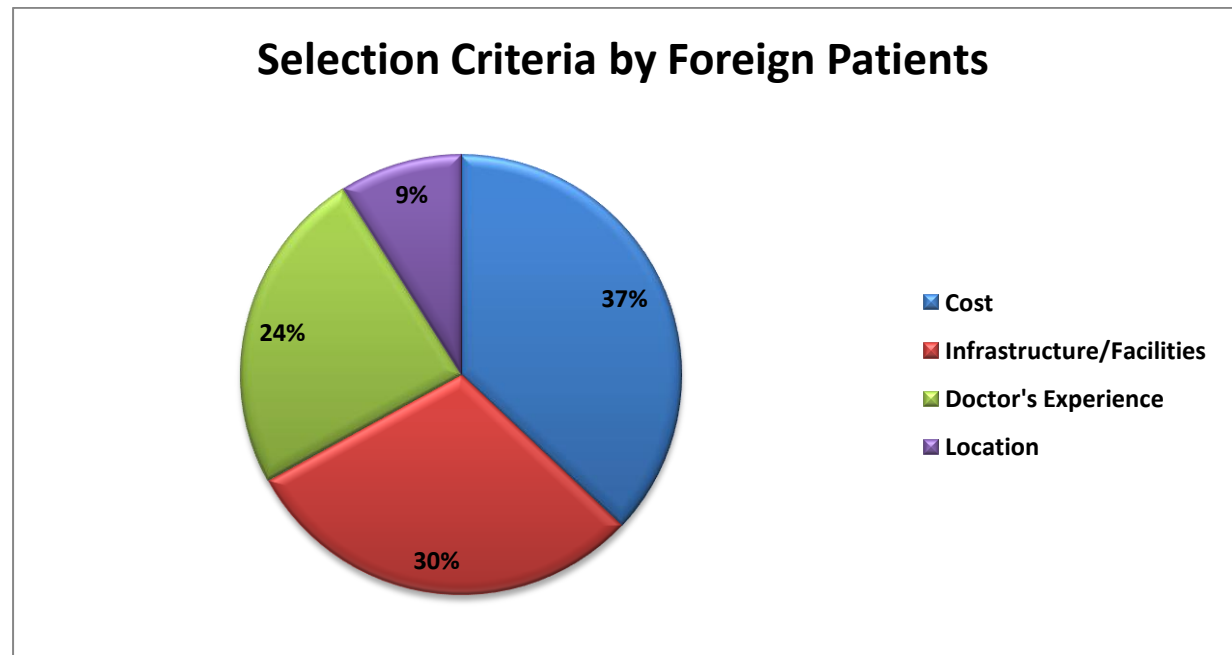
CONCLUSION:

Based on the above discussion and data analysis we compare the facts with the present findings:

Previously Medical Tourism was seen only from the developed nation's perspective because the high quality health care was available to only few developed countries like USA, UK, Norway, Denmark, Germany etc. People were attracted to these countries only because there were no standards to check the quality of hospitals. With the inclusion of Universal quality control bodies like JCI and JCAHO (Joint Commission on Accreditation of Hospital Organisations) to attract tourists , people started recognising other quality healthcare providing countries like Thailand, Malaysia, Singapore and India.

Selection Criteria Adopted by foreign patients coming to India-

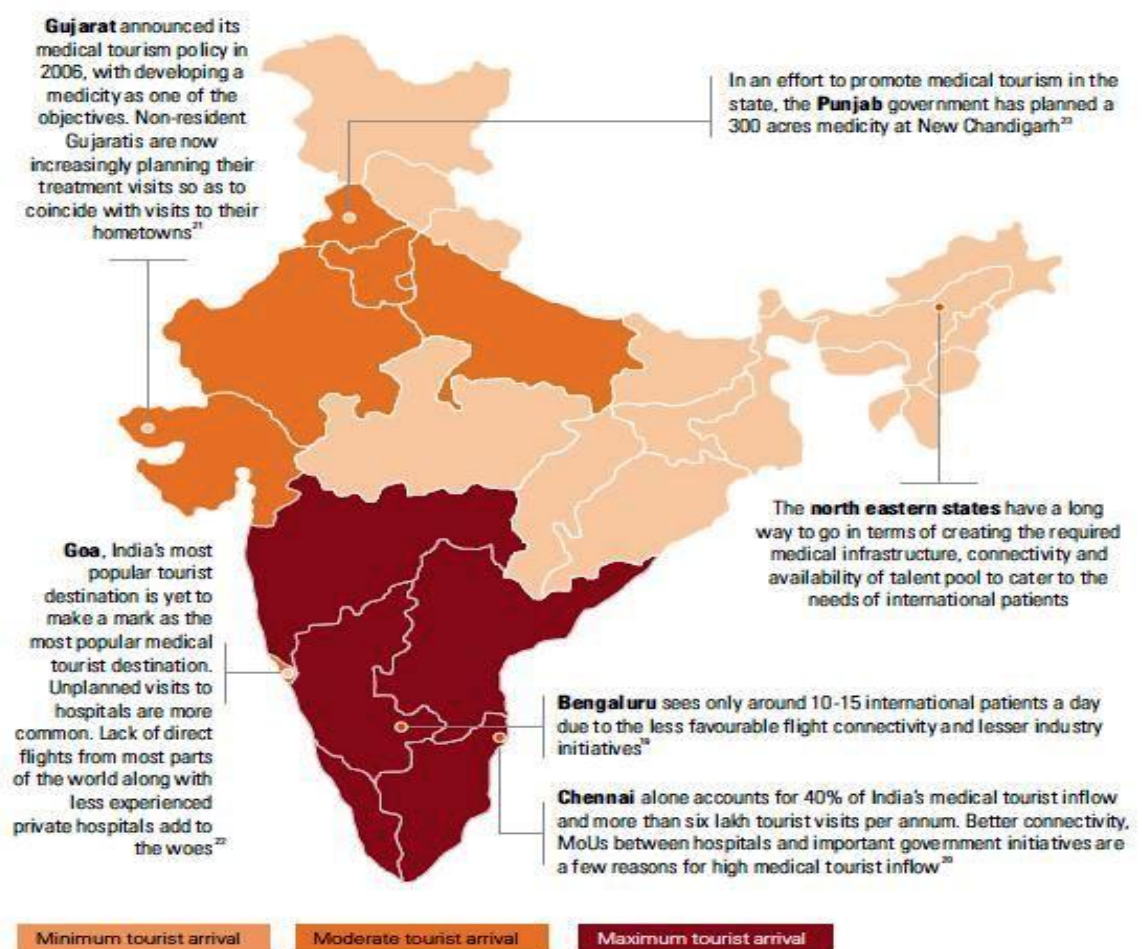
Factor	Contributing Percentage
Cost	37%
Infrastructure/Facilities	30%
Doctor's Experience	24%
Location	9%



Present Scenario-

1. The medical tourism landscape in Asia is continually evolving as price no longer remains the only important consideration; focus has now shifted to diversity in offerings, niche offerings, and even customised luxury. Thailand, Singapore, and India have established themselves as credible medical tourism destinations, globally.
2. The competition is stiff with each economy building its value proposition by further enhancing its USP. With the governments realising the true potential of the segment, there has been a concerted effort to promote and endorse the industry at all viable platforms. Other countries in Asia are also fast emerging as popular medical tourist destinations; Philippines, Taiwan, Korea, etc.

3. RECENT TRENDS AND IMPORTANT ANNOUNCEMENTS REGARDING MEDICAL TOURISM IN INDIA:



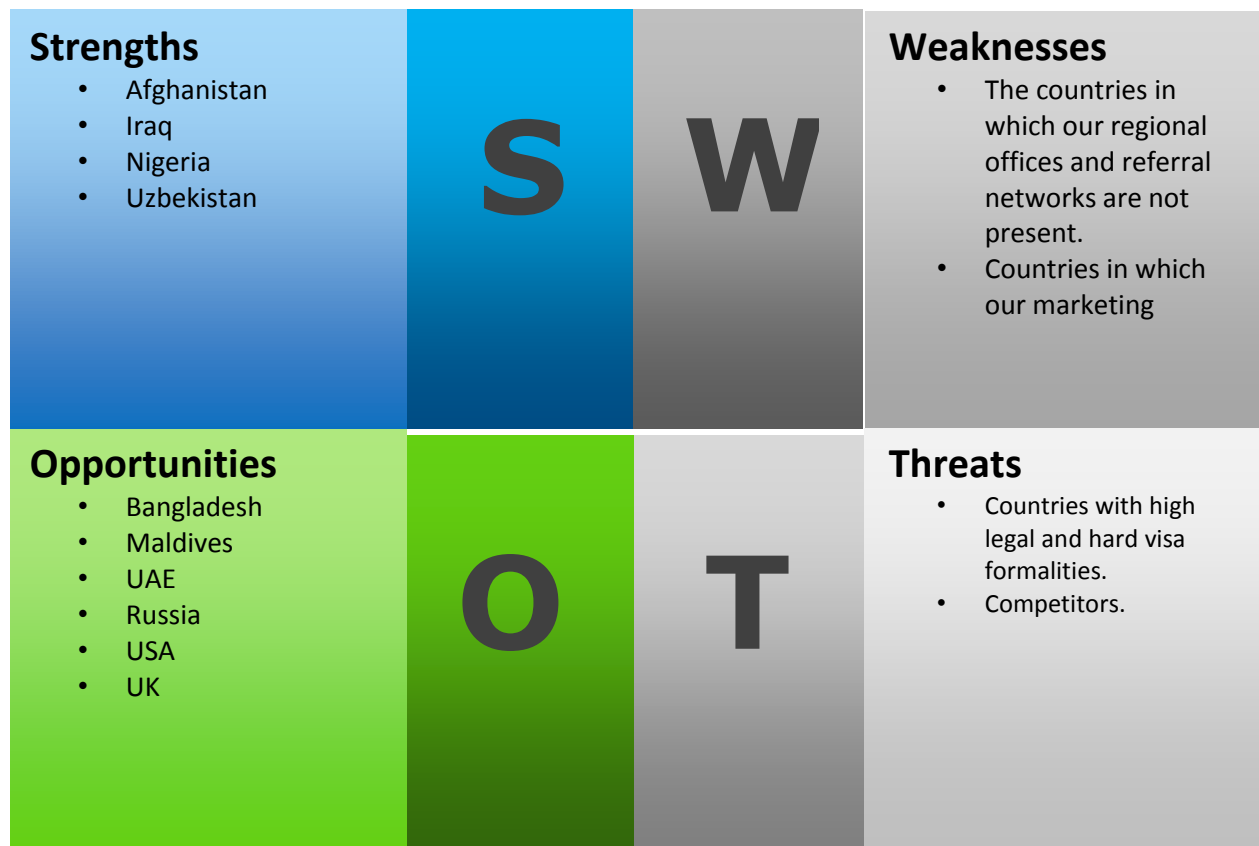
- Growth in the segment is driven by India's value proposition which is the right combination of quality and cost efficiency. Indian hospitals provide treatment in the fields of cardiology, orthopaedics, and even cosmetology at costs which are almost a tenth of the cost for the same procedures in developed countries.
- The presence of private hospitals with international standards and skilled medical professionals has helped strengthen India's position in medical tourism.
- The formalities involved in travel to India, while fairly convenient for a few countries, can be further facilitated for countries which form a major portion of the FTA pies.
- The infrastructure in India with respect to roads in cities, sanitation, and urban infrastructure may be responsible for souring tourist experiences, and there is a need to improve these facilities at least in the popular medical hubs of the country
- Yoga, meditation, Ayurveda, and other traditional methods of treatment are major service offerings that attract tourists from European nations and the Middle East to India. These services form a part of the wellness continuum and are gaining traction as competitors scale up their capacity and launch focussed digital campaigns.

MARKETING STRATEGIES:

1. Bundle Method:

The act of placing several products or services together in a single package and selling for a lower price than would be charged if the items were sold separately. The package usually includes one big ticket product and at least one complementary good. Bundled pricing is a marketing method used by retailers to sell products in high supply. Bundling can be used by firms to discriminate among consumers or to extend market power into a related product market. Bundling can be profitable, reduce a rival's profits and overall welfare, or may drive rivals from the market.

2. SWOT of present data:



3. Left channels :

Lefts channels for opportunities in top 7 target countries should be identified. Like: - MAX's regional offices should be created for the countries where there is no existing network of MAX.

4. Design PPPP and develop new forecast model for such New Market based on Burden of Diseases for the respective countries. Branding and Imaging for Doctors and Hospital should be created for the same.

5. Packaging and Costing :

Country wise list of packages according to Burden of Diseases should be given. More focus should be given on particular disease burden for a particular country with lucrative packages including Family Health Packages. Expensive surgeries and procedures along with Day Care Surgeries at good prices should be offered.

6. Concentrate on Indian origin NRIs :

Concentrating on Indian origin NRIs can act as a marketing tool via word of mouth. They are also a reliable source of revenue as most of them visit India somehow and they know the differences in the costing and packaging procedures.

7. Less Legal (VISA) formalities for the top 7 target countries analysed i.e. Bangladesh, Maldives, Afghanistan, Nigeria, Russia, Iraq and UAE. This can help in minimising the time for legal formalities and this can significantly affect the frequency of visiting India.

8. Alliances with other authorities:-

Hotel tie-ups, travel agencies tie-ups should be established. Medical tourism consultancies should have ties ups with MAX. There should be separate facilitators at their native country and after coming to India. From bringing the patients to MAX, till their return they should take care of everything.

9. New Market for the developed nations:

New Market can be created for the developed countries like USA and UK also. Because the above analysis reveals that these developed countries are amongst the top 10 target countries.

10. Cost factor can play a vital role in creation of such New Markets.

INDIA HAS EDGE OVER ITS PEER COUNTRIES IN TERMS OF COST EFFECTIVENESS:

Procedure cost (US\$)	U.S.	Thailand	Singapore	Malaysia	U.A.E.	South Korea	Mexico	Costa Rica	India
Heart bypass	1,30,000	11,000	18,500	9,000	40,900	31,700	27,000	24,100	7,000
Heart valve replacement	1,60,000	10,000	12,500	9,000	50,600	42,000	30,000	30,000	9,500
Hip replacement	43,000	12,000	12,000	10,000	46,000	10,600	13,900	11,400	7,020
Knee replacement	40,000	10,000	13,000	8,000	40,200	11,800	14,900	10,700	9,200

Source: 'Indian Healthcare Services', J.P. Morgan, 12 March 2014, p2; 'Medical Tourism in India: Progress, Opportunities and Challenges', Madras School of Economics, Monograph 26/ 2013, March 2013, p21.

11. Regular opportunity checks :-

There should a regular opportunity checks after an interval of 3 months for updating the New Markets.

12. Existing market should be excavated more and more to create a sustainable and consistent source of revenue for longer period of time.

RECOMMENDATIONS:

1. Synchronisation in agenda and expectations with respect to medical value travel on the regulations front is needed to propel the segment in the country.
2. **Single consultative platform representative of all the ministries** involved in medical tourism to aid endorsement and facilitation of medical tourism at a national level
3. • The presence of multiple bodies at the policy making level can lead to the creation of divided agendas with a diluted focus on promoting India as a preferred medical tourism destination.
• Creation of a **Single Consultative Platform (SCP)** with a unified agenda of promoting medical travel can help ensure effective trouble shooting and efficient policy making.
4. **Airports** are the first point of contact that a tourist makes with Indian soil, ease in accessing facilities at airports will help enhance the patient experience
5. **Alliances amongst private players** (different industries e.g. aviation/ hospitality, and healthcare) to help improve patient experience from a comfort and ease of journey perspective like Apollo Emirates.
6. The role of the government in establishing relationships and facilitating tourist inflow cannot be understated. **MOIA** can also play an important role in building 'Brand India' as a preferred destination for medical tourism via marketing campaigns, road shows, and networking meets. Government alliances such as **MoUs** to increase the number of medical tourists (role of Ministry of Overseas Indian Affairs (MOIA)).
7. India needs to invest heavily in **improving basic infrastructure** such as roads and airport facilities in the medical hubs to compete with other Asian counterparts.
8. There is an urgent need of a **nationally authenticated government website** to serve as a **one-stop information window** for prospective medical tourists.
9. The **role of facilitators** needs to be defined and regularised by the government to promote transparency in the Indian medical tourism industry.

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PROJECT REPORT 3:

TITLE:

ENABLING TECHNOLOGIES FOR ACHIEVING BEST PRACTICES IN CSSD AT MAX HOSPITAL, SAKET, NEW DELHI

(Present to future scenarios)

INTRODUCTION/BACKGROUND:

Central Sterile Supply Department (CSSD) also called as sterile processing department (**SPD**)/ central supply (**CS**) is the most essential feature of the hospital. It aims at centralizing the activities of receipt, cleaning, assembly, sterilization, storage and distribution of sterilized materials from a central department where bacteriologically safe sterilization is done under controlled conditions with adequate managerial and technical supervision at an optimum cost

The **scope** of CSSD has enlarged from that of a department, which was similar to an autoclave sterilization unit to encompass hospital infection control and stands for a dedicated workflow of sterile supplies and goods.

Ideally, CSSD is an independent department with facilities to receive, clean, pack, disinfect, sterilize, store and distribute instruments (both multiuse and single-use device), as per well-delineated protocols and standardized procedures.

In this age of cost cutting and space constraints, having separate CSSD, we can decrease the cost of sterilizers through centralization of equipment in one department. The rise in incidence of nosocomial infection with corresponding increase in mortality, length of stay and cost can be brought down by establishing a good CSSD set-up.

Moreover, the fatal disease AIDS became so powerful and spread worldwide, the demand for proper procedures for infection control gained momentum enormously. Diseases such as Hepatitis B & C, known to be transmitted through contaminated surgical instruments, stimulated the need for stricter guidelines for disinfection and sterilization. The essentials of the department are correct design, modern plant, skilful operators, proper work-flow, regular skilled maintenance to avoid breakdowns of plant. It contributes to reduction in hospital infection rate.

REVIEW OF LITERATURE:

- 1928 – American College Of Surgeons – CSSD.
- 1942 – World War II .Cairo, British SDS Unit .
- 1955 – Cambridge Military Hospital – Regular CSSD in UK.
- 1965 – First CSSD in India – Safadarajang Hospital.
- Hospital administrators today recognize the CSSD as one of the most important services departments in the hospital(Indmedica journal of hospital administration)
- The Central Sterile Supply Department being the most essential department within a hospital set-up contributes in reduction of infection rate, says, **Dr Sudhakar Manav**, CEO, Ojjus Medicare.

- J Pub Health Med Res 2013;1(2):58-62, states that CSSD is the need of the hour.

AIM:

The CSSD is to provide an efficient, economic, continuous and quality supply of sterilized material to various areas of the hospital to deliver quality and infection free patient care.

Central Sterile Supply Department (CSSD) is a service unit in a hospital that processes, issues, and controls the sterile stores supply to all departments of the hospital. The essentials of this department are correct design, appropriate equipments, skillful operators and a unidirectional work flow.

NEED/ROLE/FUNCTIONS OF CSSD:

- To provide all the departments with an adequate supply of reliably sterilised material for immediate and emergency use. The sterilisation process is conducted under controlled conditions at minimum cost to reduce the incidence of hospital associated infections.
- To supervise and provide facilities for the bulk-sterilisation of the materials.
- To pool in the equipment resource of the hospital for economical and effective utilisation under adequate managerial and technical supervision.
- To provide facilities for in-service teaching and training of nursing and ancillary personnel in the sterilisation practices.
- To undertake operation research techniques for improving sterilisation practices and to participate in research pertaining to supply of equipment.
- To provide the most suitable material for the patient care.
- To play an effective role in hospital infection control activities.
- To ensure quality control for infection free patient care.

OBJECTIVES OF STUDY:

1. To observe and assess the process flow of CSSD at Max Super Speciality Hospital, Saket, New Delhi.
2. To assess the feasibility of IT enabled inventory and process management system.

METHODOLOGY:

The study involved observations and hence was a Descriptive study. This study was done in CSSD and all the touch points including planning, zoning, and process flow were observed at various point of time. The tools used for this study were personal interviews and keen observations. Personal interviews had been conducted for mapping of CSSD with all departments of the hospital.

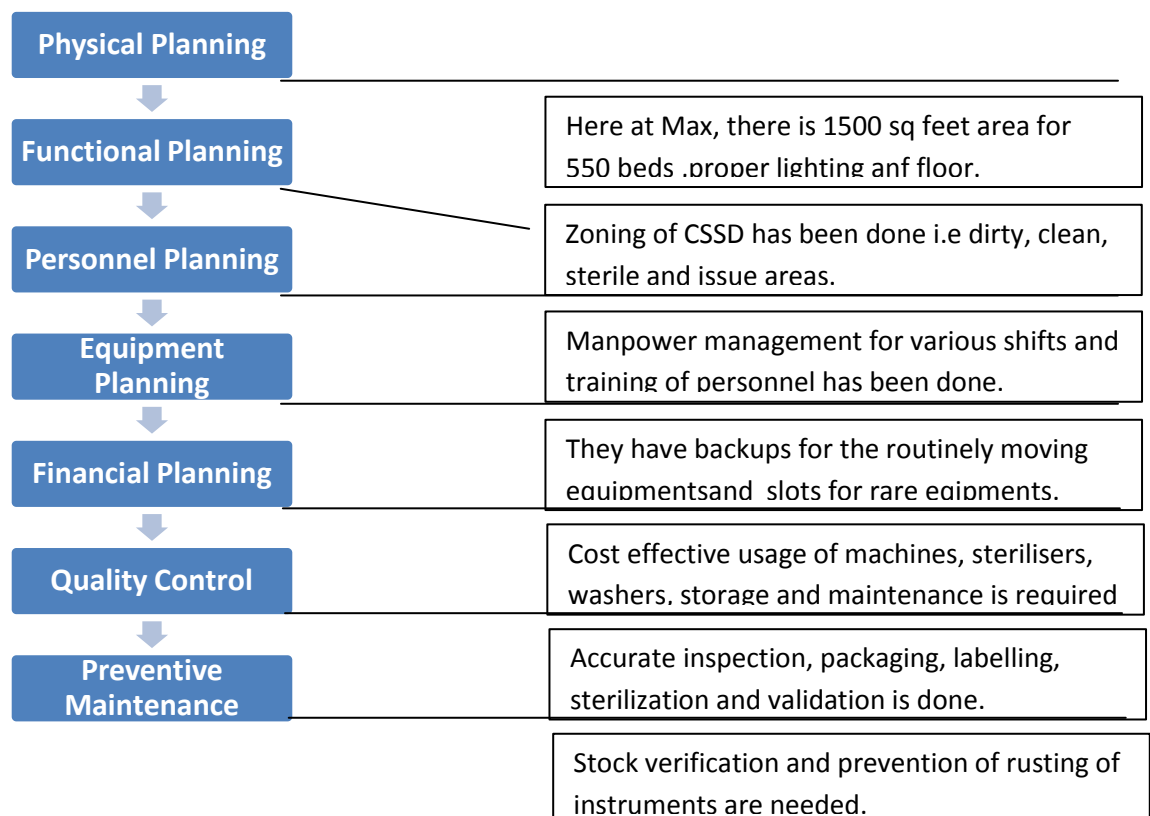
PLANNING:

The size and location usually depends on the number of the hospitals the CSSD will serve as well as the number of beds and the future expansion of the hospital. However 7 to 10 square feet per bed is recommended as an area of requirement for the CSSD.

According to *Thomson* an area of 2000 square feet for a 500 bedded and 3500 square feet for 1000 bedded hospital will be adequate for Indian conditions.

- There should be no back tracking of sterile goods.
- The materials/ items from contaminated and sterile areas should not get mixed.
- There should be physical barrier between clean and dirty areas.
- The floor should be smooth, impervious, non-skid and robust.
- Light fittings should be recessed
- Relative humidity should be maintained at 45 ± 5 per cent
- The clean area should be provided with air locks and maintained at positive pressures relative to the adjoining spaces. The minimum ventilation rate should be six to 10 air changes per hour.
- The work area should be made of marble / granite / stainless steel
- The sterilisation must be planned for autoclaving by steam as well as by gas since certain items such as rubber; plastic or delicate instruments cannot be autoclaved.

Broadly, Planning is divided into 7 sub types:



LOCATION:

The CSSD should be close to the casualty, operation theatre and wards which are the largest consumer of the sterilized material. In multistoried buildings, CSSD may be planned in the lower floor right under the operation theatre where vertical movement will be the quickest possible movement of the material.

LAYOUT:

The CSSD should have four zones for a smooth work flow. The following facilities should be provided in the layout:

1. Entrance lobby
2. Reception and Cleaning room
3. Glove room
4. Work room (Preparation and assembling of packs)
5. Syringe room
6. Sterilization room
7. Store room
8. Nurses room
9. Staff changing room
10. Cloak room

EQUIPMENTS IN CSSD:

1. Jet water cleaning gadgets
2. Ultrasonic washers
3. Glove sharpener
4. Needle sharpener
5. Gas, Chemical or Steam autoclaves
6. Testing apparatus for efficiency of sterilization

ITEMS COMMONLY HANDLED BY CSSD:

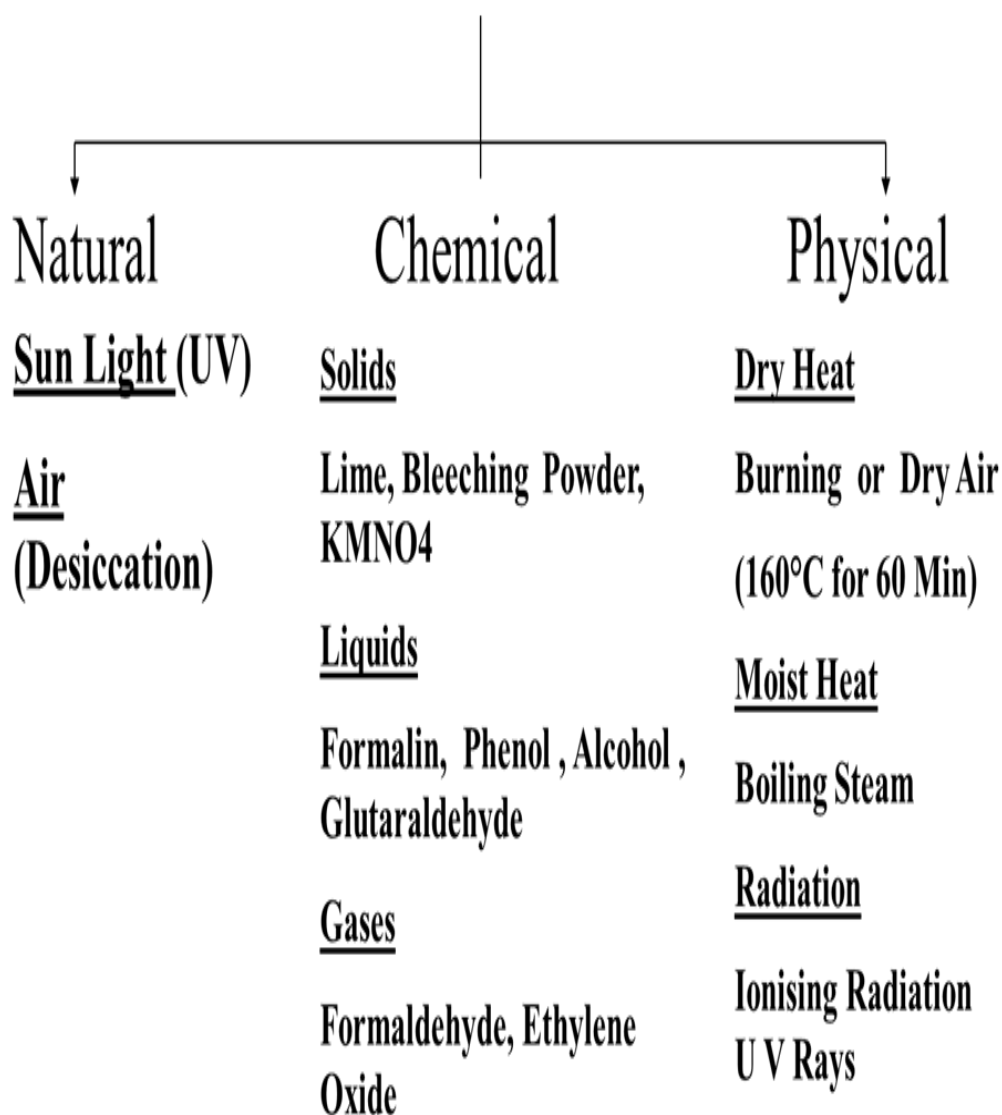
1. Syringes
2. Procedure Sets(Lumbar puncture ; sternal puncture ; venesection ; paracentesis ; aspiration ; catheterization ; tracheotomy ; suturing ; dressing ; biopsy ; incision & drainage ; aortography ; cardiac resuscitation ; etc)
3. Needles
4. I.V.Fluids
5. Treatment Trays.
6. O.T Instruments

(Diet, drugs, bedpans & urinals are not included by convention)

METHODS OF STERILIZATION:

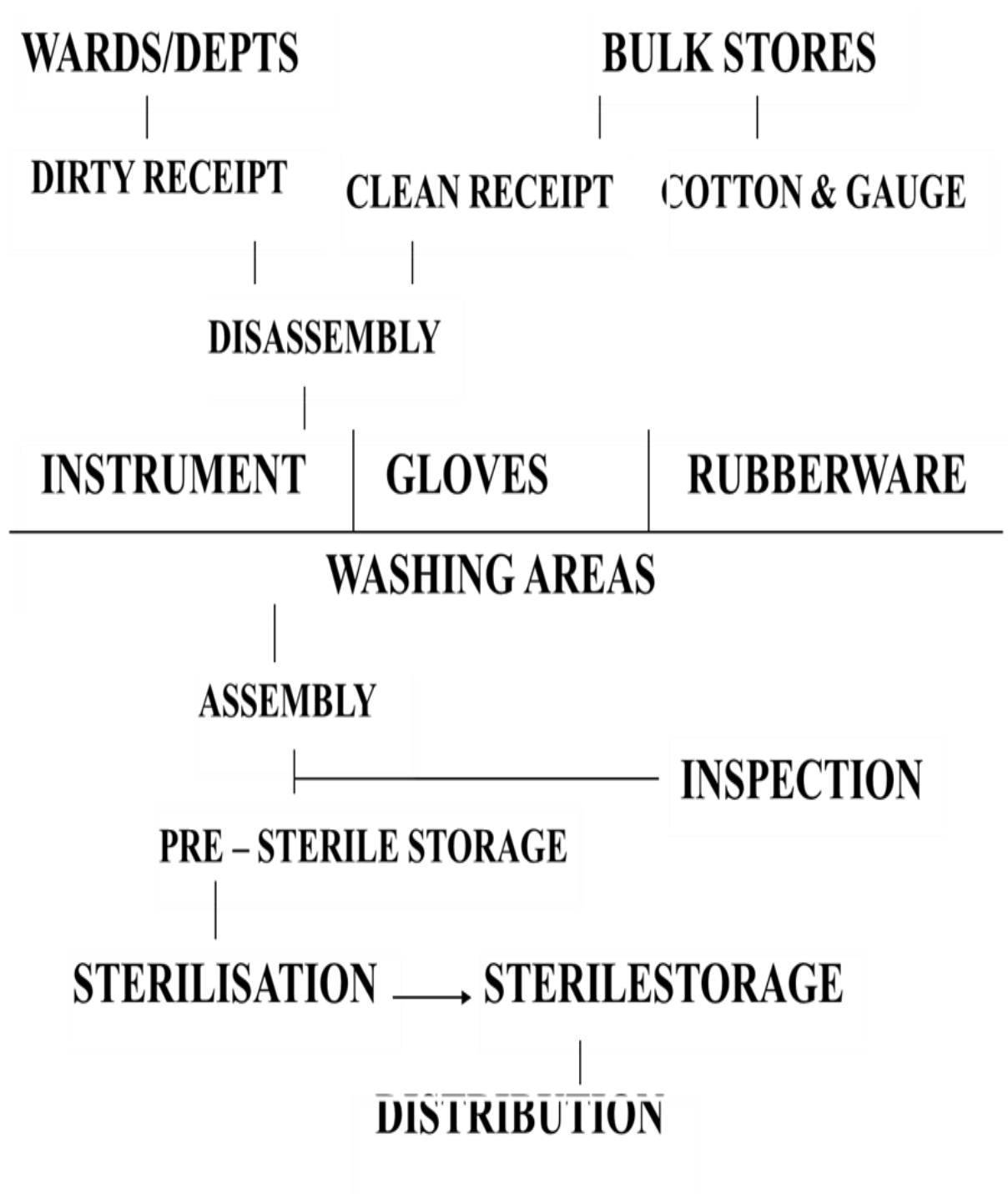
Here at Max Super Speciality Hospital, Saket, Steam sterilization, ETO sterilization and Chemical sterilization are routinely performed. **Validation of CSSD** is done by **daily Bowie Dick Test** and by **Batch Monitoring** through chemical indicator.

Methods Of Sterilization / Disinfection



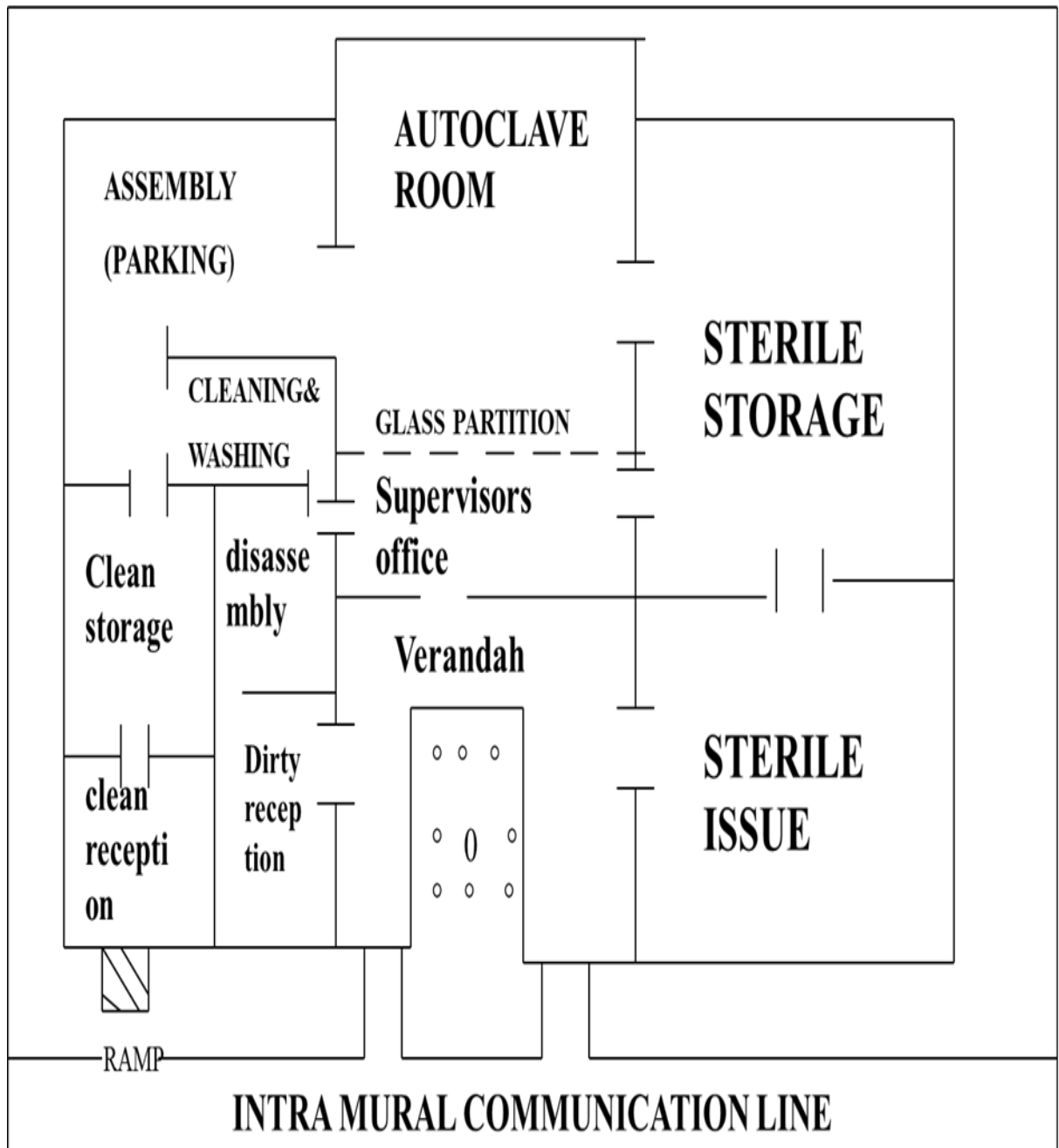
The normal process flow of CSSD is as follows:

FLOW PROCESS : CSSD



A SUGGESTED LAYOUT OF

CSSD



DISCUSSION:

The CSSD of Max Hospital, Saket is currently performing up to the mark. The ideal processes are followed over here and are working smoothly with the present infrastructure and format. But, all the records of CSSD are being prepared manually. There is no facility to check the process flow via computers. The inventory records are also maintained manually.

The manual way of record maintaining is acceptable for current or may be acceptable for not more than 2-3 years, but in this era of information technology it is really hard to continue with this way only.

At this point of time, we really need to make our CSSD IT enabled for future perspectives. The IT enabled CSSD is the current need of an hour now.

The CSSD of Max Hospital, Saket requires the Computerised system for following areas.

S.No.	Process	Present Scenario	Future Requirement
1.	Dirty Receiving	No. Queue System, GDAs come directly inside the CSSD with dirty equipments, No IT enabled receiving of equipments.	Proper Queue management system should be deployed. The receiving should be completely IT enabled.
2.	Washing	Once received equipments sent to washing directly, manual records are maintained.	The records should be maintained on computers.
3.	Assembly and Inspection	The assembly is being done by the workers directly. They follow a simple manual process flow and check the checklist when required. For inspection also a normal checklist is followed. No records maintained.	The assembly and inspection records should be maintained on computers. Software should be installed, which should have the assembly and inspection checklist. The second option can be a Touchscreen Over The Counter Computer, which will have a proper checklist for every procedure. The technician will do the

			mentioned procedure and will mark the procedure as complete immediately.
4.	Sterilisation	The sterilisation process is presently monitored by manual procedure. Only a register is being maintained.	We should prepare a checklist on the computer for the perfect monitoring of sterilization procedure.
5.	Sterile storage	Presently only manual records are maintained for the storage and stock management of CSSD.	An inventory management system need to be installed in CSSD, the software should take care of all the inventory related tasks.
6.	Dispensing	Currently the CSSD team maintain a manual record only while dispensing of sterile goods.	As we will install the Inventory management system for the CSSD. The dispensing will become very easy job and the software will maintain a proper record of that.

CONCLUSION:

The current working of CSSD at Max Hospital, Saket, New Delhi is meticulous and efficient. Despite all accurate measures, advancement in technology is needed from time to time. Much of hospital expenditure is wasted through misallocation and by technical and managerial inefficiency.

For this, IT enabled techniques will help to build a strong long run base for ideal CSSD. It also enables to save time, money and strengthen the quality parameters for ideal functioning of CSSD.

RECOMMENDATIONS:

1. Proper queue management
2. IT based records maintenance
3. Assembly and inspection checklist via software
4. Touchscreen Over The Counter Computer
5. Checklist for perfect monitoring and sterilization technique via IT based techniques.
6. Software for inventory management and its record maintenance.
7. Batch monitoring via biological indicator (here chemical indicator is used)

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PROJECT REPORT 4:

TITLE:

A SUPPLY CHAIN AND DISTRIBUTION MANAGEMENT STUDY OF CENTRAL PHARMACY AT MAX SUPER SPECIALITY HOSPITAL, SAKET, NEW DELHI.

INTRODUCTION –

The mission of pharmacy practice is to provide medications and other healthcare products and services and to help people and society to make the best use of them.

Comprehensive pharmacy service involves activities both to secure good health and to avoid ill-health in the population. When ill-health is treated, it is necessary to assure therapeutic benefit and avoid untoward side-effects. This presupposes the acceptance by pharmacists of shared responsibility with other professionals and with patients for the outcome of therapy.

In recent years the term “**pharmaceutical care**” has established itself as a philosophy of practice, with the patient and the community as the primary beneficiaries of the pharmacist’s actions. The concept is particularly relevant to special groups such as the elderly, mothers and children, and chronically ill patients, as well as to the community as a whole in terms of, for example, cost containment. While the basic concepts of pharmaceutical care and good pharmacy practice are largely identical, it can be said that good pharmacy practice is the way to implement pharmaceutical care.

REVIEW OF LITERATURE -

Medication distribution has long been the primary function of hospital pharmacy services. Three basic types of medication distribution systems exist—

1. Bulk wards stock replenishment
2. Individual medication order system
3. Unit-dose system

Variations of each exist, and all three systems may be in use in the same facility, depending on the strategy developed.

For example, a facility may use the bulk ward stock system for high-volume, low-cost medicines (aspirin, paracetamol, and antacids) that do not require a high level of control for preventing theft or medication errors. Individual medication order systems or unit doses can be used for medicines requiring a higher level of control.

1. Bulk Ward Stock –

- In a ward stock system, the pharmacy functions as a warehouse and dispenses bulk containers on requisition without reviewing individual patient medication orders for appropriateness. The main advantage is shorter turnaround time between prescribing and administering the medication. The use of ward stock medications should be minimized, but it is appropriate and desirable for certain situations—
 - In emergency departments and operating rooms, medications are usually required immediately after the physician prescribes them. Unless a pharmacy satellite is located in these emergency areas, dispensing

medications according to individual patient orders is not possible. Unfortunately, medicines used in these situations are often expensive, and control is always a challenge for the pharmacy department.

- In life-threatening emergency situations, medications need to be kept in patient care areas as a time-saving measure.
- High-volume, low-cost medicines can be dispensed from ward stock if the patient safety risk is low.

2. Individual Medication Order System –

The individual medication order system closely resembles dispensing to outpatients: a course of therapy is dispensed according to a written prescription for an individual patient.

Compared with ward stock distribution, the advantages are that the pharmacist can review the appropriateness of therapy, a patient-specific medication profile can be maintained, pharmacy charges to patients are facilitated, and closer control of inventory is possible.

This system can limit the time intervals for dispensing: for example, an individual supply for three days of therapy is sent initially; if therapy is continued beyond three days, the empty container is returned to the pharmacy to be refilled.

3. Unit Dose System –

A preferred system from a patient care perspective is the unit-dose system, which has a lower possibility for error. Medications are dispensed in unit-dose packages (each dose is separately packaged) in separate bins or drawers for each patient. Commonly, a twenty-four-hour supply is provided.

Medications returned to the pharmacy can be put back in stock without concern for identity or contamination.

This system is efficient but requires a large initial capital outlay for the purchase of repackaging machines and medication cabinets with individual patient drawers.

The cost per delivered dose is higher than with bulk packaging, but this increased expense may be offset by reduced wastage and easier detection of leakage.

Hospitals in some countries have found innovative ways of adapting local technologies to construct their own fixtures and equipment.

NEED FOR THE STUDY –

1. The study focuses on the facilities of supply chain management and distribution services at Max Central pharmacy. The persons responsible for ordering, receiving, storing, securing, dispensing and reporting on stock status and consumption various medicines are interviewed and observed.
2. The purpose of this part of the assessment is to document current pharmacy management procedures and capacity, and to identify areas that may need support to be able to ensure the consistent availability of quality services.

OBJECTIVE –

- To observe the Supply Chain and distribution management of central pharmacy.

METHODOLOGY –

It was a descriptive type of study as all the steps in the process were observed. This study was done in the in-patient pharmacy. Under the study, all the points related to drug dispatch were studied.

The tools used for the study were Personal Interviews and keen observations.

DISCUSSION:-

Responsibilities of Staff: -

The hospital pharmacist should be an expert on medicines who advises on following points –



He must be a supply manager who ensures that medicines are available through procurement, storage, distribution, inventory control, and quality assurance. The balance between these two roles varies, depending on the individual's background and the work setting. A pharmacist may assume a prominent clinical role in settings where his or her knowledge of clinical pharmacology and capacity to provide expert advice have earned the acceptance of hospital medical and nursing staff.

PURCHASING AND STOCK MANAGEMENT –

In some hospitals, a separate department manages all hospital purchasing (pharmaceuticals, medical supplies, equipment, and so forth); this department may be called medical stores or materiel management. In such cases, the chief pharmacist prepares an annual budget request for pharmaceutical purchases and places orders for medicines through the medical stores.

- Here in Max Super Speciality Hospital, Saket, all the purchasing related decisions of Pharmacy unit are being made by Central Pharmacy division of Max Health Care.
- The Saket unit of Pharmacy makes indents for the required drugs and sends it to Central Pharmacy Division.
- The Central Pharmacy commercial department releases the purchase orders for the particular drugs required.
- Weekly requisition and indenting is being done and the ABC method is being followed for the procurement of drugs.

In some settings, the pharmacy department manages pharmaceutical purchasing directly.

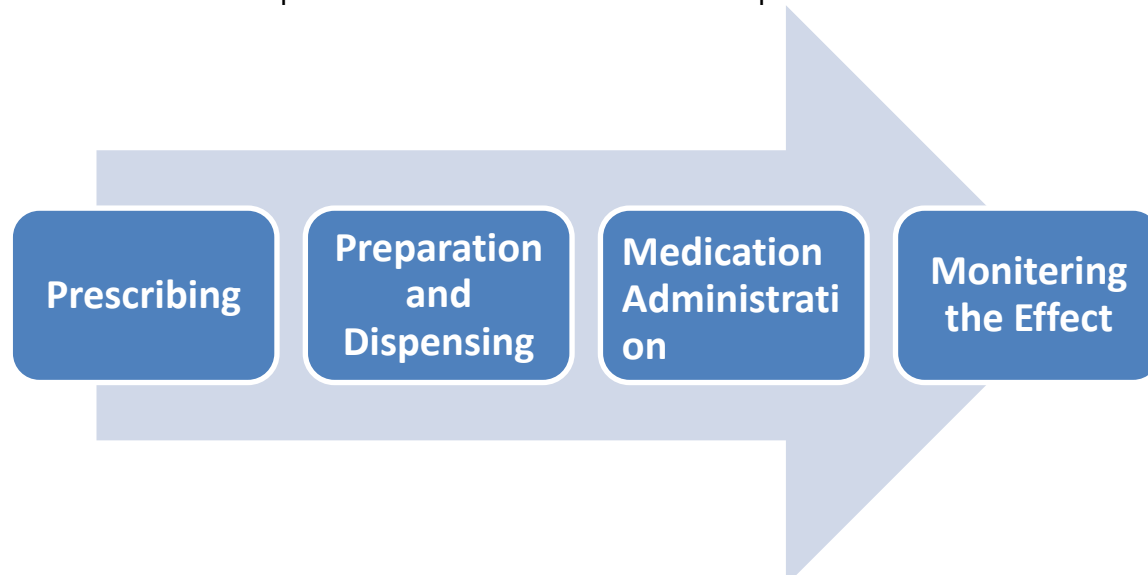
No single individual should have total control of pharmaceutical procurement. A designated committee should review and approve all purchases; either a special purchasing committee may manage this function. Procedures for procurement and inventory management should be written in a manual that has been approved by hospital administration and the appropriate committees.

Stock management procedures are determined by the facility's size and whether a warehouse is attached to the hospital or not.

- The medicines are arranged according to the software installed in central pharmacy.
- The name of software is NASA. The storage is being done in shelves, drawers and racks via generic names in alphabetical order.
- The near to expire drugs are stored separately.

THE MEDICATION USE: -

The medication-use process can be divided into four components—



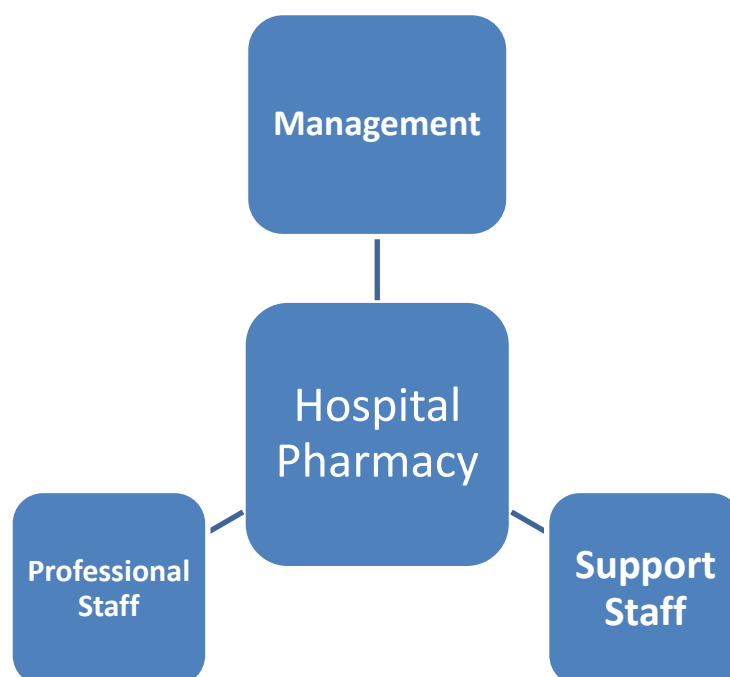
1. **Prescribing**-The physician has overall responsibility for the care of the patient, prescribing or ordering medications as part of the treatment plan. The mechanisms to ensure appropriate prescribing within the hospital customarily fall within the purview of the medical staff committees.
2. **Preparation and Dispensing**- The pharmacy department, under the direction of a registered pharmacist, is responsible for preparing and dispensing medications. Policies and procedures for these functions should be approved by the governing councils. The chief pharmacist reports to hospital administration.
3. **Medication Administration**- Administering medications is generally the responsibility of the nursing staff. The chief nursing officer oversees all nursing functions. In some cases, physicians may administer medicines such as anaesthetic agents. Other health care professionals may administer medicines within the scope of their practice (for example, midwives attending deliveries).
4. **Monitoring the Effect of Medications on Patients and Ordering Appropriate changes In Therapy**: Monitoring activities are primarily the responsibility of the physician. However, observation and reporting are required from the person who administered the medication (usually the nurse) and from other members of the health care team involved in the patient's therapy.

Government agencies and licensing boards regulate medications through laws and professional practice standards. The laws and regulations usually specify that the chief pharmacist be the person responsible for the control of medications within a hospital, including procurement, storage, and distribution throughout the facility.

ORGANISATION OF HOSPITAL PHARMACY SERVICES-

In organizing hospital pharmacy services, both the way in which the staff is organized and the physical layout of the building must be considered.

Personnel Hospital pharmacy personnel can be divided into three major categories-



- 1. Management-** Management includes the chief pharmacist and sometimes deputy chief pharmacists, who are responsible for procurement, distribution, and control of all pharmaceuticals used within the institution and for management of personnel within the pharmacy department.
- 2. Professional Staff-** These professionals are qualified pharmacists, who procure, distributes and control medications and supervises support staff for these activities. In Max Saket, pharmacists provide clinical consulting services and medicine information.
- 3. Support Staff-** The support staff category often includes a combination of trained pharmacy technicians, clerical personnel, and messengers.

PHYSICAL ORGANISATION:

The extent of the pharmacy's physical facility is determined by the size of the hospital and the services provided.

The Max, Saket have a large pharmacy department which is having the following sections within two physical spaces that is in both the buildings—

- Administrative offices
- Bulk storage
- Narcotic or dangerous drug locker

- Repackaging
- Intravenous solution compounding
- Inpatient and outpatient dispensing
- Medicine information resource centre
- After-hours pharmacy
- Emergency medicine storage

- ❖ In larger hospitals, satellite pharmacies are beneficial because they enable a shorter turnaround time for individual medication orders, especially in distribution systems that dispense medications packaged for individual patients.
- ❖ Satellites also increase the pharmacist's presence in the patient care area, facilitating interactions with medical staff, nursing staff, and patients, and thus ultimately improving patient care.

INPATIENT MEDICATION MANAGEMENT-

PROCESS FLOW OF INPATIENT MEDICATION AT MAX HOSPITAL, SAKET :-

The Max Hospital, Saket follows the Software based dispensing model for the In Patient Medication. The process includes following steps –

Step – 1:- The Clinicians post the Medication Orders in CPRS.

Step – 2:- The Pharmacists receive the orders and verify them.

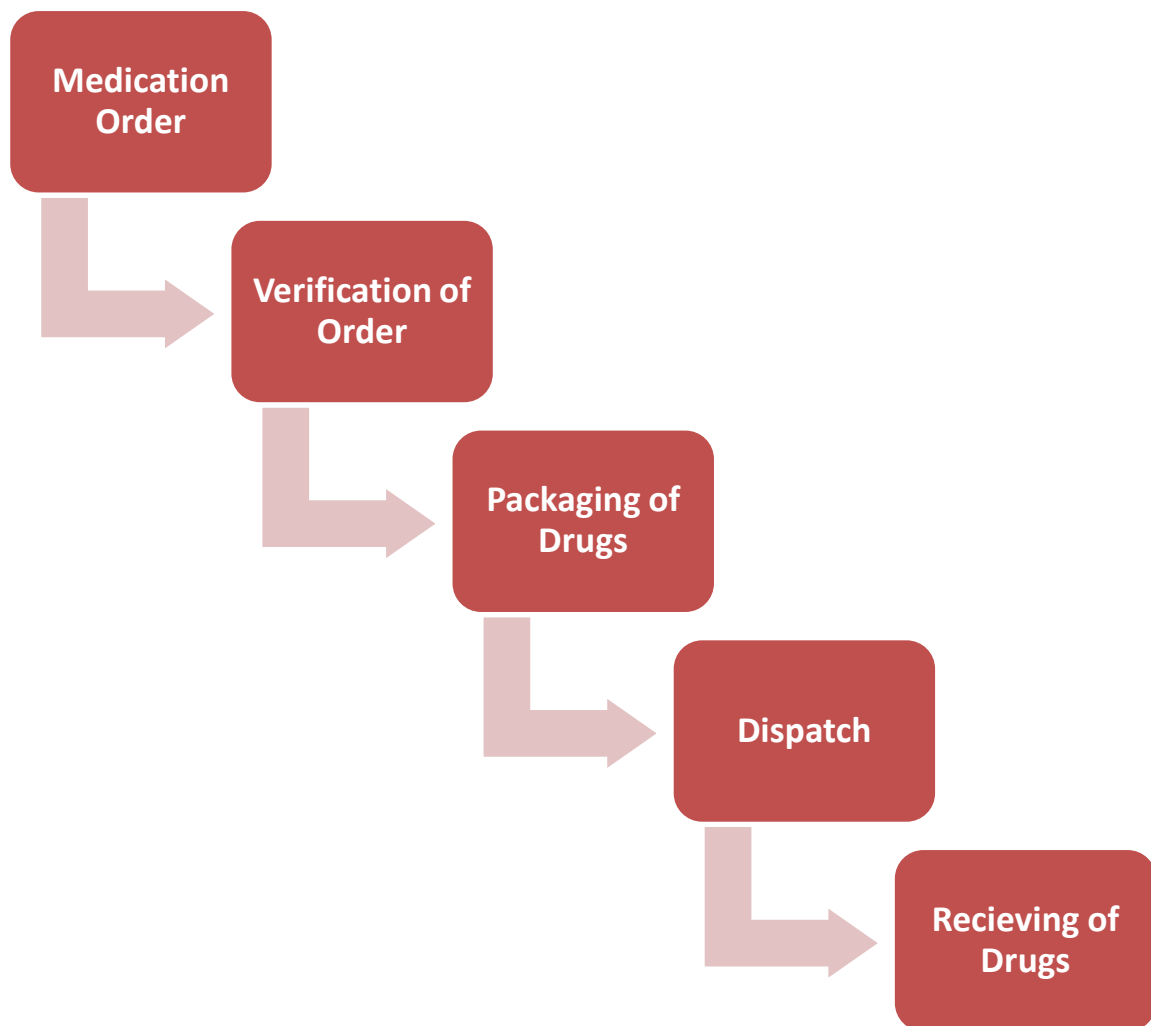
Step – 3:- The pharmacists bill the ordered drugs on HIS(Hospital Information System).

Step – 4:- The packaging of drugs is being done.

Step – 5:- The pharmacists dispatch the medication packages for the floor with the help of GDA.

Step – 6:- The GDA will hand over the medication package to Nursing Team leader.

Step -- 7:- The Nursing TL will check and update the medication order status.



The turnaround time for distribution of medication is categorised into 3 categories-

Category	Delivery Time
1. Normal	2-3 Hours
2. Stat	30 Minutes
3. Now	10 – 60 Minutes

CONCLUSION –

The central pharmacy of Max Hospital, Saket is working quite efficiently and giving up to the mark performance. The supply chain and distribution management is making the in-patient medication a smooth process. But the rapidly changing era always suggests us to make new improvements. We would like to put forward the following

RECOMMENDATIONS:-

1. Automated Medicine Dispensing -

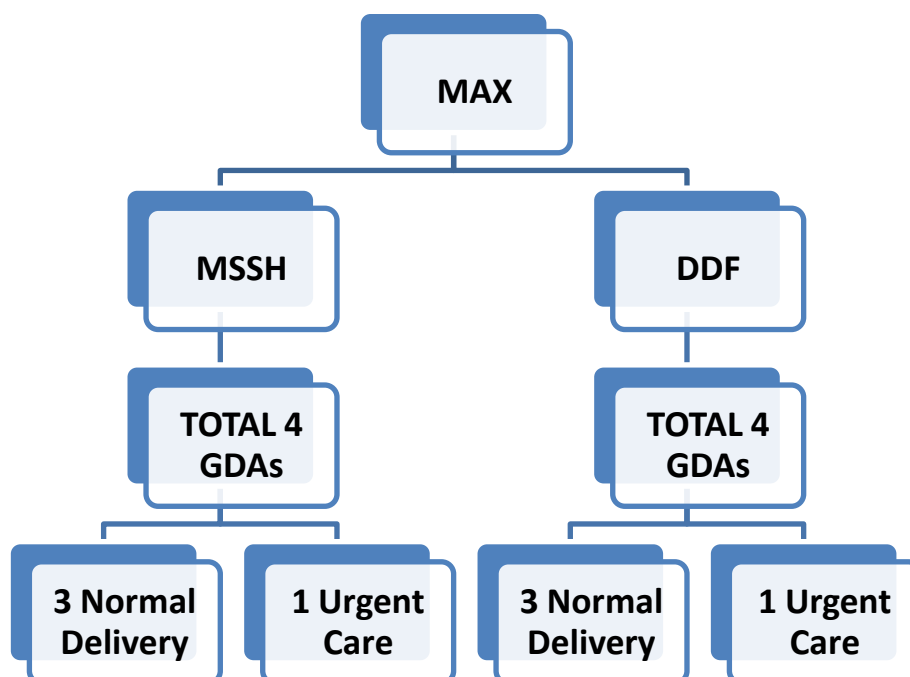
- Technology-based interventions have been investigated as a mechanism to improve medication distribution and reduce medication errors that lead to adverse drug reactions.
- The use of automated dispensing machines has become commonplace in many hospitals, but cost remains a big deterrent for implementation in resource-limited settings.
- The mechanism is founded on a computer interface between the hospital pharmacy computer terminals and the dispensing machines at the clinical ward.
- This system electronically controls and tracks the dispensing of unit doses for each patient based on individual medication profile.
- The dispensing machines allow medicines to be stored on the ward and to be more conveniently accessed by the clinical staff.

2. Proposal for new category in Inpatient Medicine Dispensing:-

- A new category can be introduced in dispensing of Inpatient medicine i.e. New Patient Admission – Category.
- This new category will be for the new patients directly coming to inpatient area.
- A separate timeliness should be prepared for getting the medications delivered on time.
- As soon as the patients get the bed, the medications prescribed by the doctors should be available on bed side.

3. Delivery time lining for GDAs :

Here at MSSH, Saket, we have 5 GDAs for both the buildings MSSH and DDF. We recommend the following process flow with increase in number of GDAs (from 5 to 8).



The following table represents the time lining for 4 GDAs in each building of MAX, Saket:-

SR. No	CATEGORY	NO. OF GDAs	NO. OF ROUNDS	TIME TAKEN
1.	NEW ADMISSION	1	As per need	30-45 minutes
2.	NORMAL	1	4 per floor	In every 120-150 minutes
3.	STAT	1	As per order	Less than 30 minutes
4.	NOW	1	As per order	10-40 minutes

The same GDA allotted for a particular category can be used for other categories also, if needed.

4. Pneumatic Shoots:-

The Pneumatic Shoots distribution system can be a useful tool for the quick delivery of medication packages.

- The pneumatic shoot system can be installed for each floor and each unit.
- Separate sections of Hospital can receive the medication packages in very short span of time.

- The pneumatic shoots can be used for transportation of other things also like sample for Lab Investigations.

5. Information Technology:-

Currently the max hospital, Saket is using two softwares for day to day operations.

1. HIS (Hospital Information System)
2. CPRS (Computerised Patient Record System)

The HIS is being used for all the operations related to Billing, Investigation reports, Bed Management etc. The CPRS is being used for the clinical purposes.

Problem –

1. There is a problem in working of these both the softwares. Both CRPS and HIS generate the separate identification number for patients. The HIS ID is being generated when patient arrives in the hospital for the first time. If patient comes to MSSH then patient will get a different ID and if the patient comes to DDF then he/she gets a different ID.
2. The complications arise when patients get transferred from MSSH building to DDF or vice-versa. This generation of separate identification numbers is causing a major problem for pharmacy department as well as the other departments also.
3. When transfer of patients occur the medication supply becomes very difficult for both the divisions of pharmacy departments.

To overcome the above mentioned problem we would like to put forward the following suggestions-

1. Hospital should try to create single software, instead of CPRS and HIS.
2. A single and unique Healthcare identification number should be created for every patient. More number of patient identification numbers makes the system ambiguous.
3. Software should be generated to carry out the **Auto Continuation of Medication Orders**.

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PROJECT REPORT 5:

TITLE:

MEDICOLEGAL ASPECTS OF BRAIN DEATH DECLARATION

(A Review Study)

INTRODUCTION/BACKGROUND:

Brain Death Preamble:

Organ transplantation has been one of the greatest advances of modern sciences that have resulted in many patients getting a renewed lease of life. It was included in the top 5 medical miracles of the last century. Organs can be donated by a living person, after natural death and after “Brain Death”. Brain death is a relatively new concept of death that was first recognized in Paris in 1959.

The concept of Brain death has been plagued with serious inconsistencies and contradictions. The first serious systematic study was undertaken by the Adhoc committee of the Harvard Medical School to examine the definition of Brain Death, which published its report in 1968.

The Government of India recognized this as a legal form of death in 1994 and passed an Act called the “Transplantation of Human Organs Act (THOA)”. This legislation was also enacted to streamline the activities of living transplants especially kidneys. This kind of transplant has achieved considerable notoriety in India with frequent commercial organ scandals where the brokerage for kidneys can be considerable leading to exploitation of the poor in the country. The Government through this Act wished to wipe away this practice by making it illegal and punishable offence.

Through this Act, multi organ transplantation has been possible. After natural death only a few organs can be donated (like cornea, bone, skin and blood vessels) whereas after brain death almost all the organs and tissues can be donated including critical organs such as kidneys, heart, liver and lungs.

What is brain death?

It is the complete and irreversible cessation of all functions of the brain including the brain stem.

It can be determined in several ways:

- i. No electrical activity in the brain (determined by EEG)
- ii. No blood flow to the brain (determined by blood flow studies)

- iii. Absence of function of all parts of the brain – as determined by clinical assessment (no movement, no response to stimulation, no breathing, no brain reflexes).

In India, brain death is **brain stem death**.

Causes of brain death:

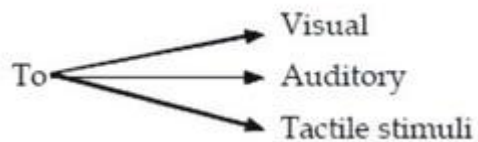
- i. Anoxia
- ii. Ischemia
- iii. Intracranial hematoma
- iv. A gunshot wound to the head
- v. Intracranial Aneurysm
- vi. Brain tumors

Criteria for Diagnosis of brain death:

In 1981 –the President's Commission for the study of Ethical Problems in Medicine and Biomedical and Behavioral Research (USA) developed standards for the determination of brain death which with some modifications are accepted worldwide.

Some steps are important to be followed:

- Unresponsiveness



- No communication in any manner.
- Absence of cerebral and brain stem function
 - (-) Absent:
 - Pupillary response
 - Vestibuloocular reflex (Cold caloric test)
 - Oculo-cephalic reflex (Doll's eye movement)
 - Corneal reflex
 - Gag reflex
- Spontaneous movements of limbs & postural responses (Spinal and tendon reflexes may be present)

- Some peculiar movements of upper limbs have been noted to occur in the confirmed brain death patient & collectively are termed 'Lazarus sign'.

This could be confused with postural response. (Hypotension and mechanical stimulation play a role).

Apnea Test

- No spontaneous respiration present at PCO₂ level of 60 mm Hg.
- 100% oxygenation maintained by a cannula inserted into endotracheal tube.
- This is consistent with medullary failure.
- Nature of coma must be known
- Some reversible causes must be ruled out
 - Hypothermia
 - Drug intoxication or neuromuscular blockade
 - Shock etc.
- Persistence of brain dysfunction
- Six hours with a confirmatory isoelectric EEG i.e.; "Electro-cerebral silence"
- Twelve hours without a confirmatory EEG.
- Twenty four hours for anoxic brain injury without a confirmatory isoelectric EEG.
- Confirmatory tests (are not necessary to diagnose brain death).
- EEG with physiological brain activity. (False (+ ve) and False (-ve) results may occur)
- No cerebral circulation present on angiographic examination (Principal legal sign)
"Electro cerebral silence + Non-visualization of cerebral arteries" = Brain death confirmed.
- Brain stem-evoked responses with absent function in vital brain stem structures
- Xenon Computed tomography (CT) scan
- Digital subtraction angiography
- Atropine bolus test
- Transcranial Doppler sonography which records arterial blood flow at the base of brain (TCD)
- 99 mTc HMPAO test (Most promising confirmatory test)
- Single positron emission tomography (PET scan) Best test

Pediatric Brain Death Protocol:

Age	Clinical Tests	Interval Between Tests	Ancillary Tests
New Born (>37 Weeks gestational age to 30 days)	As Adult	24 Hours	If required
31 days to 18 Years	As Adult	12 Hours	If required

Organ transplantation is a condition when the human organ from one individual is transplanted into the other human for the use by other such individual who himself is having his own such organ failed and non-functional.

Organ: not related to human reproduction (e.g. ova, sperm, ovaries, testicles or embryos)

- It also does not deal with blood or its constituents for transfusion purpose.

TYPES (MEDICO LEGALLY):

- ❖ **REGENERATIVE TISSUE:** blood, semen, bone marrow, skin.
- ❖ **NON REGENERATIVE TISSUE:** cornea, heart, lungs, liver, kidney.
- Regenerative tissue has fewer problems compare to non-regenerative tissue which are usually donated after the death of the person.

SOURCES OF ORGAN DONATION:

- **Homologous donation:** organ are relocated to the same body(no legal implication)
- **Heterologous donation:** includes blood or bone marrow. Live heterologous donation extends to paired organ like kidney. (**SWAP Test + Relational**)
- **Cadaveric donation:** only means of obtaining unpaired organ for donation. Here the accurate diagnosis and management of brain stem death is very essential, because organ taken from beating hearth donor have more chance of success.

1: Beating Heart donor.

2: Non heart beating donor;

Non heart beating donor: Prior to the introduction of brain death into law in the mid to late 1970s, all organ transplants from cadaveric donors came from non-heart beating donors. Donors after brain dead however lead to better results as the organs were perfused with oxygenated blood until the point of perfusion and cooling at organ retrieval.

Non heart beating donors were generally no longer used except in Japan, Germany where brain dead was not legally or still not culturally recognized.

However, a growing discrepancy between demand for organs and their availability from DBDs has led to a re-examination of using non-heart beating donors. Many centers are now using such donors to expand their potential pool of organs. Tissue donation i.e corneas, heart valves, skin, bone has always been possible for non-heart beating donors.

By providing **ECMO** (Extra Corporeal Membrane Oxygenation) to donors, immediately after death is declared by cardio circulatory criteria can keep organs in their freshest possible condition.

According to Gortmaker et al (1996), most common cause of death is spontaneous/traumatic ICH as a result of RTA.

REVIEW OF LITERATURE:

- The history began with allo-transplantation in 16th century with amputation of legs.
- In 1668, first successful bone graft.
- In 1905, first successful corneal transplantation.
- In 1954, Dr. Harrison, Joseph E. Murray, John P. Merrill performed the first successful kidney transplant between identical twins.
- Experiments have shown that Brain stem destruction leads to Brain death as it determines consciousness and ability to breathe spontaneously. However in certain countries like U.K the whole brain including brain stem is considered as brain death.

Relevant facts:

- All over world, Brain death is viewed in different ways in different countries and different laws have been framed likewise.
- In Canada two physicians who are not associated with a transplant team will do the certification of brain death.
- Countries like Spain and Croatia have a donation rate of 32 and 31 per million populations respectively.
- In India, some big cities like Hyderabad and Chennai have the donation rate of 5 and 14 per million populations respectively during last 3 years. The national average though is abysmally low at 0.16 per million populations.
- In India postmortem is not done after sunset unless prior permission has been obtained. If the family wishes to take the body, there can be delay in such a situation, hence it is important to keep the family of donor informed of this possibility.

- In the 15 years, since the THOA was passed in 1994 about 1500 cadaver donations have taken place in India.
- Tamil Nadu has the highest eye donation rate in India – 8000 per year.
- The first successful kidney transplant in India was done in Tamil Nadu in 1971.
- The first successful multi-organ donation and Transplant was done in Tamil Nadu in 1995.
- The highest number of **heart transplants** has been done in Tamil Nadu.
- From Oct 2008 to April 2013 Tamil Nadu has had 339 deceased organ donors resulting in 1895 organs and tissues.(www.dmrhs.org/tnos)

NEED/RATIONALE:

We should support organ donations, so that many end stage organ failure patients get new organs to live. We must identify all potential brain dead patients and make sincere efforts to declare brain death and convince relatives for organ donations to save many lives.

Many patient of heart, liver, kidney and lung failure die because they can't get organs from brain dead people. On the other hand we lose many brain dead patients in our ICU due lack of co-coordinated effort, legal issues and poor awareness among people.

At any given time, there are 8-10 brain dead patients in the different ICUs in any major city of the country. We have 140000 deaths from road traffic accidents every year. 67% of these patients suffer from head injuries that lead on to brain death in many instances. We hence have potentially a huge pool of brain dead donors available in India.

This pool of patients can easily meet the demand for organs for our country but also perhaps our neighbouring SAARC countries. It will help in wiping out the shortage of organs and hence the commerce in kidneys, which continues to haunt the country despite the legislation.

Almost, 85% of all transplants done across the world originate from organs from brain dead donors.

South India is doing lot better in legal aspects than north India. More Cadaveric organ donations are happening in south and west India than north India.

DISCUSSION:

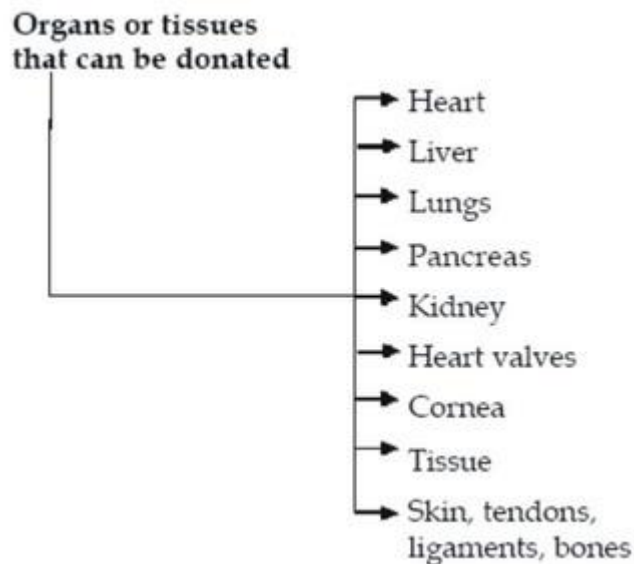
MEDICOLEGAL IMPLICATIONS:

I. Organ donation:

Unless damaged by injury or disease, the organ from a brain dead body may be used by another individual through an organ transplant.

In case the family wishes to donate the organs/ tissue, medications are usually continued until the time the patient is declared brain dead. These medications help to keep the blood pressure and heart rate under control and some reduces swelling in brain.

Organ/ tissue transplant offers life or a better quality of life to another person. It gives the donor family the opportunity to help others at this time of tragedy and loss.



Transplantation of human organ Act 1994 came in to force in 1995 in India.

Highlights of this act are:

1. Statutory sanction to the brain death concept.
2. Regulation of removal, storage and transplantation of human organs for therapeutic purposes.
3. Commercial dealings in human organs prevented.

Level of awareness about transplantation, brain death & cadaver organ donation:

It is extremely low. Only a small number of individuals are aware that brain death is legal in India. Awareness about brain death is especially low among villagers.

Education about various aspects, its immense importance for organ donation and legality of brain death in India needs to be highlighted.

II. Removal of life supporting system:

There is a line of demarcation i.e. when the artificial aids should be stopped so that the doctor may not get involved in the offence of culpable homicide not amounting to murder or one of rash and negligent act, if he has removed the aids indiscriminately. Thus he should first consult with other doctors.

Clinician should make it clear to the relatives that ventilation is not being withdrawn to let the patient die but because continued ventilation is immaterial for a patient who is already dead except in case of organ transplant.

III. Other applications:

Akabayashi & Morioka reviewed the feasible uses of brain dead bodies, especially of dead fetus and anencephalic. They are following:

- Donor for organ transplantation including marrow.
- For storage and preservation of organs for transplant.
- Factory to produce hormones and antibodies.
- For experimentation
 - a. In basic medicine to help determine physiologic functions in human in place of animal experimentation.
 - b. In clinical medicine
 - i. To serve as disease models
 - ii. for use in technological development
 - iii. for use in preliminary test of new drugs
 - c. For education purpose in practical raining and anatomic dissection
- Parkinson's disease (>1 million sufferers in USA)

They may get potential benefit from tissue (Foetal brain tissue) transplantation.

Reluctance to accept brain death:

- Lack of understanding the concept.
- Special emotional attachment to the dead person
- Loss of confidence in medical practice
- Ethical questions related to earlier organ transplant procedure
- Perceived insufficient participation of government and medical associations.

In the last three decades the concept of brain death has evolved and has had judicial approval in many parts of the world like USA, UK, JAPAN, IRAN and SAUDI ARABIA.

As health and education are state subjects this act had to be accepted by various states and passed in their assemblies. So far the act has been passed in most of the Indian states; however there are still a few states that have to accept the act.

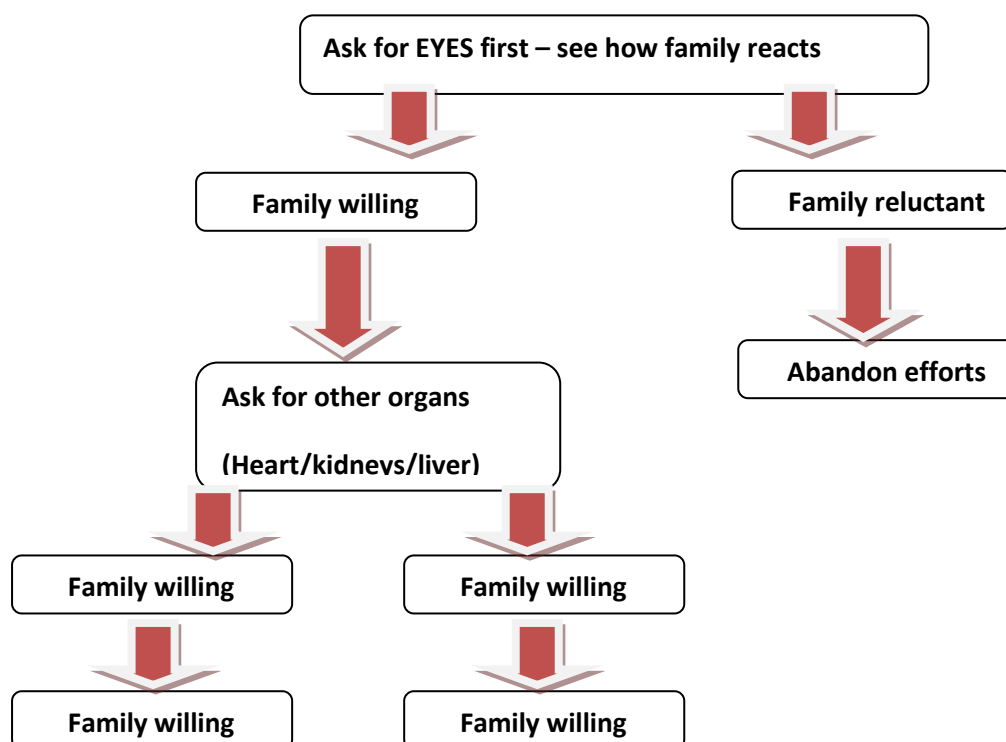
PREPARATION AND CHECKS BEFORE PROCEEDINGS:

- Consent for organ retrieval and brain death certificate –
Adult Donor- Form No. 6
Minor Donor- Form No. 9
- Check Brain Death Certification – Form No. 8 of the THO act.
- All investigations

The RAMCHANDRA Protocol:

- A survey of 5008 members of the public entitled “The Public Attitude towards organ donation “was conducted by the Department of Urology and Renal Transplantation at Sri Ramachandra College and Research Institute in Chennai.

“Ramachandra Protocol”- To ask for organs in the event of Brain Dead patient: -



NOTE: -

Grief counselling and **transplant co-ordination** are important steps which includes:

1. Donor identification
2. Donor screening

3. Donor management
4. Recipient counselling

CONSENTPROCESS:

- **Opt In System/ Required Request:** - Both in USA and UK, Opt In system is used for consent in which the donor can express the consent to donate organs after death during their life time. Form No 5 of THOA is an Opt in card but even if a brain dead person possesses such form the counsellor/doctor will still prefer asking the relatives an informed consent.
- **Opt Out System/Presumed Consent:** -Countries like Belgium, Austria, Finland, France, Norway, Spain and Singapore follow Opt Out system in which the states assumes that consent for organ donation has been given by the deceased. Exceptions are made in case of minors or if donor wishes not to donate.
- **Mandated choice Law:** - This law requires citizens to declare their choice about organ donation. This can be done by registering with a national body or expressing their wishes during the issue of important documents like “Driving License” or “Passport” or “National Identity cards”. Countries like Sweden and Denmark have implemented this law.
- **Donor Card Concept:** - This is a universal organ donor card for all organs. The next of kin needs to be informed about the wishes of donation. It is one way of putting Form 5 of THOA into action. MOHAN Foundation has been distributing these cards since 1997 and has distributed over half a million cards in India in various regional languages.

BRAIN DEATH CERTIFICATION:-

- As per the Transplantation of Human Organ Act two clinicians who are experts in the field (like neurologists or neuro-surgeons) is required for brain death certification. Ethically these clinicians must not have interest in or benefit in any way from transplantation of cadaver donor organs.
- They are expected to do two sets of tests six hours apart to certify brain death. One of these two clinicians should be a nominated member from the panel of doctors listed by the State Government for this purpose.
- The legal time of death in these circumstances is taken as the second set of brainstem death tests. The certification should be done on laid out forms as per the act.

- In a medico-legal case a forensic expert is also required for the certification. The medical director or medical superintendent of the hospital should finally countercheck and sign the form (Form 8 THO Act). It is only after this has been done should ventilator support be discontinued or retrieved.

ETHICAL ASPECTS OF ORGAN DONATION AND TRANSPLANTATION:

- 1. Principles of Ethics:-** It includes various ethical questions like :-
 - a. Is there any harm if a dying rich man buys a kidney from someone poor?
 - b. Are they doing it truly out of the love for their patients or are they doing it to charge high fees by helping the needy?
 - c. Should a poor patient who is unable to afford high cost of immuno-suppression be transplanted at all?
 - d. Should patient get a second chance if he/she discontinued immunosuppressive therapy?
- 2. Four Medical Principles:-**
 - a. Respect for autonomy
 - b. Beneficence (to do good)
 - c. Non-maleficence (not to hurt anyone)
 - d. Justice (fair adjunction)

THOA 2011 Amendments:

- i. Tissues have been included under the definition of organ transplant
- ii. SWAP organ transplant has been included
- iii. Mandatory requirement of transplant coordinator in the centre
- iv. Mandatory information to a dead in ICU telling about options for organ donation
- v. Penalty has been increased to 20 lakhs.
- vi. Diagnosis of Brain death made easy by including anaesthetist and intensivist in the category of neurologist.
- vii. No organ donation from mentally challenged person
- viii. Minors cannot donate
- ix. Indian cannot donate to foreigners unless near relatives.
- x. Eye enucleation can be done by trained technicians

ISSUES RELATED TO DONOR:

- Voluntary refusal of life prolonging treatment by a competent adult must be respected
- In untested body organ transplantation, doctor must take every precaution to ensure to rule out the risk of acquiring disease
- Doing/taking organ without the consent(>18 yrs) and that of relative-Unethical
- For the benefit of guardian if consent is given-unethical
- Unethical to go ahead with organ transplant-if the donor is mentally unsound
- Monster, anencephaly-unethical
- Marriage done for organs (kidney Marriage)-unethical
- Mutilating the foetus for benefit of others –unethical

ISSUES RELATED TO RECIPIENT:

- Xenotransplant
- Potential recipient and their relative can be tempted or pressured.
- Blackmail or bribe of living donor to donate
- Unethical to go ahead with the transplantation when the deceased had not consented but after death the relative does.
- Surrogate mother: A possibility of that the fertilized egg is reared as a fetus and infant for the purpose of organ transplantation.

ISSUES RELATED TO PROCUREMENT:

- Commercial trading of organ is an offence

-kidney buyers

-kidney marriage

-human organ shop

-surrogate mother

SCOPE OF DECEASED DONATION PROGRAMME:

There are currently over 300 transplant centers in India doing approximately 3500 to 4000 kidney transplants annually. In India, the total number of fatalities due to road traffic accident in 2011 was 140000 (Ministry of Road Transport and Highways). As per a study done by AIIMS, 67% of them end up in brain death in ICUs. Currently few hospitals are doing well but if properly organized the deceased organ donation programme has the

potential to take care of the majority of the demands of kidneys, liver, heart and other essential organs and tissues.

CONCLUSION: -

Due to severe shortage of organs, the world over has led to increased pressure on the intensive care staff for early identification of the brain dead donor and optimum management of this condition. The diagnosis of brain death as per the Transplantation Human Organ Act is based as simple clinical bedside tests. The passing of this Act in 1994 and its further Amendment in 2011 leads to subsequent adaptation by many Indian States. This has made it possible in India to use the huge pool of patients for organ retrieval and transplantation.

Currently, THOA has put leverage to various legal and ethical challenges which has led to more ease of cadaveric donation. THOA has been implemented in all the states of the country. State level and national level organ registry systems are been formed. Pioneer states like **Kerala (Mritsanjeevani)**, **Karnataka (ZCK- Zonal Cadaveric Co-ordination Committee)**, **Maharashtra (ZCTP)**, **Delhi (NOTTO,ORBO)** and **Tamil Nadu (CTP- Cadaveric Transplant Program)** have started their own cadaveric transplant programmes. **National Organ Donation Day** concept has been put forward. People are accepting **Donation Cards** thereby indicating that the long term goal of THOA is effectively proceeding forward. Various **NGOs** and **Community Participating Bodies** are taking initiatives for the Cadaveric Organ Donation. Inclusion of MLCs has enhanced the organ donation numbers. Brain Dead Committee Formation in hospitals are increasing after THOA amendments. But still the donor pool remains quite small with respect to demand pool. Currently donor pool is limited to brain dead donors only, non-heart beating donors can enhance this pool. Appropriate legislation to this effect will go a long way to increase this pool. Organ bank can be formed at national level for unanimous distribution of the same. National level donor and recipient registry should be formed to maintain the transparency. The provision of separate registration for opt out system can be a good option for national level cadaveric donation program. Separate awareness programs for health sector, doctors, government and non-government organisations need to be implemented. IEC programs should be conducted to educate the masses about organ transplantation and should be given right to choose beforehand. Efforts to legislate presumed consent may be taken up by the government.

The more awareness about brain death and organ donation will lead to a scope of life for so many patients. We need to educate more and more people about brain death. Our Government should make the legal aspects easier for cadaveric donation. Our country is having a huge pool of brain dead organ donor. This pool of patients can fulfill the demand for organ of not only our country but also other countries also.

MEANS TO CORRECT ORGAN SHORTAGE:

- More awareness for the Government and health sector, doctors and NGO.
- General public should be told about organ transplantation and should be given right to choose beforehand.

- Presumed consent should be followed in every state of the country.

RECOMMENDATIONS:

1- Steps should be taken to form a National Network of organ retrieval and sharing. We have to liaison with state authorities and work with them.

2- We should have a national and state level 24x7 Helpline for answer any query and start the process of donation as per the protocol. Most of the state will agree to give one kidney to Max and one to state. Liver and heart can only be used by some centres at present where these treatments are done.

3- We should have state level team for organ retrieval. There should be a liver, kidney and heart team. They should be ready to travel at a short notice. We should have arrangement for travel, instruments and perfusion solution for retrieval and transport facility for the organs to go to the transplant centres. Air India is committed to transport organs free. Other Airlines also do it.

4- We should have our organ allotment criteria as per the national guidelines in new act. We should have our waiting lists, updated every week and available to all the centres for inspection. This may also help in Donor swapping in different centres.

5- We should have transplant co-coordinators in each state and each transplant centres to do all these works as per the guidelines and protocol. They should have communication facilities and contact number of all the relevant peoples, doctors and administrators.

6- Guidelines' and protocols should be available to all hospitals and periodic mock drill is needed to keep it going smoothly

7- We should have political connection to get these things done in each state. We are doing all legal and right things where you need a political help to get things done. There are always problems in doing right things in right way.

8- We should get all our hospital certified for organs retrieval. We should have brain death committee in each hospital so that no organs are wasted.

9-We should also educate all our staff members of all hospitals so that no organs are wasted and consent is obtained.

10-Each hospital should have printed brochure for brain death, organ donations and transplantation. We should have standee for organ donation slogans and display board and screens to promote organ donation. There should be short running film or advertisement to promote such a noble cause.

11-We should start fellowship programme in kidney transplantation now to train more people and later on develop liver and heart treatment fellowship. Such fellowship will help our own organization as well the nation.

12-There should be a regular meeting or videoconferencing in Pan Max group to learn

from each other and improve such programme.

13-We should develop good laboratory facilities especially for treatment related investigations, which will help to do good co-ordination among all hospitals.

14-Non heart beating donor: Prior to the introduction of brain death into law in the mid to late 1970s, all organ transplants from cadaveric donors came from non-heart beating donors. Donors after brain dead however lead to better results as the organs were perfused with oxygenated blood until the point of perfusion and cooling at organ retrieval. Non heart beating donors were generally no longer used except in Japan, where brain dead was not legally or still not culturally recognized.

However, a growing discrepancy between demand for organs and their availability from DBDs has led to a re-examination of using non-heart beating donors. Many centers are now using such donors to expand their potential pool of organs. Tissue donation i.e. corneas, heart valves, skin, bone has always been possible for non-heart beating donors.

By providing ECMO (Extra Corporeal Membrane Oxygenation) to donors, immediately after death is declared by cardio circulatory criteria can keep organs in their freshest possible condition.

Today much greater attention must be given to understanding the public and professional perceptions of brain death. There is strong need to educate both groups and inspire them for Organ donations.

Proper laws should be framed perhaps to assure legal and ethical exemption for those who are unaware and reluctant to accept the concept of brain death.

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PROJECT REPORT 6:

TITLE:

BILL TILL DATE -- (BTD) -- PROCESS AT MAX SUPER SPECIALITY HOSPITAL, SAKET, NEW DELHI (A DESCRIPTIVE STUDY)

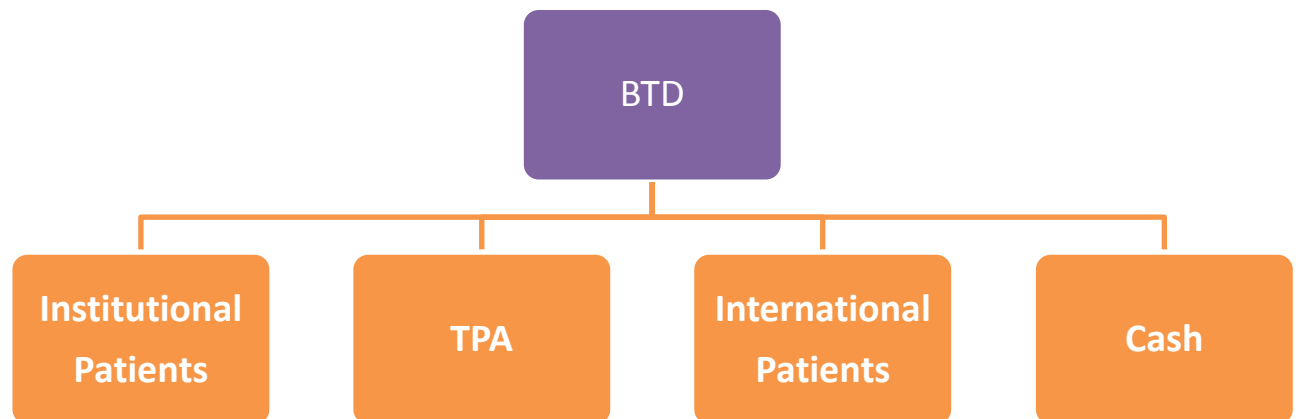
INTRODUCTION/BACKGROUND:

Today, every corporate hospital has an operational process flow for Admission, Discharge and Billing. The Hospitals work on the principle of generating revenue by providing the cost effective treatments for both hospitals and for the patients. Continuous monetary flow is needed for the efficient running of any hospitals. Back log of large amount of money can lead to the downfall and insolvency of these corporate hospitals.

Bill Till Date (BTD) is the process of getting all the pending bills on time and diagnosing the potential threats / dangerous cases for minimizing the future financial risks.

DISCUSSION:

The process of BTD at MSSH is carried out by the following 4 major ways:-



1. INSTITUTIONAL PATIENTS:-

In these cases, various PSUs and Corporate companies' employees are included. The only condition is that MSSH should have a tie up with these organizations. The organizations provide a "**Credit Letter**" as guarantee which is valid for a stipulated period of time. So, there is no problem in taking bills from such patients as the organization is responsible for the payments of such bills. In case of extension of stay, authorized letters for pending bill payments are directly sent to the respective organizations. The organizations are responsible for the payments of pending bills.

2. TPA PATIENTS :-

Third party payment is quite similar to the institutional patients. Here also the prior permission and initial approval is taken for the bill clearances by TPAs. The only difference is that the part of the payment with regard to exact duration of treatment is provided with the limit. Only the part of the payment with the limits is provided by TPA. If there is hospital extension, TPA does not give the total limit. In such conditions, case summaries are sent along with the estimates to TPAs. TPA provides the limit and once the limit is exhausted further treatment is done as Cash treatment.

3. INTERNATIONAL PATIENTS:-

International patients mostly are under Cash payments. Mostly they come via facilitators so the IPS (International Patient Services) department is responsible for BTB of the same. In case the patient does not give money then mark-ups are removed. The share of facilitators is removed and no money is given to them. In this way these international patients are converted into domestic patients. Recovery of them is as same as domestic patients.

4. CASH PATIENTS:-

The patients who spend out of pocket expenditure come under cash patients. These are divided into 3 categories according to the pending amount:-

a. More than 50,000 pending amount (Future Potent threats level 1) :-

Every morning, system generated BTB list comes out and is sent to the managers and higher authorities. All the potential threats have been identified and categorized according to the amount of pending bills. Up to 50,000, it does not come under the list. More than 50,000 pending bills come under this category which can be future potential threats. Managers look after these patients, prepare separate lists and ask for the payments with no written documents.

b. Up to 1 lac (Future Potent threats level 2) :-

These patients are more risky than the level 1 patient. Here the pending amount is up to 1 lac. For it, formal demand for payment is sent in form of **Demand Letters** to the patient and his/her attendant. Doctors and floor managers meet the family members and attendants of the patient. They explain everything starting from the procedure, further stay, billing details, queries and recall them about treatment protocol. In this way, MSSH tries to remind the patient and their attendants about the pending bills via **both formal Demand letter and via Family Briefing**.

c. Up to 2 lacs (Future Potent threats level 3) :-

Here the pending bills reach up to 2 lacs. Along with the previous measures taken in level 1, additional measures are taken for recovering the payments. Now the patient is treated like OPD walking patient. Now the medications and Lab Investigations become direct i.e. via cash payment. By this, further payments of new medications and investigations can be recovered. It

becomes crucial issue and Meeting with DMS (Deputy Medical Superintend), Billing managers and Front Office managers are scheduled for reminding the patients and their attendants about the pending payments.

If no change occurs then following process is being followed:-



FACTS:-

1. The overall recovery loss for Max Hospital Saket remains approximately 20% of total billed amounts.
2. Only 50% bills are recovered from TPA and Institutional patients.
3. Patients with long stay and large pending bills are considered as the most dangerous patients for the hospitals.

CONCLUSION:

Bill till Date process is the backbone of any hospital. Its proper functioning is utmost necessary for the liquefaction of monetary funds. This leads to the fulfilment of all the financial needs of hospital.

For this, identification of weaknesses and continuous monitoring of the system is mandatory. The blockage of funds can cause severe damage to the financial foundation of the hospital. The BTB process at MSSH, Saket is working effectively. But future changes can make the system more effective and efficient.

The shortcomings identified are as follows:-

- Minimal I.T interventions are there. Most of the process of BTB is being done by hospital manpower.
- There is no software which can perform the BTB analysis.

- There is no protocol for system – flagged events. Only human detected events are occurring.
- There are only 2 persons for the entire building who are responsible for the completion of BTB process.

On the basis of above mentioned shortcomings, we would like to put forward the following

RECOMMENDATIONS:-

- New software should be created exclusively for the BTB analysis.
- This software can be integrated with present HIS for inclusion of such dangerous cases of BTB.
- This system should be able to detect and generate flagged events. The flagged events include any crossing of boundary levels in terms of bill amount.
- The software should have checks on crossing every 50,000 rupees bill amount.
- The software should also be able to perform analysis anytime and print the analysed data as well as reports.
- The system should also be able to create notifications for further steps like organise a meeting, family briefing, legal notice etc.

REFERENCES:

Hospital data source MAX Super Speciality, Saket, New Delhi.