

**Summer Training at
Max Super Specialty Hospital,
Saket, New Delhi**

**Process Mapping and Identification of Bottlenecks in the Oncology Daycare at
Max Superspeciality, Saket**

**By
Eisha Sangwan**

**Under the guidance of
Col (Dr.) Ashok Kaushik**

**MBA Hospital and Health Management
2015-2017**



**The IIHMR University, Jaipur
2016**

CERTIFICATE

This is to certify that **Dr. Eisha Sangwan** has undergone Summer Training in Max Saket, New Delhi from 1st April 2016 to 31st May 2016.

The candidate herself completed the following projects under my guidance during her training-

A)"Process flow mapping and identification of bottlenecks in Oncology Chemotherapy daycare centre at Max Superspeciality Hospital Saket, New Delhi."

B)"A retrospective study on distribution and occurrence of Pressure sores at Max Superspeciality Hospital Saket, New Delhi."

Her approach to the projects was sincere and proactive. This summer training is partial fulfillment of the course requirement recommended for the award of MBA in Health and Hospital Management.

I wish her success in all her future endeavors.



Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affair)

IIHMR, Jaipur



CERTIFICATE OF COMPLETION

This is to certify that

Dr. Eisha Sangwan

has been associated as an

INTERN

with the department of

MEDICAL ADMINISTRATION

for a period of

1st April 2016 to 31st May 2016

at

Max Super Specialty Hospital,
Saket

"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

For a MANAGEMENT student, the power of knowledge is unattainable unless an element of practical observation and practical performance is not added. I consider myself fortunate for having being provided an opportunity to pursue my summer internship from MAX SUPER SPECIALITY HOSPITAL, Saket, New Delhi. It is a great pleasure to express my sincere gratitude to **Mr Anil Vinayak** (Director, Operations) **Dr. Nalini Kaul** (Medical Superintendent), **Dr. Sahar Qureshi** (Assistant General Manager), **Dr Sandeep Mor** (Deputy Medical Superintendent) for providing me an opportunity to undergo training in this highly esteemed organization.

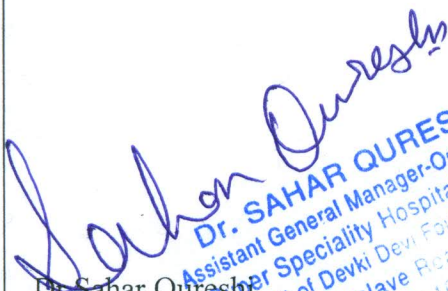
I would also like to thank my mentor **Col(Dr) Ashok Kaushik** (Professor and Dean Academic and student Affairs, IIHMR, Jaipur) for his able guidance and support, unflinching help and motivation at every step of completion of this report.

I am grateful to **Dr Harit Chaturvedi** (Chairman, Max Oncology) for providing me the opportunity to embark my project in his department.

It is my genuine pleasure to express my very special thanks and gratitude to **Dr. Shihad Khader** (Manager - Oncology) whose dedication and keen interest had been solely and mainly responsible for the completion of this report. His timely advice, meticulous scrutiny, scholarly advice and scientific approach has helped me to a great extent to complete this task. He has been a constant guiding light and source of illumination to me. It entirely goes to his credit that this report has attained this final shape.

I would also like to thank the **Team of Oncology Daycare**, for providing me the necessary detail and clearing my doubts whenever required. I acknowledge them for taking out time from their hectic schedules and helping me in completion of my report.

Lastly I would like to express my gratitude to my family and friends for being a constant source of inspiration for me.


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(Assistant General Manager)

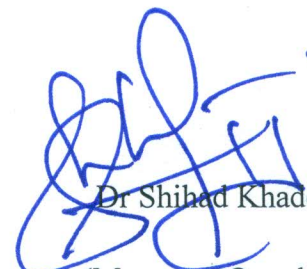

Dr Shihad Khader
(Manager- Oncology)

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Declaration

I do hereby declare that I am a student of 1st year, MBA in Hospital and Healthcare Management, IIHMR University, Jaipur, Rajasthan session 2015-2017.

I would like to state that I have carried out my Internship on the topic “A study on Process Flow Mapping And Identification of bottlenecks in Oncology Daycare department” under the guidance of Dr. Shihad Khader (Manager - Oncology) at Max Super Speciality Hospital, Saket, New Delhi for the partial fulfilment for the degree of MBA in Hospital and Healthcare Administration.

This project work is my own and has not been submitted to any of the other Institute or University for the purpose of award of any degree or diploma.

Dr.Eisha Sangwan

IIHMR University

(2015-2017)

Acknowledgement

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Dr Sahar Qureshi
(Assistant General Manager)

Dr Shihad Khader
(Manager- Oncology)

Abbreviations

S.No.	Abbreviation	Meaning
1.	AAMI	Association for the Advancement of Medical Instrumentation
2.	ABG	Arterial Blood Gas
3.	BBV	Blood Borne Viruses
4.	CABG	Coronary Artery Bypass Graft
5.	CAPEX	Capital Expenditure
6.	CAUTI	Catheters associated urinary tract infections
7.	CDC	Centres for Disease Control and Prevention
8.	CLABSI	Catheter linked associated bloodstream infections
9.	COW	Computer on Wheels
10.	CPRS	Computerized Patient Record System
11.	CSSD	Central Sterile Services Department
12.	CTVS	Cardiac Thoracic Vascular Surgery
13.	GDA	Ground Duty Assistant
14.	HAI's	Hospital Acquired Infections
15.	HIS	Hospital Information System
16.	ICPs	Infection Control Practitioners
17.	IPS	International Patient Services
18.	LAMA	Leave Against Medical Advice
19.	LASA	Look alike Sound alike
20.	MRSA	Methicillin Resistant Staphylococcus aureus
21.	MSSH	Max Super Specialty Hospital
22.	NABH	National Accreditation Board for Hospitals & Healthcare Providers
23.	OPEX	Operational expenditure
24.	PAC	Pre-Operative Assessment Clinic
25.	PPE	Personal Protective Equipment
26.	PPT	Partial Thromboplastin Time
27.	RA	Restricted Antibiotics
28.	RRT	Rapid Response Team
29.	TAT	Turn Around Time

Hospital Profile and Observational Learning

Max Super Speciality Hospital

Hospital Profile

INTRODUCTION

Max Super Speciality Hospital, Saket (MSSH) is a NABH accredited 502 beds, super speciality, tertiary care hospital by Max Healthcare Institute Limited (MHIL), located in Saket, in the national capital region of New Delhi, India. Designed to be one of India's most advanced Hospitals, Max Super Speciality Hospital, Saket has some of the world's finest technology and equipment. The hospital is designed by renowned architect Mr. Richard Wood and provides highest level of professional expertise and world-class care in all major medical disciplines and allied specialities.

The medical practices and procedures followed at the hospital are research oriented and benchmarked against the best in the world. The doctors at Max have trained abroad and have certification from foreign board. The hospital delivers world-class services in a warm, open, patient centric environment.

The hospital handles a large number of patients a year, which includes international patients as well. International patients come to Max Super Speciality Hospital, Saket (MSSH) from the USA, UK, Europe, Middle East, Australia, Africa and CIS countries, among other countries.

Max Super Speciality Hospital, Saket (MSSH) is a multi-speciality hospital, owned and operated by Max Healthcare Institute Limited (MHIL). With over 1800 beds and 12 hospitals in Delhi NCR, Uttarakhand and Punjab, Max Healthcare is one of the leading chains of hospitals in India.

At Saket, the two hospitals are accredited with NABH Accreditation in patient care. The hospitals have two wings- the East and the West wing. They have 302 Beds in the East while 202 Beds in the West. In total there are 176 critical care beds (99Beds & 77 Beds respectively) in the two wings and all have the most advanced technologies to meet the needs and provide best services to the patients and to their families. Max Healthcare has state-of-the-art facilities designed in accordance with international norms – 20 operation theatres, Cath Labs, MRI and CT across an integrated network.

Infrastructure: Max super Speciality Hospitals, Saket are ideally located in South Delhi, approximately 10 kilometers from the airport. They are easily accessible from all the satellite townships of Delhi NCR.

Servcies & Facilites : The Hospitals are designed to provide highest levels of professional expertise and world class care in all major disciplines and support specialities.

MAX HEALTHCARE

The Logo



The cross is the accepted symbol for Healthcare the world over. The hands that you see within it are inspired by Michaelangelo's famous painting on the roof of the Sistine Chapel showing the birth of Adam. In this work, which has endured for centuries, God bestows the gift of life on mankind through his touch, a truly fitting symbol for a group that endeavors to enhance the quality of life through healing and care.

The healthcare green that we have finally chosen is fresh, close to nature and symbolic of life. We hope to use this color to differentiate all our healthcare properties.

Passion, Vision and Mission



Passion - Build Trust

Vision

To deliver International Class healthcare with a total service focus, by creating an institution committed to the highest standards of medical & service excellence, patient care, scientific knowledge and medical education.

Mission

Create Unparalleled standards of medical and service excellence

- Create exceptional standards of medical and service excellence
- Care provider of first choice
- Principal choice for physicians
- Ethical practice

The Hospital is divided into 2 Wings

EAST WING

Aesthetic and reconstructive surgery

Anesthesiology and critical care

Blood bank

Cardiology including non-invasive cardiology and interventional cardiology

Cardiovascular surgery

Dietetics

ENT

Emergency and Ambulance

Endocrinology

Internal Medicine

Medical Oncology

Mental Health

Minimal Access, Metabolic and Bariatric surgery

Nephrology including Portable dialysis and dialysis unit

Nuclear Medicine

Pediatrics

Pharmacy

Physiotherapy and Rehabilitation

Pulmonology

Radiation oncology

Surgical oncology

WEST WING

Orthopedics and joint replacement

Neurosciences

Obstetrics and gynaecology

Pediatrics

Internal medicine

Aesthetic and reconstructive surgery

Emergency services

Allied medical services

- Nephrology
- Endocrinology
- Ophthalmology
- ENT
- General and laparoscopic surgery
- Dermatotomy
- Pulmonology
- Gastrology
- Urology

Imaging services

- MRI
- CT Scan
- Ultrasound
- X-ray

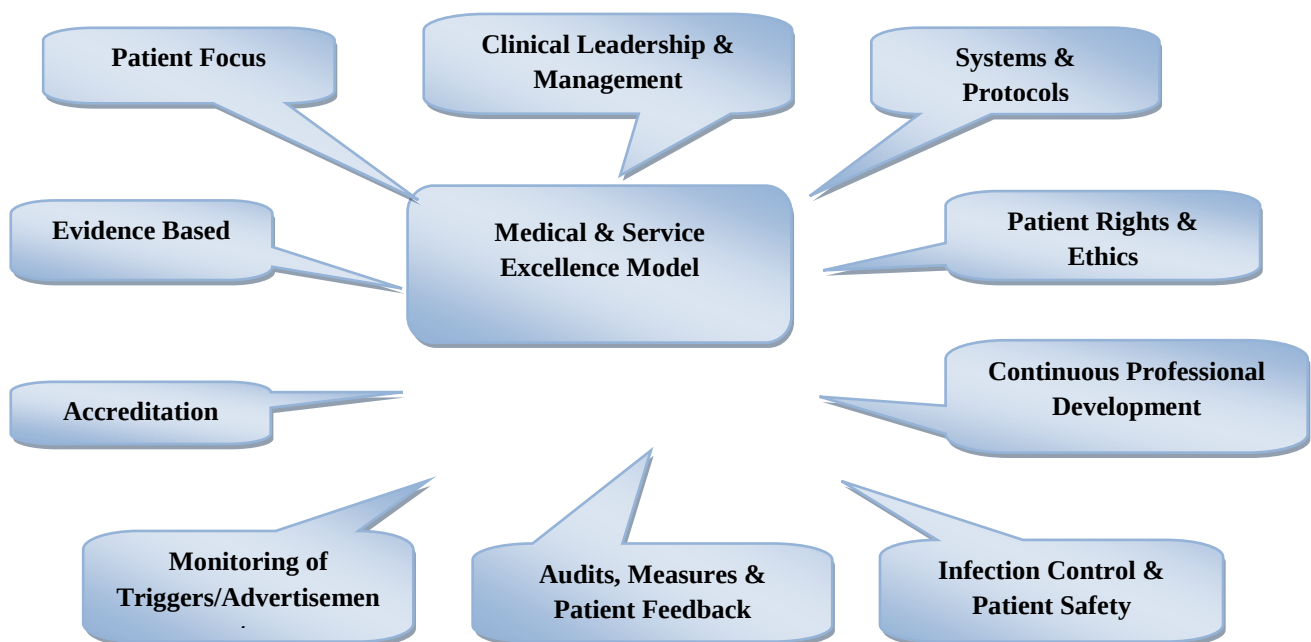
Laboratory services

- Immunology
- Microbiology
- Pathology

Observational learnings from the hospital

INTRODUCTION

Max Healthcare follows a core of **‘Patient Centred Care’**. Widely acknowledged nationally and internationally for its quality patient care, Max has successfully implemented the **“Medical Excellence Model”** through its clinical team of expert physicians and nurses who work together in an integrated manner, assessing patient needs, ordering tests, planning treatments, scheduling surgeries, monitoring progress and planning for early discharge to home.



The pillars of this model include:

- Clinical governance
- Credentialing and clinical privileging of physicians & nurses
- Use of standardized, evidence based protocols
- Patient and staff safety
- Infection control
- A culture of audit and continuous professional development

Every department of the hospital was observed carefully for its working, staff, hierarchy, physical set up and major challenges faced by them and suggestions were made to overcome those challenges.

The hospital has five key areas of specialties:

- Institute of Oncology.
- Institute of Cardiac Vascular Surgery.
- Institute of Bariatric & Metabolic Surgery.
- Institute of Orthopedics
- Institute of Nephrology.

MODE OF DATA COLLECTION

Data collection involved discussions with the HODs on the managerial issues and talking to the other staff and going through the records.

Sources of Data

➤ **Primary**

- By interacting with the HODs, executives, Doctors and other employees of the hospital.
- By interacting with the patients and their attendants.
- Through direct observations.

➤ **Secondary**

- Through registered records
- Through website of the hospital
- Literature available about the hospital like magazines, pamphlets, brochures, CDs, written documents

FRONT OFFICE

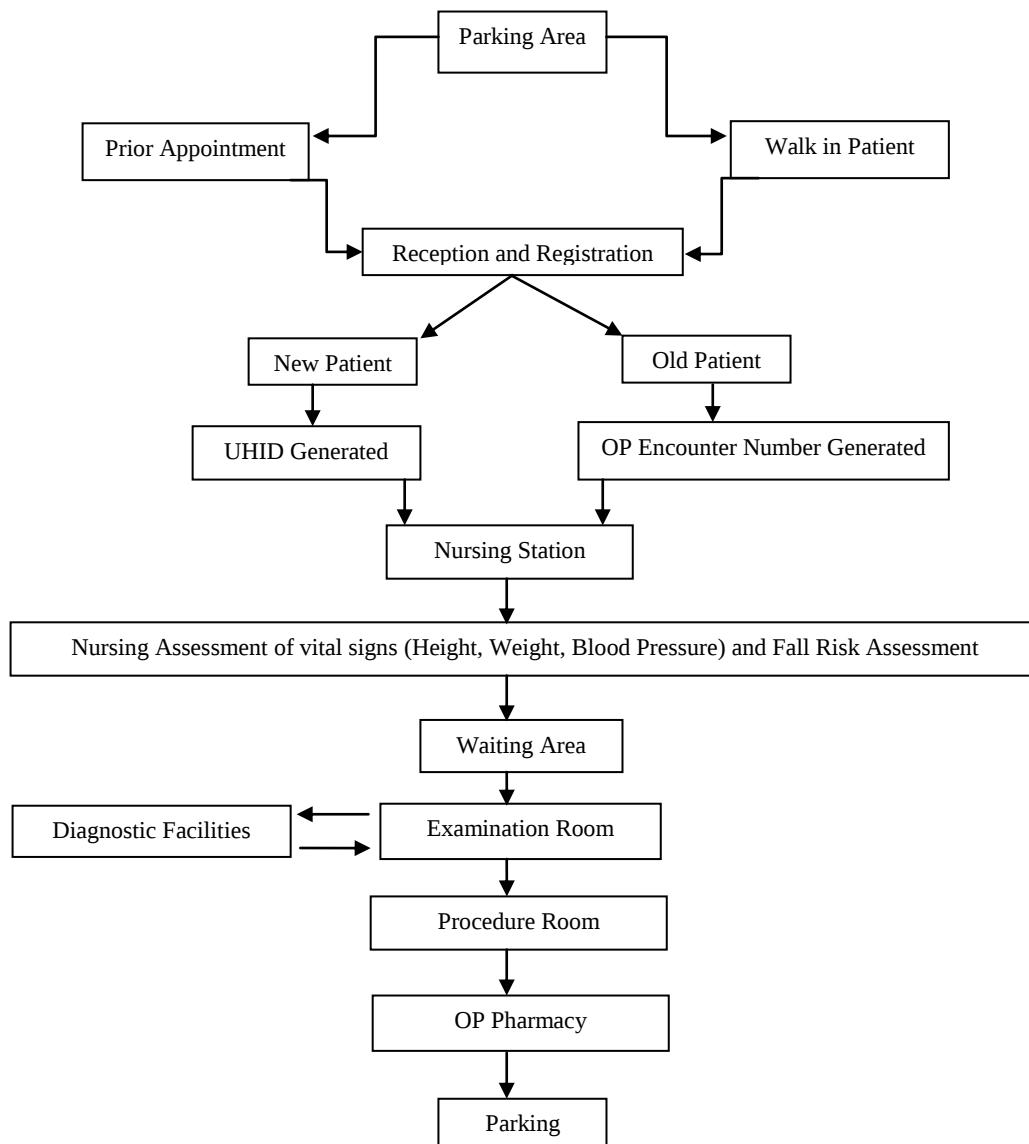
- **First contact point** between the patients / their attendants coming to the facility.
- Gives directions to them about the locations of various departments.
- Helps in planning timely discharge a day before by inquiring about the same from the concerned consultants.
- Performs in patient and out- patient registration.
- Does appointment scheduling of the patients.
- Makes doctors' available summary.
- Insurance management.
- Does registration and scheduling of preventive health check-ups.

Challenges

- Huge rush during peak hours such as morning.
 - Shortage of staff
-

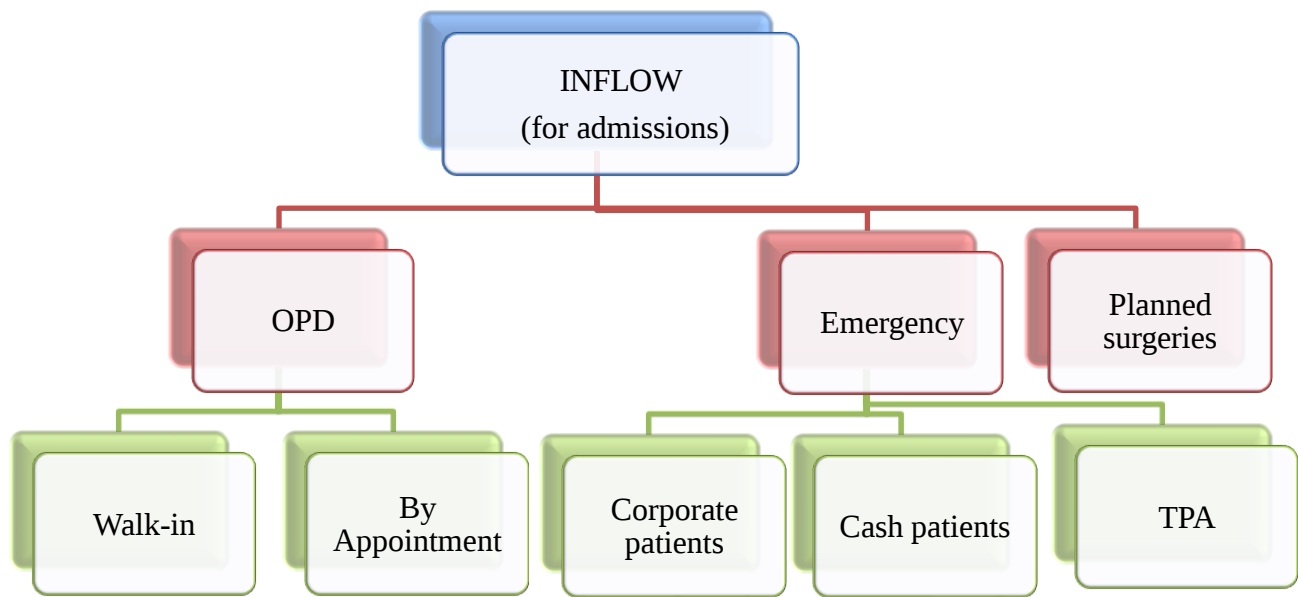
OUT-PATIENT DEPARTMENT

- Each INSTITUTE of Max Saket hospital has its own OPD area as well as IPD area / day-care area wherever applicable with doctor's chambers and procedure rooms.
- Every OPD has a procedure room and its own Front Desk.
- Appointments are centralized 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 the 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 waiting.
- In case of a new patient, registration is done which is valid pan-Max and for life time of the patient and a UHID is created which becomes a unique identification for all his health related information.
- For Chairpersons and senior doctors, a junior doctor does the initial assessment of the patient, which not only reduces the workload of the senior doctors (whose slots are always overbooked), but it also gives the 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:



ADMISSIONS DESK

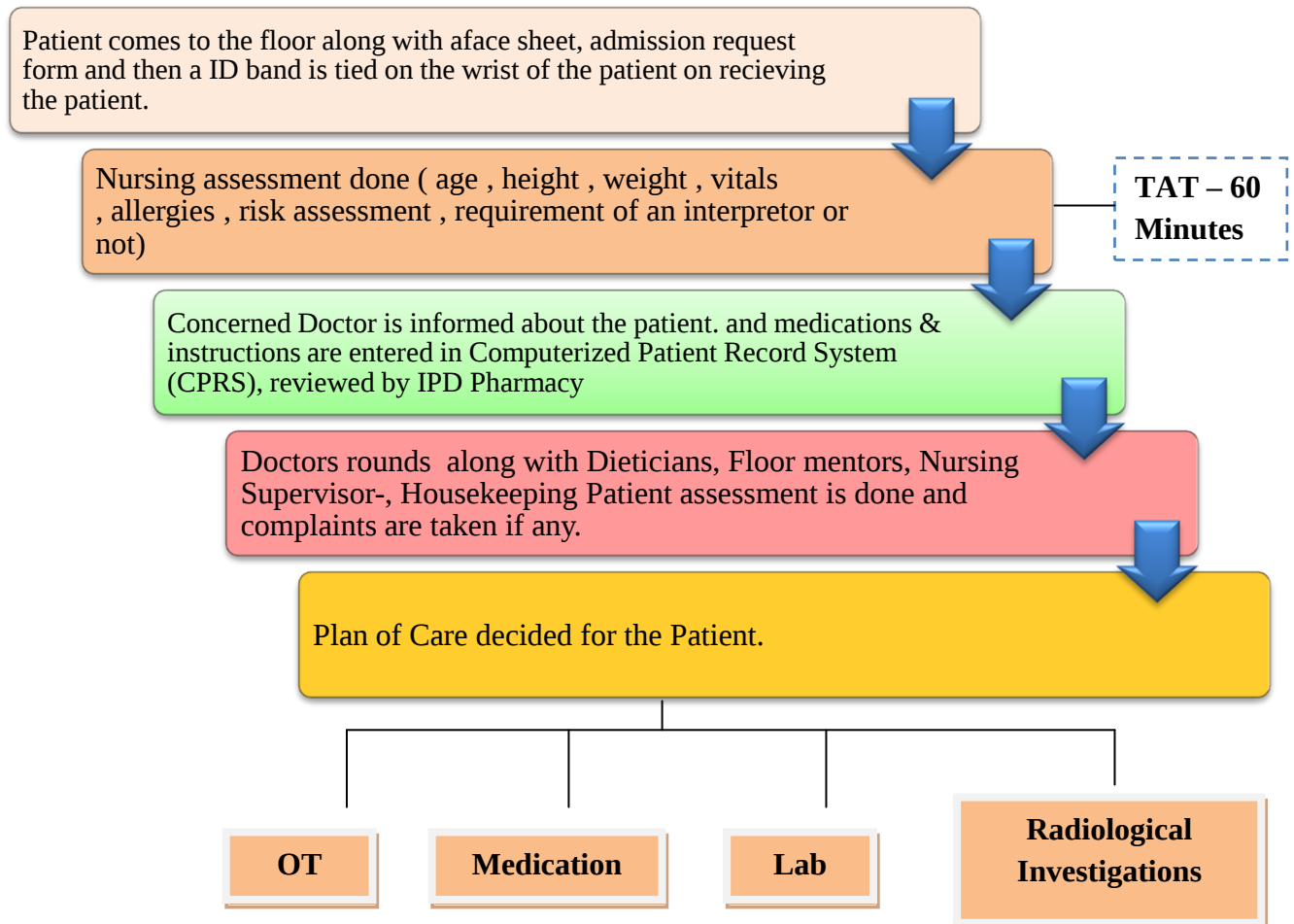
- If the patient has to be admitted to the hospital , he/she first reports to the admissions desk wherein all the paperwork is completed , do's and dont's as well as patient's rights and duties are explained to him. An initial token amount is deposited here by the patient which is according to his preference of the room (be it economy , single , twin sharing or suite)
- In case of TPA patients, the admission has to be reported to the insurance company within 24 hours.
- **STAFF**: 70-80; work in shifts with TPA staff working only from 5-5.
- **Challenges**: Huge departmentalisation which causes co-ordination problems



IN-PATIENT DEPARTMENT (IPD)

- IPD is distributed over four floors (**3rd-6th**) in the east wing and over five floors (**2nd-6th**) of Max hospital including a total number of beds.
- Every bedside has:
 - Details of Consultant, Nurse and Mentor written at the top of every bed
 - Room equipment checklist – side rails, Oxygen, Suction
 - Important Instructions
- The rooms available in IPD have the following structure of beds per room:
 - Economy room – 4 beds per room.
 - Twin Sharing – 2 beds per room
 - Single Deluxe
 - VIP suite
- Every floor has a central nursing station with Information Board covering:
 - Designation & Contact numbers of
 - a) Duty doctor
 - b) Administration Staff
 - c) Floor Mentor
 - d) Support Staff
 - e) Ward Secretary
 - f) Bed Manager
 - g) Nurses' names with shift timing and designation(8-10 nurses per shift)
 - Crash Cart parked next to the nursing station
 - Computer on wheels (COW) - 4
 - Cupboards with forms- down time form, investigation track sheet, blood request form, PAC sheet, informed consent, inventory files and registers
 - Medication rooms – 2 ;Pantry – 1
 - Records room
 - Biomedical Waste Disposal
- Nurse to bed ratio = **1:5 or 1:6**
- General Duty Assistants (GDAs) = **2-3 in every shift**

- Average Length of Stay (ALOS) for normal Laparoscopic surgeries = 2-3 days
- Quality Indicators are: Patient Fall, Hypoglycaemia, Needle stick Injury
- Process of admission of new patient to IPD



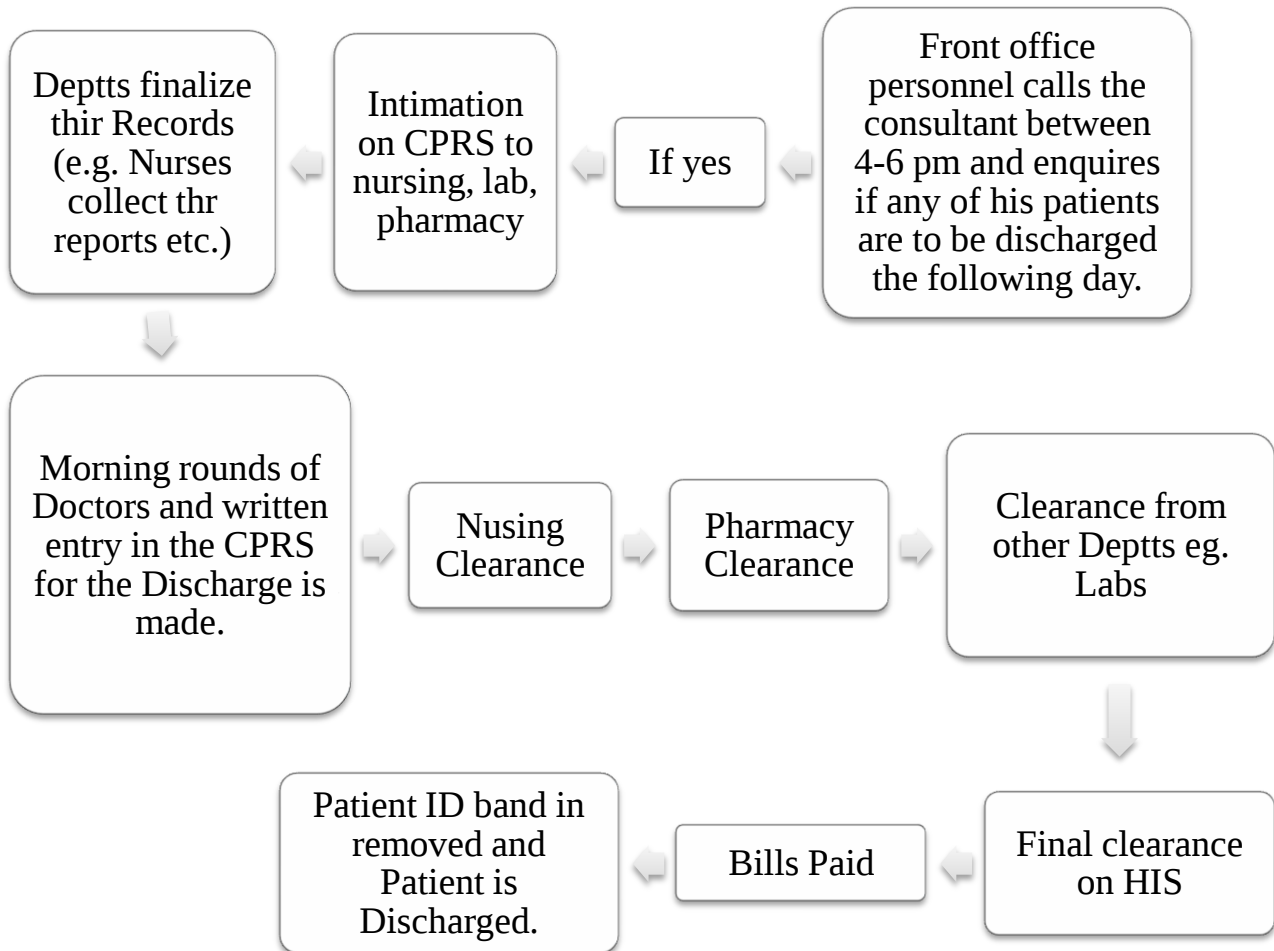
- **BARRIER NURSING**

Isolation of the patient in case the blood or urine culture of the patient has been tested positive for any infection so that the infection doesn't spread to others.

- **REVERSE BARRIER NURSING**

Done in cases where patient is immuno compromised so that infection doesn't travel to him from others.

Process of Discharge of patient from IPD



EMERGENCY DEPARTMENT:

Due to the unplanned nature of patient attendance, this department provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be [life-threatening](#) and require immediate attention, except for major burns. It is located at the ground floor with its own dedicated entrance and operates for 24 hours a day.

Ambulance - 2 ACLS (with CCTV camera for telemedicine, Suction Cardiac Monitor, Defibrillator, Oxygen Pump) and 2 BCLS (Ferno Stretcher, Oxygen Pump)

Patients are either transferred to other departments or are discharged within 4 hours. Max Super Speciality Hospital, Saket had made a world record for management of MI patient in emergency department from entrance to the balloon time in cath lab, in less than 35 minutes.

Response time:

- i. EMO response time <1 min
- ii. Consultant response time <60 min
- iii. Code blue response time <3min
- iv. Ambulance response time <10 min

Infrastructure:

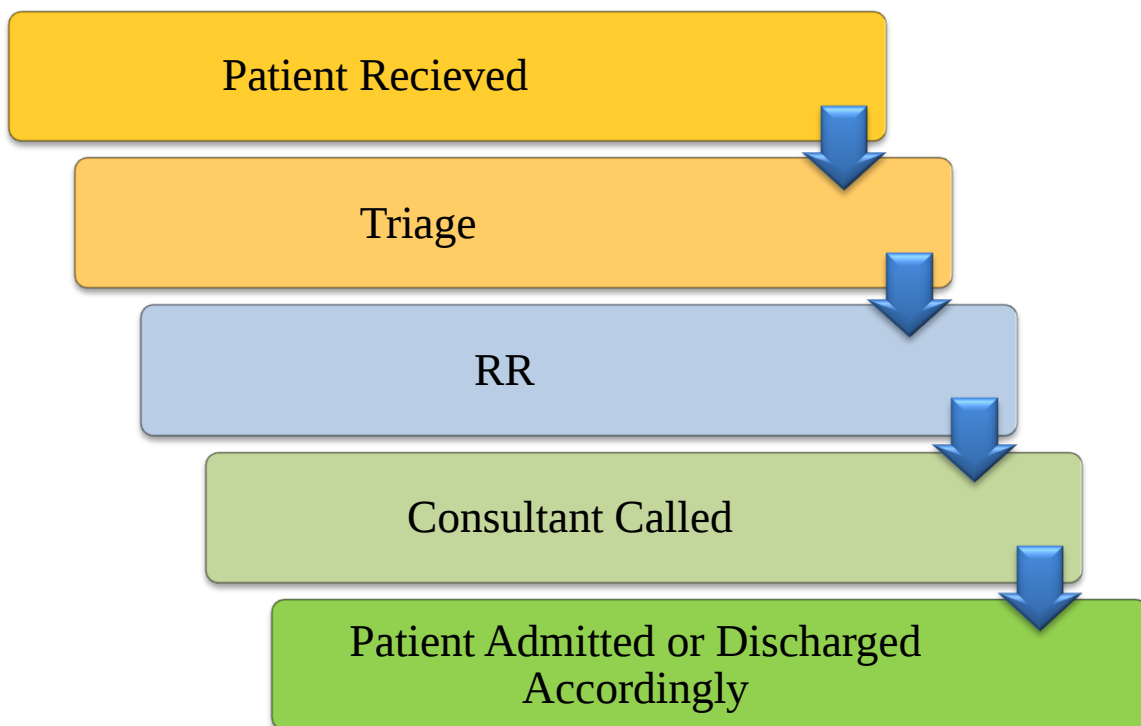
- Total **16 bedded triage**
- Resuscitation suite: **1 bed**
- Urgent care area: **4 beds**
- Observation area: **9 beds**
- Clinical decision unit: **2 beds**
- Doctors work station-is located in the centre of the urgent care area
- Store room- is located behind the reception. Medications are filled twice a day and stock of two days is kept in advance for Sunday. Narcotics are also available and kept in double lock and key system.
- Hospital information system and CPRS
- COWS(computer on wheels)

➤ Waiting area for patient's attendants is outside the department.

Staffing:

1. Senior consultant (Emergency medical officer)
2. 4 doctors
3. Team leader
4. Emergency physicians - 3
5. Nurses : 32 (8 nurses per shift)
6. 2 personnel at reception
7. Paramedical staff for ambulance
8. 4 GDA per shift
9. Outsourced staff: security personnel.

Process Flow



OPERATION THEATRE COMPLEX

Operation theatre complex of East wing is located on first and second floor. Operation theatre complex has 11 operation theatre assigned to various departments. Cardiac, oncology, bariatric laparoscopic, gynaecology, ENT and plastic surgeries are performed in these operation theatres. Operation theatre complex of west wing is located on first floor. It has 7 operation theatres for various departments. Orthopaedic, neurology and general surgeries are performed here.

Organization of staff: The staffs of Operation Theatre are organized into four groups:

- Anaesthetist
- Surgeon
- Nursing staff
- Technician and support staff.

Some observations and key highlights

- Average number of cases done per day - 40 in each wing
- **Temperature-** 21 degrees approx
- **Humidity** – 50-55 mm Hg
- **Light** – 2000 lux in the centre of OT table and decreases on moving farther
- **OT booking** is done through online. 2 types of surgeries are performed – *elective*: surgeon gets PAC done and gives an appointment; *add on*: manual booking of OT in case there is cancellation of the scheduled cases due to any reason.
- Each OT complex has a separate material store and a TSSU (Theatrical Sterile Supply Unit).
- **Staffing ratio**
 - **Nurses : patients:** 4:1(pre-op) & 2:1(post-op)
 - **Technicians : patients:** 1:1
- **OT Utilisation:** average is 70%

- Max super speciality hospital recently got a **GREEN OT certificate** which signifies minimal amount of pollution caused by OT gases and acceptable standards of practices being followed here.
- Sterilisation is done by ETO (12 hrs); autoclave. Fumigation is done twice a day in the morning and evening.
- Bio medical waste disposal is done every 2 hours.
- **No. Of pre-op beds: 3**
- **No. of post-op beds: 4**

Surgical safety check list includes

Identification	Sign in	Time out	Sign out

- Quality indicators: wrong patient , wrong surgeon , wrong surgery , return to OT(within 7 days) , waiting time for OT

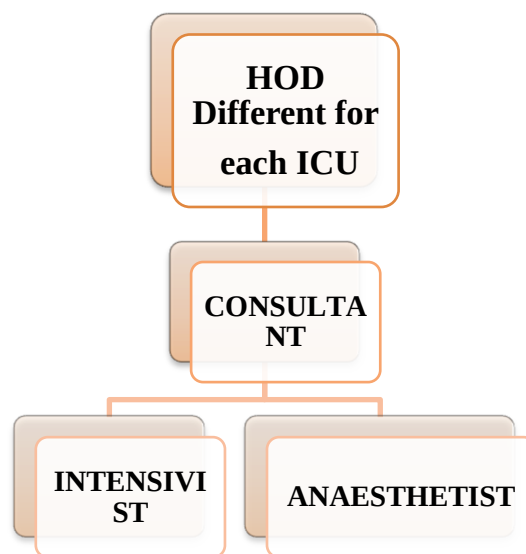
INTENSIVE CARE UNIT (ICU)

Max Saket has a total of 7 Intensive Care Units in the Hospital :

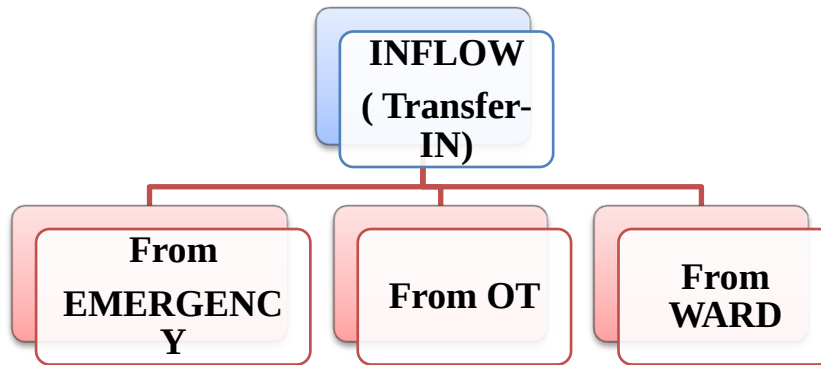
1. Respiratory ICU – 8 Bedded
2. Medical ICU – 8 Bedded
3. Neonatal ICU – 8 Bedded
4. Apex Coronary Care - Bedded
5. Stroke and Neuro Medical ICU - Bedded
6. Neurosurgical ICU – 8 Bedded
7. CTVS ICU - Bedded

All Intensive Care Units have a 24 hour service of Intensivist and an Anaesthesit.

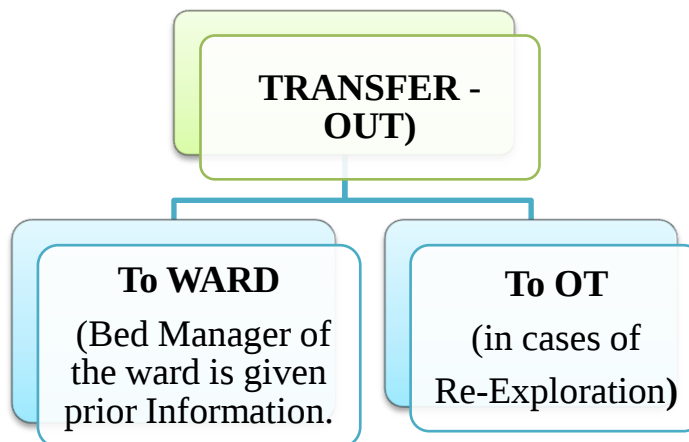
Staffing



Patient Flow



Before hand information is given on call to the ICU for *transfer-in* of the patient.



- **Patient: nurse:** 1:1(for all patients)
- **Patient counselling:** done throughout the day. Attendant counselling is usually done twice a day by the Intensivist .
- **Protocol for infected patients**
 - Isolation
 - Visitor's policy- no visitor allowed inside the isolation room
 - Aseptic policy
 - Full PPA
 - Separate linen disposal in separate bags
 - Separate dressing trolley
 - Separate housekeeping material- dusters, mops etc
- **Quality indicators**
 - Patient falls
 - Bed sores
 - Medication error

- Nosocomial infections

All the Quality indicators are duly noted in “*Quality Flash*” and it is audited time to time and measures are taken to reduce the number of incidents.

CARDIAC 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 here are:

- a) Angiography
- b) Electrophysiology study
- c) Cath study

Out of these 3 angiography, angioplasty and cath study is done in cath lab 1 and EPS is done in cath lab 2.

Other procedures are:

1. Percutaneous Transluminal Coronary Angioplasty
2. Peripheral Transluminal Angioplasty
3. Radio Frequency Ablation
4. Permanent Pacemaker Implantation
5. Intra Cardiac Defibrillation
6. Cardiac Resynchronisation Therapy Defibrillator Device
7. Cardiac Resynchronisation Therapy Pacemaker
8. Left and right sided pressure studies
9. Closure of some congenital heart defect

Slots are booked for everyday as per the doctors’ and patients’ convenience. About 70% of the slots booked are treated everyday

Units of cath lab:

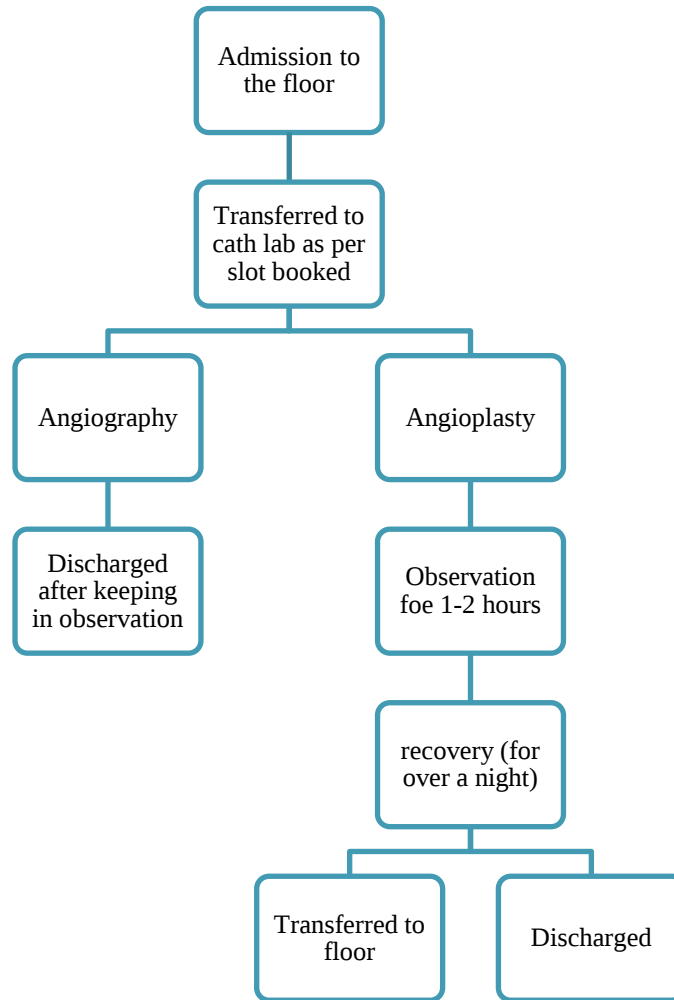
1. Cath lab 1

2. Cath lab 2
3. Technical room
4. Observation area
5. Technician room
6. Store room and utility room
7. Observation area-7 Beds
8. Instrument washroom

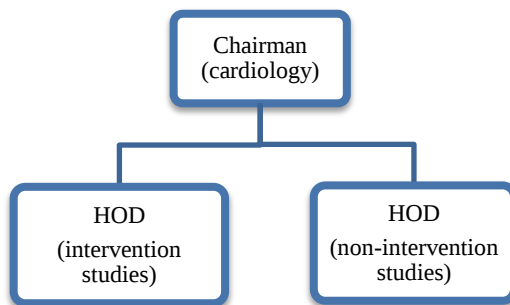
Location: Cath lab is located on the first floor with the vicinity areas as

1. Emergency department
2. Operation theatre
3. Cath recovery-14 Beds
4. Coronary care
5. CTVS OT
6. SICU
7. PICU
8. MICU

Process Flow of Patients



Staff



-
- Sr. Consultants (12)
 - Jr. Consultants (5)
 - Nurses (22)

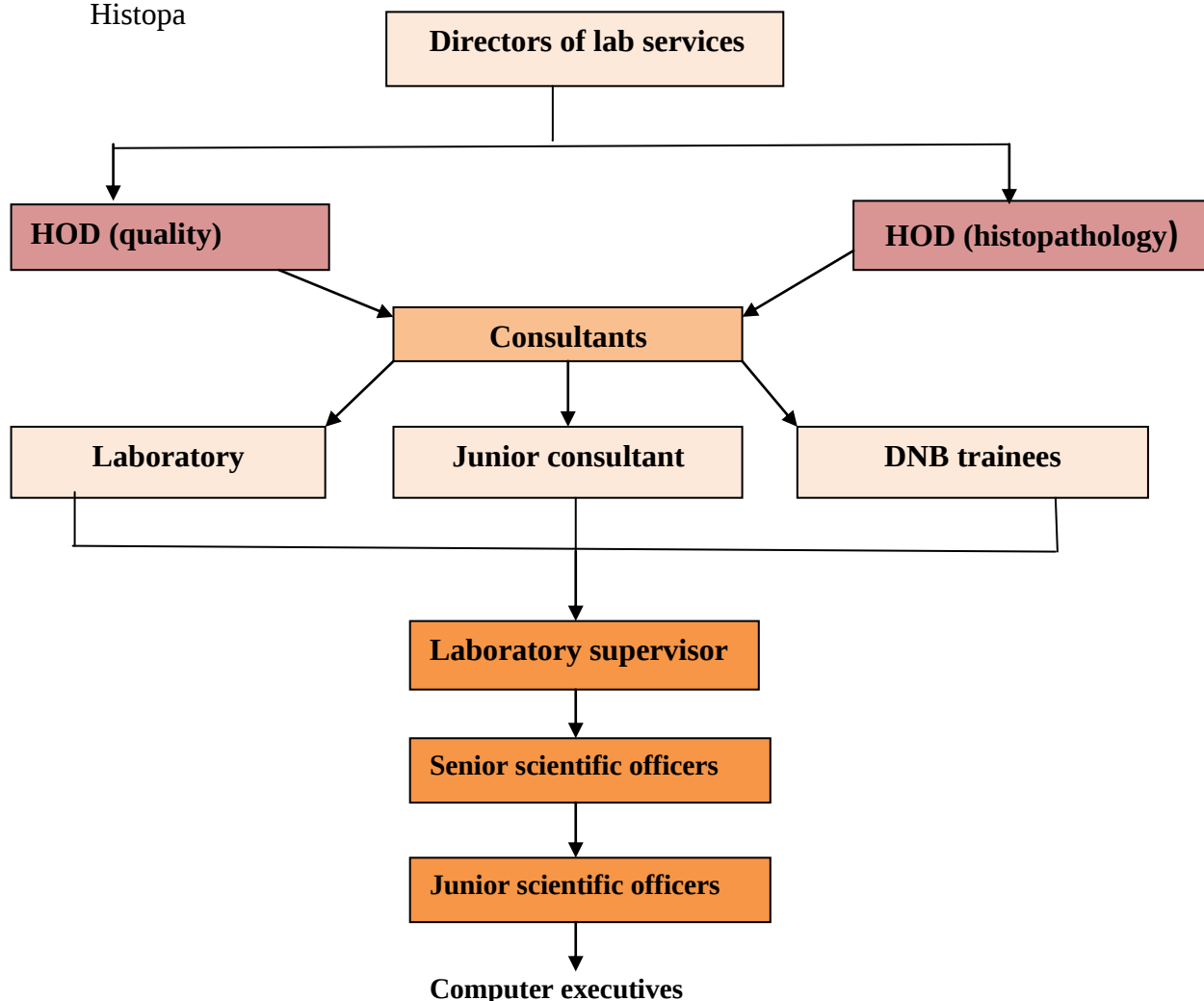
DEPARTMENT OF LAB SERVICES

Introduction

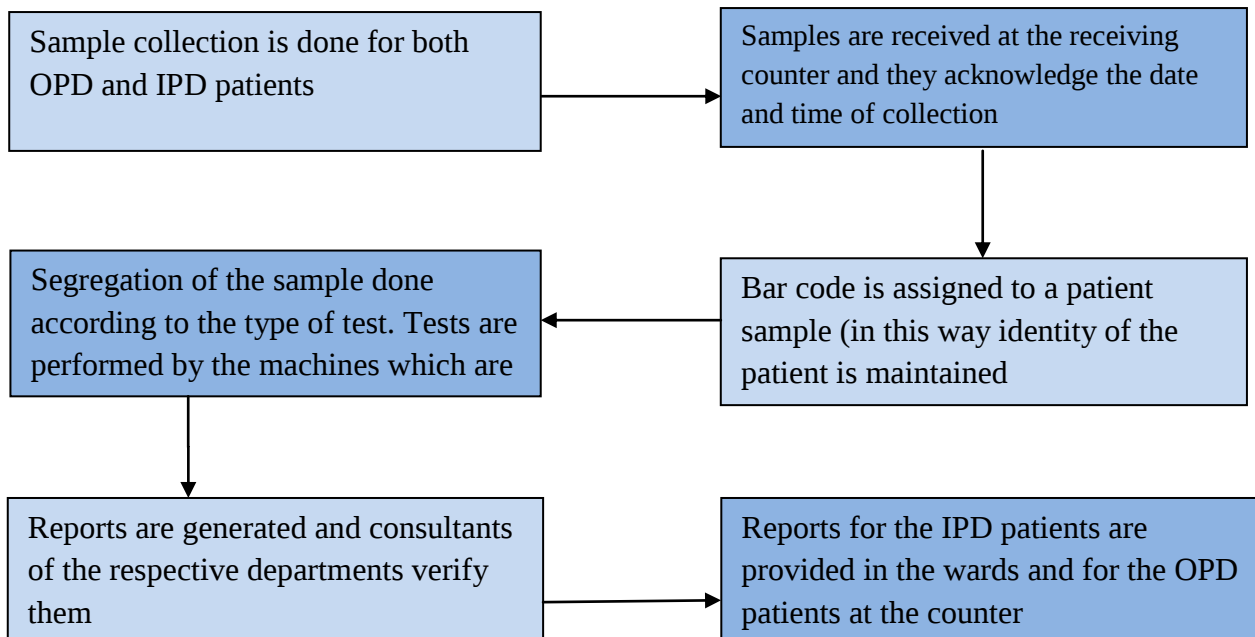
An ISO 9001:2000 certified lab, it is open 24 hrs a day. It's a high-tech lab with fully automated instrument which are directly interfaced with **hospital information system** and **laboratory information system**. Facility of stat tests (emergency) and sample collection from home is also available.

LABORATORY COMPRISES OF THE FOLLOWING DEPARTMENTS:

- Biochemistry
- Haematology
- Immunoassay
- Histopathology
- Clinical pathology
- Serology
- Microbiology
- HIERARCHY: Department of Lab Is Broadly Divided In Two Departments: a) Lab medicine & b) Histopa



PROCESS FLOW



LABORATORY INFORMATION SYSTEM

It is connected with hospital information system

- Sample received-red colour
 - Samples acknowledged-yellow colour
 - Test done-blue colour
 - Result verified-green colour
 - Billing done-pink colour
-

RADIOLOGY DEPARTMENT

Situated at the ground floor of the west wing of the hospital. The total staffs working in the Radiology Department are 60.

Procedures done in the department:-

1. Routine X-Ray studies
 - a. Plain (Chest, Abdomen etc)
 - b. Routine fluoroscopic procedures e.g. Barium studies
2. Routine ultrasound studies (Ultrasonography/Doppler)
3. Mammography
4. Dexascan
5. Special imaging techniques
 - a. CT
 - b. MRI

Divided into two parts:-

1. For Ultrasonography, mammography, Dexascan
2. For CT scan, MRI, X-ray, fluoroscopy

Consist of:-

1. Reception:-Counter for appointment and billing
2. Waiting room with general facilities like toilets, drinking water, air conditioning
3. Diagnostic room
4. Counseling room
5. Changing room
6. Film processing room
7. Radiologist office
8. Report collection room

➤ There are two MRI and one CT scan machine in the department.

- **Timings for OPD patients:-**8am to 8pm
- In between this IPD and Emergency patients are also taken.
- **Main OPD hours:** - 8am to 6pm and after 8pm only IPD and Emergency patients are taken
- **Report collection:** - If the scan is done before 12pm, reports are ready by the evening and can be collected in the same evening. And if done after 12pm, report will be delivered next day.
- Patient who comes in the radiology department either walks in or takes the appointment.
- Appointment patients are given preference whereas walk in patients have to wait. Emergency, doctor's referred patients or ICU patients scan is done as soon as possible.

Process flow in radiology department (OPD)

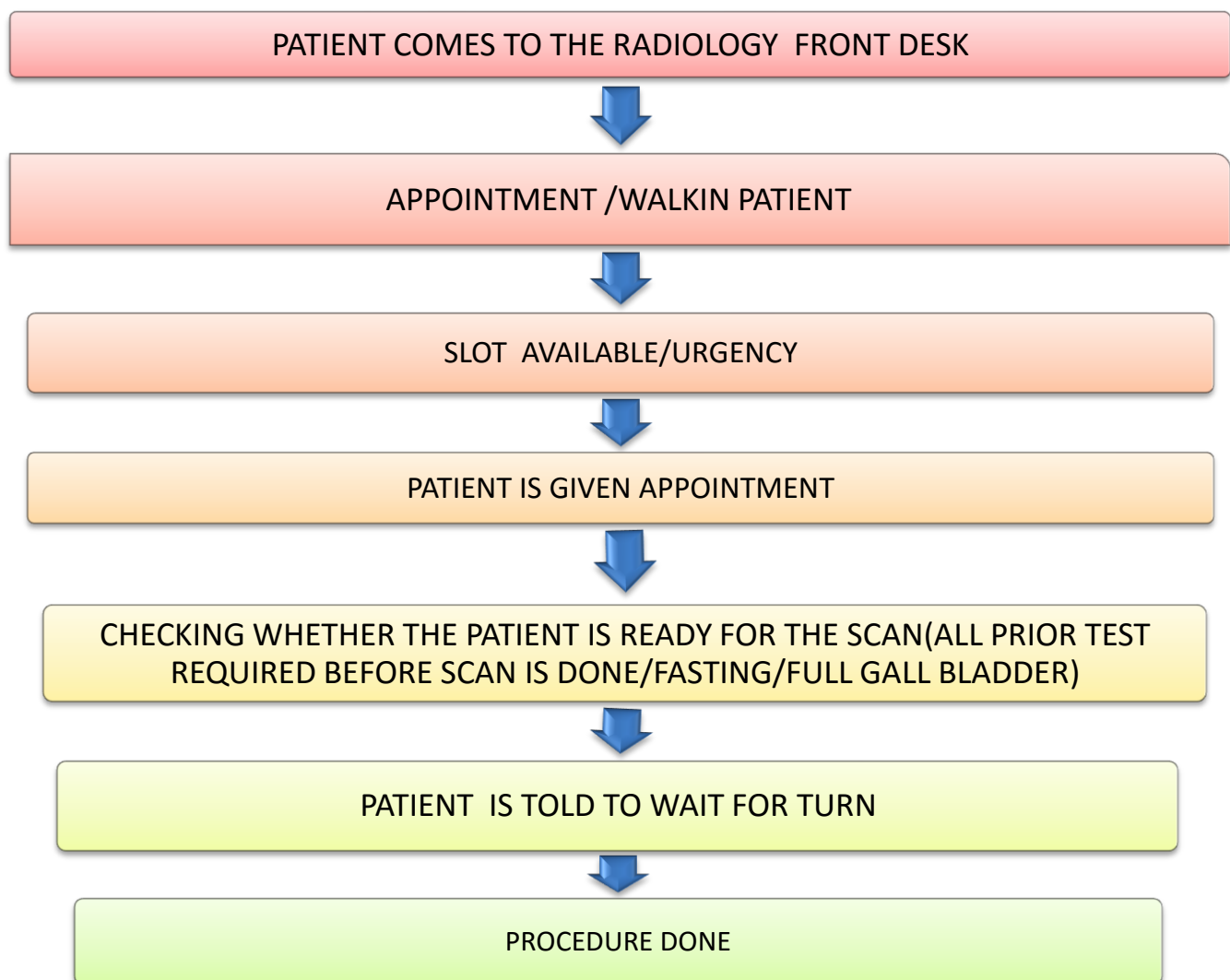


Figure:-Process flow in radiology department for outpatients.

Firstly, the patient comes to the radiology front desk after being prescribed by a doctor for the scan; the patient is either taken prior appointment or walk-in patient. The availability of the slot

required is then checked for the walk in patient by the front desk. Once the slot is checked, the requirements for the scan i.e. condition of the patient required to undergo the scan is checked. (E.g. proper creatinine level for renal patients). After that the patient is been provided the appointment and been told to wait for his turn. Finally the procedure is been performed.

- **Emergency patients** especially with a critical diagnosis – highlighted in the register and the consultant is immediately informed about the findings.
- Procedures wherein contrast is to be given, for example MRI, **consent of the patient** is taken prior to the procedure.

Max super specialty hospital has its own blood bank. All blood groups are available. But it is preferred that patient arranges blood through his relatives or any friend and should give replacement.

Blood bank consist of

1. **Sample collection area / reception area:** In reception area a form is given to the attendant of the patient regarding their details before he/ she donates the blood.
2. **Aphaeresis area:** blood have several components including red blood cells platelets and Plasma. Donor aphaeresis is a special type of blood donation in which a specific component platelet, plasma is withdrawn from donor
3. **Component room:** In component room the whole blood is separated into packed cells FFP and platelets.
4. **TTI room:** It is to diagnose transfusion transmitted infections. If donor is detected positive for TTI status it means donor have the potential to transmit the infection to their partner and children.
5. **Issue room:** This room is to issue the screened blood bags.

Staff of blood bank consists of **1 HOD, 2 blood bank officer, 1 technician supervisor, 16 technicians, 2 staff nurse, 2 computer executives, 4 GDA.**

- The Department is headed by Dr.Sangeeta Pathak and the technical manager is Ms. Ruchi.
 - The blood donation timings are from 9am to 5pm and approximately one volunteer comes for donating blood. Blood can be donated after every 3 months.
 - The PRBC are stored for 45 days at 2-6 degree Celsius.
 - The Platelets are stored for 5 days at room temperature 22± Celsius.
 - The FFP (Fresh Frozen Plasma) are stored for 1 year at -40 degree Celsius.
-

CENTRAL STERILIZATION SERVICE DEPARTMENT

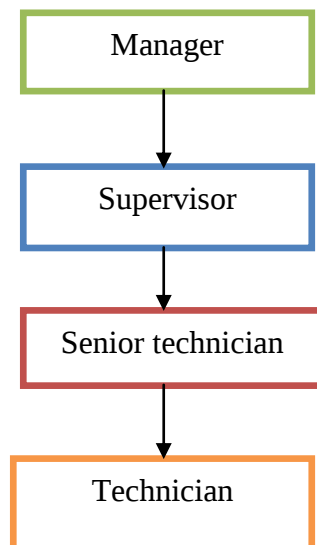
INTRODUCTION

CSSD is the heart of the hospital infection control and the most important unit of the clinical support services. CSSD role lies in receiving, cleaning, packing, disinfecting, sterilizing, storing and disinfecting instruments as per well-delineated protocols and standardized procedures.

CSSD department in max healthcare, Saket is a centralized department and the location of the department is in the basement

The main aim of the CSSD department is to reduce the level of micro-organisms from 10^6 to 10^{-6} .

HIERARCHY OF THE DEPARTMENT



The Department is headed by Dr. Sanjeev Bhatia.

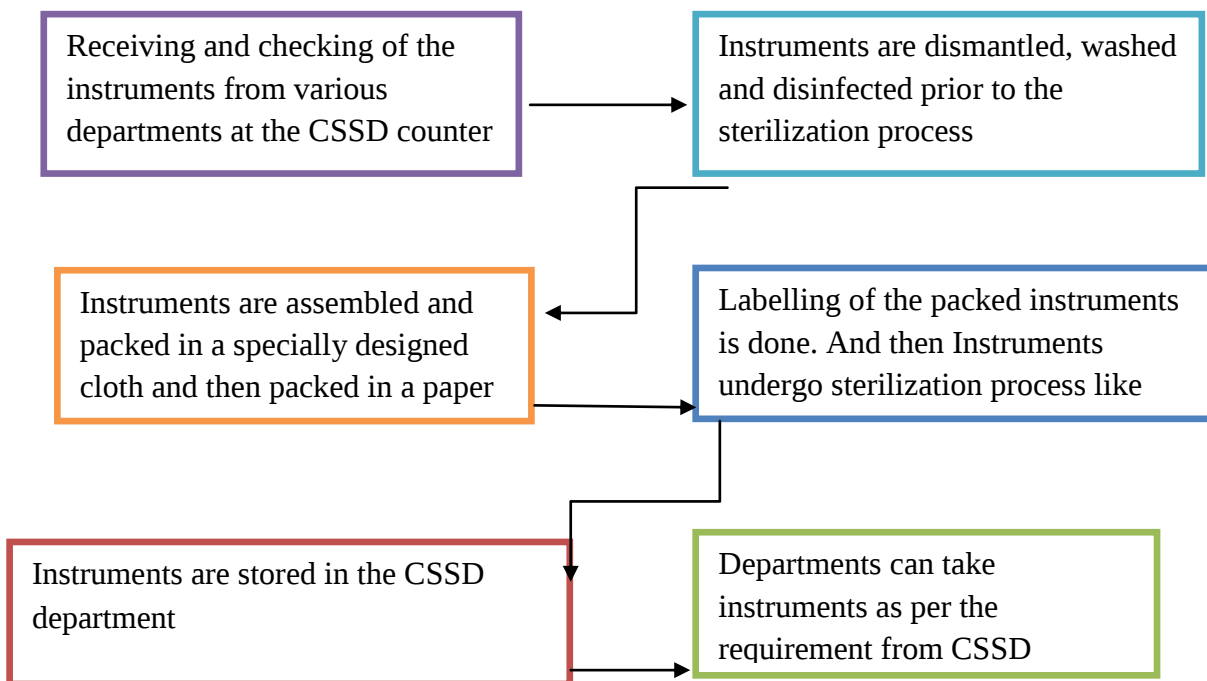
ZONES PRESENT

- Decontamination
- Clean
- Sterile

Colour coding for the following zones

- Decontamination area-red colour
- Clean area-blue colour
- Sterile area-green colour

PROCESS FLOW



- At the time of receiving the instrument at the CSSD department, the instruments are counted, checked for any damage, segregated according to the method of sterilization required for the instrument.
- Instruments used for the washing of the instruments are fully automated and according to the European standards.
- For packing of the instruments medical grade paper and cloths are used which are specifically designed for the purpose(they have a zig -zag pattern)
- Once sterilized and packed instrument can be used within 6 months.

EQUIPMENT LIST

- Washer
- Autoclave
- Plasma sterilizer

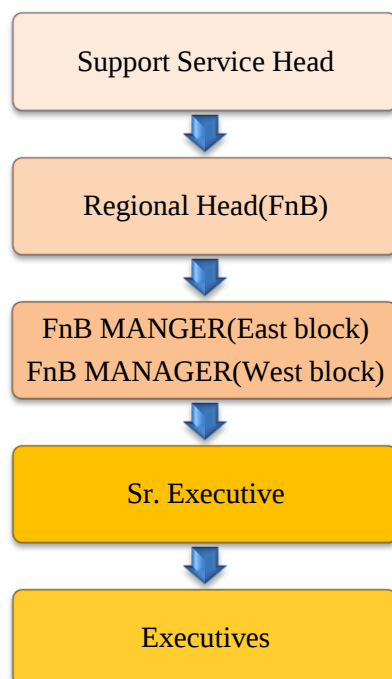
- ETO sterilizers
- Dryers
- Air-guns
- Water-guns
- Ultrasonic cleaners

QUALITY INDICATORS-

Various quality indicators used in CSSD are - **Batch monitoring strip**- a yellow colored strip which is attached to every lot which on exposure to right temperature and pressure turns black

FOOD & BEVERAGES

- Food & Beverage department is responsible for the supply of food to the in-patients and sometimes their attendants (if required) and also for arranging food during various meetings and conferences in the hospital.
- The department has been outsourced to sodexo pvt, ltd., however, the management and supervisory staff is in-house.
- Staff- 230 (outsourced) ; 11 (Max in house)
- Hierarchy

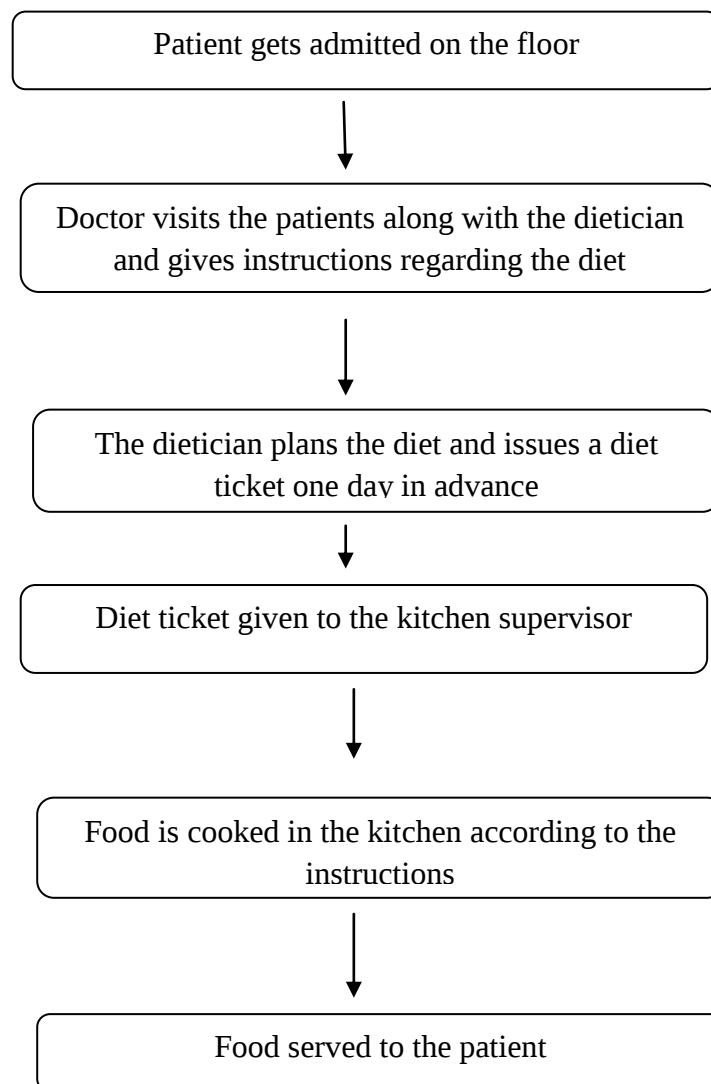


Time table for the diet of the patient

7-8AM	Breakfast
10:30-11:30AM	Soup/Beverages
1-2PM	Lunch
4-5PM	Evening tea
6-7PM	Soup
8-9PM	Dinner

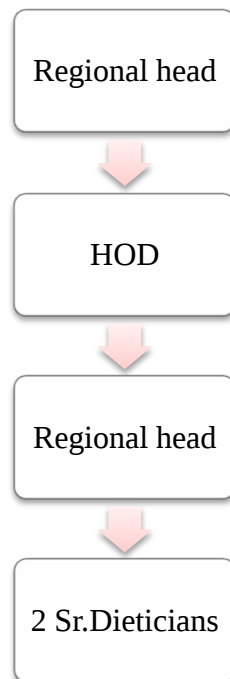
- Dinner of the same day, breakfast and lunch of the next day are decided prior in the evening and diet tickets are issued by the dietician and given to the chef.
- Apart from these if patients wants to have something extra, those can be provided to the patient after consulting dietician, but for an extra charges.
- Different menus offered are:
 - a) Continental
 - b) Afghani – for middle east patients
 - c) No onion and garlic – for middle east patients
 - d) Indian

Process flow of the department



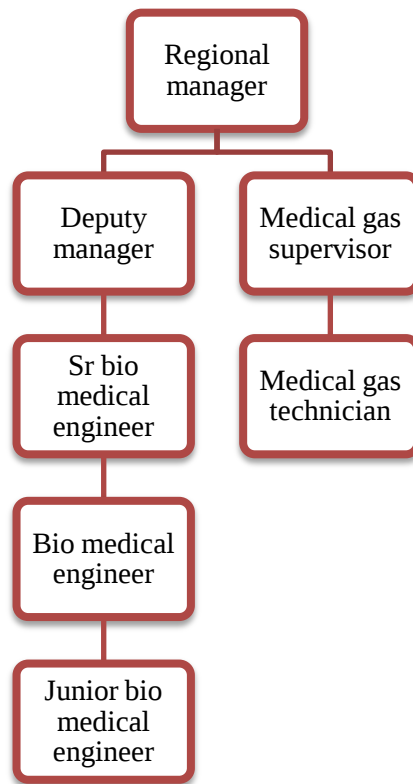
DIETETICS

- The department plans diet for all IPD patients in accordance with the primary consultant's opinion on the same.
- **Staff-** 13 in total.
- **Hierarchy**



- **Dietician: patient-1:50**
 - **Assessment** of each patient to be done within **24 hours of admission** and thereafter every 8th day after initial assessment.
 - For enteral nutrition, all commercial supplements for each disease are available.
-

- This department deals with purchase, installation and commissioning, training on operating, handling and maintenance of medical equipment in all departments of the hospital.
- Looks after running equipment and new equipment.
- For Running equipment
 - Preventive maintenance is done – to prevent breakdown, maintenance is done.
 - Calibration is done – i.e. to check how accurate an equipment is functioning
 - Breakdown call is checked for
 - Depreciation is measured
- For new equipment
 - Installation and commissioning is done.
- AMC and CMC records are maintained.
- CAPEX (Capital Expenditure) and OPEX (Operating Expenditure) registers are maintained.
- Equipment Incident report is made in case of any physical damage – it is filled mentioning how the damage did happened. Thereafter replacement or repair whatever is required is done.
- Organisational chart



- Gas manifolds are also handled by this department and Max is awarded green OT certificate because of the efficient dispersion of OT gases.
-

PHARMACY

Max pharmacy is self-owned with Central Pharmacy situated at corporate office, Okhla. There are 2 In-patient pharmacy stores and 2 Out-patient stores in the hospital.

PURCHASE

Auto purchase requisition is given to central purchasing team which is forwarded to vendor (outsourced). For purchasing the items ABC method is followed. Weekly requisition is done and vendors take minimum 3 days for delivery of drugs to hospital.

STORING OF DRUGS

Medicines are arranged according to VISTA (e-care) in Client patient record system via generic name in alphabetic order in racks, shelves, cupboards and drawers. Oral, parenteral and topical items are stored separately. Near expiry (expiry within 3 months) is stored in separate designated area to expedite the consumptions.

INDENT AND DISPENSE OF MEDICATIONS.

In patient pharmacy-

In CPRS, Medication orders posted by the clinicians is verified by pharmacist on PUTTY System labelled with (patient info, SSN no., drug name,) then the medications are dispatched after Billing via HIS (Hospital information system) and finally handover to GDA to dispense medicines. The Stat orders required immediately are dispensed within 30 minutes. The normal order is dispensed within 1 hour and routine order is delivered by 1 round per day.

NARCOTICS DRUGS

They are kept in double lock and key system. Documentation of narcotic drugs is appropriately maintained.

Narcotics drugs under statutory regulation being used in max hospitals includes: injection and transdermal patch of Fentanyl and injection and tab. of Morphine.

LOOK ALIKE AND SOUND ALIKE DRUGS

Look alike and sound alike medications have high medication error due to similarities in nomenclature and packaging.

In the main pharmacy stores, (SALA Medications) are stored separately in 2 adjacent racks with blue coloured sound alike and pink coloured look alike medications warning stickers to avoid confusion while dispensing.

Medication Recall: If a drug is found to be defective, it is reported to the Okhla office where the records for that particular series of drugs dispensed is checked and verified for medication recall.

Licences acquired by Max hospital pharmacy -

- 1) Pharmacist License
- 2) Narcotics License

INVENTORY MANAGEMENT PARAMETERS

- I. ABC Class
 - A Items: 7 days
 - B Items: 10 days
 - C Items: 15 days
 - II. EOQ - (economic order quantity)
 - III. LEAD TIME – Time from ordering to delivery of drugs
 - IV. VED – Vital Essential Desirable (According To move of drugs)
-

CALL CENTRE

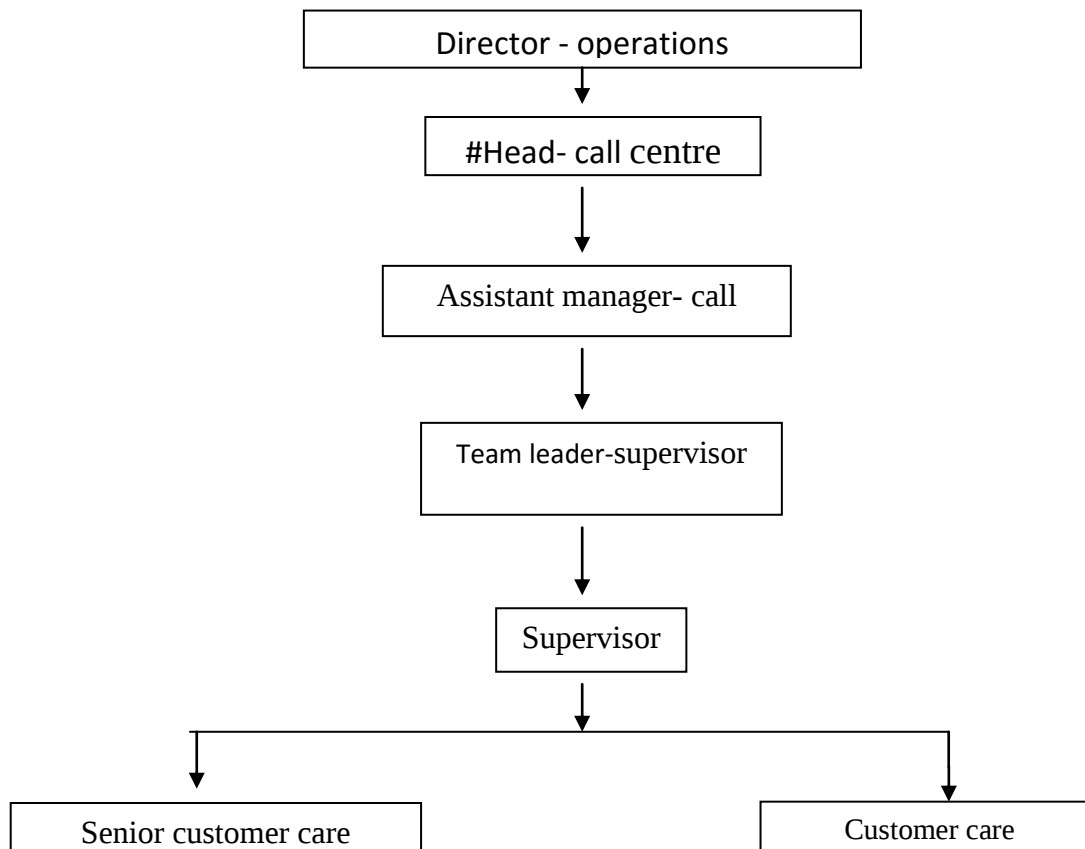
Call centre of Max hospital, Saket operates at 24*7. It is centralized patient contact centre for saket. It can be used as an information centre for all customers.

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
- It handles internal emergency e.g. Blue code

Main board line number is: 26515050

Organization chart:



SECURITY DEPARTMENT

The security department is an eye and ear of every organization acting as a liaison between management and staff. The control room of Security Department is located on B1 (basement) of East Wing, Max Saket.

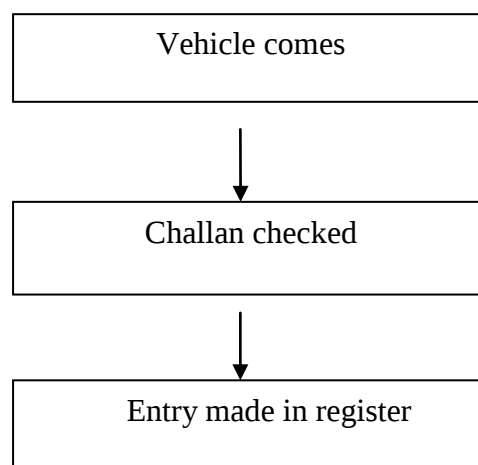
Functions of Security Department:-

1. Security management:-

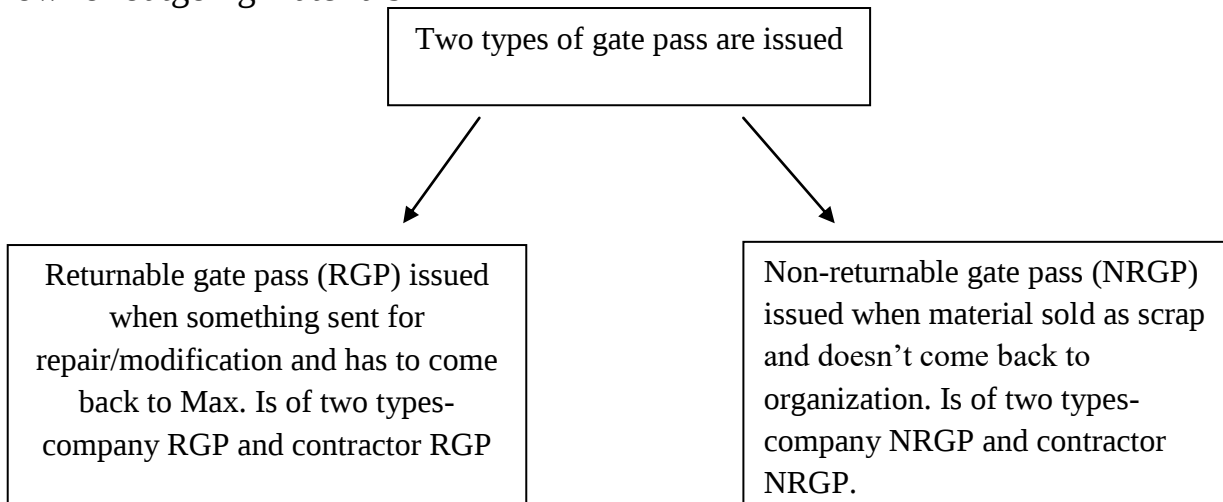
- Selection of people(guards and supervisors)
- Deploying of security staff to different floors and departments
- Checking of people entering hospital
- Turnout and grooming of security staff
- Training of security staff
- MLC handling
- Dispute handling

2. Material management:-It includes management of both incoming and outgoing materials.

a. Flow for incoming materials:-The incoming materials are received either from a company or a contractor to Max. The process flow is as under:-



b. Flow for outgoing materials



3. Disaster management:-

There are six emergency codes:-

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

The SOP's and disaster management plans are prepared by the Security Department. Fire management system includes smoke detectors, sprinklers fitted on ceiling and fire shafts in all corridors.

Walkie talkies are an important source of communication.

Other disasters include floods, water logging, terrorist attacks.

4. Valet management:-

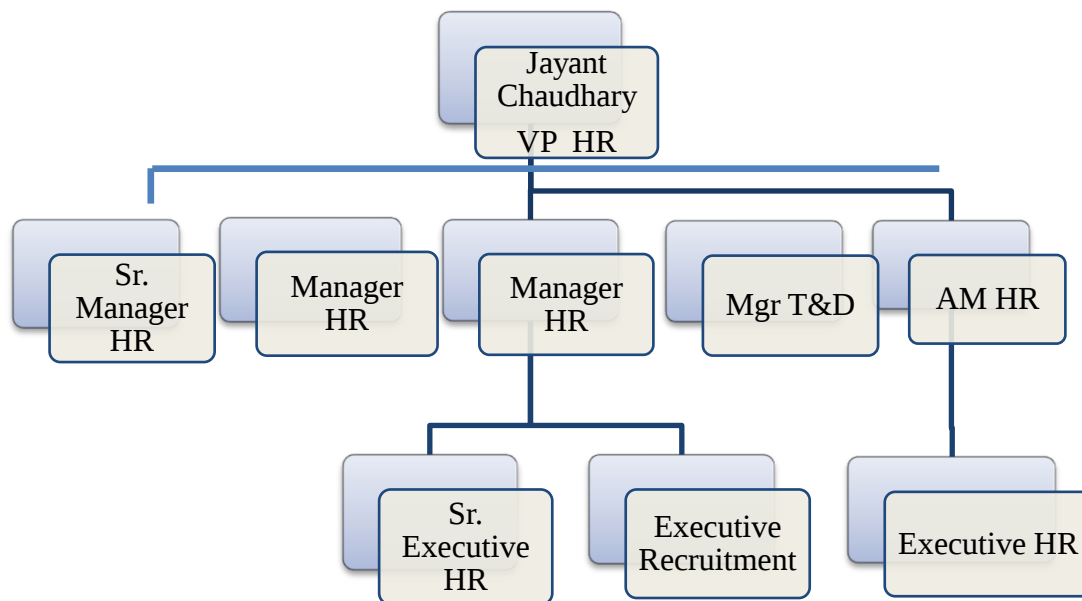
- Helps to optimally utilize the parking space.
- Within a time frame of maximum 7 minutes, vehicle is handed over to customer when asked for in porch.

HUMAN RESOURCE MANAGEMENT

Human resource management (HRM or simply HR) is a function in designed to maximize employee performance in service of their employer's strategic objectives. HR is primarily concerned with how people are managed within 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 & Grievances Redressal Policy.
- Disciplinary Policy.
- Medical Discount Policy.
- Annual Medical Check-up Policy.
- Clinical credentialing and privileging Policy.
- Nursing Credentialing and Privileging Policy.



INTERNATIONAL PATIENT SERVICES (IPS) DEPARTMENT

It takes a lot to be a world-class health care services provider and as per patient registration data, over 11 Lakh overseas patients have been helped to get back to their normal lifestyle. This department, situated in East wing, is exclusively dedicated for the services of international patients.

Contact Procedure:

- Patient sends a query and/or reports
- IPS Team consults the relevant consultant and provides diagnosis, proposed treatment and estimate
- If required, a telephonic meeting may also be arranged
- Patient confirms if he wants to have treatment at Max Healthcare to provide Visa Facilitation Letter
- Patient confirms the arrival date and time
- IPS Team, in the meantime, books room, OT etc. for the patient

- Patient is received at the Airport and then, brought to the Hospital/Guest House/Hotel

Also, another contact procedure is as follows:

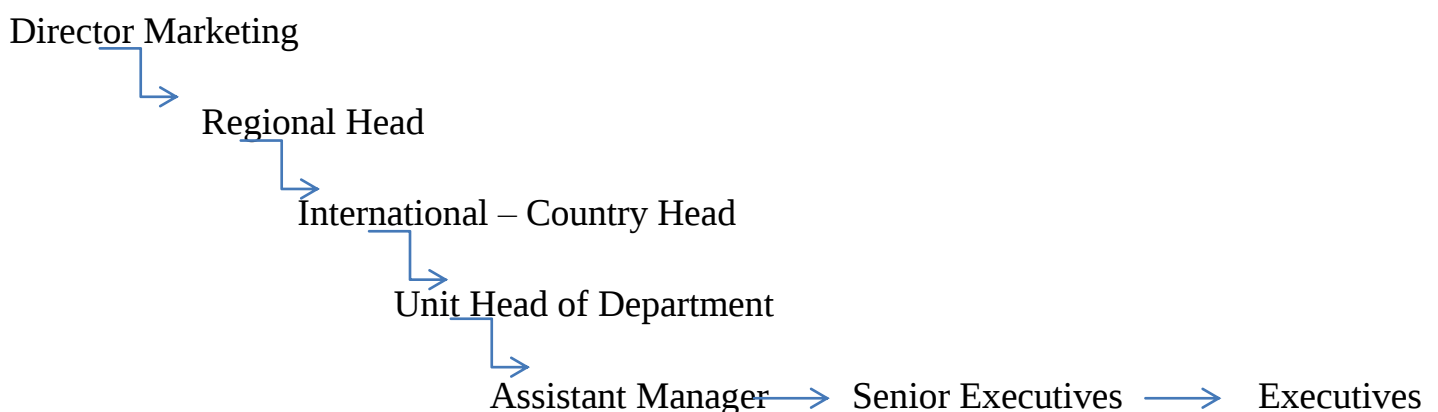
- Max hospital conducts free outreach OPDs in other countries, at least 1-2 per year
- Max hospital also has tie ups with different hospitals in these countries

International patients avail treatment in India mainly because these facilities or treatments are not available in their respective countries, and are available at a much cheaper price in India than other countries such as US, UK or European countries. The countries from where patients come to seek treatment most commonly are Iraq, African countries (Nigeria, Congo), Oman, Uzbekistan, Afghanistan, Nepal, and Bangladesh.

The hospital provides:

- Various Regional Translators such as Arabic, Persian, Iraqi, Bangladeshi and Russian (In house interpreter).
- Assistance in ground transportation such as finding a shuttle, hiring a car or choosing any other mode of transportation within the city.
- Relationship Managers, who closely work with over 50 Diplomatic Missions and numerous Expat bodies to ensure that international patients have a comfortable and memorable stay in India.

Staffing:



**PROCESS FLOW MAPPING AND IDENTIFICATION OF
BOTTLENECKS IN ONCOLOGY DAYCARE**

AT

MAX SUPERSPECIALITY HOSPITAL, SAKET

FIGURE DETAILS OF THE PROJECT

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2	TABLE 1.1 PRECHEMO DELAY
3	TABLE 1.2 CHEMO ADMINISTRATION DELAY
4	TABLE 1.3 DISCHARGE DELAY
5	TABLE 2.0 INSIDE/OUTSIDE AREAS OF PRESSURE SORES FROM JAN-APRIL'16
6	TABLE 2.1 INTERDEPARTMENTAL DISTRIBUTION OF PRESSURE SORES IN JAN'16
7	TABLE 2.2 INTERDEPARTMENTAL DISTRIBUTION OF PRESSURE SORES IN FEB'16
8	TABLE 2.3 INTERDEPARTMENTAL DISTRIBUTION OF PRESSURE SORES IN MARCH'16
9	TABLE 2.4 INTERDEPARTMENTAL DISTRIBUTION OF PRESSURE SORES IN APRIL'16
10	TABLE 2.5 DISCHARGE STATUS OF PATIENTS FROM JAN-APRIL'16
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I3	FIGURE 2.3 PERCENTAGE DISTRIBUTION OF AREAS DEVELOPING PRESSURE SORES IN OMICU FOR MARCH '16
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15	FIGURE 2.5 PERCENTAGE DISTRIBUTION OF AREAS DEVELOPING PRESSURE SORES IN 3 RD FLOOR FOR MARCH'16
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INTRODUCTION

Need for study

Cancer, a term that elicits a shock in the nerve endings of every individual touches every country in the world. Cancer is one of the commonest diseases affecting around 10 million new cases per year worldwide. In India, cancer prevalence is estimated to be around 2.5 million, with 8,00,000 new cases and 5,50,000 deaths per year¹. Cancer is the second leading cause of death and disability around the world. More number of people die of cancer than from all cases of AIDS, tuberculosis and malaria put together. According to World Cancer Report, there is a high incidence rate of cancer throughout the world and it may reach about 20 million by 2030 (WHO, 2008). More than half of new cancer patients and two-thirds of cancer-related deaths now occur in developing countries. Cancer has become one of the major causes of death in India. Every year, about 0.4 million deaths occur in India due to cancer (Government of India, 2010), it is estimated that nearly one million new cases of cancers will be diagnosed by 2017 and nearly 0.67 million people are expected to die. Cancers of oral and lungs in males, and cervix and breast in females account for over 50% of all cancer deaths in India (Government of India, 2005). Most cases of cancers are detected only in the advanced stages, when they are untreatable. With an estimated incidence rate of eight lakh new cases every year and prevalence of 2.4 million cases, the cancer treatment market needs attention.

With the Rs-10 billion Indian oncology market expected to grow at a rate of 21 per cent for the coming five years, a slew of standalone and dedicated oncology setups within hospitals are in the pipeline to cater for 2.5 million cancer patients. The growing number of patients seeking treatment for cancer has made hospitals realise that cancer treatment is an important area for growth. Today there is more awareness about cancer and people are willing to go to recognised centres for cancer treatment. People, particularly in urban India are recognising the fact that cancer patients can lead a normal life, just like with any other chronic disease. Hence more and more people are willing to undergo therapy, which is a positive trend.

Cashing in on this growth trend, multispecialty hospitals are investing in cancer care and even standalone cancer care hospitals are being set up. The Indian oncology treatment market is thus estimated to be in excess of Rs 10 billion and is expected to grow at a rate of 21 per cent for the coming five years. Traditionally surgery and radiation have been the cornerstones of cancer treatment. However, now almost all patients (solid and haematolymphoid cancers) will at some point require chemotherapy - in addition to conventional surgery and radiation. All the three modalities will contribute to growth of the cancer treatment market in the Indian healthcare industry.

Cancer chemotherapy is the corner stone of cancer treatment in the domain of medical oncology which can prolong the life of cancer patient .Chemotherapy is one of the many weapons that injure the enemy of cancer cells and sometimes it is so potent that the cancer completely retreats².More than half of all people diagnosed with cancer receive chemotherapy which helps treat their cancer effectively, enabling them to enjoy full productive lives³. Majority of cancer chemotherapy is given on an out-patient basis⁶.

INTRODUCTION TO THE DEPARTMENT OF ONCOLOGY

Oncology is one of the most important specialty of Max Super-Specialty Hospital, Saket. Max Cancer Centre has comprehensive cancer services at 4 centres across Delhi NCR(Saket, Shalimar Bagh, Patparganj, Vaishali) and 3 centres outside Delhi (Mohali, Bhatinda, Dehradun) with dedicated services in fields of oncology including surgical, radiation and medical oncology.

The department is equipped with state-of-the-art equipments and instruments to carry all diagnostic procedures and full range of surgeries and provide excellent preoperative, operative and postoperative care. The Chairman is responsible for holding the group together and delegating responsibilities to the various members to ensure seamless delivery of high class services.

Medical Oncology unit will deliver state of the art treatment for cancer for both adults and children. The unit will offer the highest international standards of care in a supportive environment, also providing the support including all the ancillary care required by patients and their families.

Mission

The mission of Medical Oncology department is to provide the highest quality of medical care to our patients; offering the most appropriate and current diagnostic and therapeutic modalities in an honest, supportive, respectful and compassionate manner.

Vision

To provide excellent, evidence-based care for each patient we serve, while advancing cancer care for tomorrow.

Goals of the department

The main Goal of the department is to prevent and cure cancer.

Scope of Services

Multidisciplinary meetings (Tumour Board Meetings) will be held to decide on the appropriate course of treatment for every patient diagnosed with cancer,if decided upon for chemotherapy,then

Chemotherapy: Chemotherapy is the use of anti-cancer (cytotoxic) drugs to destroy cancer cells (including leukemia, lymphoma and myeloma). There are over 50 different chemotherapy drugs. Some are given on their own but often several drugs are given together. The type of chemotherapy given will depend on the type and stage of cancer. Chemotherapy may be used alone to treat some types of cancer. It may also be used with other types of treatment such as surgery, radiotherapy, hormonal therapy, biological therapies, or a combination of these.

Services of department distributed as follows:

Private OPD:

All consultants are available in Private OPD each day except Sunday. A dedicated treatment room is available near OPD for dressing minor procedure of all outdoor patients from 9.00 a.m. to 7.00 p.m.

Casualty:

There is a duty roster for attending patient in casualty. The medical oncology emergency number is a 24x7 number (9560588860). Junior resident informs the consultants after seeing the patient and takes necessary guidance.

Inpatient Services:

A patient is admitted to medical oncology unit in Max Cancer Centre in daycare or ward area.

Day Care Services

The number of beds are 25 including both beds and recliners. There is a team of nurses with a team leader. Other ancillary staff is available round the clock like GDAs etc. The rooms are well lit with a pleasant atmosphere. A chamber for preparation of drugs with laminar flow/hood where protective wears for staff like goggles, masks are provided. A clinical pharmacist prepares the chemotherapy drug. Nurses are responsible for administering drug. A dedicated junior resident is present in daycare.

There is oxygen flow / resuscitation facilities on at least 2 beds with easy Anesthetist availability; OT Anesthetist available on call for 24 hrs. An onco-psychologist and dietician is available in the daycare during working hours. Pain care consultant is also available.

Dedicated Oncology/Wards

- A. Dedicated Oncology wards are available on 4th floor and 3rd floor with oncology trained Nurses
- B. Treating/Neutropenic patients - Isolation room is provided for these patients with facility for senior nursing

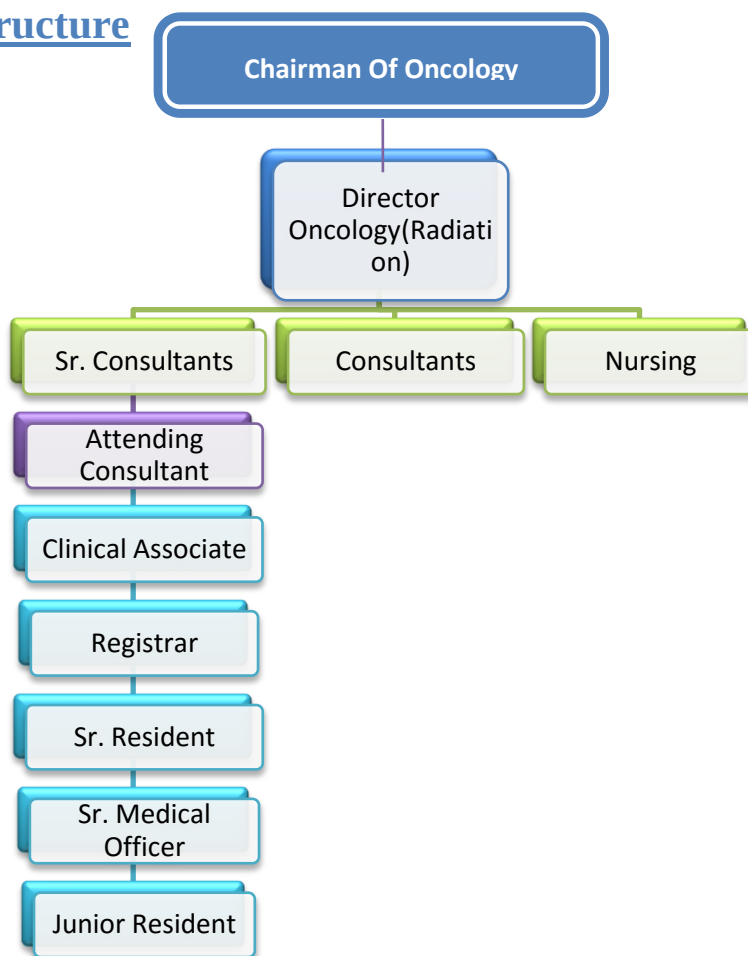
ICU

Separate oncology ICUs one each for surgical and medical patients with isolation room is available for critical patients requiring admission to ICU

Referral:

Various patients admitted under other specialties may require Chemotherapy where consultation is available round the clock.

Organizational structure



Human Resources

S. No.	Manpower	Strength
1.	Chairman Oncology	1
2.	Directors	2
3.	Sr. Consultant/Consultant	8/11
4.	Associate/ Attending Consultant	3/5
5.	Clinical Associate	2
6.	Registrar	1
7.	Senior Resident (<i>Including DNB students</i>)	11
8.	Sr. Medical Officer	1

9.	Junior Resident (<i>Including DNB students</i>)	14
10.	Nurse Practitioners	5
11.	Nurse	65

General principles

Principles of chemotherapy

1. The first and most crucial decision is whether active specific anti-cancer treatment (surgery, chemotherapy, targeted therapy or radiotherapy) is appropriate or not. Factors involved in this decision will include performance status and the patient's own wishes. Patients will also receive palliative/supportive care alongside active treatment, or palliative/supportive care alone where appropriate
2. If active treatment is appropriate, then the next decision is whether this should be given with curative intent or for palliation. This is discussed at a tumour board reviewing histology and imaging; staging each patient, this will determine the type, intensity, and duration of treatment.
3. Most patients referred to the Unit have disease which is clearly inoperable, but there are exceptions. A key early decision, therefore, is to consider whether there is a possibility that surgery might be appropriate. The decision whether to make a surgical referral can be a difficult one and must be made at consultant or senior registrar level in consultation with radiology colleagues at the MDM.
4. Where chemotherapy, targeted therapies or radiotherapy is appropriate, the intensity, type and duration of treatment depends on performance status, extent of disease and associated co morbidity. Details of investigations and pre-treatments are contained in individual protocols and these should be checked carefully for each patient on treatment. **All patients for chemotherapy, targeted therapy and radiotherapy must sign a consent form after reading and having time to ask questions relating to appropriate written and verbal information.**
5. Patients receiving anti cancer treatment who have progressive disease should discontinue therapy. Standard practice is to assess chemotherapy response using CT after every 1-3 cycles of chemotherapy and at 6 weekly intervals while on treatment.
6. Treatment should also be discontinued if the toxicity is proving unacceptable, even if there is no evidence of progressive disease.

Quality Indicators

The following Quality Indicators are being followed in Department of Oncology. The data are collected on a monthly basis and are submitted to Medical Quality Department:

- Patient Falls
- Nosocomial Infection
- Phlebitis
- Medication Error
- Near Miss
- Needle Stick Injury
- Hypoglycemia(Less Than 70mg/dl)
- Adverse Drug Reaction
- Blood Transfusion related error
- Notifiable Disease
- Sentinel Events
- Mortality

Chemotherapy Daycare Centre

INTRODUCTION

Daycare Services

These are surgical procedures where patients do not need overnight admission and can go home the same day. The advance in surgical techniques, anesthesiology and pain relief are important contributing factors in increasing the popularity of day care surgeries.

Fully-equipped Operation Theatres, latest gadgets and trained personnel ensure optimum patient safety and satisfaction. Latest technology such as key-hole surgery along with excellent post-operative care and effective pain relief enable the patients to recover in just few hours.

Therapeutic & Palliative Procedures

- A number of therapeutic procedures like chemotherapy for cancer patients are performed in day care centre where overnight admission is not needed. Here, the patients just walk in, have their treatments done and walk out.

Advantages of Daycare Centre

Complete infrastructure with latest gadgets

- Expertise of eminent Consultants

- Competent and dedicated Technicians and Nurses
- No overnight stay
- Faster recovery
- Minimal or no disruption to regular routine.
- Economic advantages

LOCATION OF DAYCARE

Chemotherapy Day Care is the area where chemotherapy treatment takes place, and is located on the first floor of EAST WING OF MAX SUPERSPECIALITY SAKET. . The chemotherapy treatment chairs and beds surround an open plan lounge area, which is designed to provide a relaxing environment for patients and relatives. Patients are encouraged to bring a relative or friend to stay with them during their treatment. The Daycare in Max Saket is functional from 08:00 to 20:00 Monday to Saturday

RATIONALE

Onco Day Care centre is an important part of treatment of cancer patients. This study will help to understand the process flow, identify the delays and levels of utilization of onco day care. In order to maximize the utilization of day care, it is essential to know the process flow and understand the reasons leading to its underutilization. The study also focuses on identifying of bottlenecks in the current process with appropriate suggestions for improvement.

RESEARCH QUESTION

- a) What is the current process flow in the Onco day care centre of Max superspeciality saket?
- b) Are there any bottlenecks leading to delays in the current process?
- c) If there are bottlenecks what are the causes of these delays in the current process flow?
- d) What can be the possible solutions to improve the process flow?

OBJECTIVES

1. To observe and analyze the process flow of Oncology Day Care Centre followed at Max Super Specialty Hospital, Saket.
2. To search for areas of problem and find reasons for the same.

3. To give recommendations for further improvement in the process flow and minimize the patient waiting time.

REVIEW OF LITERATURE

A thorough literature review focusing on prior researches related to the topic of the study gives a strong foundation on which to base knowledge thus the survey of literature is one of the vital parts of any research endeavor⁷.

The investigator has organized the related literature under the following headings after reviewing various research studies and non research literature.

A Study on Improvement of chemotherapy patient flow and scheduling in an outpatient oncology clinic*

Bohui Lianga, Ayten Turkcana[†], Mehmet Erkan Ceyhanb, Keith Stuartb a Department of Mechanical and Industrial Engineering, Northeastern University, Boston, MA 02115 b Lahey Hospital and Medical Center, Burlington, MA 01805

A discrete event simulation model was developed by Department of Mechanical and Industrial Engineering, Northeastern University, Boston, MA 02115 b Lahey Hospital and Medical Center, Burlington, MA 01805 ,to model the complex flow of chemotherapy patients in oncology clinics. The model considered multiple patient classes with varying routings and resource requirements, unpunctual arrivals, uncertainties in service and treatment durations, addons, and cancellations. The model was used to evaluate the performance of a real clinic and to test alternative operational decisions to improve system performance. Earlier simulation studies, which proposed changing the arrival rates to have a smoother workload, did not develop any scheduling method to find a schedule that considers the dependencies between oncologist and chemotherapy appointments. Lahey Hospital developed an optimization model to determine a coordinated appointment schedule for oncology and infusion clinics. The proposed scheduling method determined the number of oncologist and chemotherapy appointments with the objective of minimizing the deviation between low and high utilization time slots. The impact of the proposed scheduling method was tested using the simulation model that incorporated several uncertainties of a real clinic environment.

A study on Chemotherapy production: Reducing patient waiting times and increasing efficiency

Provided by: Taunton and Somerset NHS Foundation Trust

Chemotherapy production: A proven study on reducing patient waiting times and increasing efficiency
P Musgrove Park Hospital has a 14-bed oncology ward, a 12-bed haematology ward and a chemotherapy day unit with 19 chairs. The hospital provides these services to a population of more than 500,000 people. Around

5500 anticancer treatments are given within the trust each year, one third of which are given to haematology patients and two thirds to oncology patients. Patients are generally pre-assessed on set clinic days (for example patients with breast cancer are seen on a Tuesday and those with gastrointestinal cancers on a Wednesday), meaning that vial sharing can be used for certain high-cost agents. Dosebanding and dose-rounding are used, both through the Mosaiq integrated oncology information and electronic prescribing system. Electronic systems were introduced to help manage patient information, prescribing of medicines and clinical booking. Pre-filled bags and syringes are outsourced for a number of routinely used agents.

Chemotherapy services were evaluated using common lean change management techniques such as process mapping, to identify areas of inefficiency following introduction of electronic prescribing and clinical booking. This required stakeholder involvement and agreement from those affected by the changes. Potential solutions were trialled and successful solutions were implemented.

This improved process resulted in:

1. a 29% reduction in staff resources required to deliver the service
2. approximately 90% reduction in the number of patients experiencing waits of more than 1 hour on the day of drug administration
3. the ability to capacity plan for further expansion of the service by multiplying staffing levels and production run times
4. please note that realising similar benefits will depend on the current service model and scale of activities.

METHODOLOGY

The study would involve two elements

1. Study of the process flow of the department and analysis of the gaps in the current process
2. A dashboard created to capture the delays if any, that lead to the increase in patient waiting time in the Department

Study Design: Descriptive cross-sectional

Sampling: A Convenience Non-Probability Sampling technique would be followed.

Sample Size: 145

Study location: Oncology Daycare First Floor, Max Super Speciality Hospital, Saket, New Delhi

Duration of Study - 4 weeks

Inclusion Criteria: All the patients coming to Oncology Day Care for chemotherapy at Max Saket Hospital(including morning and afternoon patients) during the course of the study.

Exclusion criteria:

- Patients going for radiation prior to chemo treatment

Data Collection:

Type of Data – Quantitative(2weeks) & Qualitative(1 week)

Technique – Direct Observation of Operations and collection of primary and secondary data.

Tool – Observation, stakeholder interviews, dashboard

Source of Data

The process flow analysis would be done by garnering information from three main sources

- Interviews with the stakeholders
 - ✓ Doctors
 - ✓ Oncology Daycare Staff (daycare pharmacists, daycare coordinators, front office coordinators, bed managers and the program manager)
 - ✓ Nurses
- Departmental Manuals (Standard operating protocols, ISO manuals and the NABH manual)
- Shadowing the stakeholders and tracking all the processes involved.

a.Primary Data

- Will be collected by covering all the touch points of the patient starting from preparation of planned patients list made by coordinators, entry of patient into the day care, registration at the ipd, entry of patient details and allotment of bed/recliner into the hospital information system, admission of patient, entry into the day care, treatment and then following the patient till discharge and exit from the centre

b.Secondary Data

- Daycare Department Staff (Interviewing the stakeholders)
- Standard operating manuals/ NABH Manuals

Dashboard:

A prestructured dashboard was formulated to capture the delays in the chemotherapy administration process in the daycare. The dashboard is formulated to capture the waiting time of the patients coming for chemotherapy treatment in the Daycare. The waiting time was analyzed on the basis of recording the following timings like-

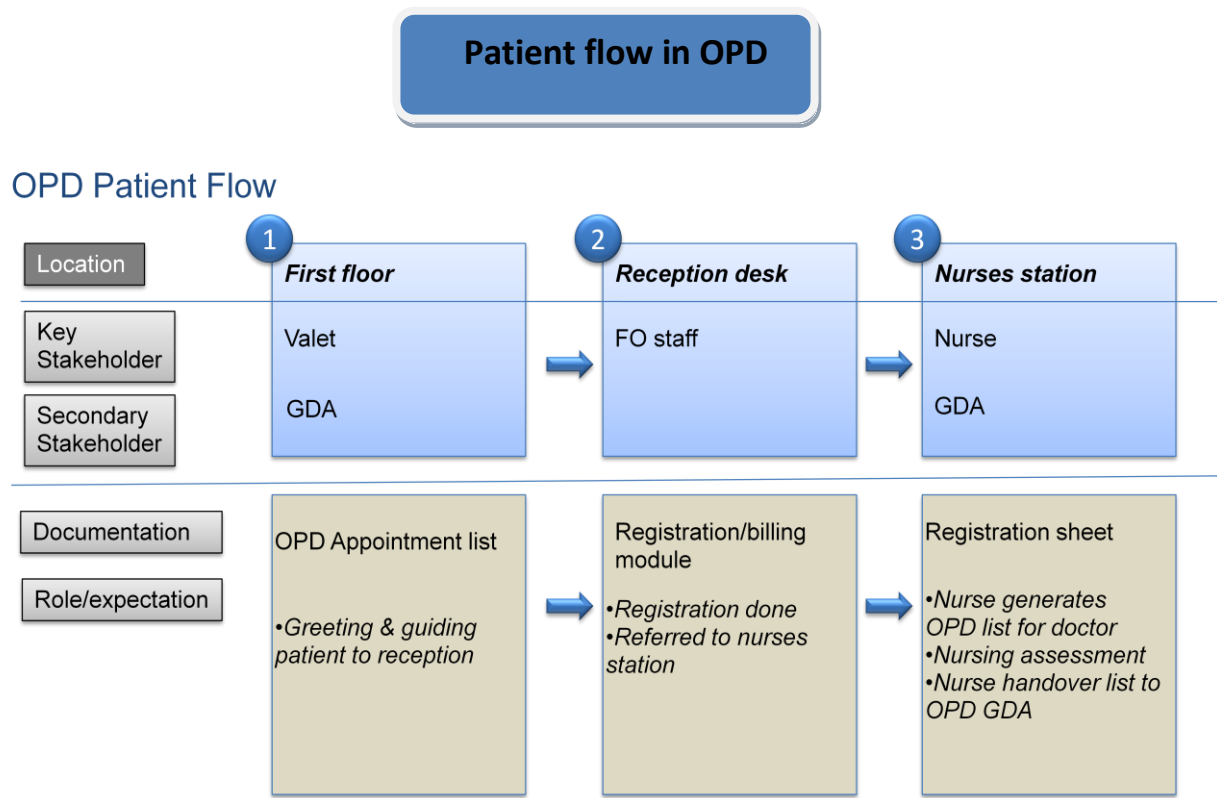
- a) Admission delay (OPD waiting time).
 - b) Prechemo delay (Start of prechemo waiting time).
 - c) Chemo Administration delay (Start of chemo waiting time)
 - d) Discharge delay (Postchemo stop to discharge waiting time)
- **Data entry**- Manually
 - **Data Analysis**- Using bar charts, pie charts

MAPPING OF THE PROCESSES IN DAYCARE

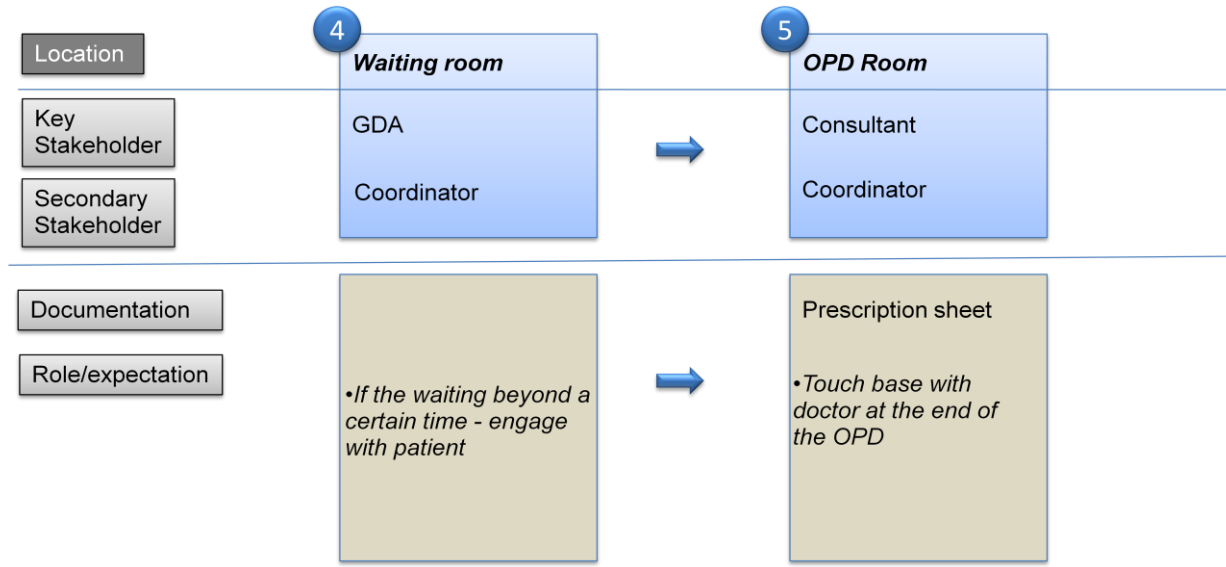
Mapping of the Processes

The mappings of the processes involved in this department were done mainly by three methods;

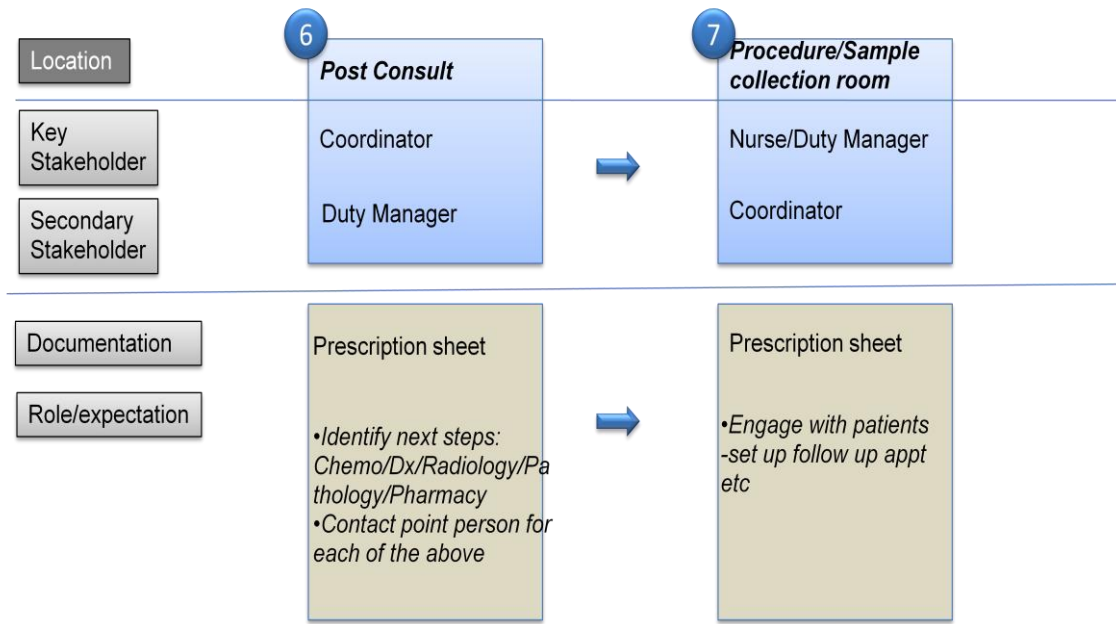
- ✓ Interviews with the stakeholders (Doctors, Daycare pharmacist, Front office staff, Daycare coordinators, Daycare Staff, Daycare Nurses)
- ✓ Studying of the Departmental Manuals (Standard operating protocols, ISO manuals and the NABH manual)
- ✓ Shadowing the stakeholders and tracking all the processes involved.



OPD Patient Flow



OPD Patient Flow

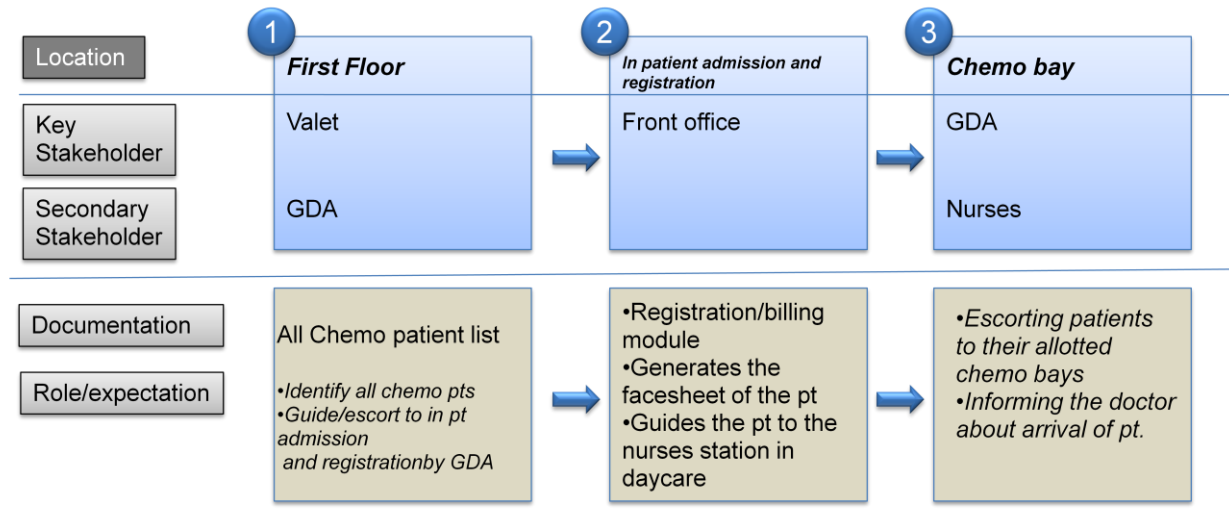


CONCERNS OF FRONT OFFICE

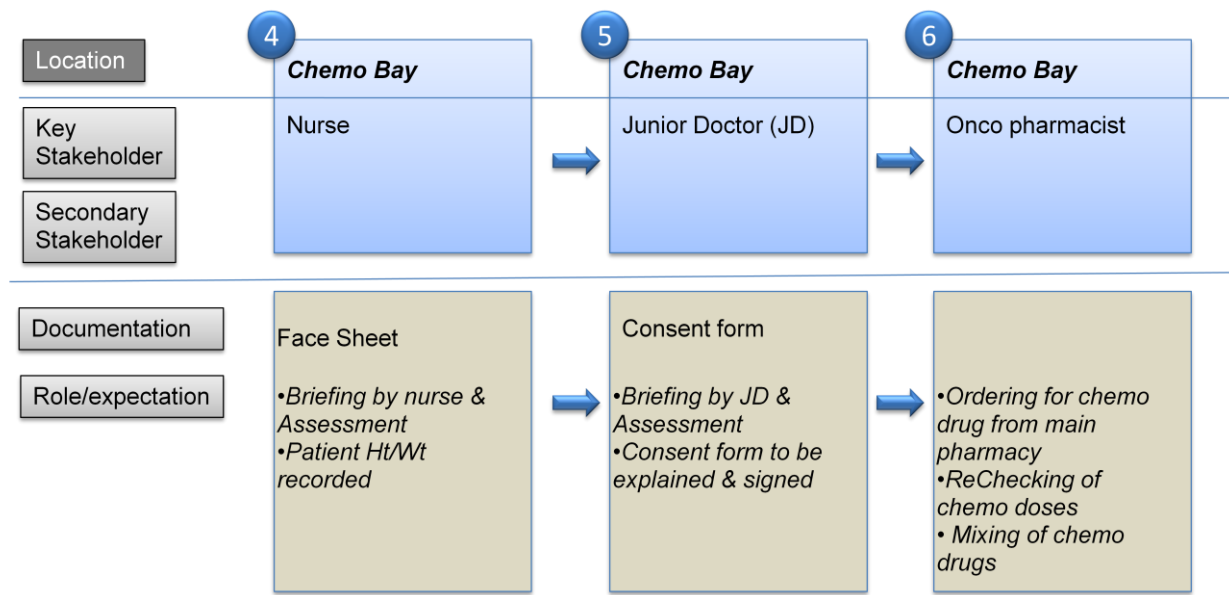
- Too many patients lining up for chemotherapy in the morning.
- Non staggering of the patient list handed over by the day care coordinators.
- Dealing with patient concerns for choice of bed/recliner
- Working in coordination with the TPA
- Planning for unplanned patients
- Blocking of OPDs for doctors
- Concerns of patients regarding long waiting hours

Patient flow in daycare

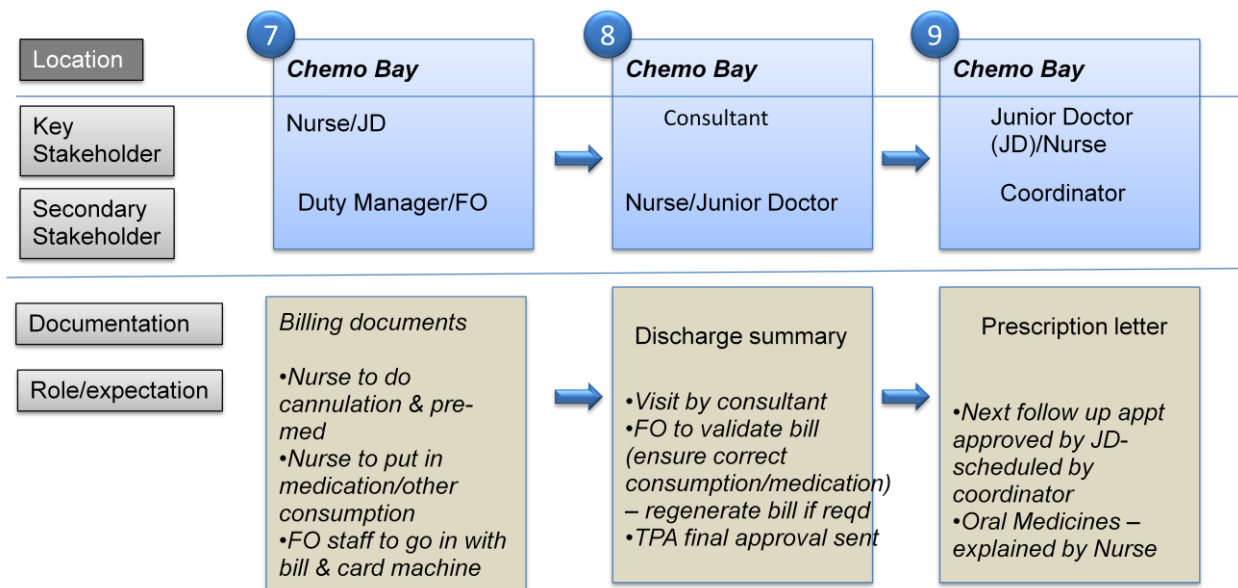
Chemo Patient Flow



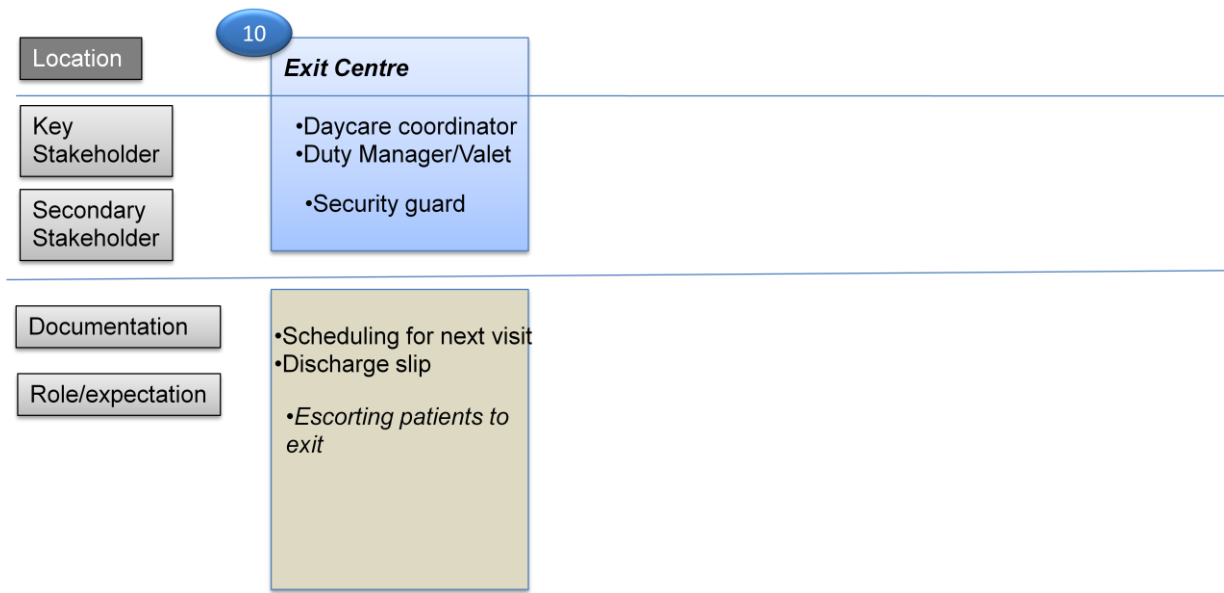
Chemo Patient Flow



Chemo Patient Flow



Chemo Patient Flow



Concerns of daycare

- The timings of daycare on the board not updated.
- Concerns regarding long waiting hours for patient before start of treatment.
- Concerns of pharmacy regarding arranging drugs for unplanned patients.
- Concens regarding junior doctors to reach out to the senior consultant.
- Nurses attending too many patients.
- Delays in discharge formalities of patients.

PROCESS FLOW OF PATIENTS IN THE ONCOLOGY DAY CARE

IN patient process flow-Registration and admission

Patient facing staff:

- a. Front desk coordinator-registration and admission of the patient including collection of all mandatory insurance, other corporate policies records and tpa records.

Back end staff

- b. Day care coordinator-planning of day care patient list one day prior and forwarding it to the doctors, pharmacists, bed manager and the front office staff.
- c. Bed manager-plans on allocation of beds and recliners for the day care.

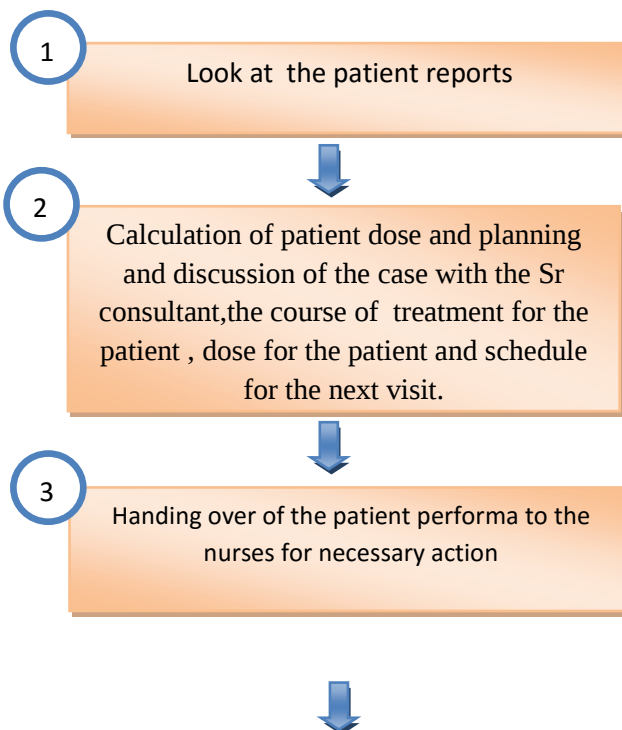
TPA-Pre approval from the insurance company

Day care process flow

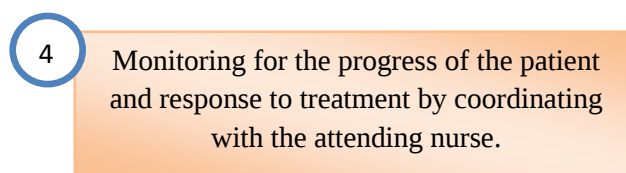
Patient facing staff:

1. Doctors-

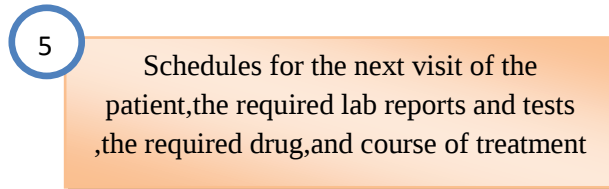
1) Pretreatment phase



2) Treatment phase

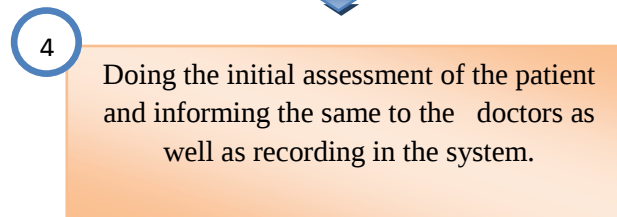
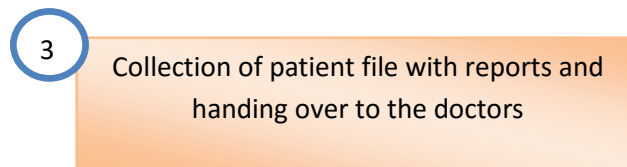
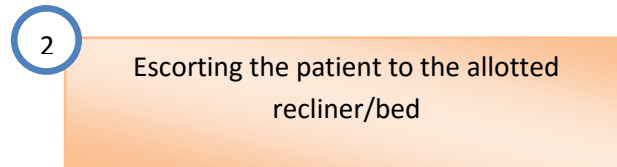
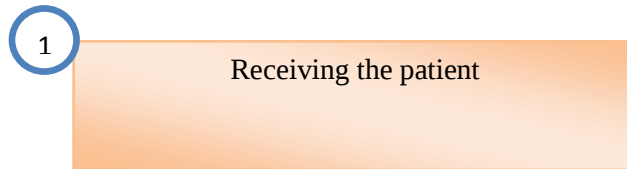


3)Posttreatment phase

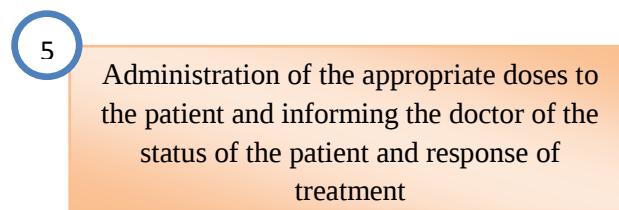


B)Nurses-

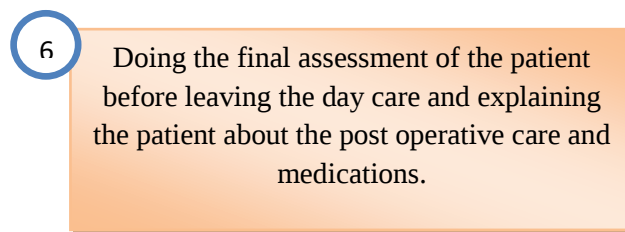
1)Pretreatment phase



2)Treatment phase

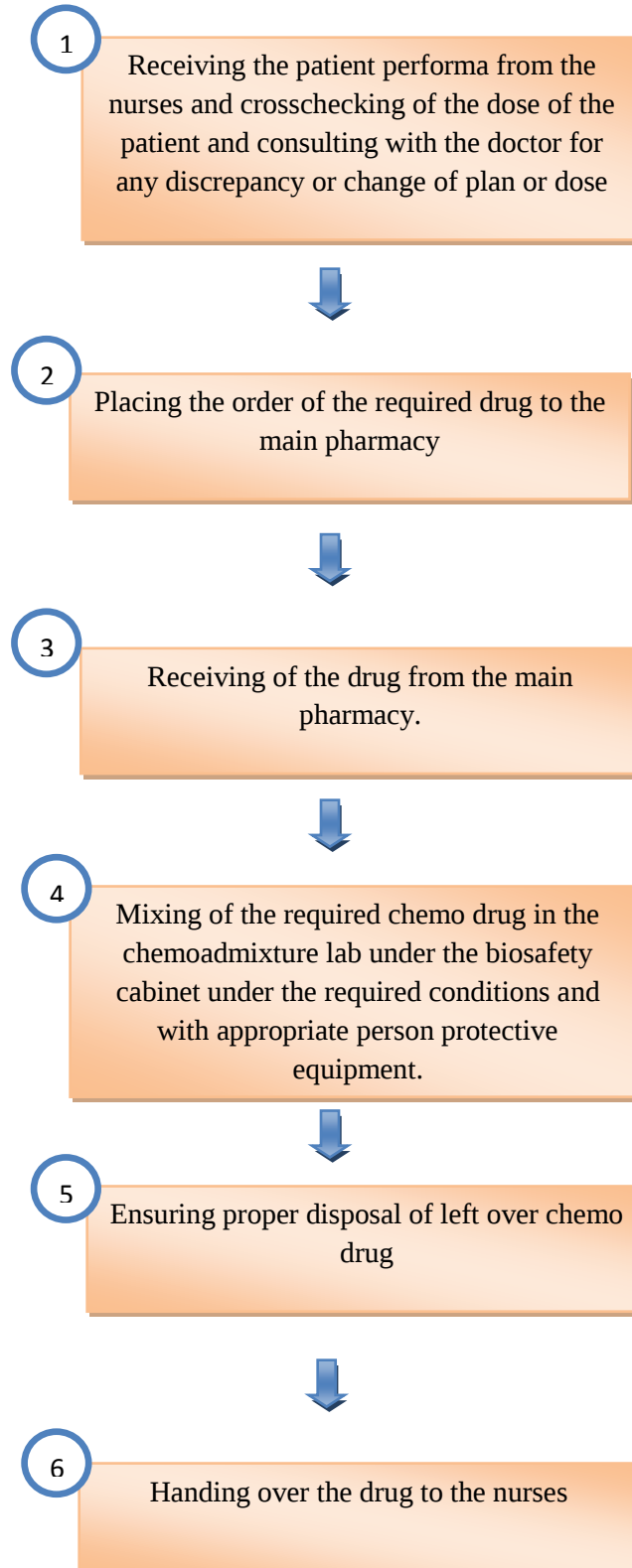


3)Posttreatment phase



Backend staff in day care

1)Daycare Onco Pharmacist-



2)GDA

Getting the patient files from the mrd and delivering them back,changing of patient dresses and linen,escorting of the vulnerable patients and patients on wheelchairs into and if required escorting them for tests,transporting the used laundry to the housekeeping,handing over of samples of patients,collection of patient reports,receiving of the sterilized equipments from the cssd.

3)Housekeeping

Cleaning and mopping of day care.Ensuring that the toilets are functional and ready to use.

4)Food and beverage

Ensuring supply of eatables and drinks to the patient and attendants as and when ordered.

5)Others

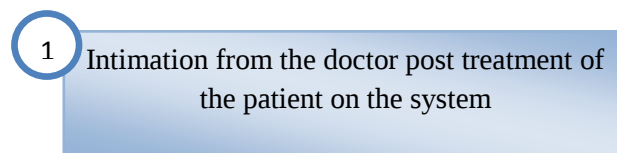
Dietician and referrals as and when ordered by the attending consultant.

Discharge process flow

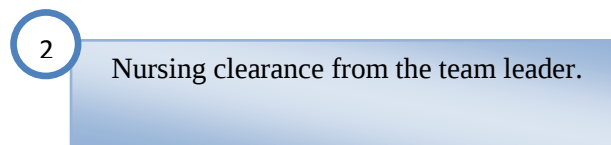
A)Day care

Patient facing staff

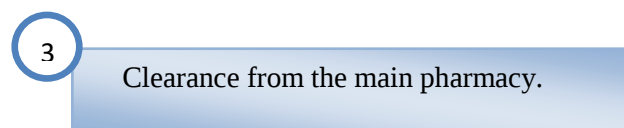
1)Doctors-



2)Nurses-



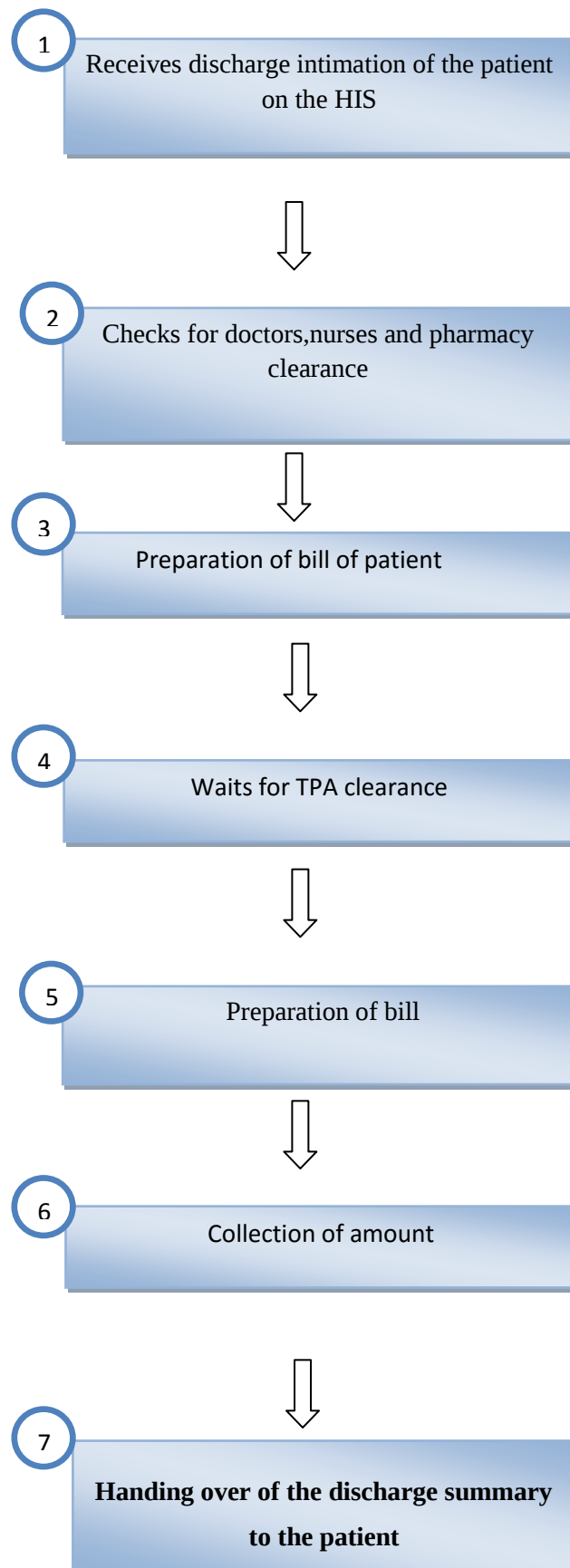
3)Pharmacy



B)In patient admission and discharge

Patient facing staff

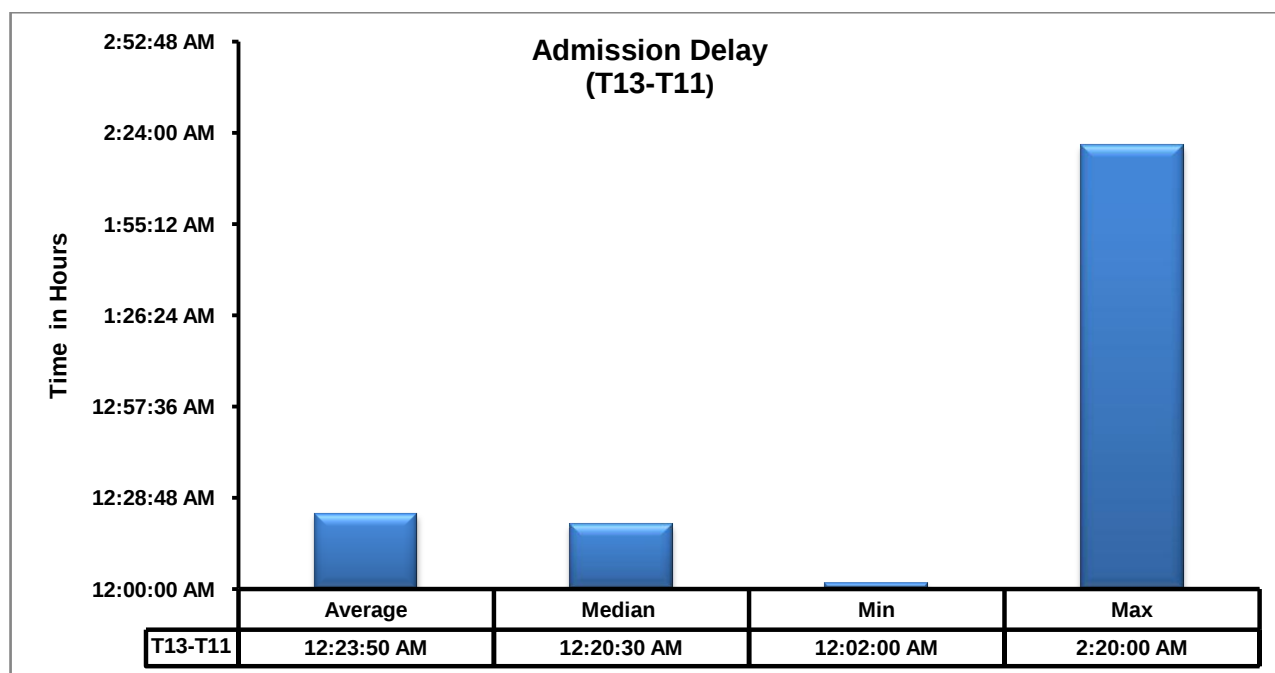
1)Front end coordinator



DATA ANALYSIS

TABLE 1.0 ADMISSION DELAY

<u>AVERAGE</u>	<u>MEDIAN</u>	<u>MIN</u>	<u>MAX</u>
00:23:50	00:20:30	00:02:00	02:20:00



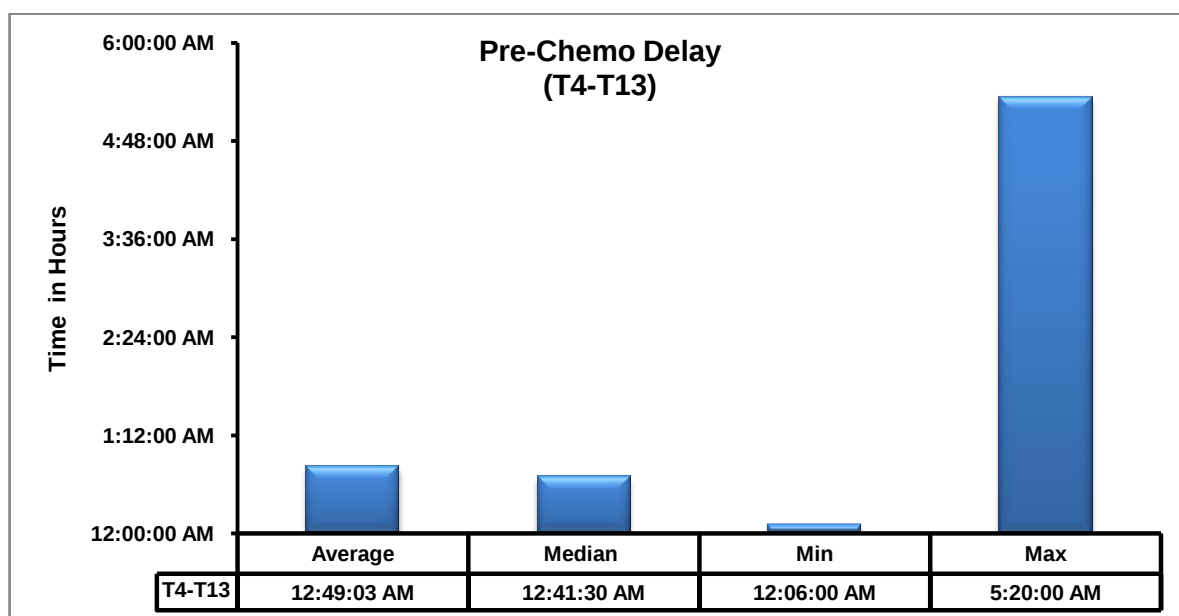
The above graph explains the average, median, minimum and maximum waiting timing of the patients for admission and registration to the daycare. It was calculated by subtracting from the daycare entry timing of the patient, the entry of the patient in the opd. It measures the admission delay timing.

Out of a sample of 145 patients studied,

- Average time for admission delay was 23 mins which is decent
- The median admission delay timing was 20 mins.
- The minimum waiting time for admission was 2 mins
- The maximum waiting time for admission was 2 hours 20 mins which is definitely a concern for the daycare.

TABLE 1.2 PRECHEMO DELAY

<u>AVERAGE</u>	<u>MEDIAN</u>	<u>MIN</u>	<u>MAX</u>
00:49:03	00:41:30	00:06:00	05:20:00



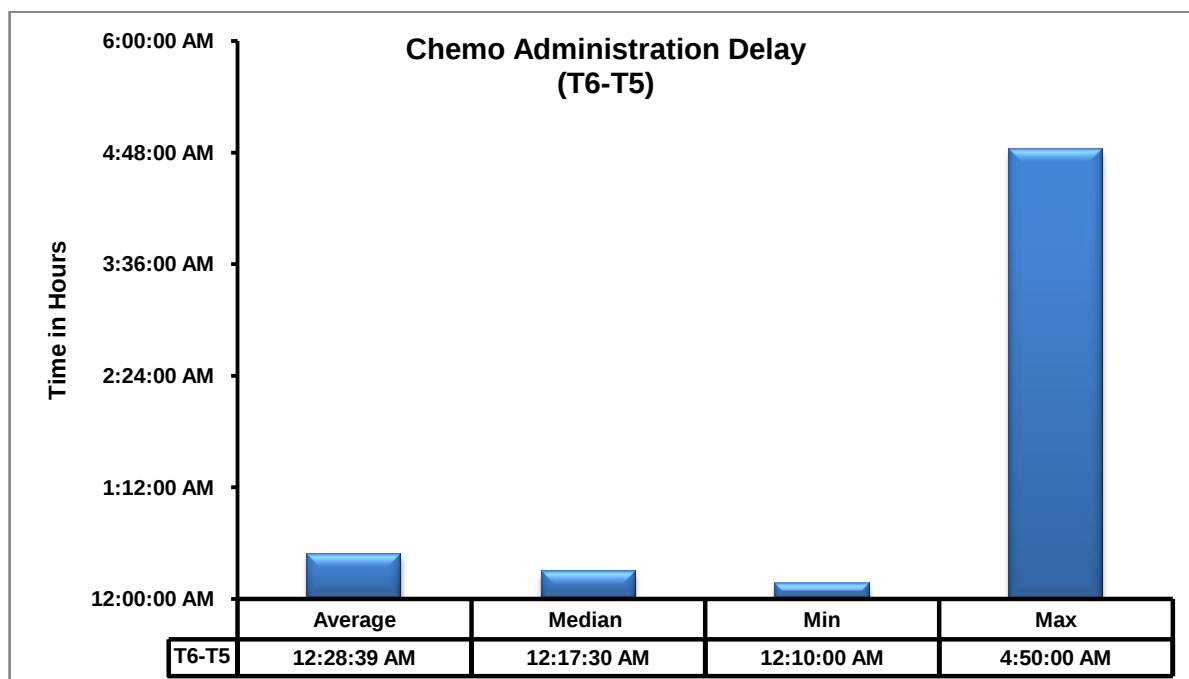
The above graph explains the average, median, minimum and maximum waiting timings of the patients for start of chemotherapy treatment. It was calculated by subtracting from the prechemo start timing of the patient on the performance the daycare entry timing of the patient. It measures the delay in prechemo.

Out of a sample of 145 patients studied,

- Average time for prechemo delay was 49:03 mins which is of concern
- The median prechemo delay timing was 41:30 mins
- The minimum waiting time for start of chemo was 6:00 mins
- The maximum waiting time for prechemo delay was 5 hours 20 mins which is definitely a concern for the daycare.

TABLE 1.3 CHEMO ADMINISTRATION DELAY

<u>AVERAGE</u>	<u>MEDIAN</u>	<u>MIN</u>	<u>MAX</u>
00:28:39	00:17:30	00:10:00	04:50:00



The above graph explains the average, median, minimum and maximum waiting timings of the patients for chemotherapy administration. It was calculated by subtracting the prechemo stop timing from the chemotherapy start timing. It measures the delay in chemo administration to the patient.

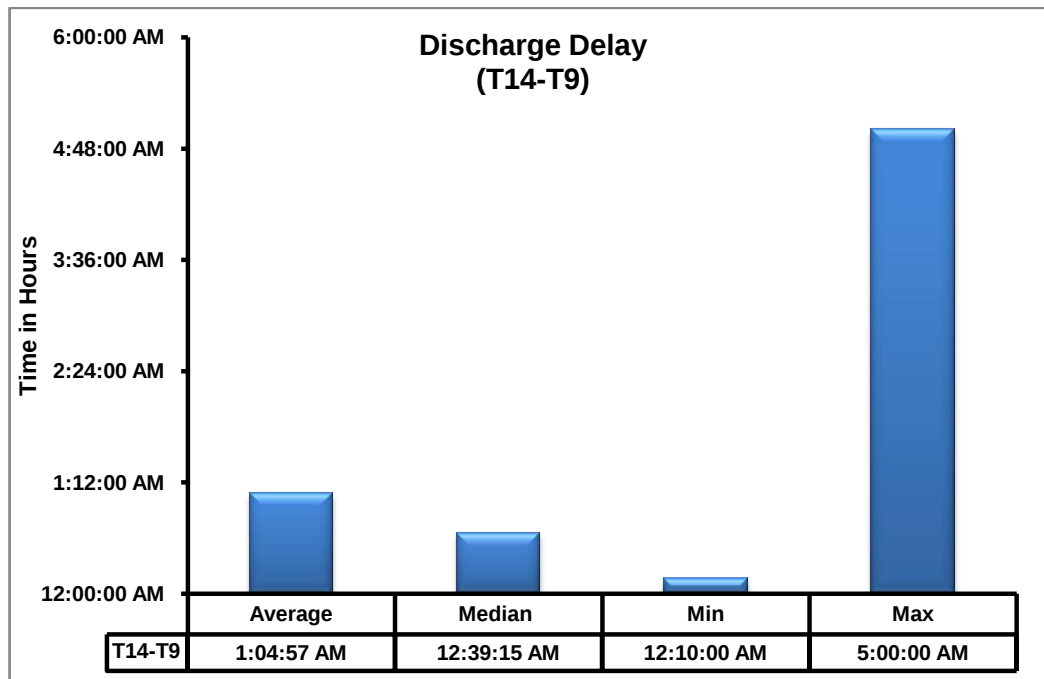
Out of a sample of 145 patients studied,

- Average delay time for chemotherapy administration was 28mins39 secs
- The median delay time for chemotherapy administration was 17 mins 30 secs
- The minimum delay time for chemotherapy administration was 10:00 mins

The maximum delay time for chemotherapy administration was 4 hours 50 mins which is definitely a concern for the daycare.

TABLE 1.4 DISCHARGE DELAY

<u>AVERAGE</u>	<u>MEDIAN</u>	<u>MIN</u>	<u>MAX</u>
01:04:57	00:39:15	00:10:00	05:00:00



The above graph explains the average, median, minimum and maximum waiting timings of the patients for discharge. It was calculated by subtracting the post chemotherapy timing from the discharge timing. It measures the delay in discharge of the patient.

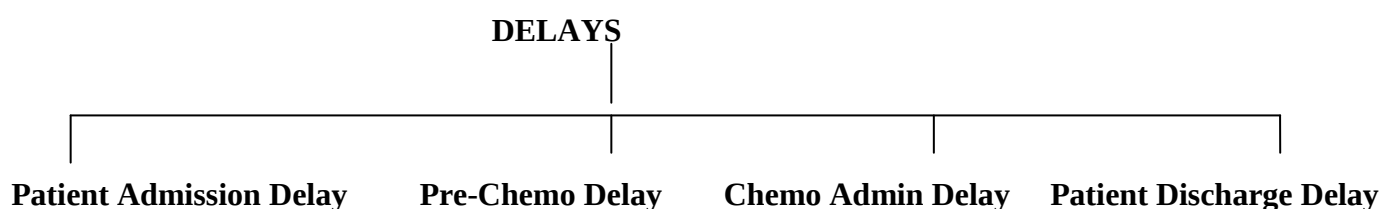
Out of a sample of 145 patients studied,

- Average delay time for discharge was 1 hour 5 mins
- The median delay time for discharge was 39 mins
- The minimum delay time for discharge was 10:00 mins
- The maximum delay time for discharge of patient was 5 hours which is definitely a concern for the daycare.

OBSERVATIONS AND FINDINGS

Delay in process flow at different stages is one of the key factors that hinders optimal flow of patients and has a significant impact on the economic outcome of the hospital.

During the course of this study 4 major delays were identified after collection of the data through different sources and the reasons for the same were later analysed and probable solutions were then proposed.



A. Reasons behind delays in admission

1. Improper planning of patients
2. Adjusting New walk-in patients (unplanned)
3. Choice/requirement of bed by the patient (vis-à-vis recliner)
4. Non availability of beds in the day care
5. Patients not turning up on the intimated time (morning v/s afternoon)
6. Patients not bringing along the required documents for the TPA or Corporate policies

B. Reasons behind pre-chemo delays (Post admission)

1. Required lab/radiology tests not being done by patient
2. Fluctuation in patient blood counts/lab reports
3. Delay in reaching out to the concerned consultant as well as the Delay in performa preparation by the doctor
4. Delay in calculation of patient dose
5. Non availability of desired drug or dose in pharmacy (unplanned patient or is a new walk-in patient)
6. Prescription of new tests and waiting for the results (mainly in change in clinical condition of the patient)
7. Change of drug/drug dosage for the patient
8. Waiting for referral opinion from other consultants (e.g opinion from the nephrologist for a patient with kidney disease or a cardiologist for an underlying cardiac condition)
9. Ongoing concurrent radiation of the patient

C. Delay in chemo administration

1. Nurses attending too many patients
2. Some adverse drug reaction of the patient
3. Patient not coping well with the drug and showing symptoms

D. Delay in patient discharge

1. Delay in clearance from pharmacy
2. Delay in clearance from nurses
3. Delay in preparation of discharge summary (Junior doctors)
4. Delay in corporate and insurance clearance
5. Delay in payment of estimated amount by patient
6. Lack of awareness about TPA policies among patients leads to delay in financial clearance

SUGGESTIONS AND RECOMMENDATIONS

Based on the above reasons that were identified during the course of the study, the following probable solutions are proposed by observations and stakeholder interviews

A) Solutions for delays in patient admission

- a) As one of the major reasons for delay was improper planning of the planned patients, it led to overcrowding in the admission counter and led to an increase in patient waiting time. Proper planning and structure of the list according to different time slots would be a solution which would lead to a more smooth functioning of all the other processes and in turn lead to enhanced patient experience. Staggered admissions to be followed in the morning and afternoon (for eg: 5 patients to be slotted in time slots of 15 mins each from 8am to 9:30am (8:15, 8:30, 8:45, 9:00, 9:15, 9:30am))
- b) Standardisation of admission process is a factor which is largely in our control and implementing it effectively can lead to an increase in the overall output of the daycare.
- c) Proper communication to the patient regarding the hospital policies and awareness of the TPA, private and corporate policies prior to patient admission would likely improve the patient flow.
- d) Proper communication to the patient regarding the reporting and prior allotment of bed/recliner can further help in reducing the workload on the staff and would decrease the patient dissatisfaction at the time of admission and allotment.
- e) There is an opportunity by process reengineering to increase bed capacity and productivity with the same fixed costs. In this sense, actions that lead to an increase in productivity without diminishing the service quality, or even increasing it, should be implemented for gaining competitive advantage.

B) Solutions for delays in Prechemo

- a) As the prime function of any healthcare facility is to provide the best of treatment to our customers, fluctuations in patient reports and changes in doses and drugs, plan of treatment are some of the things which cannot be hampered with in the best favour of our patients.
- b) Preplanning of the chemo drug and dosage of the patient by consultation with the attending consultant duly signed by the consultant one day prior to the scheduled appointment day would smoothen the whole treatment process and avoid delays eg. reaching out to the consultant.
- c) Awareness of the patient regarding the test and lab reports to be brought at the scheduled appointment day to avoid any delay in the planning and calculation of drug dosage and course of treatment.
- d) Reducing the time span for reaching out to the referrals and the concerned consultants based on the diagnosis of the patient.

C) Solutions for delays in chemo administration

- a) Proper planning of the attending nurse to the patient ratio depending on the footfall of the patients in the daycare.
- b) Proper allotment of nurses shifts.

D) Solutions for delays in discharge of the patient

- a) Standardization of the discharge process would lead to a significant opportunity to create important benefits for increasing bed capacity and daycare throughput and productivity.
- b) Significant decrease in waiting time for discharge will basically reduce waste in terms of human resources, public health services and increase patient quality of care as well as it will gain flexibility in hospital capacity.
- c) Planning would ensure an early and certain discharge as well as a better bed assignment because then there will be information about which beds would be available. The communication and awareness of the patient to the required insurance and TPA formalities would further smoothen the discharge process.
- d) Providing the patient with an estimated cost of treatment would play an important part in decreasing the patient queries and hastening the whole discharge process. The discharge process should start in the admission point itself, as it is the mismatch between demand and supply of beds that promotes delays and bottlenecks in the system.

CONCLUSION

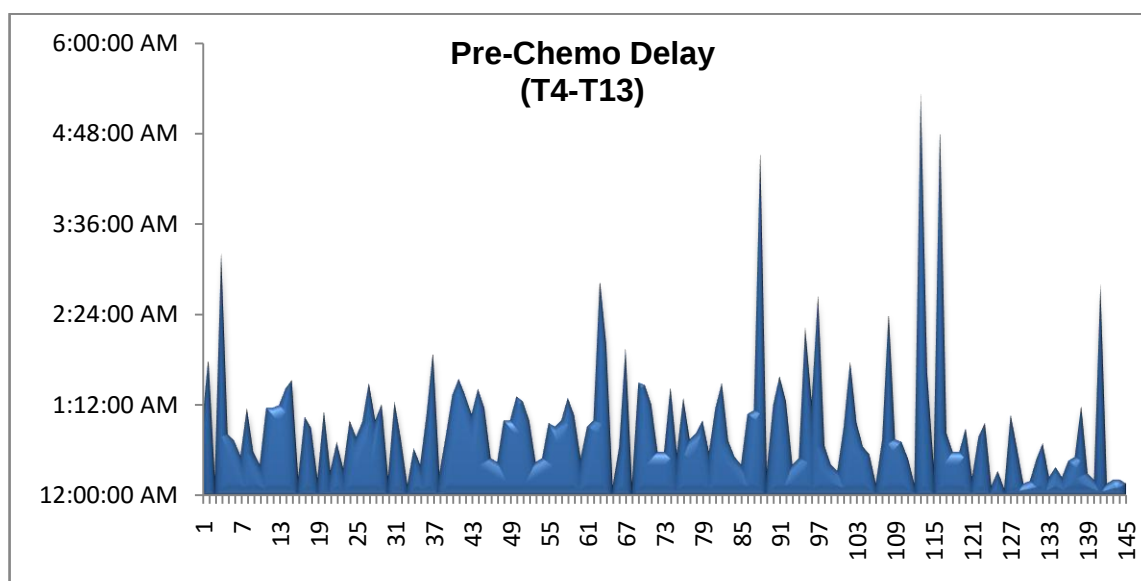
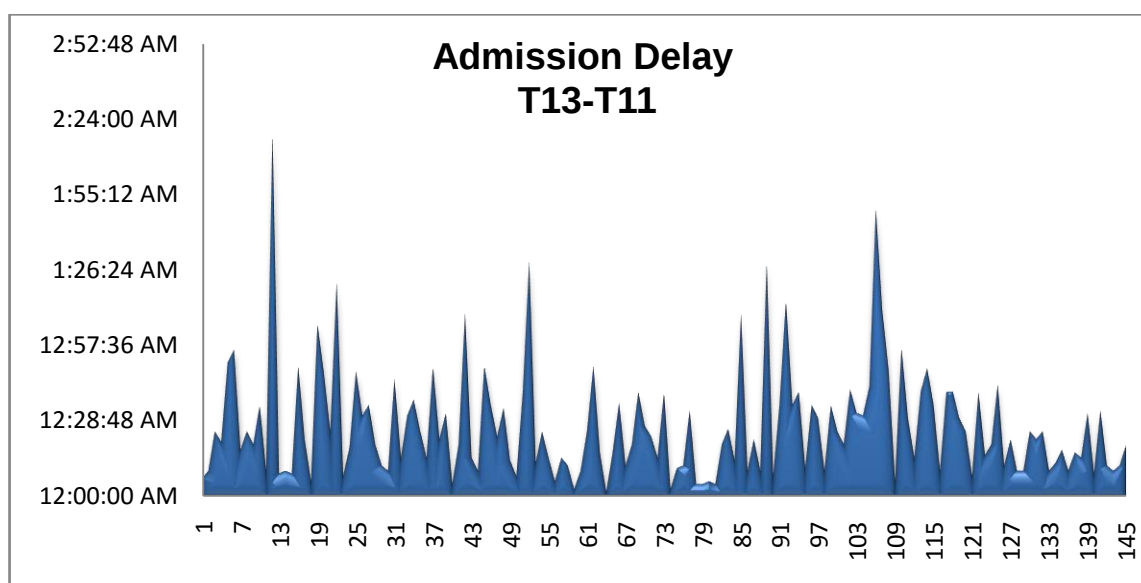
Cancer patients often receive multiple treatments of chemotherapy in the daycare for extended periods of time. Services such as blood work, physical exam, drug preparation, and chemotherapy administration, are required to be performed in different facilities such as laboratories, clinics, pharmacies, and treatment rooms. The services in each facility are performed by multiple resources such as phlebotomists, nurses, pharmacists, and medical oncologists. Clinic administrators face the difficult decision of improving efficiency in this complex multi-facility environment. The coordination of these services and resources is critical for timely and efficient treatment of patients.

Despite of Oncology being an extremely demanding section in terms high performance expectations and work load, consisting of all the uncertainties and challenges at work, handling the large footfalls of patients, the Daycare staff have been dedicated and worked as a team that featured competence. In this study, my aim was to show that delays due to inefficient care delivery can be eliminated by better coordination, planning, and scheduling. Uncertainties such as unpunctual arrivals, delays in admission of patient, prechemo, chemo and discharge areas, increase or decrease in treatment durations due to side effects or dose changes, cancellations, and add-ons, occur during a typical clinic day. All these uncertainties affect patient flow and staff workflow.

Patients experience long waiting times due to delays in admission, prechemo start, chemotherapy administration areas, and discharge. The providers and staff experienced an unbalanced workload throughout the day. Reducing patient waiting times should be among the highest priorities for quality improvement and patient satisfaction in outpatient cancer treatment facilities. Solutions in admission process such as staggering of the daycare patient list, standardisation of admission and discharge process, preplanning of patient dose with the consultant prior to appointment, delays in TPA clearance etc, would greatly help in reducing the waiting time for the patients and would thereby increase the flexibility in hospital capacity and give the patient a good overall experience.

ANNEXURE

ANNEXURE 1:



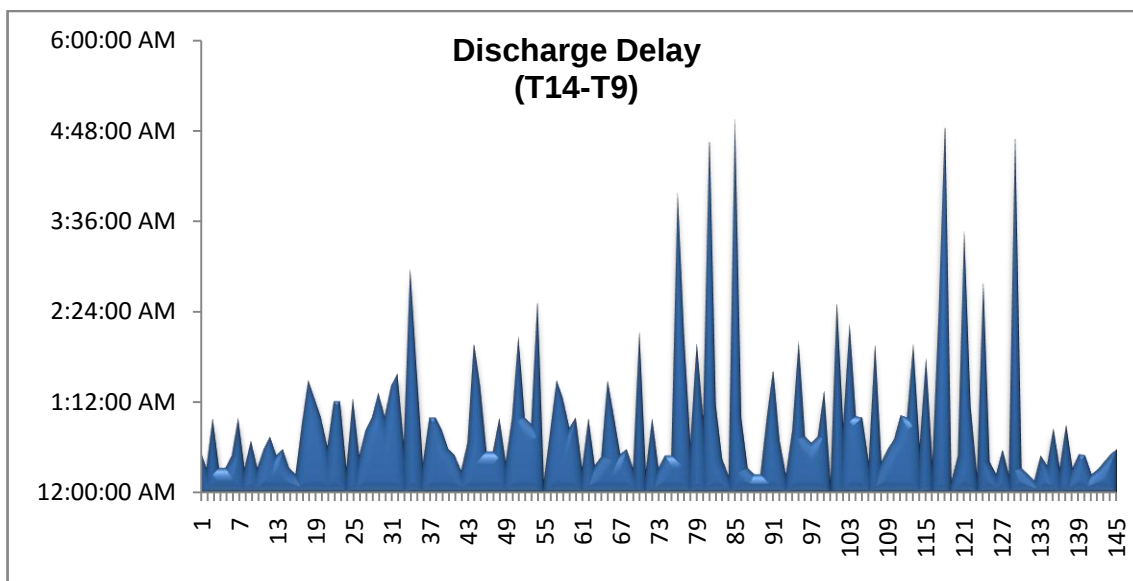
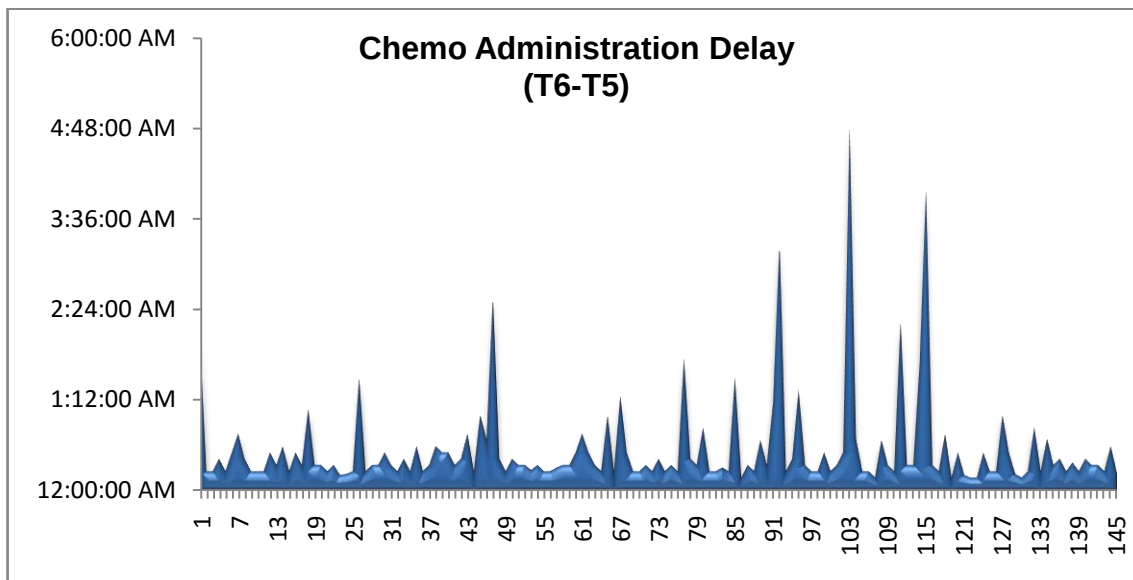


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2	Review Of Literature	
3	Methodology	
4	Results and Analysis	
5	General Solutions and Recommendations	
6	Conclusion	
7	References	
8	Annexure	



**Summer Training
In
Max Super Specialty Hospital, Saket, New Delhi
(April 1st to May 31st, 2016)**

**A Report
on
A retrospective study on distribution and occurrence of pressure sores at Max
Superspeciality, Saket**

**By
Dr.Eisha Sangwan

MBA in Hospital and Health Management
2015-2017**



Institute of Health Management Research, Jaipur

Introduction

Pressure ulcers are defined by the National Pressure Ulcer Advisory Panel (NPUAP) as “localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction.”

1 Pressure ulcers are a common condition, affecting an estimated 3 million adults in the United States.² In 2006, pressure ulcers were reported in more than 500,000 hospital stays.³ Estimates of pressure ulcer prevalence range from 0.4 to 38 percent in acute care hospitals, 2 to 24 percent in long-term nursing facilities, and 0 to 17 percent in home care settings.⁴⁻⁶ The prevalence of facility-acquired pressure ulcers was 6 percent in 2008 and 5 percent in 2009.⁶ A number of risk factors are associated with increased risk of pressure ulcer development, including older age, black race, lower body weight,^{7,8} physical or cognitive impairment, poor nutritional status, incontinence, and specific medical comorbidities that affect circulation such as diabetes or peripheral vascular disease.

Pressure ulcers are often associated with pain and can contribute to decreased function or lead to complications such as infection.² In some cases, pressure ulcers may be difficult to successfully treat despite surgical and other invasive treatments. In the inpatient setting, pressure ulcers are associated with increased length of hospitalization and delayed return to function.³ In addition, the presence of pressure ulcers is associated with poorer general prognosis and may contribute to mortality risk.³ Between 1990 and 2001, pressure ulcers were reported as a cause of death in nearly 115,000 people and listed as the underlying cause in more than 21,000.⁹ Estimates of the costs of treatment for pressure ulcers vary, but range between \$37,800 and \$70,000 per case.

Recommended prevention strategies for pressure ulcers generally involve use of risk assessment tools to identify people at higher risk for developing ulcers in conjunction with interventions for preventing ulcers.¹⁴⁻¹⁶ A variety of diverse interventions are available for the prevention of pressure ulcers. Categories of preventive interventions include support surfaces (including mattresses, integrated bed systems, overlays, and cushions), repositioning, skin care (including lotions, dressings, and management of incontinence), and nutritional support.^{15,16} Each of these broad categories encompasses a variety of interventions.

The purpose of this report is to review the distribution of pressure ulcers in the hospital setting, to find out the areas where its distribution is more and to evaluate the preventive interventions for pressure ulcers in different settings and patient populations.

Research question

- 1) What is the distribution status (inside vs outside) of pressure ulcers in different departments?
- 2) What are the departments and speciality with the maximum number of cases?

3) In these departments which are the more prone areas where likelihood of development of pressure ulcers is more?

4) How was the case managed till the discharge of the patient? (Did the staging improve?)

Objectives

When a deep pressure ulcer develops, it usually reflects not so much the failure of an individual rather it is a system failure. Thus, these deep pressure ulcers represent a learning opportunity regarding aspects of care that may need improvement. While pressure ulcers commonly occur and are associated with significant health burdens, they are potentially preventable.

The report focuses to evaluate the areas of high risk patients (ie to focus on the medical condition where the probability to develop pressure ulcer is more) and to follow up from the data the management of various pressure ulcer risk-assessment and prevention approaches till the discharge of the patient with pressure ulcer which serves as a quality indicator for the hospital; with recommendations which intends to develop a guideline on prevention and management of pressure ulcers.

This report systematically reviews the evidence on

- (1) Analysing the current rate of pressure sores occurring in Max Superspeciality Saket, studying the discharge status of the patient and on which stage of pressure ulcer would help to analyse the quality of care provided to the patients in the hospital.
- (2) identifying medical conditions at higher risk of pressure ulcers and
- (3) evaluating the management interventions to serve as a quality indicator of the hospital

Review of literature

RISK ASSESSMENT OF DECUBITUS ULCERS USING FOUR SCALES AMONG PATIENTS ADMITTED IN MEDICAL AND SURGICAL INTENSIVE CARE UNITS IN A TERTIARY CARE SET UP: A CROSS-SECTIONAL STUDY by-

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Background and objectives: For predicting the risk factors early among patients admitted in intensive care units, all critically ill patient should be screened for presence of all possible risk factors. There is no single specific tool for risk assessment which can predict almost all risk factors. Least studies have been done in Indian scenario to compare and suggest a better predictor of risk assessment for presence of pressure ulcers. The objectives of the present study was to assess & predict the risk for decubitus ulcer using Braden, Norton, Waterlow and Cubbin & Jackson scale as well as to compare better predictor score / tool among these four scales in patients admitted in M.I.C.U.

S.I.C.U.inIndianscenario.

Materials and Methodology: A total of one hundred fifty (150) subjects adult males and females admitted in I.C.U within 48 hours were included in the study. Braden scale, Norton scale, Waterlow scale and Cubbin & Jackson scale were administered by two physiotherapy interns.

Results: The data was analyzed using student's paired t test, Chi square test and single way ANOVA. Statistically significant differences were noted when the test scores were compared to age (58-77) years ($p=0.0308$) nutritional status(underweight & obesity) ($p=0.0174$), mechanical ventilation ($p=0.00001$), musculoskeletal problems ($p=0.0333$), type II Diabetes Mellitus ($p=0.0003$) that have shown to contribute higher risk for development of decubitus ulcers. Cubbin & Jackson scale have shown to be the best predictive value with 99.3% sensitivity and 55.5% specificity compared to other scores.

Conclusion: The present cross-sectional study concluded that the Cubbin and Jackson scale is a better predictor of risk of pressure ulcer in Indian scenario. In addition, Nutritional status, age group of 58-77 years, Type II diabetes mellitus and musculoskeletal problems have demonstrated to be risk factors for development of pressure ulcers in ICU admitted patients.

Another study on the prevalence of pressure ulcers in hospitalised patients in a university hospital in India.

The cross-sectional study took place in a university hospital in [Varanasi, India](#). A total of 445 patients hospitalised in medical and surgical wards were examined in a single day for the number, site and grade of pressure ulcers. Haemoglobin, serum albumin and blood sugar levels of patients with pressure ulcers were recorded. The prevalence of pressure ulcers was high (4.94%). Anaemia, malnutrition and diabetes were important risk factors, while morbidity due to pressure ulcers in long-stay wards, such as neurology, was exceptionally high (40.9%).

METHODOLOGY

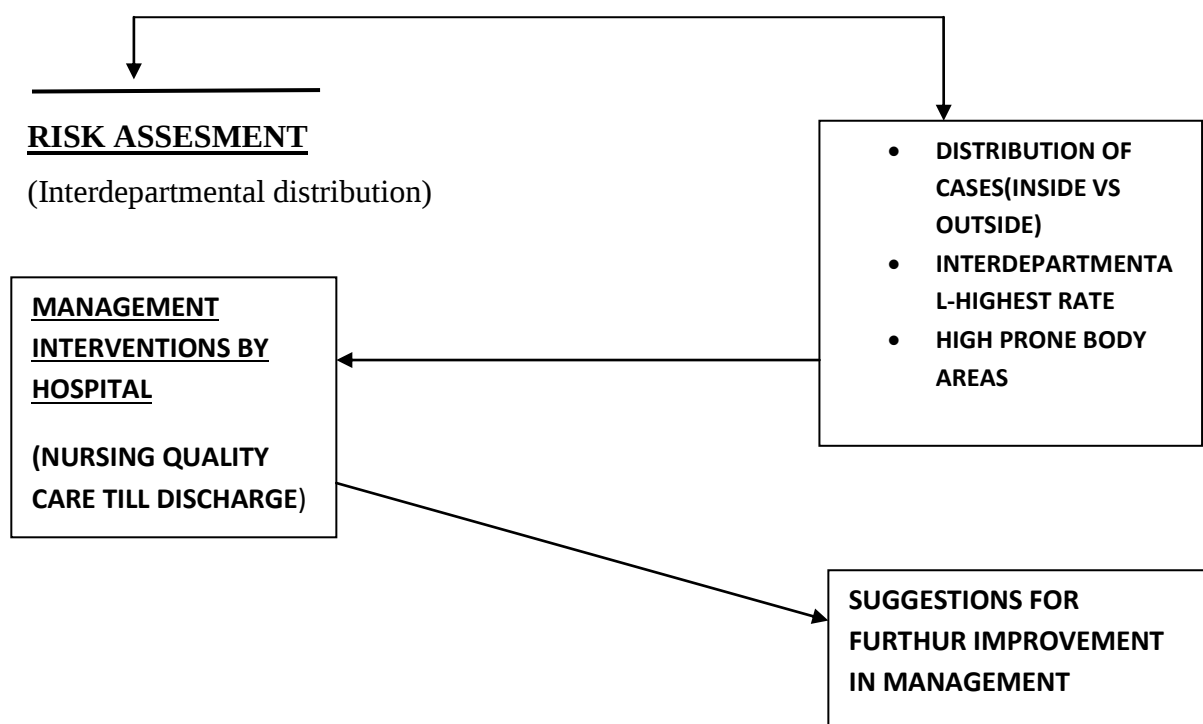
- **Type of study :** Retrospective cross sectional
- **Study population :** In Patients from January to April 2016 at Max Super Speciality Hospital, Saket, Delhi
- **Study area** – East wing of Max Superspeciality,Saket(Including ICUs and wards)
- **Duration of Study** – 2 weeks
- **Type of Data** - Quantitative
- **Technique** – Data collected from the quality flash of the hospital.
- **Sample size** –In patients from January to April 2016

- **Sampling technique-** Convenience Non probability sampling
- **Inclusion criteria-**All patients of pressure ulcers in all icus and wards of east wing
- **Exclusion criteria-**Icu and wards of west wing.
- **Data collection** - Quantitative (4 Months)
- **Data entry-** Manually
- **Data Analysis-** Using bar charts, pie charts

Analytic Framework

The analytic framework (Figure A) used to guide this report shows the target populations, preventive interventions, and health outcomes that were examined.

Figure A. Analytic framework: pressure ulcer risk assessment and management



DATA ANALYSIS

• TABLE 1.1

Month	Inside	Outside
Janurary	1	10
February	3	11
March	3	11
April	2	12

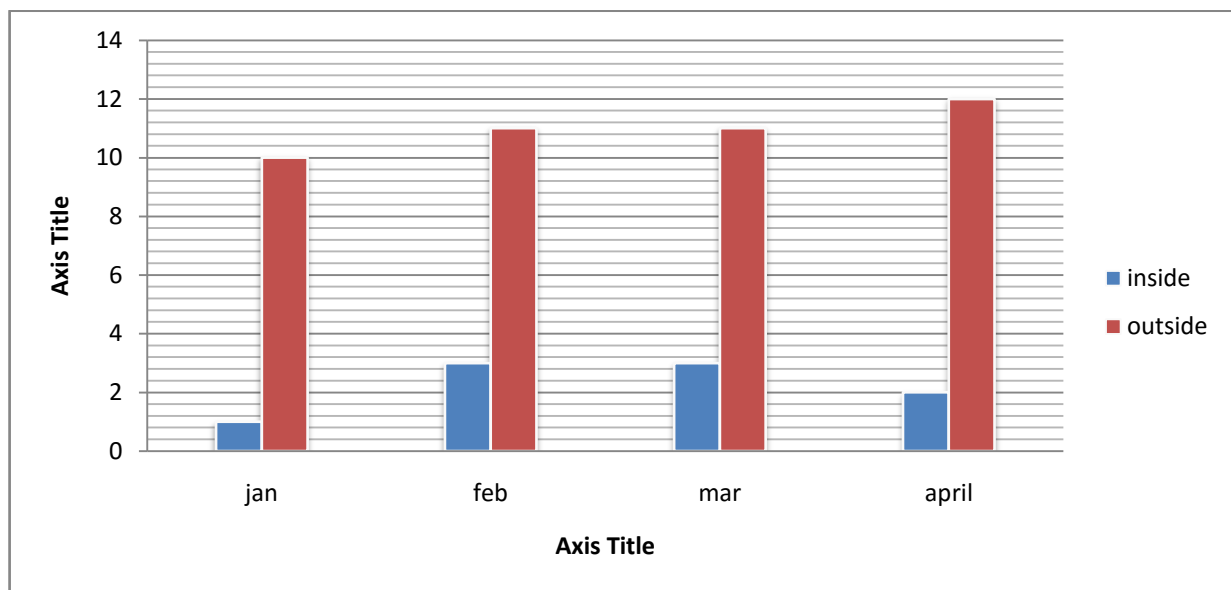


Figure 1.Cases of pressure sores from the month of jan-april '16

The above graph explains the no of cases of pressure sores(outside and inside),in different departments of Max Hospital,Saket,from the month of January to April 2016.

- It is clearly evident from the data that there were more number of cases of pressure sores from outside the hospital as compared to number of cases developed inside the hospital.
- There were comparatively more number of inside cases in the month of february and march.

TABLE 1.2

Department	No of cases
OMICU	5
4 TH EAST	2
RICU	1
CTVS ICU	1
3 RD ONCO EAST	1
ACC	1

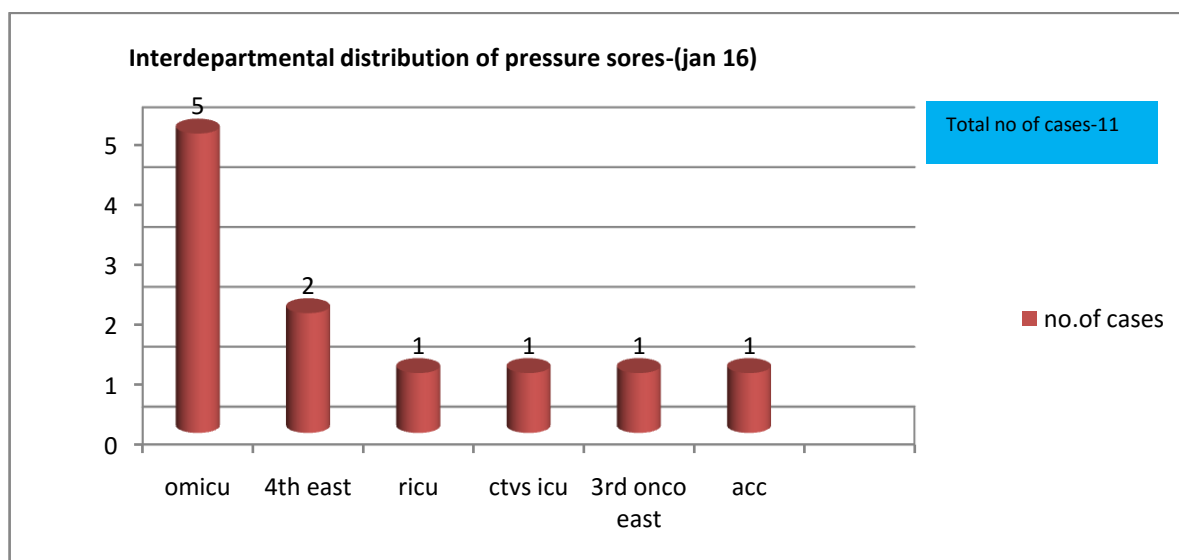


Figure 2 Interdepartmental distribution of pressure sores for jan'16

The above graph explains the distribution of pressure sores in different departments for the month of January'16.

- It is clearly evident from the data that maximum no of cases were recorded in the OMICU(Onco Medical ICU)
- 4th east ICU had the second highest no of cases.
- RICU,CTVS ICU,3RD Onco East and ACC had equal no of cases of pressure sores.

TABLE1.3

Department	No of cases
OMICU	4
2 nd floor	1
ACC	2
OSICU	1
CATH Recovery	1
3 rd floor East	2
Triage	1
CTVS ICU	1
RMICU	1

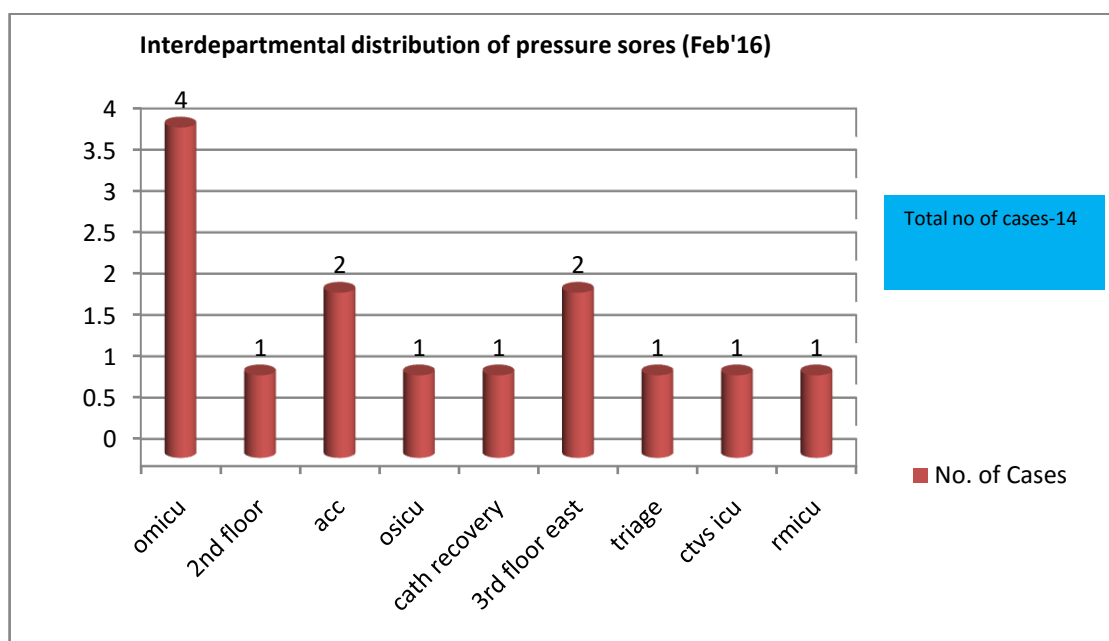


Figure 3 Interdepartmental distribution of pressure sores for feb'16

The above graph explains the distribution of pressure sores in different departments for the month of February'16.

- It is clearly evident from the data that maximum no of cases were recorded in the OMICU(Onco Medical ICU),followed by ACC and 3rd floor east having the second highest number of cases.
- 2 nd floor,OSICU,Cath Recovery,Triage,CTVS ,ICU AND RMICU show equal no of cases.

TABLE1.6

Department	No of cases
Economy Ward	4
4 th floor East	1
3 rd flloor ONCO	2
ACC	1
OMICU	1
RMICU	2
3 RD EAST	1
OSICU	1

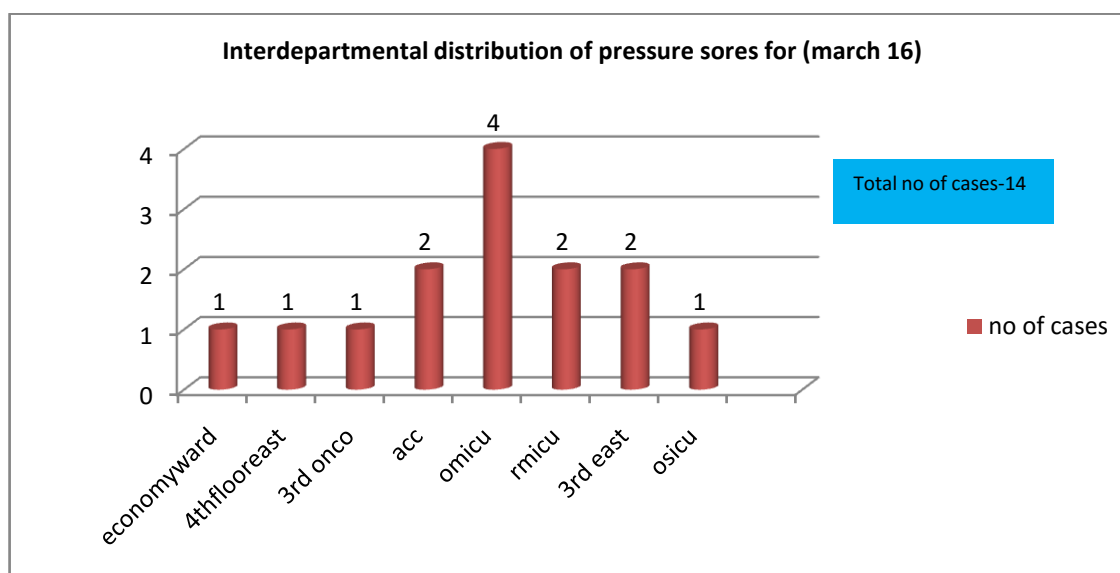


Figure 4 Interdepartmental distribution of pressure sores for March'16

The above graph explains the distribution of pressure sores in different departments for the month of March'16.

- It is clearly evident from the data that maximum no of cases were recorded in the OMICU(Onco Medical ICU),followed by equal no of cases in ACC,3rd floor east and RMICU having the second highest number of cases.
- Economy ward,4th floor East,3rd floor ONCO,Triage,and osicu show equal no of cases.

TABLE 1.7

Department	No of cases
3 rd floor	4
OMICU	6
ACC	2
RICU	1
4 th floor	1

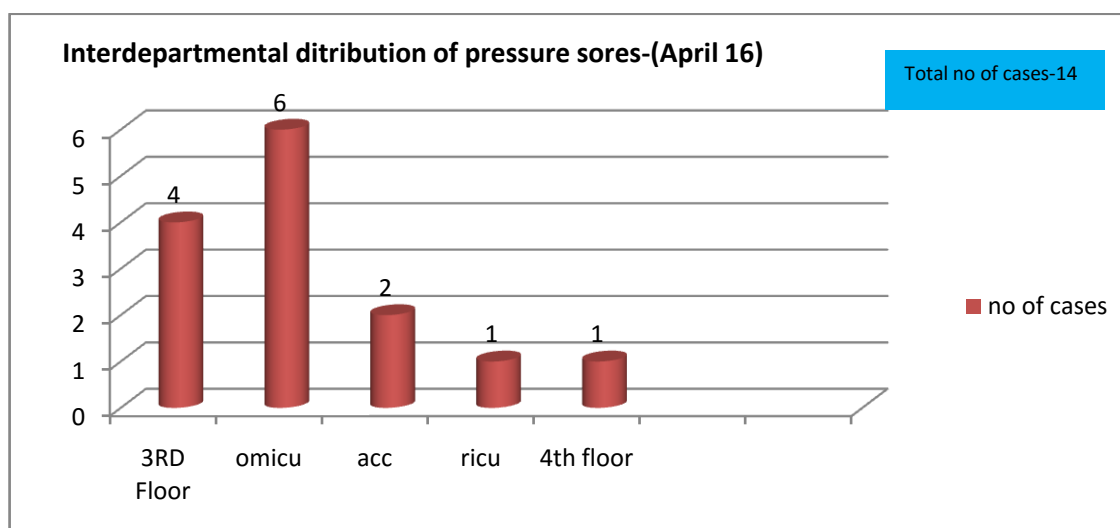


Figure 4 Interdepartmental distribution of pressure sores for April'16

The above graph explains the distribution of pressure sores in different departments for the month of April'16.

- It is clearly evident from the data that maximum no of cases were recorded in the OMICU(Onco Medical ICU),followed by 3rd floor showing the second highest no of cases.
 - ACC showed the third highest no of cases,followed by equal no of cases for RICU and 4th floor.
- TABLE 2.1

Discharge status	On healing phase	Healed	Expired	Needs debridement	Total
JAN	8	3	0	0	11
FEB	9	4	2	0	15
MARCH	12	2	1	0	15
APRIL	4	8	1	1	14

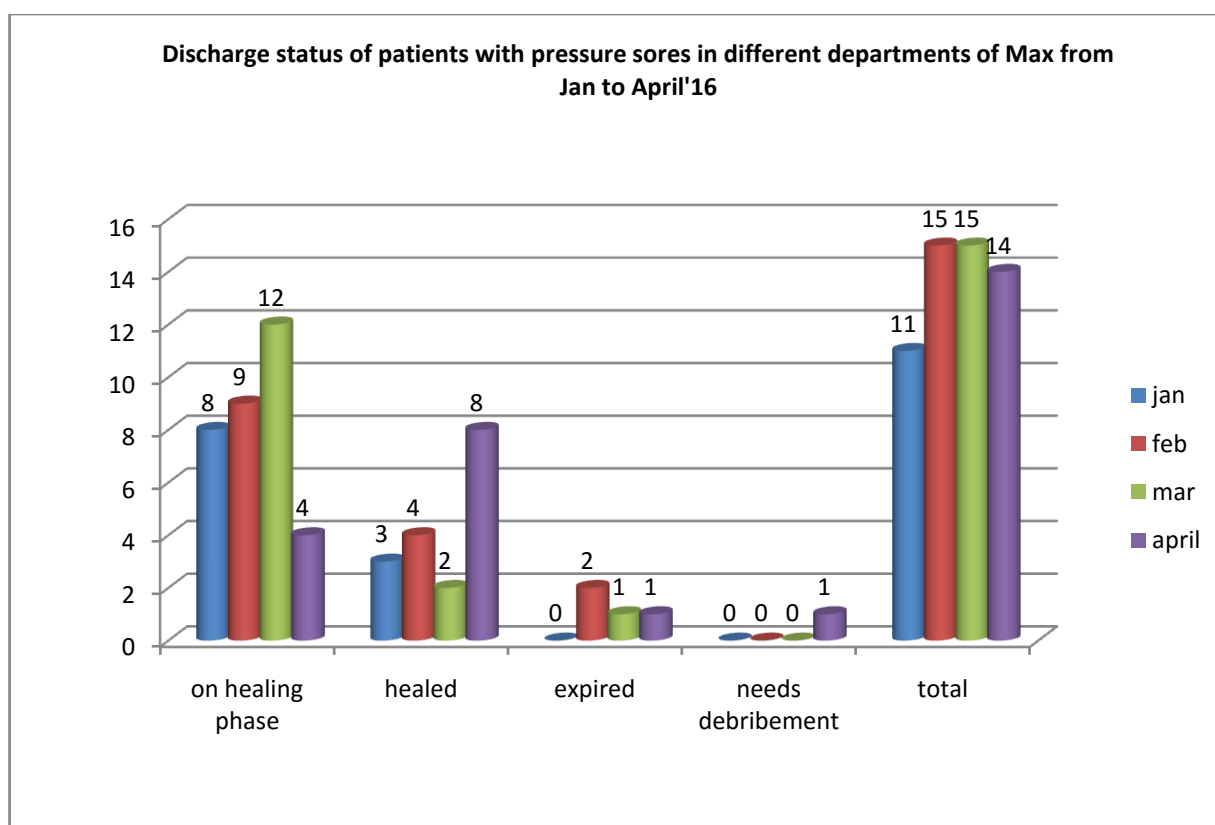


Figure 5 Discharge status of patients with pressure sores in different depts. From Jan to April'16

The above graph explains the discharge status of patients with pressure sores from the month of Jan to April'16.

- The maximum no of cases discharged on healing phase were for the month of march.
- The maximum no of cases discharged after being healed completely were in the month of april.
- There were two cases who expired in the month of february.
- There was one case in april which needed debridement and was discharged.

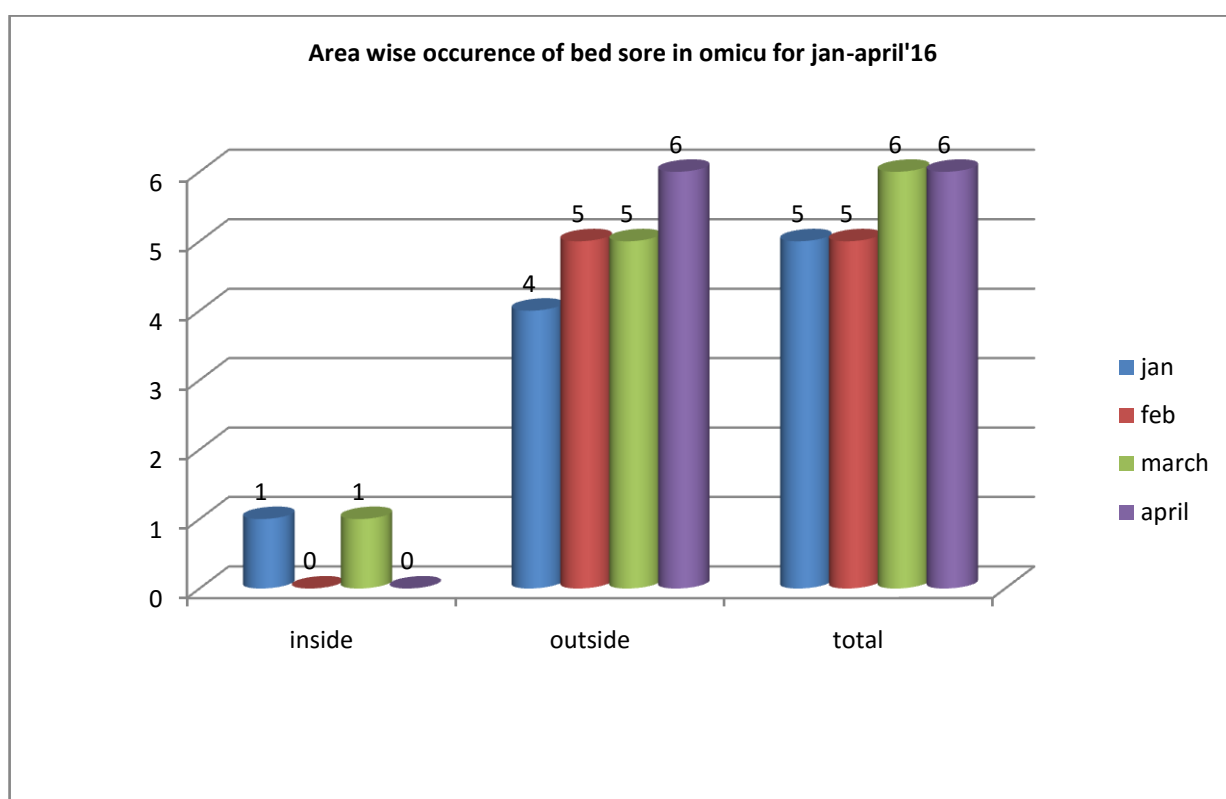
The top three departments encountering the maximum number of cases of pressure sores are as under-
1.OMICU(ONCO MEDICAL ICU)

2.3RD FLOOR(Consisting Cardiac,Urology and Internal medicine patients)
3.ACC(APEX CORONARY CARE)

TABLE2.2

OMICU

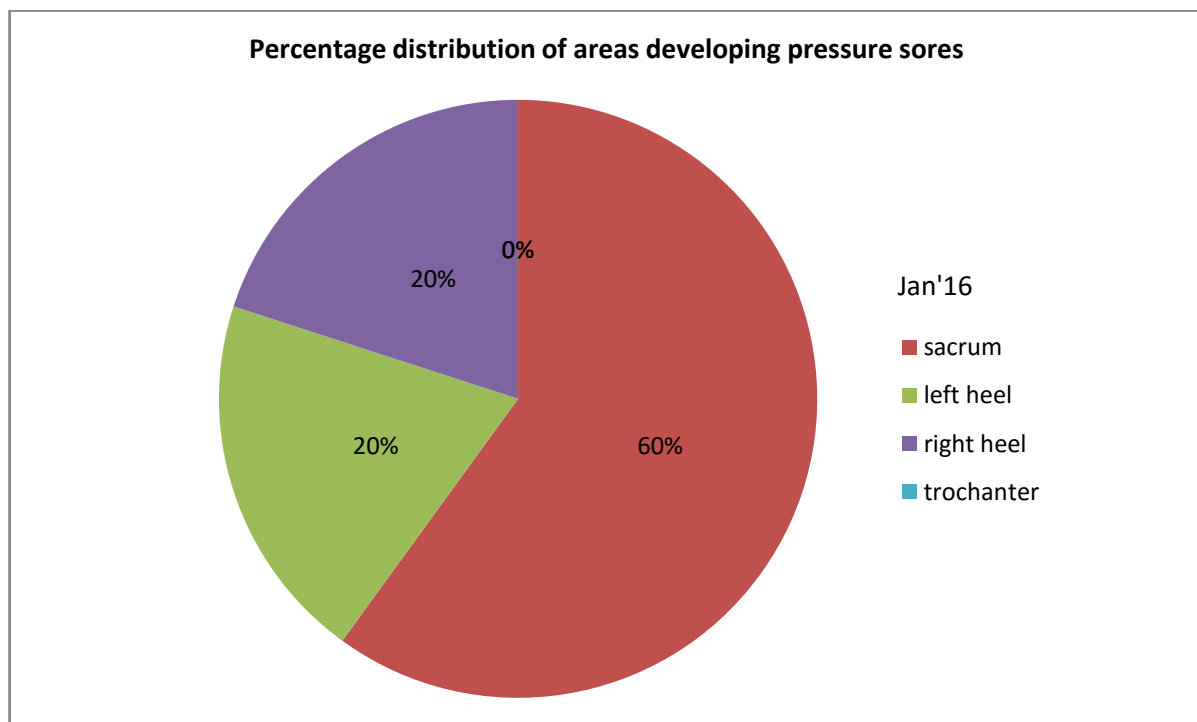
Discharge Status	On healing phase	On healed phase	Expired	Total
JAN	3	2	0	5
FEB	3	0	2	5
MARCH	6	0	0	6
APRIL	3	2	1	6



The above graph shows the total no of inside and outside cases in omicu from the month of january to april'16.

- The maximum no of cases of pressure sores in OMICU were in the month of april'16.
- More no of inside cases were observed in the month of jan and march as compared to feb and april.

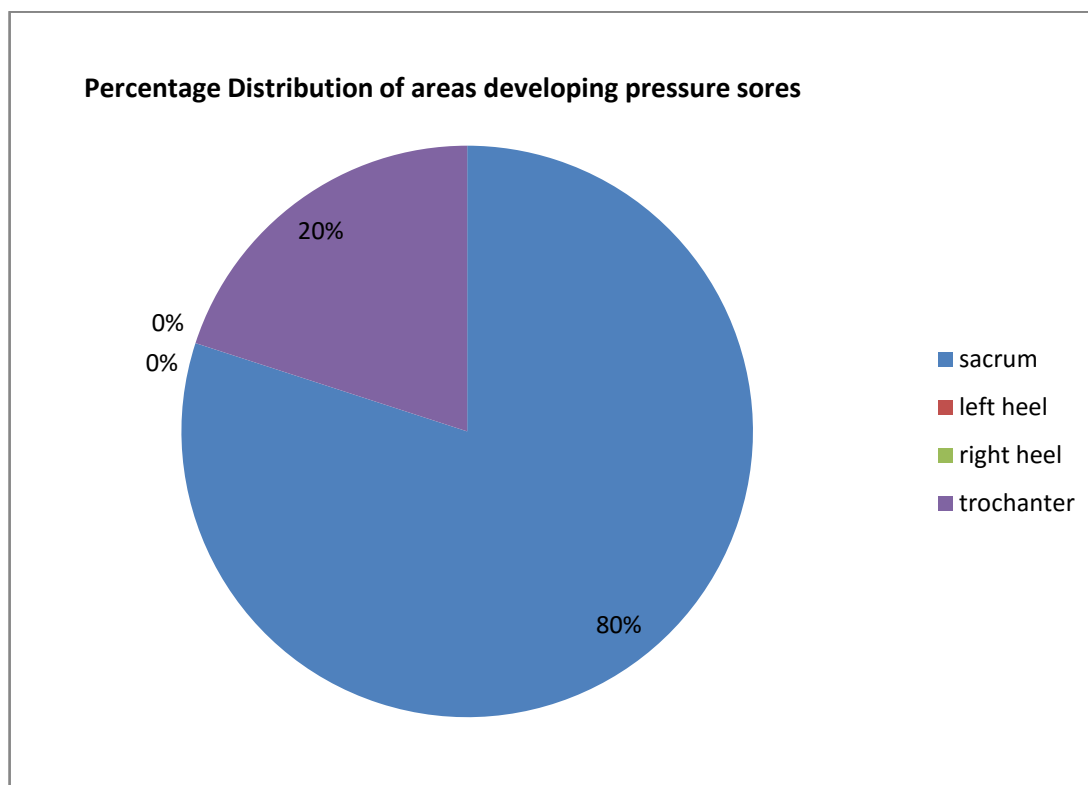
Figure 2.2 Percentage distribution of areas developing pressure sores for omicu for Jan'16



The above pie chart shows the percentage distribution of pressure sores in different areas of the body of the patient for the month of january'16.

- Almost 60% of the cases of pressure sores were diagnosed to be in the sacrum region
- Percentage of cases in the right heel region and left heel region were almost equally distributed(20%)

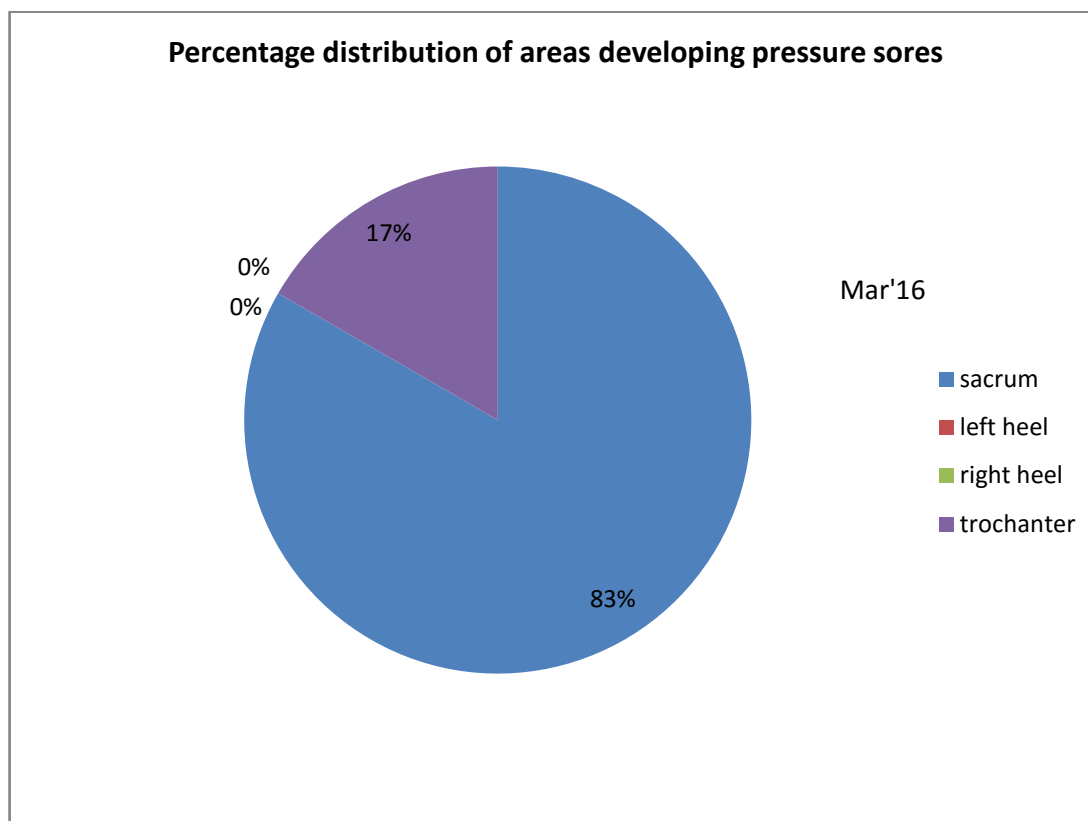
Figure 2.3 Percentage distribution of areas developing pressure sores for omicu for Feb'16



The above pie chart shows the percentage distribution of pressure sores in different areas of the body of the patient for the month of february'16.

- Almost 80% of the cases of pressure sores were diagnosed to be in the sacrum region
- Rest of the cases of pressure sores developed in the trochanter area.

Figure 2.3 Percentage distribution of areas developing pressure sores for omicu for March'16



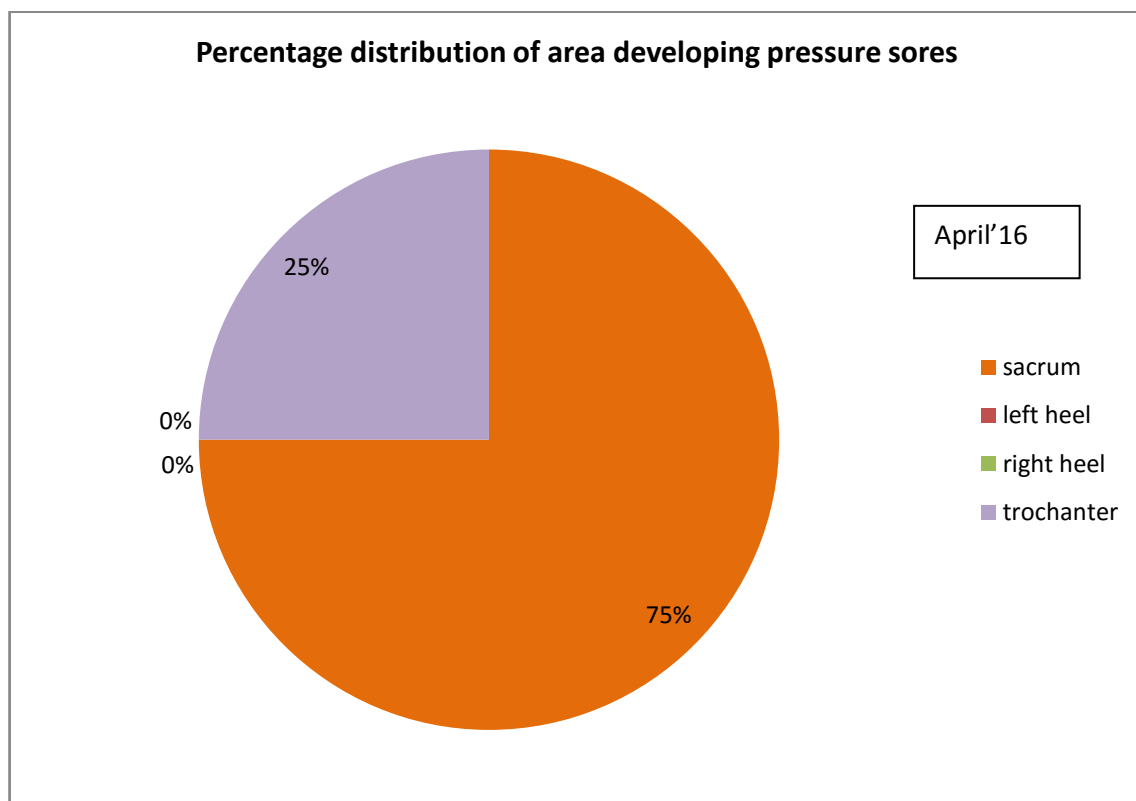
The above pie chart shows the percentage distribution of pressure sores in different areas of the body of the patient for the month of March'16 in OMICU

- Almost 83% of the cases of pressure sores were diagnosed to be in the sacrum region
- Rest of the cases of pressure sores developed in the trochanter area

3rd Floor

For the month of January, february and march almost 100% of the cases developed in the sacrum region.

Figure 2.4 Percentage distribution of areas developing pressure sores for 3rd floor for April'16

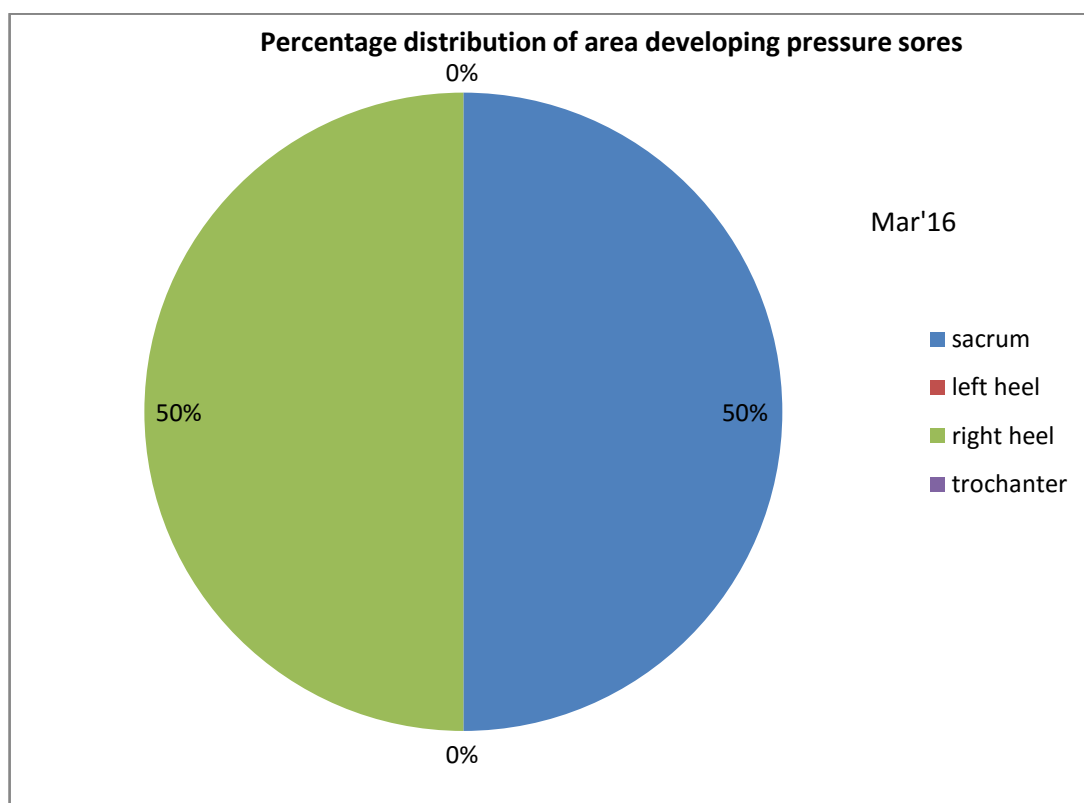


The above pie chart shows the percentage distribution of pressure sores in different areas of the body of the patient for the month of April'16 in 3rd floor

- Almost 75% of the cases of pressure sores were diagnosed to be in the sacrum region
- Rest of the cases of pressure sores developed in the trochanter area.

ACC

For the Month of Jan ,Feb and April all the cases were observed in the sacrum region.



The above pie chart shows the percentage distribution of pressure sores in different areas of the body of the patient for the month of March '16 in ACC.

- Almost equal no of the cases of pressure sores were diagnosed to be in the sacrum and right heel.

OBSERVATIONS AND FINDINGS

On the above analysed data these were the findings and observations-

- Maximum number of cases of pressure sores were from outside the hospital as compared to inside.
- Maximum number of cases were discharged on the healing phase which surely indicated good management of the cases in the hospital.

The top three departments developing the maximum number of cases were OMICU, 3rd floor and ACC. . This result suggests that patients whose underlying disease is cancer are more likely to develop pressure ulcers.

Reasons for development of pressure sores in patients in the OMICU, 3rd Floor and ACC-

1. Terminally ill cancer patients are considered at high risk for pressure ulcers because of their clinical condition. These results support the need to focus attention on pressure ulcers prevention and treatment in terminally ill cancer patients, and to further define specific guidelines aimed at warranting patients' comfort and quality of life.

2.As pressure ulcers tend to develop in patients with cancer despite intensive care, new guidelines and measurements for the prevention of ulcers are desirable.

3.Most of the bed ridden,terminally ill patients are admitted in these departments.

4.The Medical condition of the patients.

5.Severity of the disease of the patients.

- On further analysis of the data it was found that maximum number of cases were in the sacrum region.
- Seventy-five percent of these injuries occurred around the pelvic girdle, most often at the ischium, greater trochanter, and sacrum.Sacrum being the most prone area for injury.

Specific risk factors for sacral pressure ulcers include

- a)Lying in the supine position and
- b)Fecal incontinence.

SUGGESTIONS AND REMARKS

- Cancer can be a devastating illness causing severe debilitation and prolonged confinement to bed..The consequences of these lesions can be devastating, even fatal. Thus, the common bedsore should not be overlooked as an important clinical problem.
- The results emphasize that pressure ulcers in patients with cancer need to be cared for more attentively through preventive measures. It is necessary to modify risk assessment measures (eg, risk assessment scores of patients with cancer), because cancer is a risk factor for pressure ulcers.

Measures to reduce the pressure sore incidence in patients.

1. For patients at the authors' facility who are thought to be at moderate or high risk air mattresses or extra-soft mattresses must be prepared.
2. Risk Assessment (Assess and reassess)
3. Skin care(Protect skin from moisture)
4. Nutrition that is Optimal (Assess and monitor patient's calorie intake)

1)As majority of cases were in bed ridden patients the following preventive measures are suggested-

Consider the following recommendations when repositioning in a bed:

- **Reposition frequently.** Change patient's body position every two hours.
- **Look into draw sheets to help reposition.** If the patient have enough upper body strength, try repositioning using a draw sheet. This can reduce friction and shearing.
- **Try a specialized mattress.** Use special cushions, a foam mattress pad, an air-filled mattress or a water-filled mattress to help with eventing pressure sores

2)Skin care of patients

Protecting and monitoring the condition of the skin is important for preventing pressure sores and identifying stage I sores early so that you can treat them before they worsen.

- **Clean the affected skin**
- **Protect the skin..**
- **Inspect the skin daily**
- **Manage incontinence to keep the skin dry.** If the patient have urinary or bowel incontinence, take steps to prevent exposing the skin to moisture and bacteria.
- **Nutrition**
- **Choose a healthy diet-** may need to increase the amount of calories, protein, vitamins and minerals in patient diet and may be advised to take dietary supplements, such as vitamin C and zinc.

In case pressure sores develops then, the following can be considered for **treatment of pressure sores**

Surgery Some bedsores may become so severe that surgical intervention is necessary, regardless of treatment received. Surgery aims to improve the appearance of the sore, clean it up, treat or prevent infection, reduce fluid loss, and lower the risk of subsequent cancer.

Non-Surgical Measures-

- **Clean wound** - the wound must be kept clean. If it is a Stage I wound, it may be gently washed with water and a mild soap. Open sores, on the other hand, need to be cleaned with a saline solution each time the dressing is changed. Hydrogen peroxide or iodine should be avoided.
- **Continenence** - this must be controlled as much as possible. The patient may be helped with lifestyle changes, behavioral programs, incontinence pads as well as certain medications.
- **Debridement** - a wound does not heal well if dead or infected tissue is present. The dead or infected tissue needs to be removed.
- **Surgical debridement** - the doctor uses a scalpel to remove dead tissue (other devices are possible)
- **Mechanical debridement** - a high-pressure irrigation device removes devitalized tissue
- **Laser** - dead tissue is removed using focused light beams.
- **Dressings** - these are key to protecting the wound and accelerating healing. The type of dressing used depends on the severity of the wound. Basically, the wound must be kept moist, while the surrounding tissue has to stay dry. A Stage I sore does not usually require covering. Stage II wounds are generally treated with hydrocolloids, or transparent semi-permeable dressings' that hold the moisture in and accelerate skin cell growth. Special dressings may be used for weeping wounds, or those with surface debris. An **antibiotic** cream may be used for contaminated sores.
- **Oral antibiotics** - the patient may be given oral antibiotics if the pressure ulcers are infected.
- **Relief from muscle spasms** - skeletal muscle relaxants that block nerve reflexes in the spine or in the muscle cells may alleviate spasticity.

CONCLUSION

- To improve data quality, it is necessary to improve staff recognition and staging of pressure ulcers. An effective way to prevent pressure ulcers is to pay close attention to patients with risk factors for pressure ulcers.
- Keeping an eye on the number of inside cases of pressure ulcers in the hospital is very important as it would serve as a parameter for the nursing quality.
- The recognition and staging of pressure ulcers is very important, so, a comprehensive skin assessment every three months with a wound care nurse is required.
- Keeping a track on the healing process of pressure ulcers is important before being admitted and at the time of discharge
- Management of the case is an indicator of quality of the hospital.
- Assistance with management may be obtained by consulting with colleagues knowledgeable in the field. But finding such physicians may be challenging because interest in this topic is underrepresented and spread across many disciplines, such as rehabilitation medicine, plastic surgery, critical care, family medicine, geriatrics, and palliative care.
- The field of nursing, however, should be very active in this area of research, and nurse specialists such as enterostomal therapists, who frequently are exposed to these problems, may be better able to provide assistance.
- Health-care workers in the fields of physiotherapy, occupational therapy, and nutrition science may also be helpful in developing a management plan.

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