Summer Training at
Paras Hospital, Gurgaon
(April 1–May 31, 2014)

- **A Time Motion Study on In-Patient Discharge Process**
- **A Study on Operation Theaters Utilization**

By
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Under the guidance of
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MBA- Hospital & Health Management (MBA-HM)
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2014

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CERTIFICATE

This is to certify that Ms. Ritika Batra has undergone her summer training in Paras Hospitals, Gurgaon from 1st April, 2014 to 31st May, 2014 and has done projects on:

- A Time Motion Study on In-Patient Discharge Process
- A Study on Operation Theatre Utilization

Her approach to the study has been scientific and analytical. This summer training is partial fulfilment of course requirement and is recommended for the award of Post Graduate Diploma in Hospital and Health Management.

I wish her success in all her future endeavours.

Dr. Ashok Kaushik
Dean (Academic & Student Affairs)
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PARAS
HOSPITALS
Partners In Health

PHPL/HR – Comm./2014/212 May 31, 2014

WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms Ritika Batra** has successfully completed her two months training in Operations Department with our organization from **April 1st 2014 to May 31st 2014.**

During her training period, she was found to be sincere and efficient.

We wish her all the best for future endeavors.

For Paras Hospitals

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Acknowledgement

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LIST OF ACRONYMS

- AC-Air Conditioner
- AMC-Annual Maintenance Contract
- AHU-Air Handling Unit
- BME- Biomedical Engineering
- BMW-Biomedical waste
- CAG-Coronary Angiography
- CCU- Coronary Care Unit
- CGHS-Central Government Health Scheme
- CMO-Casualty Medical Officer
- CSE- Combined Spinal Epidural Anaesthesia
- CSSD- Central Sterile Service Department
- CT-Computed Tomography
- CTVS ICU- Cardio Thoracic Vascular Unit
- DNB-Diplomate of National Board
- DVT-Deep Vein Thrombosis
- ECG-Electrocardiography
- ECHS-Ex-servicemen Contributory Health Scheme
- ED-Emergency Department
- EEG-Electroencephalography
- EMG-Electromyography
- ENT-Ear Nose Throat
- ER- Emergency Room
- ERCP-Endoscopic Retrograde Cholangiopancreatography
- ESI-Employee State Insurance
- ETO-Ethylene Oxide
- FCU-Fan Coil Unit
- FMCG-Fast Consuming Consumer Goods

- GA- General Anaesthesia
- GDA- General/Ground Duty Assistants
- GM-General Manager
- HCO-Health Care Officer
- HIS-Hospital Information System
- HIV-Human Immunodeficiency Virus
- HMIS-Hospital Management Information System
- HOD-Head of Department
- HSEB-Haryana State Electricity Board
- HVAC-Heat Ventilation Air Conditioning
- ICU- Intensive Care Unit
- IPD- In-Patient Department
- IT-Information Technology
- JCI-Joint Commission International
- LDR- Labor Delivery Room
- LOS- Length of Stay
- MICU-Medical Intensive Care Unit
- MLC-Medico Legal Case
- MO-Medical Officer
- MRD- Medical Record Department
- MRI-Magnetic Resonance Imaging
- MRP-Maximum Retail Price
- NABH- National Accreditation Board for Hospitals and Healthcare Providers
- NABL- National Accreditation Board for Testing and Calibration Laboratories
- NCV-Nerve Conduction Velocity
- NICU- Neonatal Intensive Care Unit
- NSICU-Neurosurgical Intensive Care Unit
- OPD- Out-Patient Department
- OT- Operation Theatre
- OTC-Operation Theatre Complex

- PAC- Pre- Anaesthetic Checkup
- PACU-Post Anaesthetic Care Unit
- PHC-Preventive Health checks
- PICU- Paediatric Intensive Care Unit
- PTCA-Percutaneous Thrombo Coronary Angioplasty
- RDP-Random Donor Platelet
- RMO-Resident Medical Officer
- SA- Spinal Anaesthesia
- SDP-Single Donor Platelet
- SICU-Surgical Intensive Care Unit
- TAT-Turnaround Time
- THR-Total Hip Replacement
- TKR-Total Knee Replacement
- TMT-Treadmill Test
- TPA- Third Party Administrator
- UV-Ultraviolet

Chapter1-Overview of the Hospital

Paras Hospital Gurgaon is a NABH Accredited 250 bedded super specialty hospital. It was the first hospital in Gurgaon region to get NABH accreditation. Since its inception it has aimed to be a preferred health care provider for all. Its expertise in advanced medical and surgical treatments helped thousands of patients receive world class quality treatment of affordable cost. Paras is equipped with one of the leading Neuro Sciences centres in the region which boast of all facilities needed for research and surgery in the field of Neurosciences. Besides this it has 55 specialty departments which include medicine, minimal invasive surgery, gynecology, oncology, ophthalmology, dermatology, cosmetic surgery, plastic surgery etc. in its mission to provide affordable health care services to all people, it has taken a step ahead to start two major projects in state of Bihar, Paras HMRI hospital, Patna has a capacity of 350 beds while Paras global hospital Darbhanga has a capacity of 100 beds. The multi disciplinary facilities provided by Paras hospital at its Patna and Darbhanga hospitals make it one of the largest health care providers in Bihar. Paras hospital is also renowned globally for its specialized international patient services. Patient from all across the globe visit Paras frequently for health checkups. Customized treatments and surgery are designed to benefit international patients.

1.1 Vision

- To become preferred healthcare provider for all.
- Partnership in caring and curing.
- Providing excellent medical care to customers through faith in values, integrity, respect, teamwork and innovation to achieve complete patient satisfaction.

1.2 Mission

- To provide competitive, innovative and accessible medical care to the patients.
- To facilitate improving the health of patient by providing quality service through professionals that is affordable and delivered-

- ***C***ompassionately
- ***A***ppropriately
- ***R***esponsibly
- ***E***fficiently

1.3 Quality Policy

Paras Hospitals believe in partnership with the communities they serve.

- Paras Hospitals provide uniform patient treatment and care, use of evidence based medicine and excellence in clinical outcomes.
- Knowledge enhancement for staff, clinicians and patients.
- Delivering superior customer service and complying with statutory regulations

1.4 Accreditations

National accreditation board for hospital and healthcare providers (NABH) accreditation- Paras is the first multispecialty hospital in Gurgaon to receive this accreditation. Primarily focusing on patient care, safety, continuous quality improvement and innovation, NABH (Accredited by ISQ, International Society for Quality in Health Care) has been set up to bring the world‟s best Health care quality standards to India. This accreditation is testimony to the fact that Paras care pathways are protocol driven, reflect global practices and ensure that patients consistently receive Quality care.
Paras diagnostics is accredited by NABL, India‟s leading accreditation body pathology services. This reiterates Paras diagnostics position as a premier provider of pathology services in India. With a team of highly experienced and efficient staff, it provides services strictly adhering to International Quality standards. Its well organized sample management practices and state of the art automated equipments ensure that patients receive quick and accurate results.

1.5 Paras Hospitals, Gurgaon

- 250 - bedded Multi super specialty hospital, spread over 3 Acres with covered area approx 2.1 Lac sq. ft. spread over 7 stories
- 6 State of the art Operation Theaters
- 70 critical care beds
- Region"s most Advanced Neurosciences & Trauma Center
- Flat Panel Cath Lab
- 24 Hr ER forms backbone of the hospital services
- Round the Clock three Cardiac ambulances with all the life-saving equipment.
- Advanced Mother & Child Care Unit with Level III Neo – Natal ICU
- Fully automated Blood Bank with component facilities and advanced facilities for collection & processing

1.6 Floor wise Facility Distribution

Fourth Floor

- Nurse Stations
- 4A = Neurosurgery Ward (All Room Categories)
- 4B = Surgery Ward (All Room Categories)
- Dormitory – 9 beds
- 4C = General Ward
- PICU

Third Floor

- Patients" Rooms & Wards
- Labor Room (The Bliss), NICU
- Nursing Stations A, B, C and D.
- VIP Suite
- Deluxe Rooms
- LDR Suites

- Single bedded Rooms
- Double bedded Rooms
- Four bedded Rooms

First Floor

- Operation Theaters
- Neuro ICU
- Medical ICU
- Surgical ICU
- CCU
- CTVSICU
- Post Operative Recovery Room
- Cath Lab

Ground Floor

- Emergency Room with Minor OT
- Radiology & Imaging
- Pharmacy
- Dialysis Room
- Endoscopy Suite
- Doctors‟ Consultation Rooms
- OPD

1st Basement

- Kitchen
- Staff Cafeteria
- Visitors‟ Cafeteria
- Physiotherapy
- IT
- Marketing
- Office- Administration
- Laboratory

- Blood Bank
- Dermatology
- Dentistry
- PHP
- Attendance M/C

2nd Basement

- Attendance Swiping Machine
- CSSD
- MRD
- Engineering
- Purchase & Commercial
- BME
- Morgue
- Parking
- Store

1.7 Services at Paras Hospital

- Anesthesiology
- Cardiac sciences
- Dental Surgery
- Dermatology
- Dietetics and Nutrition
- Emergency and Trauma centre
- Endocrinology
- Geriatrics
- Gynecology
- Hematology
- Head and Neck Oncosurgery
- Internal Medicine
- Laparoscopic, Gastrointestinal and Bariatric Surgery

- Mother and Child
- Neuro Sciences
- Neuro, Vascular and Non vascular intervention
- Obstetrics
- Ophthalmology
- Orthopedics and Joint Replacement
- Pediatrics
- Physiotherapy and Rehabilitation
- Plastic and Reconstructive Surgery
- Preventive Health Checkups
- Psychiatry and Psychology
- Pulmonary and Critical care
- Radiology
- Renal sciences and Urology
- Rheumatology

Chapter 2-Details of Departments Visited

2.1 Clinical Support Services

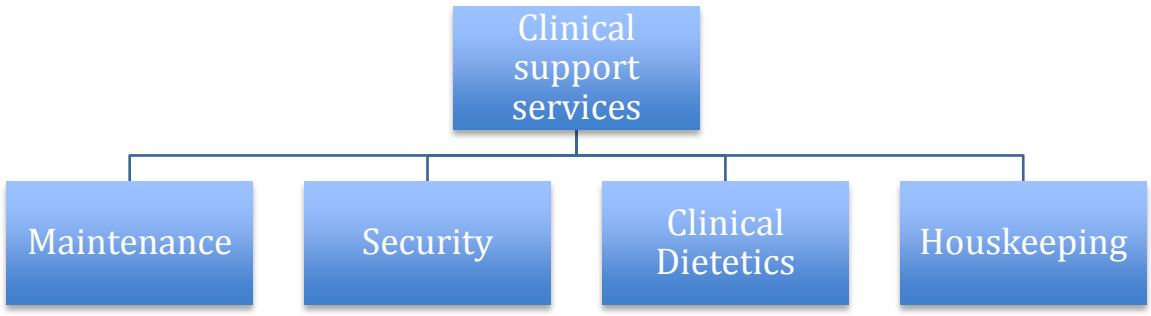

Figure 2.1.1: Segregation of the Clinical Support Services

2.1.1 Maintenance Department:

Location: Second Basement

Overview:

There are 13 contractual staff who are experts in different areas of maintenance. There are 4 employees of Paras hospital in the maintenance department namely Head engineer, Senior executive, Jr Engineer and the Lift Manager. There are various kind of registers which are maintained by the department with special focus on Operation Theater (OT). These files are as follows:

1) OT(temperature, humidity, CFM(cubic feet per minute(1 tonne=400 cubic feet per minute, used in AC))
2) OT complains
3) OT air exchanges
4) Complain register
5) Daily maintenance rounds
6) Handover register

7) Ion charger(Chemical to be added to water to prevent scaling)
8) Job Card (Used to get a confirmation from the floor manger that the complain is taken care of)

This department is responsible to look after all the infrastructure and non medical related machines installed inside the hospital. The major domains of maintenance are:

1. HVAC system.
    a. FCUs and AHUs
2. Electricity
3. Sewage and water supplies
4. Miscellaneous maintenance

1) HVAC system

a. List of machines
    i. Boilers of Aqumatic (Thermes) - 30,000L capacity-2
    ii. Chillers of Carrier-185TR-2
    iii. Chillers of Carrier-265TR-1
    iv. Condenser pump of ABB-15KW-2
    v. Condenser pump of Crompton Greeve-15KW-1
    vi. Chiller pump of ABB-15KW-3

HVAC basically consists of two subparts, namely boilers (used in winters) and chillers (used in summers).
The major work of HVAC is to provide central air conditioning to the entire hospital.

<u>Working in summers</u>:
Water enters the chiller via cooling towers which are present on the terrace of the building. R134a is the refrigerant being used. After the water is brought to low pressure with the help of an expansion valve, water is converted into high pressure vapors by a compressor. These vapors cool the building by air conditioning with the help of FCUs.

During this process there are a couple of heat exchanges due to which these vapours are converted into water. After this the water is again pumped up to the cooling tower with the help of condenser pumps to repeat the same process.

Working in winters:

Water is sent into the boiler from the reservoir where it is heated and converted into vapors and pushed into the air vents with help of a pump.

FCUs and AHUs:

There are a total of 51 AHU"s (Air Handling Units) which are responsible to absorb the environmental air and recondition it and resupply to the environment. Meanwhile there are 161 FCUs (Fan Coil Units) which are responsible to cool the infrastructure by passing air through the chilled water coils(which come from chiller pumps).

2) Electricity

HSEB transmits electricity to the hospital at 1100KVA (3 phase current), which is brought down to 430V , 3 phase 1 neutral current by a step down transformer(Star to delta conversion).

The process is shown below:

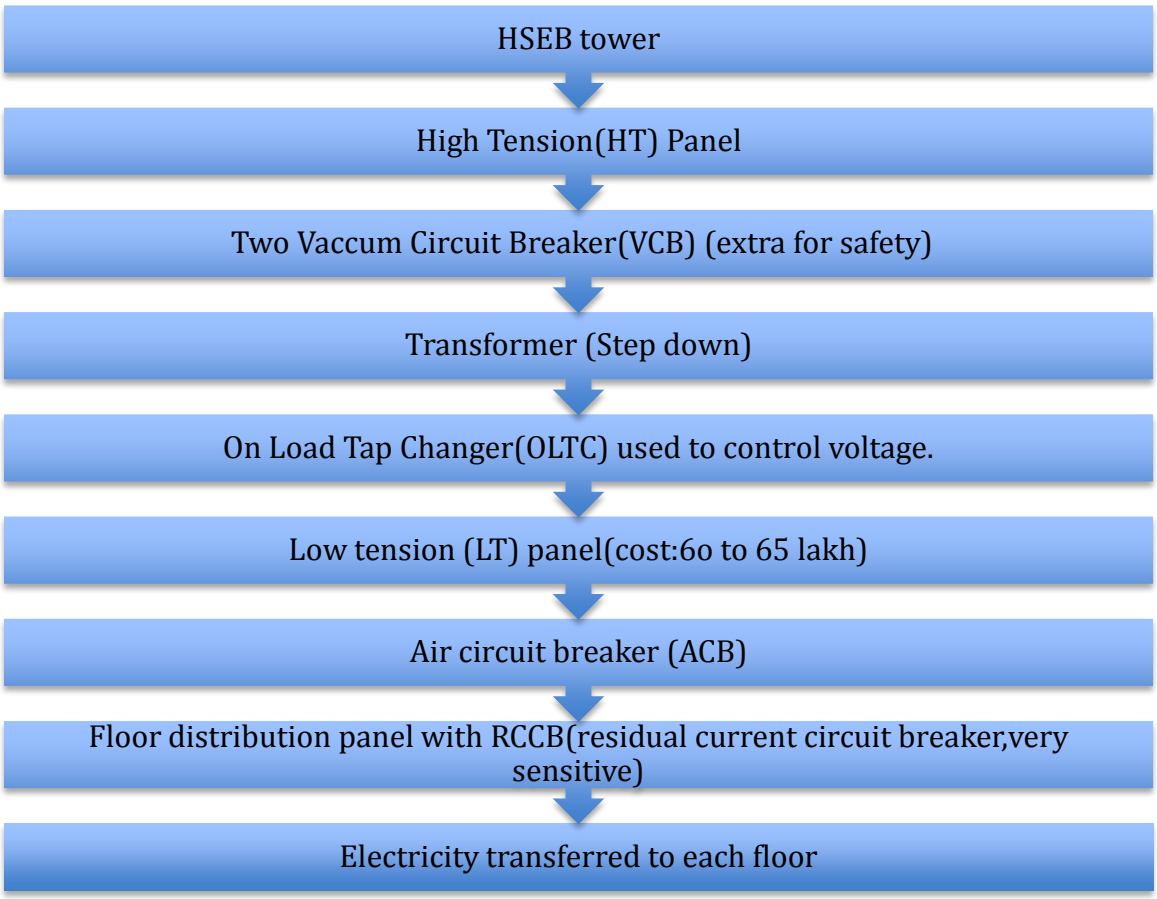

Figure 2.1.2: Electricity transfer flowchart

ACB and VCB (cost: 3-4 lakhs) are used as safety device if there is a case of overload on the system. These safety device break the circuit and save the devices present ahead from overload of electricity. In case if there is a loss in power supply, two diesel generator (DG) of 500V(automatic) and 380V (Manual) are used. To prevent uninterrupted power supply during the time lag of the DGs to work , five UPS are used to power critical services, such as OT,ICU, Computer systems, Security cameras etc. These 5 UPS have the following rating:

1. UPS of power rating 30KVA (2)
2. UPS of power rating 20KVA (1)
3. UPS of power rating 5KVA (1)

Also separate registers are maintained for electricity by the department:

1. Transformer reading

2. Daily consumption of electricity based on HSEB meter reading and the time for which the diesel generator were kept working.
3. Generator check list

3) Water management

The hospital has six tanks of one lakh liters each out of which two are for fire safety department and 4 are used for water supplies. The water goes through a water softener and is further pushed into the pipeline with a hydraulic pump and than distributed.
Water is supplied to the hospital by the government and in house bore wells. The water is pumped by a 7hp centrifugal pump with a capacity of 6,000 litre per hour.

The water is softened with the help of a water softening process which consists of three levels.

1. Water is passed through sand in the first tank of capacity 500 litre
2. Water is made to pass through carbon present in the second tank of capacity 500L
3. Finally the water is passed through resins which have to be charged from time to time with the help of salt. It takes about 45 minutes to charge the tank.

Once charged the water hardness is checked after 4 hours of working and accordingly the resins are again charged. A 5hp motor is used to run the softener process. The softness is brought down from 100 ppm to less than 10 ppm which is fit for drinking. Also this water for drinking purpose is sent to RO purifier, which further reduces the hardness to about 3ppm. There are two RO purifiers of 250L (used for dialysis) and 500L(used for drinking) capacity.
The water hardness is checked by a liquid kit or also by a hardness strip. The hospital consumes about 3,00,000 litres of water a day.
In case of sewage water, the water is collected from all the floors and then is treated at the STP plant, after which the water is directed back into the sewage pipeline of size 30 inch that has a filter attached to the end. This pipe end into the city sewage pipeline.
Registers maintained for water management:

1. TDS (Total dissolved solid) and water hardness(in parts per million) before and after charging the salt

2. Separate TDS and hardness register for RO purifiers(Before and after changing the filter). As for dialysis the TDS should be less than 50 and hardness less than 3 ppm. For drinking purpose, the hardness of water should not exceed 20 ppm.

List of machines for fire safety:

1) Sprinkler pump-(Kirloskar)-75HP
2) Jockey pump-(Kirloskar)-15HP
3) Hydrant Pump-(Kirloskar)-75HP
4) Diesel generator (DG)-Banco products-100KVA

4) Miscellaneous Maintenance

The maintenance of the infrastructure and the generic complains of the hospital, right from fixing a chair to fixing the air supply of the OT, are addressed by the department.

2.1.2 Security Department

Location: Second Basement

Manpower:

On Paras Payroll:

1-Security Manager

1-Security Officer

2- Asst. Security Officer

2- Head Supervisor

Contractual:

2-Security Supervisor

29-Security guards

The major responsibilities of the department are:

1) Vehicles Management

Vehicles coming inside the hospital are first checked for potentially harmful substance or device. The checking is done by checking the lower part of the car. At the entrance, based on the reason of visit, passes are made by the security guard. A multiple enter and exit

pass made by the person concerned if the attendant or the driver needs to visit the hospital multiple number of times in a single day. Parking is separate for staff and doctors, and visitors.

Vehicles coming in with some supplies or machines for the hospital can be issued two kinds of passes, which are:

- Returnable Gate Pass (RGP): This pass is issued to vehicles which will be coming back to the hospital premises again. Example: A machine is sent for repair to a workshop. In that case the vehicle will be issued a returnable gate pass for the promised period of repair by the vendor. So that the pass will be valid for the agreed number of days.
- Non- Returnable Gate Pass (NRGP): This gate pass is issued to vendor vehicles who wont be returning. Example: A medicine vendor can unload its consignment of medicines for the pharmacy but it wont be returning again in a stipulated period of time.

2) Attendants visiting IPD patients

As per the hospital policy only one attendant is allowed with the patient for 24 hours and only a maximum of two visitors per patient are allowed during the visiting hours. This is also called the access control of the hospital. All the attendant and visitors are issued respective id cards, without which they cant enter the visitors lift which go upstairs to the IPD. The work of security in this case is to check the id passes and only than allow a person to enter the lift.

3) Cameras in the hospital

There are a total number of 48 cameras placed at strategic points within the hospital so that the security officers have a hawk‟s eye view of the entire hospital and people present in the hospital. The main display of all the cameras is present in the security office. The camera is always on recording mode and the recordings are saved for 15 days before they get deleted automatically.

Type of cameras:

- Wall mounted camera: 13
- Dome shaped camera: 30 + 3(In three lifts i.e cargo, patient and visitor lift)
- Penta zoom (PTZ) camera: 2 in number; located on terrace in the from and rear of the hospital with a zoom radius of 1km.

4) Maintaining the decorum of the hospital (Mob control)

Some of the emergency codes are mentioned below:

Emergency codes (dial *111)	
Codes	Meaning
Blue	Cardiac arrest
Violet	Violent people
Red	Fire
Yellow	Bio hazard
Pink	Child abduction or person lost
Black	Bomb threat

Table 2.1.1: Emergency codes

These codes are announced by the call center amongst the staff initially so that the staff can take immediate action without creating any chaos amongst the visitors to the hospital. The helpline number is that of the security department. In case of a mob, all the extra guards at other posts will be called in instantly to control the mob and only two to three attendants of the patients will be allowed inside the hospital. If the situation goes out of hand or it is a medico-legal case, the police should be informed instantly. After proper action is taken, an incident sheet is filed based on the incident which is than discussed with the top management.

5) Fire Safety and Disaster Management

Fire increases majorly because of three things, namely heat, oxygen and fuel.

There are majorly four classes of fire which can be caught inside a hospital:

- A-Ordinary Combustibles (wood, etc)
- B- Combustible liquids and gas (grease, oil, LPG, etc.) (water will increase this kind of fire)
- C- Electrical fires (caused due to short circuits)
- D – Metals (Dense metal like catching fire)

Types of fire extinguisher:

- ABC powder: It can work for class A,B and C.
- CO_2 type: Only for Class B and C
- DCP type: Dry chemical powder(DCP) should not be used in any crowded area has it can have a disastrous effect on people breathing it. This is used for Class D.
- Foam type: On breaking the cartilage in this extinguisher, a mixture of foam and water comes out. This is used for Class A only.

A master disaster management plan has already been planned in case of fire or any hazard. A special emergency response team (ERT) of 40 staff members has been made if in case of any disaster. All the staff members are given proper training from time to time against fire and other related hazards. In case of a fire:

F-find

I-inform

R- restrict

E-extinguish

The above acronym is used to educate the staff.

The ERT would segregate into smaller teams as mentioned:

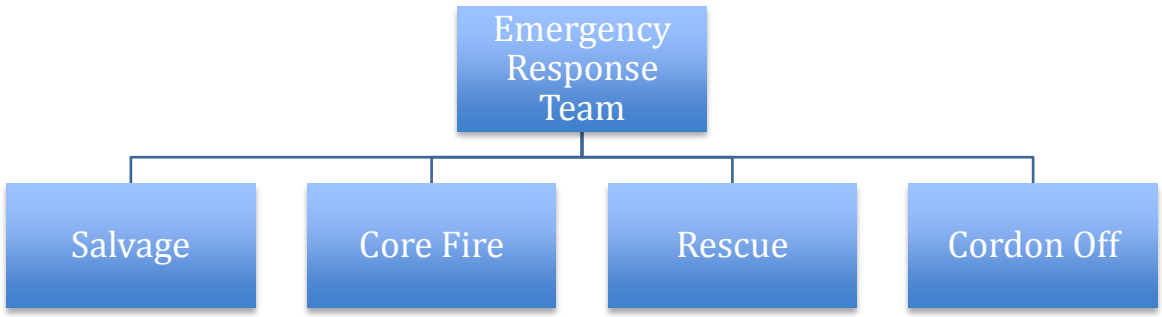

Figure 2.1.3: Emergency response team segregation

- Salvage: This team would try and save all the documents and devices which are of extreme importance such as files, instruments, etc.
- Core Fire: The only work of this team would be to extinguish the fire.
- Rescue: This team would be responsible to save the patients and other visitors to the hospital incase of the fire.
- Cordon Off: As the word suggests, this team would be responsible for preventing access to or from (an area or building) by surrounding it.

6) Dead body shifting from the mortuary

The department has to make sure that anybody that comes in the mortuary, has to be shifted within seventy two hours otherwise the embalming process has to be done for the body. If nobody claims the dead body than the body is shifted into the district hospital.

2.1.3 Clinical Dietetics Department

Location: Second Basement

Manpower:

Paras Payroll:

Dieticians-4

Contractual Staff:

Cooking staff-12

Utility workers-8

Stewards-22

Introduction

This department is responsible for providing food and beverages as per the need of patients. It is also responsible for setting the menu for the canteen, which is outsourced, for providing meals to staff and visitors of the hospital. For patients, depending upon their condition, meals are provided seven times a day. If the patient is supposed to be on liquid diet than the meals are provided nine times a day. A team of committed dieticians make sure that every patient gets the meal which suits them the most. All the meal plans of every patient are made with the help of HIS system that is provided. A separate charge of Rs 400 is levied on the patient as dietician consultation charges. Based on the meal plan, room wise list is made according to which the staff distributes food to each room. The food distribution is done with the help of food trollies. Proper hygiene is maintained and quality checks are done on a daily basis. These checks are done with the help of a proper checklist. Every floor has a separate pantry where the food timings and schedules are displayed. Also microwaves are kept to heat up the food, if needed.

The department follows a 10 day set menu so as to reduce monotonicity in terms of type of food served.

Every patient has a different meal plan especially tailor made the patient. The dieticians also plays a major role in bringing back the diet of the patient to normal i.e. Liquid diet to soft diet to semi solid to normal diet. Some surgeries , such as spinal surgeries cant be performed on obese patients, hence the dietetics department helps patients loose weight through specific diets. Time when food is given in the hospital.

There are various find of diets:

1. Clear liquid Diet
2. Diabetic Diet
3. Potassium restricted Diet
4. Loose motion
5. Chemo or Neutropenic Diet

Also the timings for food are as follows:

1. 6- 6:30am(Bed tea)
2. 8-9am(Breakfast)
3. 10-10:20am(Mid meal)
4. 11-11:30am(Soup)
5. 12:30-1:30pm(Lunch)
6. 4-4:30pm(Evening tea)
7. 6-6:30pm(Soup)
8. 7:30-8:30pm(Dinner)
9. 9-9:30pm(Bed time)

For six meals a day patients, the timings of food are:

1. 8-9am(Breakfast)
2. 11-11:30am(Soup)
3. 12:30-1:30pm(Lunch)
4. 4-4:30pm(Evening tea)
5. 6-6:30pm(Soup)
6. 7:30-8:30pm(Dinner)

2.1.4 Housekeeping Department

Manpower:

On Paras Payroll:

1-Manager

1-Assistant Manager

4- Head Supervisor

Contractual Staff:

6-Supervisor

113-Contractual manpower

1) Laundry:

As the name suggests the work of this department is to look after the cleanliness of the hospital. This department maintains 2.25 PAR for bed sheets and 2.1 PAR for patient dresses, which ideally should be between 3 to 4 (1 in use, 1 in laundry, 1 in inventory and 1 as back up) depending upon the location. The ICU should have a higher par in terms of stocking. Laundry comes under the purview of this department. The laundry service is outsourced to "laundry.com" and the morning load is given back in the evening and the evening load in the next morning. Cost of towel is Rs5 and bed sheet is Rs4.75. Everyday a morning briefing is given to the staff and also the staff is trained in terms of making beds. There is a separate laundry for OT linen which works hand in hand with the CSSD.

2) Turnaround time:

The turnaround time (TAT) for getting a single room ready is 30 minutes and for a double rooms 20 minutes. No bed sheet is laid on the empty beds in the double room or rooms with more than one occupancy because it might be used by the attendants of other patients. Every floor has its own linen room from where linen is dispensed to the floor. Bed sheets are changed three times a day. Proper schedule is in place for the cleaning of the floor for every day. Before the room is handled over to the patient, a checklist is signed by the floor coordinator to make sure everything is as per standards. Near the end of every month a physical counting is done.

3) Chemical used for cleaning

For dusting and cleaning of the hospital the R series chemical of Johnson Diversey is used:

Chemical Type	Use
R1	Floor cleaner (multipurpose)
R2(contains Hypochlorite)	Floor cleaner + disinfector
R3	Glass cleaner
R4	Wooden Polish
R5	Air freshener
R6	Toilet Bowel Cleaner
R7	Bathroom Tiles
R9	Multipurpose floor cleaning +heavy duty spots
D7	Steel polishing

Table 2.1.2: Chemical list of Johnson Diversey

R1,2,3,9 are generally used in the concentration of 20 to 40 ml per litre. In case of heavy cleaning the concentration is increased to 40 to 60 ml per litre. Italian marble, which is used in public places and is used in the OPD section, needs to be cleaned with low concentration of cleaning chemical because high concentration will remove the polish of the marble. Plastic material or ebonite is cleaned by general scrubbing.

Carpet cleaning is done by using chemicals from TASKY Company.

Chemical name	Use
TR101	Carpet cleaner
TR103	Carpet spot remover

Table 2.1.3: Chemical list of TASKY company

Also for laminated and vinyl flooring, a separate set of chemicals from Quatz company should be used:

Chemical name	Use
Q1	Strip Polishing
Q2	Polish Putting
Q3	Polish maintenance

Table 2.1.4: Chemical list of Quatz company

In ICUs, a 1% hypo solution is used for cleaning , thee times a day. Accordingly the floor is of ceramic.

4) Biomedical Waste Management

The biomedical waste is collected by the housekeeping staff in the evening and morning, so that it can be given to the municipal van for final disposal of the waste. During the collection, the area, person disposing and shift is mentioned. This is done so that if something is disposed by mistake, it would be easy to find. The area, where all the BMW is assembled, is divided into 4 separate blocks namely red, blue, yellow and black.

Color Coding	Type of waste	Disposal
Red	Used plastic items, catheters etc.	1. Autoclave 2. Thrashed 3. Melted(no reuse)
Yellow	Body part or anatomical waste. Eg used gauze pieces	Incineration
Blue	Glass items, sharp instruments	Melted and reusable
Black	General waste	Dumped or incinerated.

Table 2.1.5: Color coding for biomedical waste

Ideally the blue bin should be used for unbroken glass. A sky blue bin with a white color lid should be used to dispose off used needles and other sharp objects. One this bin is closed, it cannot be open. This bin is puncture proof and is directly sent for incineration.

Additionally a “C” labeled dustbin is specially made for contaminated medicine and chemo drugs. Also a separate type of green garbage collection bag should be kept to collect kitchen waste. This bag is biodegradable and can be used in the form of compost pit.

5) Type of Spills

There are two types of liquid spills for which a spill team as been made:

1. Minor spill (less than 30ml)
2. Major Spill (more than 30ml)

In case of minor spill a personal protection kit (PPE kit) is used . The kit includes:

1. Tissue paper
2. Spatula
3. Yellow garbage collector
4. Thrash newspapers
5. Hypochlorite.

In case of major spill, which can be of body fluids, chemo drugs etc. A separate set of advanced kit called HAZMAT kit is used.

This kit includes a lot of different instruments and chemicals. To name a few:

1. Gumboots
2. Goggles
3. Chemical suit
4. Full face mask
5. Absorption pad
6. Spatulas
7. Fiber broom
8. 3kg sand(To make a boundary around the liquid, preventing it from further spreading)
9. Dust pan
10. Old newspaper

11. Yellow Garbage
12. Different chemical set (boric acid, citric acid, Hypochlorite)
13. Steel container

Without the Hazmat team, a hospital cannot get any NABH or JCI accreditation.
The hospital has a separate code for the spill team. The team should ideally include Nursing supervisor, Housekeeping supervisor, Infection control nursing team and housekeeping cleaners. The housekeeping is also responsible for pest control and horticulture for which separate AMCs are given.

2.2 Operation Theatre Complex

Operation Theatre Complex in Paras Hospital is located on 1st floor with the restricted area for outside visitors to minimize the traffic and to maintain the sterility. Nobody is allowed inside the Complex without the Management"s or Doctor"s permission. It is also necessary to wear shoe-covers before entering the OT Complex.
OT Complex is divided into different areas:

1. PAC Room
2. PACU
3. CTVS ICU
4. Catheterisation Lab
5. Female Doctor changing room
6. Changing room for OT Technicians
7. Common Room for Doctors
8. OT pharmacy
9. 6 OTs
10. 2 scrub stations
11. 1 room for flash sterilization
12. Dirty utility room
13. OT Store Rooms

1) PAC Room

PAC Room in OT Complex is meant for Pre-Operative Evaluation of patients on OPD basis by Anaesthetists to check if the patient is fit for surgery. This room is also used by surgeons to examine the OPD patients in case the surgeon is in OT.

2) PACU (Post Anaesthetic Care Unit)

This unit accommodates the patients before and after surgery. There are 6 beds in PACU. Patients to be operated are shifted from wards to PACU around 15-30 minutes before. Nursing staff in this unit check the vitals of the patients and check that the medicines have been given to the patients or not. After the surgery is over, the patient is brought to PACU with the objective to monitor the patients post-surgery. The patients" vitals are monitored every half an hour and if the patient is found stable based on Aldrete scoring mechanism (score should be more than 12 out of 14), the patient is shifted to the ward after the evaluation by anaesthetist. Critical patients are directly shifted from OT to ICU for monitoring. Cardiac and Neuro surgery patients are shifted from OT to CTVS ICU and NSICU respectively.

Manpower in PACU:

1 Area Incharge

3 staff nurse

1 trainee.

Shifts:

Morning 7:00-3:30 (1staff nurse)

General shift (G1) 8:00-4:30 (1 Area Incharge)

General shift (G2)12:00-8:00 (2 staff nurse)

Maintaining sterility in PACU:

1) The floor is cleaned every four hours with sodium hypochlorite.

2) For spillage, spill kit is used having PPS (Personal Protective Equipment). PPS includes goggles, scoop, sodium hypochlorite, shoe cover, mask, apron, etc.
3) Fumigation with Lonzagard every Saturday night. Fumigation takes 30 minutes for the process, after that PACU is closed for the whole night.
4) Carbolization of all the beds every morning.

3) Catheterisation Lab

It comes under the cardiology department. Major procedure taking place within the cath lab are CAG and Percutaneous thrombo coronary angioplasty (PTCA). There are overall 24 procedures taking place inside the Cath Lab. Cath Lab is divided into console room, procedure room and store rooms.

4) Operation theatres

There are 6 operation theatres in OT Complex. Based on specialties they are classified as follows:

OT1&4: General surgery but urology cases are preferred to be done in OT1
OT 2: Dedicated to Orthopedic and Spine cases
OT 3&6: Dedicated to only Neurology cases
OT5: Dedicated to Cardiac surgeries

These OTs differ based on different machines and hence different areas. Super specialty branches such as Cardiology and Neurosurgery have almost an area of approximately 20*20 sq. feet. The other OTs are dimensioned around 18*18 sq. feet.

Equipments in OT:

- High Electronic Operation Tables in each OT which can be tilted to 12 positions. Alongwith this, in OT 2 Ortho Table is used whose lower half is detachable and can be connected to Fracture Table in cases such as DHS, etc. In OT 3&5, head end of OT Table is detached and horse shoe is attached to it which supports the head.
- Anaesthesia machine (1 for each OT).
- Laparoscopy machine-1

- 6 Microscopes. 2 are used in Neuro, 1 in spine, 1 in ENT and 2 for eye surgeries.
- Single Pendant in OT 1, 2 & 4 whereas double pendant in OT 3, 5 & 6.
- Instrument s-14 large sized and 8 medium sized.
- Shadow less ceiling lamps (2 in each OT) except Cardiac OT where these are 3 in number.
- 3 Patient warmer, used for long cases or if patient is critical. It maintains the body temperature in the range of 35-40 degree Celsius.
- 15 Syringe pumps
- 3 C-Arm Fluoroscopy Machine
- 16 lead aprons and Thyroid shields used with C-Arm Fluoroscopy.
- FM radio in OT 3&6
- Debrider- 1
- Crash Cart in OT 1&2
- Sterilizer, used in cases when Fogging could not be done. It uses the UV light to sterilize the environment in 15-20 minutes.
- Suction Apparatus, one in each OT.
- Apple recording system: OT 2 & 6
- Patient shifting trolley, 3 in number :
    - in OT-2
    - in Recovery-1

For OTs which are devoted to specialties some machines are different which are stated below:

- Urology:
    - Lithotripsy: Used to break stones with the help of laser.
    - Stabilizer used to operate Lithotripsy.
- Spine and Ortho:
    - DVT pump: used in spine surgeries.
    - Tourniquet machine: To stop arterial supply mainly used in joint replacement surgeries
    - Electro diathermy (unipolar & bipolar)

- Navigation machine

- Neurosurgery:
  - Cusa machine: Used to take out the tumor by vibrating and then aspiring it.
  - Neuro power drill: Used to drill the skull
  - 2 Monitor: To see live surgeries
  - Neuro specific microscope
  - 3 Electro surgical generator: used for cutting and coagulation
  - Air curtain: Supposed to be for sterilization
  - Navigation machine: to locate the tumor
  - Ultrasound machine, attached to navigator to see the tumor after going upto the dura mater.
  - Surgi stool-2
  - Intraoperative machine, to know the nerve conductivity used in surgeries on brachial plexus and CP angle tumor.
- Cardiac Surgery:
  - Heart and Lung machine: to keep the blood circulation in the body normal.
  - Thermostat
  - Defibrillator
- Eye Surgeries
  - PHACO machine
  - Microscope

Each OT has its own inventory of medicines, injectables, IV fluids, dressing materials, etc. which if used during the surgery, is replaced by the OT Pharmacy.
Outside every OT, except OT 6 there is an alarm called “alarm annunciator” which comprises of four blocks i.e. oxygen, nitrous oxide, medical air, vacuum. If there is any fall in pressure for any of these supplies the alarm goes off. For OT 6 the alarm is connected to the OT 5. Each gas supply has a different color coding:

1) Oxygen: White
2) Nitrous oxide: Blue

3) Vacuum: Yellow
4) Medical Air or compressed air -Black

Each OT has 4 HEPA (High efficiency particulate air) filters and laminar flow is maintained inside the OT. Each OT has uninterrupted Power Supply to support the life saving machines and temperature and humidity monitor to keep track on the required levels in OT. The Normal level for the temperature in OT is 18-22 degree Celsius and humidity is maintained in 45%-55%.

If there is a highly infectious patient whose surgery is taking place. In that case , disposable mattress, double gloves, face shield mask, eye covered with transparent film and only disposable linen are used. Then after the surgery, Operation Theatre is fumigated.

Manpower:

1. Head of Department
2. Anaesthetists-5
3. DNB students-3
4. Nursing staff (assisting surgeons)- 21+2trainees
5. Technicians (assisting anesthetists)- 15+3trainees
6. Housekeeping or cleaning staff - 4 (2 inside, 2 outside)
7. GDA- 4 (2 inside, 2 outside)

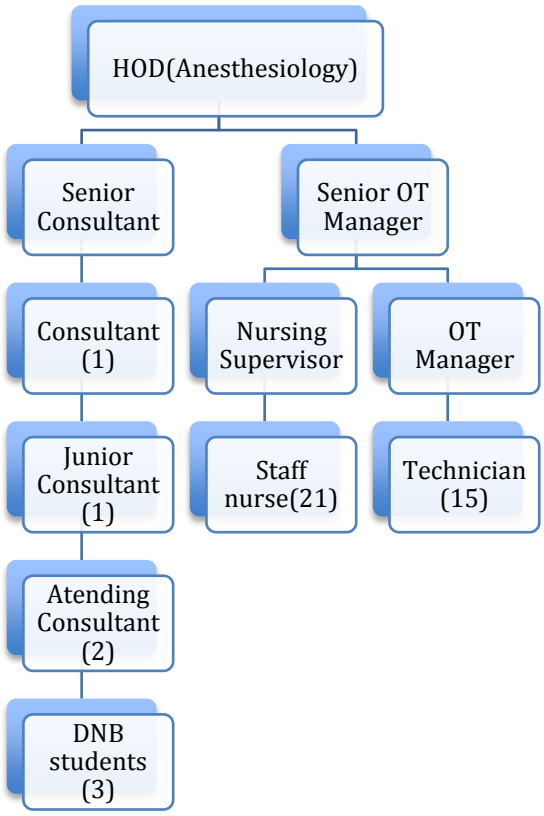

Figure 2.2.1: OTC organogram

For each OT except Neuro and Cardiac OT, there is a requirement of 1 technician to assist anaesthetist and 2 staff nurses to assist surgeons (1 scrub nurse and 1 circulation nurse). For Neuro OT-3 staff nurse and 1 Technician and for Cardiac OT, 3 staff Nurse and 2 Technicians.

Shifts (same for Technicians and Nurses):

General shift G1: 8:00am -4:00 pm (13 nurses and 8 Technicians)

General shift G2: 12:00pm-8:00pm (2 nurses and 1 technician)

Shifting duty: 2:00pm-8:00pm (2 nurses and 2 technicians)

Night: 8:00pm-8:00am (1 nurse and 2 technicians)

Sterilisation in OT-

a. After every surgery cleaning of floor is done by sodium hypochlorite and bags of the bins are changed.

b. Different sets of instruments are there for different surgeries. After the surgery, used instruments are washed with 3M and then after drying them they are wrapped in double sheet and sent to CSSD department for sterilization. TAT for unused instrument is 72 hours. In case of any emergency they are sterilized in autoclave in flash sterilization room. The process for sterilization takes 20-30 minutes. Sterilization indicators are being used to check, if sterilization has been done properly or not. Color of indicator changes after sterilization; color changes from green to black for instruments being autoclaved. ETO objects are also sent to CSSD department after use. TAT for unused is 6months.
c. If during surgery, surgical instruments fall down on the floor and the same instrument is not available, then for quick sterilization it is dipped in Disinfection Soaking Tray containing CIDEX.
d. The Laparoscopic instruments are dipped in Disinfection Soaking Tray containing CIDEX(2% Glutaraldehyde) solution for 20 minutes to sterilize them in case those are needed for the next surgery otherwise they are stored in the Formalin chamber with Formalin tablets. For sterilization of Laparoscopic instruments in the Formalin chamber, 30 minutes are the least required.
e. Once a week fumigation is done with Lonzagard. Microbial sample is collected before fumigation & is sent to lab and same procedure is performed after fumigation has been done & comparison is done to see the effect of it. Usual timings of fumigation is 45min but once in a week OT has been kept closed for a night. One OT is kept operational in case there is an emergency.
f. Different slippers are used inside the OT area. Only for Neuro OT slippers are specific. Some OTs such as Neuro and Urology where liquid losses are high gum boots are used.
g. Instrument trollies are carbolized after each surgery.
h. Patient trollies are carbolized in case it goes out of the OT Complex.

5) Scrub stations

Two scrub stations are there. Each scrub station has three taps, one is to take out 10% Butadiene and the other two are for water supply (one manual elbow tap and one automatic).

6) Utility room

Utility Room is for-

1) Washing soiled linen with sodium hypochlorite.
2) Washing soiled instruments 3M solution.
3) Collecting Biomedical waste in different bins according to the color coding:
   Blue- Unbroken Glass
   Red-Infected Plastics: IV sets, gloves, tubings, catheters, urobags, etc.
   Yellow-Anatomical and Pathological waste: cotton gauze, etc. contaminated with blood or other body fluids.
   Black-General waste.
   After collection of biomedical waste inside the utility room it is taken in the containers to the main garbage disposal from where it is sent for incineration. In case of an amputated body part, it is packed in the Yellow bag with patient details attached to it and then sent for incineration.

Broken glass pieces are sent after double wrapping it in paper and then writing over it- „BROKEN GLASS".

7) Store rooms:

3 store rooms are there. One store room is for Cardiac OT gen and neuroot store

- For Neuro OT,
- For Cardiac OT, and
- For General OT.

8) OT pharmacy

OT has its separate pharmacy with the total manpower of 4. OT Pharmacy has been given the list of items needed for each surgeries which ease the process. According to the surgeries pharmacy gets all the required medicines and surgical items ready in a very short period of time. Once the operation is over, the nurse or technician provides the list of instruments and medicines used, which are then added to the patients bills, rest of the medicines are returned.

The inventory in OT Pharmacy is maintained by the HIS and reorder through the ROL (Re order level) based on moving medicines and instruments. Near 20^{th} -25^{th} of every month, the pharmacy looks for medicines which are closing expiry(3 months) and surgical items(6months) then deposits it to the IP pharmacy, so that it can be returned to the vendor for credit. Implants are taken on credit from vendors. If these implants are used, the vendor is asked to provide the bill which then included into the patient‟s bill or else it is returned to the vendor. Every Saturday the OT pharmacy files its indent and maintain the optimum number of medicines and surgical items.

9) OT billing

After each surgery, OT charge slip is filled by the circulation nurse and at the end of the day, all the slips are sent to the IP Billing Department.

The list of medicines, injectables and other surgical items used in the surgery are provided by the nurses and technicians to the OT Pharmacy where Billing for all these items are done.

10) OT Scheduling

OT Scheduling is done by Senior OT Manager. Patients take appointment from doctors & according to the convenience of patients & doctors, date & time of surgery is decided and this way scheduling of OT is done.

PROCESS FLOW:

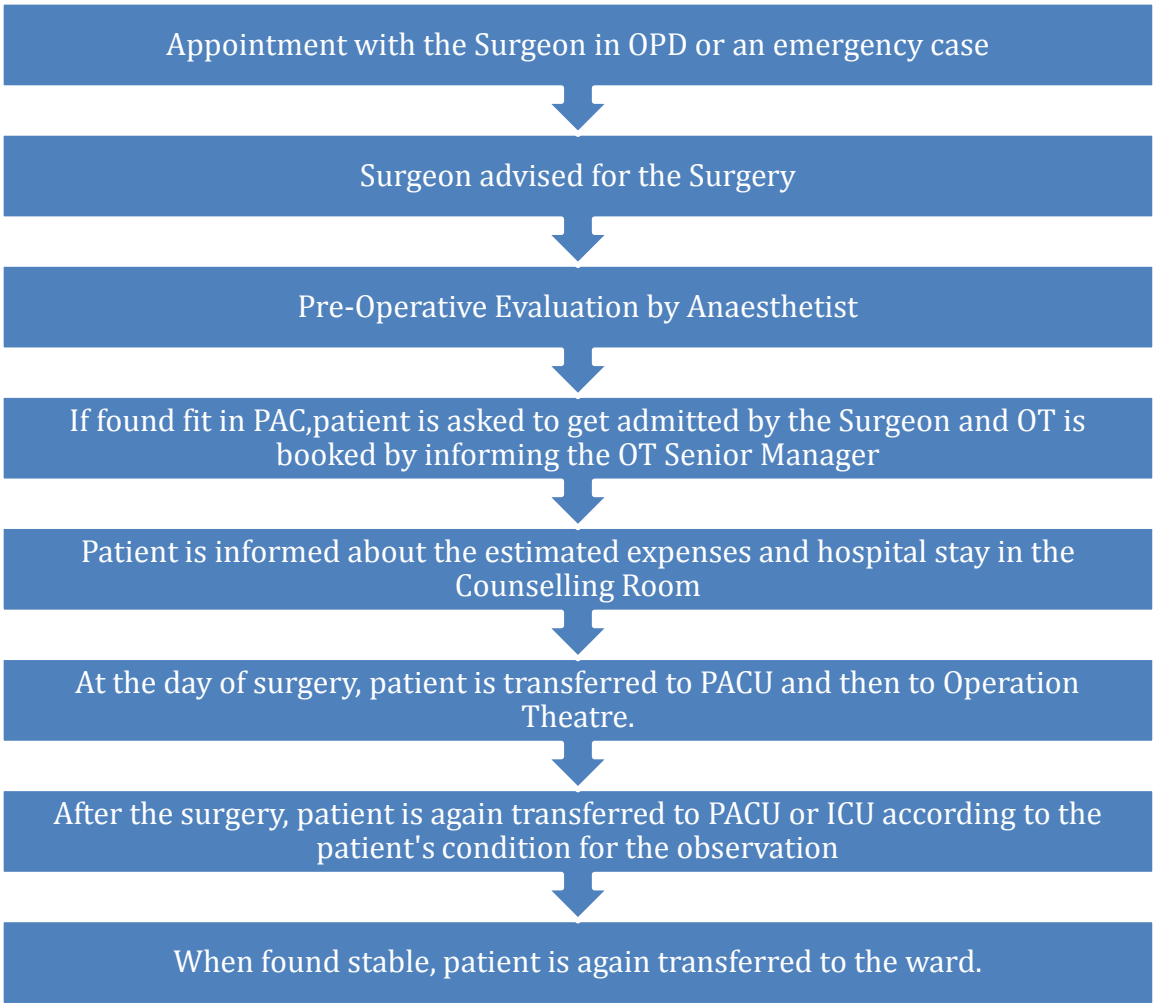

Figure 2.2.2: Process flowchart for surgeries

2.3 In Patient Department

"Inpatient" means that the procedure requires the patient to be admitted to the hospital, primarily so that he or she can be closely monitored during the procedure and afterwards, during recovery.

An inpatient is "admitted" to the hospital and stays overnight or for an indeterminate time, usually several days or weeks (through some cases, like coma patients, have been in hospital for years).

1) Functions:

1) To provide the highest possible quality of medical and nursig care to the patients.
2) To provide necessary equipment, essential drugs and all other stores required for patient in an organized manner.
3) To furnish most desirable environment substituting as temporary home for the patients.
4) To provide facilities to meet the needs of the visitors and attendants.
5) To provide highest degree of job satisfaction for the nursing and medical staff including training and research.

2) Type of wards:

- Double room ward
- Four bed room ward
- General Ward
- Single room ward
- VIP Suite
- Deluxe Ward

3) Influencing factors:

- General
- Hospital staff
- Education and training

- Physical facilities and equipments
- Clinical and services facilities
- Effective use of beds
- Quantum of work
- Administration

IPD in Paras Hospital Gurgaon is situated on 3rd and 4th floor of the building. Both the floors have different rooms and some of which are divided according to specialties.

4) Facility Tour

Fourth Floor

- Nursing Stations A,B,C
- 4A = Neurosurgery Ward (All Room Categories)
- 4B = Surgery Ward (All Room Categories)
- Dormitory – 9 beds
- 4C
- General Ward
- PICU

Third Floor

- Patients‟ Rooms & Wards
- Labor Room (The Bliss), NICU
- Nursing Stations A, B, C and D.
- VIP Suite
- Deluxe Rooms
- LDR Suites
- Single bedded Rooms
- Double bedded Rooms
- Four bedded rooms

There are total 82 rooms and 250 beds inclusive of ICU among which functional beds are 209. Rooms are divided into different categories having different facilities and charges

5) Allocation of Beds in IPD (3rd & 4th Floor)

ROOM CATEGORY	NO. OF BEDS
a) VIP	2
b) Deluxe	3
c) International	4
d) Single	48
e) Double	38
f) Four bedded	36
g) General ward	9
h) Isolation rooms	2
i) Bliss (labor room)	2 double, 3 single
j) Birthing suite	2 double, 2 single
k) Labor room recovery	3
l) NICU	12
m) PICU	8

Table2.3.1: Allocation of Beds in IPD (3rd and 4th floor)

6) Rooms under different nursing counters:

4A Counter:

The counter consist of both single and double bedded rooms and is completely dedicated to "Neurology & Neurosurgery cases".

4B Counter:

This counter is specially allocated to "Ortho" department and some beds are for "Oncology" and Surgical cases, and having single, double and 4-bedded rooms.

4C Counter:

The counter is having both single and double bedded rooms and no fixed cases are taken here.

3A Counter:

This counter is having single bedded rooms, Deluxe and VIP rooms and is dedicated to "Medicine" department only.

3B Counter:

This counter consists of single bedded and four bedded rooms and is dedicated to "Medicine" cases.

3C Counter:

This counter consists of only twin bedded rooms and is dedicated to "Oncology" department only.

3D Counter:

This counter is having single bedded rooms and only "Gynecology" cases are taken here.

7) Visiting hours:

Only two passes are allowed per patient

Pass 1: One Relative: 24 hrs – entire stay

Pass 2: Other Relative:

10:00 am – 12:00 pm

5:00 pm – 7:00 pm

8) Patient Bed Transfer:

Patients are transferred from one Ward to another Ward due to change in the treatment or change in the Consultant. The charges for different categories of rooms are different, so in case patient"s room category is changed during transfer, then policy for Billing is as under:

a) Stays upto 8hrs

↓

Half day room rent is applicable

b) Stays more than 8hrs

↓

Full day room rent is applicable

9) Timings of the meals that is given to the patient:

1. Morning Tea: 6:00-6:30am
2. Soup:11:00am-11:30am
3. Lunch:1:00pm-2:00pm
4. Evening Tea: 4:00pm-4:30pm
5. Dinner: 8:00pm to 9:00pm
6. Milk: 9:00pm-9:30pm

10) Cleaning of rooms and floors

Corridor Floor cleaning is being done 2 times a day.

- Morning: 7 am – simple mopping
- Evening:11 pm- Proper washing

Room cleaning is done 4 times a day.

1. Morning: 8 am, 11 am
2. Afternoon: 4 pm
3. Evening: 8 pm

11) Laundry Service

2 times a day Linen is sent to Laundry Department.

1. Morning: 7 am
2. Evening: 6 pm

Linen sent in the morning is returned to wards in the evening and vice versa.

12) DISCHARGE PROCESS:

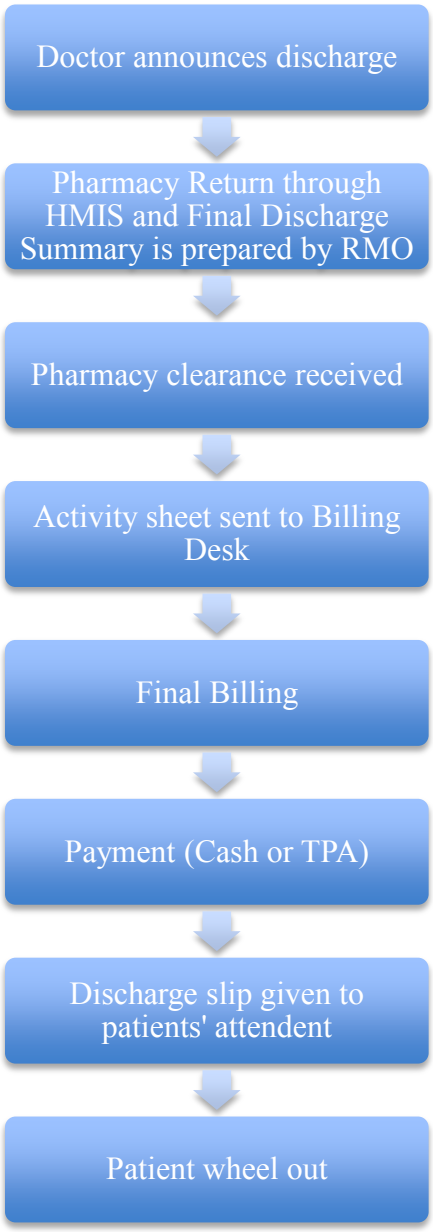

Figure 2.3.1: Discharge process flowchart

12) Layout of rooms

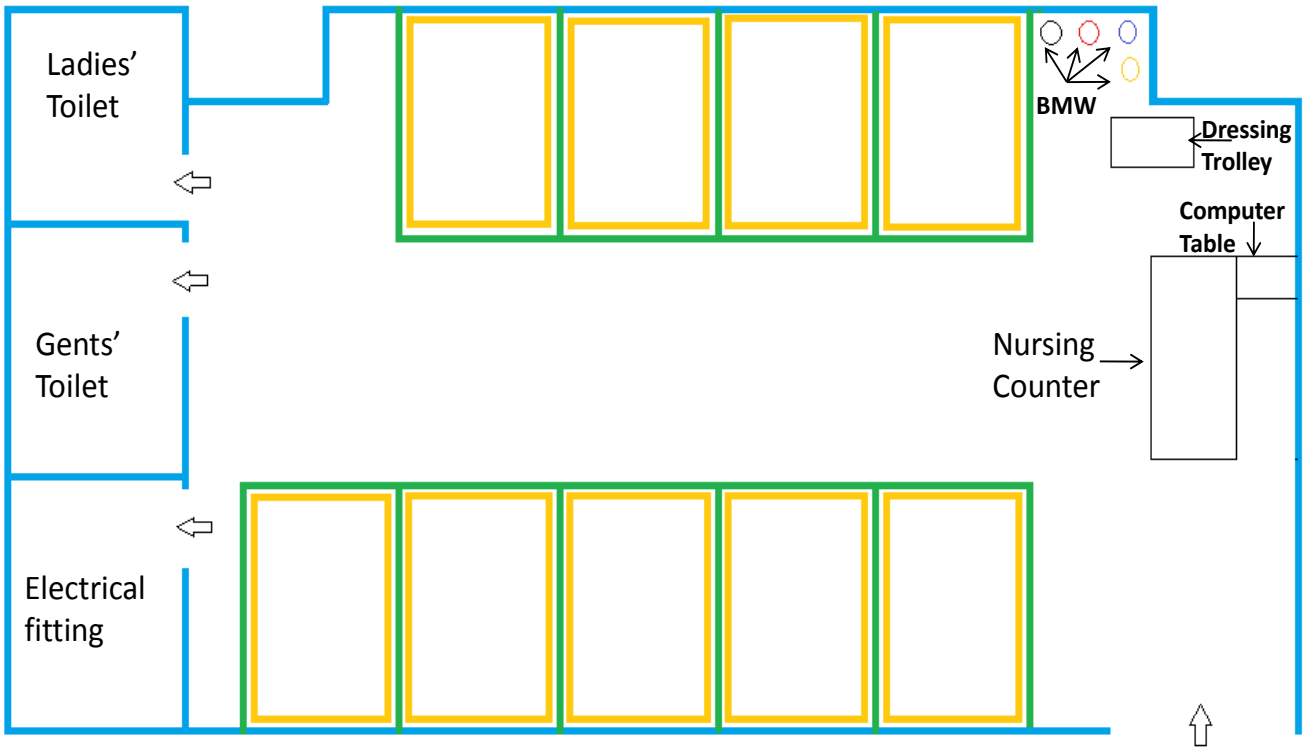

Figure 2.3.2: General Ward Layout

In the Figure, Yellow lines represents Area covered by Beds.
Green Line represents the curtains surrounding the Beds.
Arrow represents the doors.
BMW- Biomedical waste including 4 bins- Black, Red, Blue and Yellow represented by their respective colors.

Dimensions of General Ward:
Area covered by General Ward - 31.5ft*18ft
Each Patient"s Area including the bed and cupboard (surrounded by curtains)- 7ft*4ft
Area covered by Nursing Counter- 6ft*4.5ft

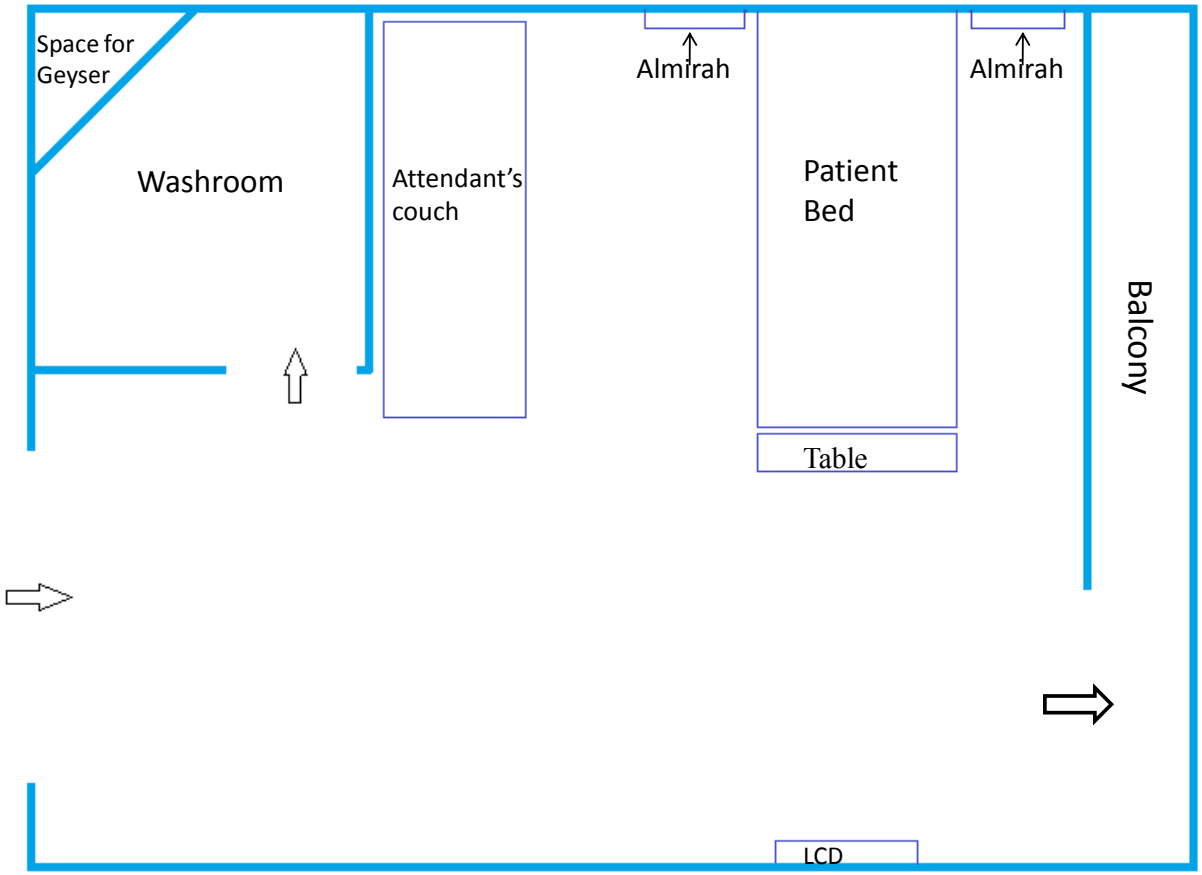

Figure 2.3.3: Single Bedded Room Layout (Block Arrow represents Doors).

Dimensions of Single Bedded Room:

- Room (including the Washroom): 15ft*9ft
- Washroom: 4.5ft*4.5ft
- Patient Bed: 6ft*2.5ft
- Table: 2ft*0.75ft
- Main Door: 3.5*6.75ft

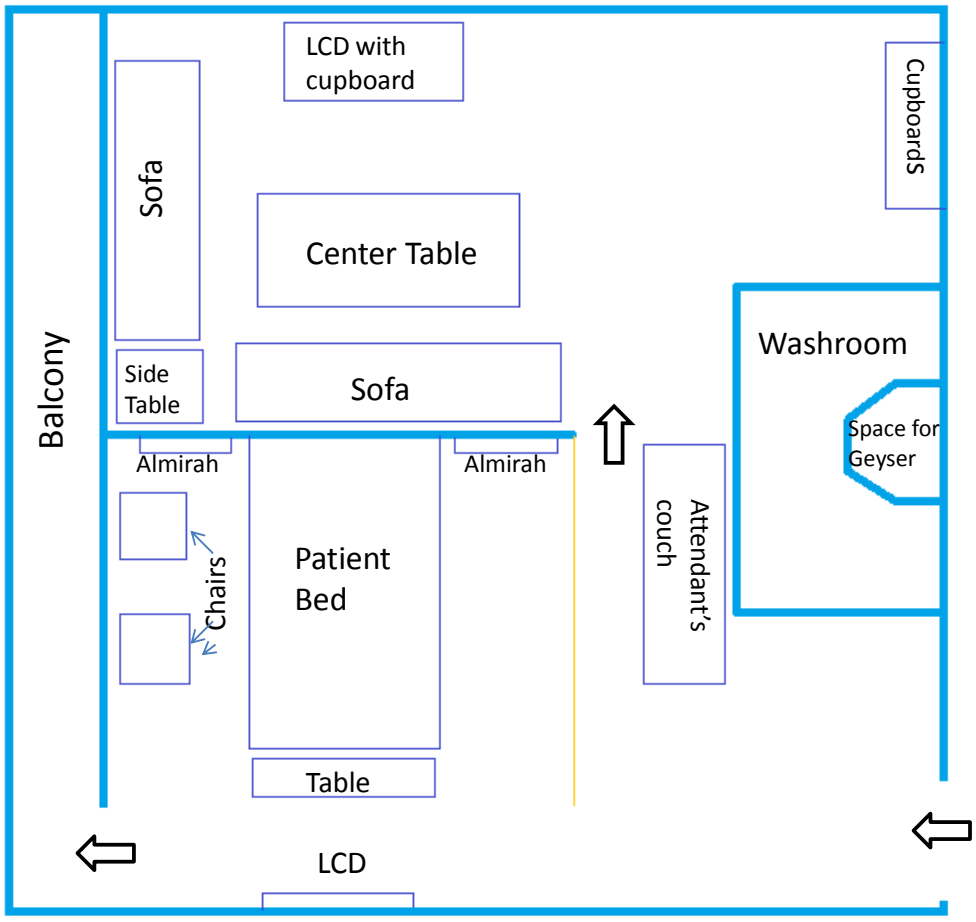

Figure 2.3.4: VIP Suite Layout; Yellow line represents the curtains and Block Arrows represents the Doors.
Room Area: 15ft*18ft

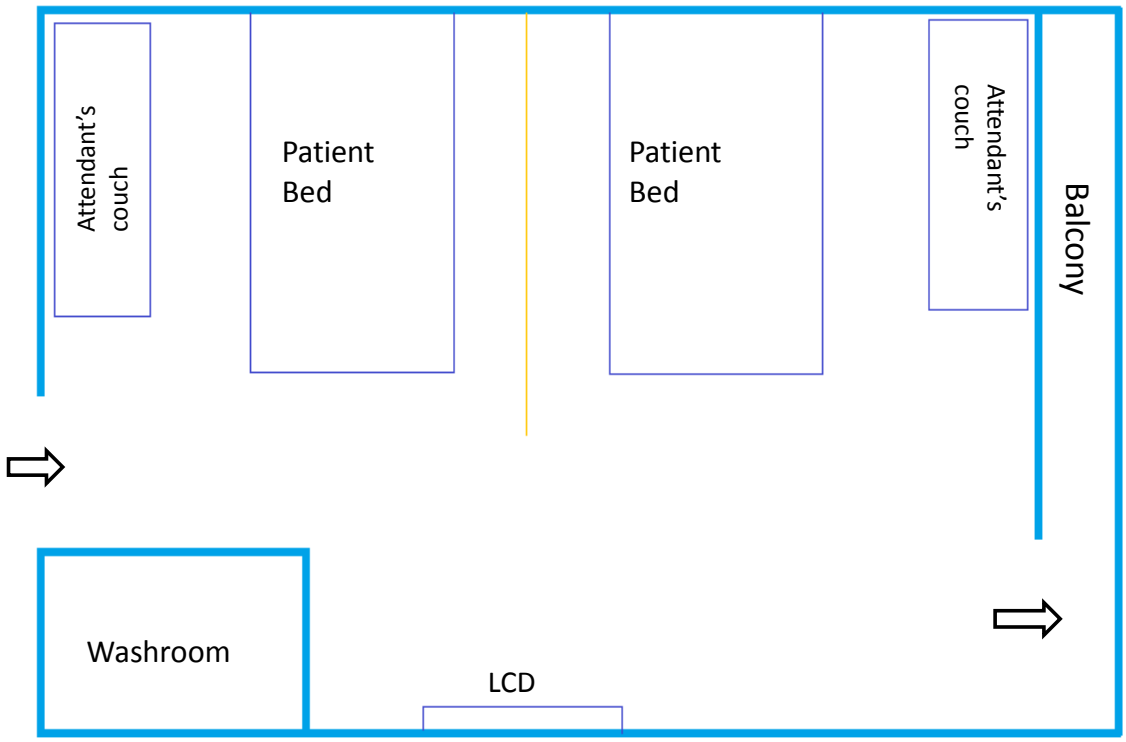

Figure 2.3.5: Double-bedded room Layout; Yellow line represents the curtains and Block Arrows represents the Doors.

Room Area: 15ft*10ft

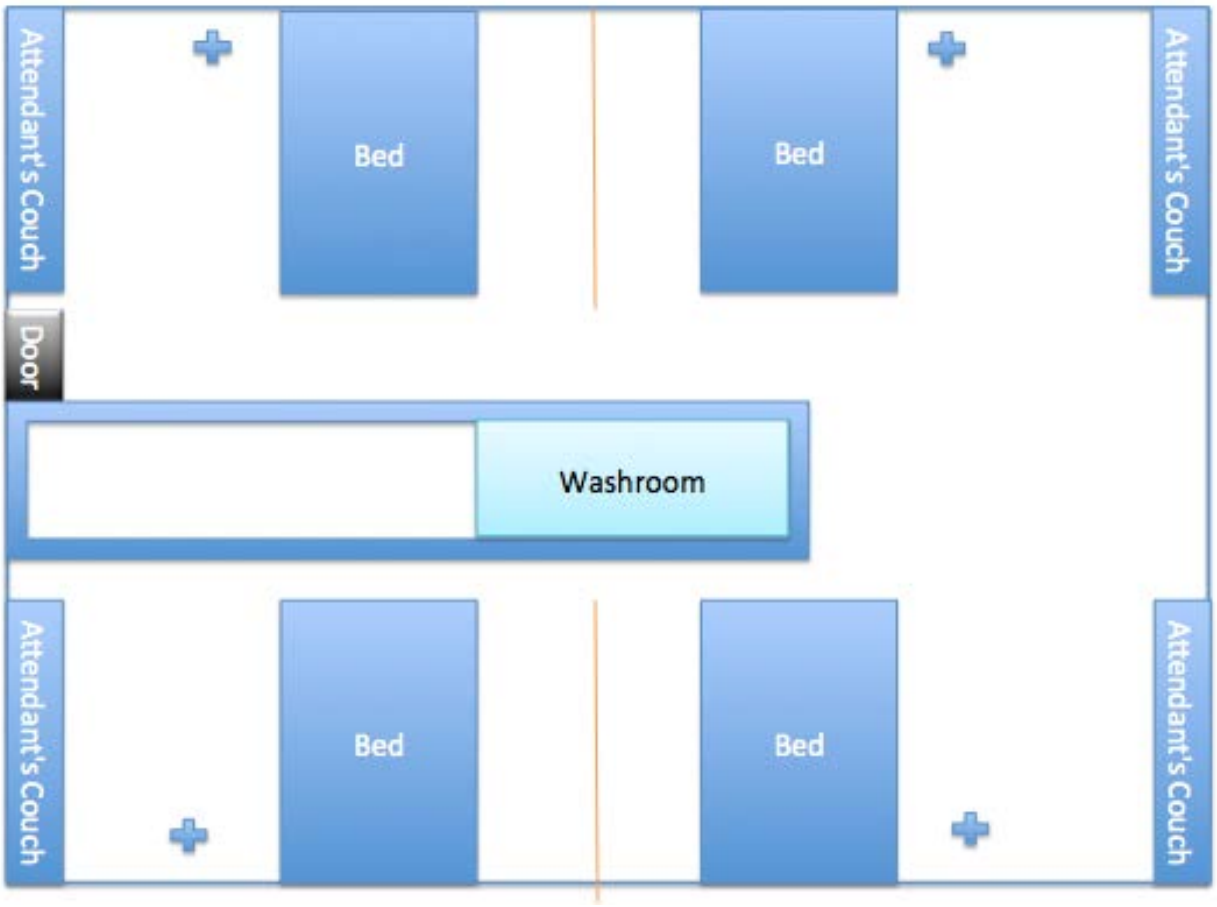

Figure2.3.6: 4-bedded room Layout
Room area: 18ft * 15ft
The yellow lines above indicate curtains which are in place to maintain patient‟s privacy.

2.4 Intensive Care Unit

Intensive care units (ICUs) provide intensive care (treatment and monitoring) for people in a critically ill or unstable condition. In common, ICUs have:

- Specialised monitoring equipment
- High degree of medical expertise
- Highly trained nurses

Paras Hospital has **7 ICUs**:

1. CTVS ICU: For patients admitted for Cardio Thoracic Vascular Surgeries or critical Cardiac patients.
2. Surgical ICU: For patients who have undergone surgeries or trauma patients.
3. CCU: For patients who are admitted for invasive procedures in Cath Lab.
4. MICU: For patients with Medical conditions
5. NSICU: For Neuro patients
6. PICU: For Pediatric patients
7. NICU: For care of Neonates after delivery.

1) Admission Process in ICU

In ICUs patients get admitted via OPD, IPD or Emergency. Patients can come directly to the Hospital in critical condition or can deteriorate during the Hospital stay in wards, in which condition patient is shifted to ICU.

2) Discharge process from ICU

Generally, patient is stepped down to the ward if the condition gets stable and then discharged. In some cases, if patients‟ relatives wants to take the patient against the Doctor‟s advice, then they are given LAMA (Leave against Medical Advice).

3) Transfer In and Transfer Out

If patient is shifted to a particular ICU from another ICU or ward, then it is called Transfer In. The opposite of it is called Transfer Out.

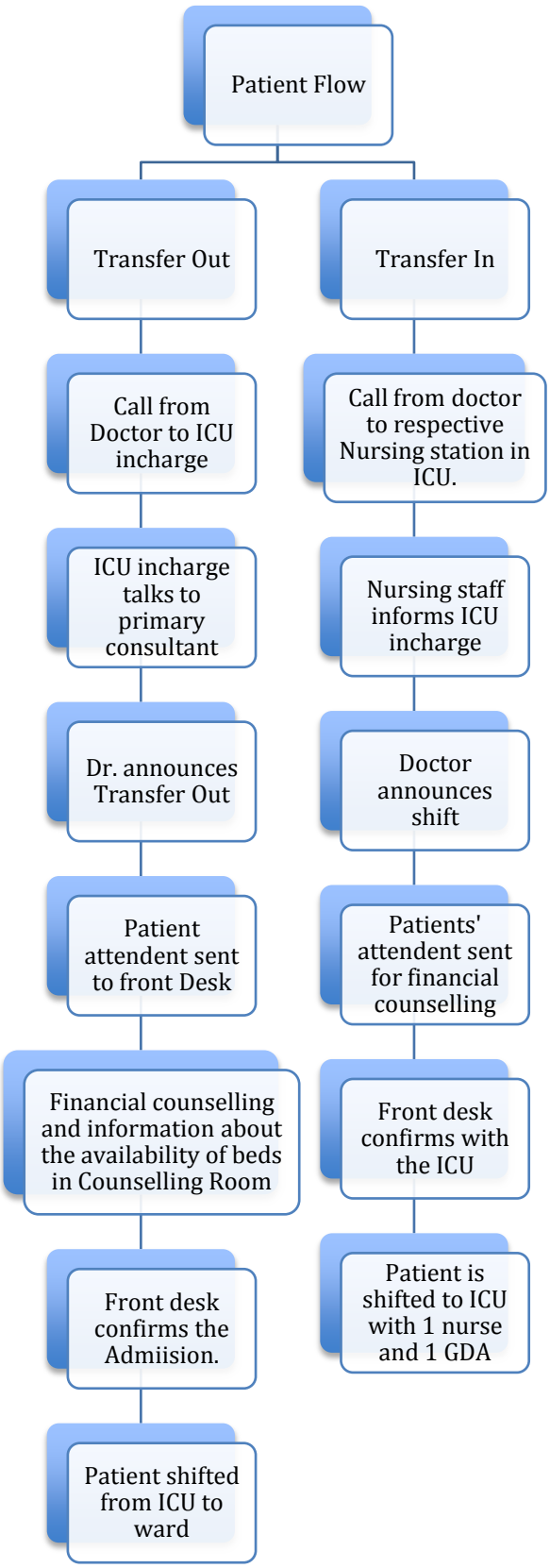

Figure 2.4.1: Transfer In Transfer out process chart

4) Equipments used & care in ICU

Major Equipments used in ICUs:

1. Ventilator `
2. Monitor
3. Crash Cart
4. Air beds to prevent Bed Sores
5. BIPAP

In each ICU, Bed Panels are there for each bed through which medical air, oxygen, vacuum for suctioning is supplied.

2 Portable machines are also dedicated for ICUs, mainly for the Chest X-Rays of the bed-ridden patients to check the pulmonary changes as patients are on the Ventilator. For Portable Chest X-Rays, ICUs have to send the Portable Request to the Radiology Department.

Special care in ICU:

- Head Bath
- Back Care
- Mouth care to maintain oral Hygiene
- 2-hourly positioning by nursing staff to prevent bed sores.
- 2-hourly suctioning

In case of infectious patients, nurse-to-bed ratio is one with separate gown for the Nurse and Doctor who sees that patient. For infected patients with Respiratory diseases, double mask are given to the patients to wear to control the spread of infection to other patients and ICU staff. Identification to Infectious patient is by „Barrier Nursing" or „High Risk patient" Tag at the head end of the bed.

5) Infection Control in ICU

- ✓ Hand washing.
- ✓ Floor cleaning with Sodium Hypochlorite.
- ✓ Proper Biomedical waste segregation.

- ✓ Not more than 3 antibiotics
- ✓ Fumigation once in a month.
- ✓ Used items such as Ambu Bag, etc. are sent to CSSD for sterilization.
- ✓ Use of Gowns, shoe covers and masks inside the ICUs.
- ✓ Every night, ICUs are washed with Detergent
- ✓ After each Transfer Out or Discharge, bed is carbolized with sodium hypochlorite.

6) Temperature in ICU

In each ICU, temperature is maintained between 22-24 degree Celsius, reason being bacteria and viruses cannot thrive at lower temperatures.

7) Nurse-to-bed ratio

For ventilated patients, nurse to bed ratio is 1:1

For non-ventilated patients, nurse to bed ratio is 1:2 or 1:3

8) Food & beverages

Patients‟ diet is decided by the doctor by consulting the dietician. The diet chart of every patient is told to the food & beverages department and then food is served accordingly.

9) Break up of beds in ICU

Beds	CTVS	MICU	SICU	NSICU	CCU	PICU
2F	3	2			9	8
3F	2	6	4	3	5	
4F		5	4	4		

Table 2.4.1: Bed break up based on the type of beds

7) Equipment Breakup in ICU

	CTVSICU	MICU	CCU	SICU	NSICU	NICU	PICU	Total
Monitors	5	13	13	8	6	7	6	58
Ventilators	1	4	1	3	5	4	*	20
Syringe pump	5	4	9	5	5	14	14	56
ECG machine	*	1	1	*	*	*	*	2
DVT pump	*	9	*	2	1	*	*	12
BIPAP pump	*	2	1	1	*	*	*	4
Air beds	4	6	3	5	2	*	*	20
Defibrillator	1	1	1	*	1	*	1	5

Table 2.4.2: Equipments made available in ICUs

8) Store rooms

Each ICU has store room where medicines, injectables, etc. are kept for the need of the hour. Generally medicines for the patients are called from IP Pharmacy through Drug Requisition in HMIS. But if there is any need, it is taken from the store. On Daily Basis, each Nurse is assigned to check the items of the store for its expiry date. The medicines are moved out which are 3 months short expiry and sent to IP Pharmacy.

9) ICU specific details

Specific to CTVS ICU:

Equipments-

- Intra-aortic Balloon pump
- Suction Apparatus

Manpower & shifts-

1 Senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm)

7 staff Nurses

- Morning shift-8:00am-2:00pm (3 staff nurses)
- Evening shift-2:00pm-8:00pm (2 staff nurses)
- Night shift-8:00am-8:00pm (2 staff nurses)

Different Areas in CTVS ICU-

- Patient Area
- Registration Area
- Utility Room
- Wash room
- Doctor‟s Room
- Store Room

Specific to SICU:

Manpower & shifts in SICU-

1 Senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm)

16 Nursing staff

- Morning shift-8:00am-2:00pm (4 staff nurses)
- Evening shift-2:00pm-8:00pm (4 staff nurses)
- Night shift-8:00am-8:00pm (4 staff nurses)

2 Housekeeping staff (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

2 GDA (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

2 Aya (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

Different Areas in SICU-

- Patient Area
- Nursing Counter
- Store Room
- Utility Room

Specific to NSICU:

Neuro Surgical ICU has an isolation room which is mainly for highly infectious patients, negative air pressure is maintained in this so that infection does not spread.

Specific to CCU:

Patients in CCU are admitted mainly for the Angioplasty or other Cath Lab Procedures. Before patient is sent to Cath Lab, below mentioned things are looked after:

- Part Preparation of Radial and Femoral site.
- Surgery Billing
- Completion of Consent Forms
- Investigations, mainly kidney Investigations are done because the dye given during the Cath Lab Procedure can affect kidney.

Manpower & shifts in CCU-

1 Senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm)

18 Nursing staff

- Morning shift-8:00am-2:00pm (5 or 6 staff nurses)
- Evening shift-2:00pm-8:00pm (5 or 6 staff nurses)

- Night shift-8:00am-8:00pm (5 or 6 staff nurses)

2 Housekeeping staff (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

2 GDA (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

3 Aya

- Morning shift-8:00am-8:00pm (2 Aya)
- Night shift-8:00pm-8:00am (1 Aya)

CCU have one **Central Monitor** which is placed on the Nursing Station and shows all the parameters of all the patients. It also records the vitals for upto 72 hours.

Different Areas in CCU-

- Patient area
- Doctor‟s Room
- Store Room
- Utility Room

Specific to MICU:

MICU is 13-bedded and divided into 2 different areas. In one area, there are 7 beds where mainly critical patients are kept. When their condition improves, they are shifted to another area, and then finally to ward. Another area have 6 beds where recovering patients are kept.

Areas in MICU-

2 Nursing counters, one in each area.

- 2 Doctor‟s Room

- Store Room
- Linen store
- Changing Room
- Staff Toilet
- Patient‟s Toilet

Manpower & shifts in MICU-

1 Senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm)

28 Nursing staff

- Morning shift-8:00am-2:00pm (7 staff nurses)
- Evening shift-2:00pm-8:00pm (7 staff nurses)
- Night shift-8:00am-8:00pm (7 staff nurses)

2 Housekeeping staff (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

2 GDA (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

4 Aya

- Morning shift-8:00am-8:00pm (2 Aya)
- Night shift-8:00pm-8:00am (2 Aya)

Specific to PICU:

Pediatric ICU mainly caters children of age 1 month to 15 years. It is 8-bedded with special equipments needed for the Pediatric care. Ventilators used in PICU are different from other ICUs as they have Pediatric mode setting in it.

In PICU, mother is allowed to stay with the baby, and father & other relatives are allowed only in the visitor‟s timings.

Manpower-

There are 9 staff in total.

1 senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm

28 Nursing staff

- Morning shift-8:00am-2:00pm (2 staff nurses)
- Evening shift-2:00pm-8:00pm (2 staff nurses)
- Night shift-8:00am-8:00pm (2 staff nurses)

2 GDA (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

Specific to NICU:

NICU mainly caters to the neonates of less than a month. Only low-birth weight babies are treated in NICU for upto 3 months. NICU is divided into 2 areas: One is for outside patients who are referred from other hospital for the neonatal care and another is for inside patients who got delivered in Paras Hospital. There are total 9 beds in NICU, 3 for the outside patients and 6 for the inside patients.

Patients who got delivered in this Hospital are first shifted to NICU for immunization, stomach wash, etc. After some hours of observation, they are shifted to the room with the mother. In NICU, admissions are mainly due to Pre-term, meconium aspiration or Low Birth Weight.

Patients in NICU are treated according to the Level of care needed:

For Level 1- only patient warmer is used.

For Level 2- patient warmer, monitor, syringe pump & phototherapy is used.

For Level 3- patient warmer, syringe pump, monitor & ventilator is used.

Only feeding mother is allowed inside the NICU. All other family members can see the patient from the door.

Equipments used in NICU-

- Neonatal warmers-9, which maintains the temperature between 36-37 degree Celsius.
- Phototherapy unit -4
- 3 ventilators- 2 Pediatric and 1 adult
- 6 oxygen hoods- to supply the oxygen to the patient
- Nasal prone, for patients with high respiratory distress.

Manpower-

1 senior Area Incharge (8:00am-4:30pm)

1 Area Incharge (12:00pm-8:00pm

9 Nursing staff

- Morning shift-8:00am-2:00pm (2 staff nurses)
- Evening shift-2:00pm-8:00pm (2 staff nurses)
- Night shift-8:00am-8:00pm (2 staff nurses)

2 GDA (1 for each shift)

- Morning shift-8:00am-8:00pm
- Night shift-8:00pm-8:00am

10) Visitor's Timings in ICUs

SICU- Morning- 10:45am-11:00am
Evening- 5:45 pm-6:00pm

MICU-Morning-10:15am-10:30pm
Evening-5:15pm-5:30pm

CCU& CTVS-Morning-10:00am – 10:15am
Evening-5:00pm-5:15pm

NSICU-Morning-10:30am-10:45am
Evening-5:30pm-5:45pm

2.5 IP Pharmacy

IP Pharmacy majorly caters to IPD, OT pharmacy and Emergency department.

1) Manpower

Head of Department: 1

Deputy Manager: 1

Assistant Manager: 1

Executive: 2 (store)

Senior Pharmacist: 4

Pharmacist: 9

Pharmacy asst.: 5

There are a total of four shifts:

Pharmacy asst. have 12hour shift of 8am to 8 pm and 8pm to 8am.

Morning: 8m to 2pm: 3 pharmacist, 2 Pharmacy asst., 1 store asst.

Evening: 2pm to 8pm: 3 different pharmacist, 2 same Pharmacy asst., 1 same store asst.

Night: 8pm to 8am: 2 pharmacist, 1pharmacy asst.

General shift: 9am to 5:30pm: The senior staff from HOD to Senior Pharmacist.

2) Emergency Drugs:

A total of 35 critical life saving drugs and 48 high alert drugs are kept. High alert drug such as chemo drugs are those which need to be handled with care and prevent breakage etc.

3) Types of Drugs:

There are five types of drugs based upon the government norm made:

1. Schedule X drugs: These are narcotics drugs. The narcotics allowed inside the hospital are morphine and fentanyl. The norm says it should be kept in double lock and key. The keys are with the senior pharmacist and head pharmacist. A separate register is maintained for this kind of drug. Secondly, the inventory is decided by the HODs of all departments and than it has to be approved by the

excise department of the government after which the pharmacy receives a fixed inventory for every month which is sanctioned by the government. Finally a narcotic drug comes with a XRx written in red on the top left corner. Even empty vials need to be accounted for with the name of the doctor prescribing.

2. Schedule H and Schedule L drugs: These drugs are prescriptive drugs, which can only be given if a person is prescribed by the doctor. These drugs might have NRx written in red on the top left corner, if they come under Dangerous Drug Act. These drugs include injectables, antibiotics and antibacterial.
3. Schedule C and C1 drugs: These drugs include biological products eg. Serum and Vaccines.

Schedule M in the government norms includes the norms to be followed when a medicine is being manufactured.

Schedule N lay down the norms to be followed for equipment, staff and hospital pharmacy.

There are different types of drugs based on situation or physical shape:

1. Chemo drugs
2. Cardio Vascular drugs
3. Critical Life Saving drugs
4. Emergency drugs
5. Look alike drug
6. Sound alike drugs
7. FMCG
8. Diabetic powder
9. OTC drugs (Over the counter drugs)

Look alike and Sound alike drugs are kept in a different shelf and are marked as look alike and sound alike so that a person dispending any of these drugs is more alert.

4) Drug Ordering:

Bulk orders are given on Tuesday and Friday but still depending on the stock at hand the department can put an indent every day. Sometimes when the stock is needed in urgent

basis, the pharmacy gets it from the local market, in that case the medicine entry is done in a separate register called Local Purchase (LP) register. Once the GRN (Goods received note) is generated, the medicines are billed to the patient. The ROL (Re order level) has a minimum stock marked for 7 days and a maximum for 15 days. The amount of reorder is decided based on the average data of three months. Also the order can be changed based on external requirements such as seasonal changes can cause changes in the pharmacy list.

5) Medicine Expiry:

Every month in the last week, the IP Pharmacy staff checks the medicines which are three months before the date of expiry. Medicines found in that category are collected and returned to the respective vendor. Surgical device and vaccines can be kept before 6 months of expiry after which they are returned. The money refunded or the credit bill generated after refund is the same.

6) Legal Norms:

Forms 20 and Form 21 certify the pharmacy by the government to dispense medicines. As of now the pharmacy has three licenses issued in name of three people. Anyone of the three is expected to be at the hospital at all times.

For a person to qualify as a pharmacist, he or she is at least expected to have a Diploma in pharmacy. Also each pharmacist is expected to have a valid registration with the pharmacy council which has to be renewed every year.

To perform any kind of drug mixing the hospital should have a license to do so. No mixing takes place in the pharmacy.

To stock narcotics, a separate permit is also required.

7) Pharmacy as a revenue center:

One of the biggest revenue center of the hospital is pharmacy. The average income of the hospital from the pharmacy alone, which included surgical items, FMCG, OTC drugs etc. is close to rupees five lakh. The profit percentage of the pharmacy is set by the vendor as the MRP is fixed. The only difference comes in the cost of procurement, which always is

negotiable. Generally the pharmacy gets higher margins on injectables as compared to tablets.

8) Storing the drugs:

Drugs are stored based on alphabetical order and are segregated based upon the types. Some medicine might need to be stored in refrigerator, some have to be stored away from light etc. The surgical items, injectables, vaccines are kept in different shelves but arranged alphabetically to aid the person dispensing.

9) Processes Taking Place in the Pharmacy:

Medicine Dispatch:

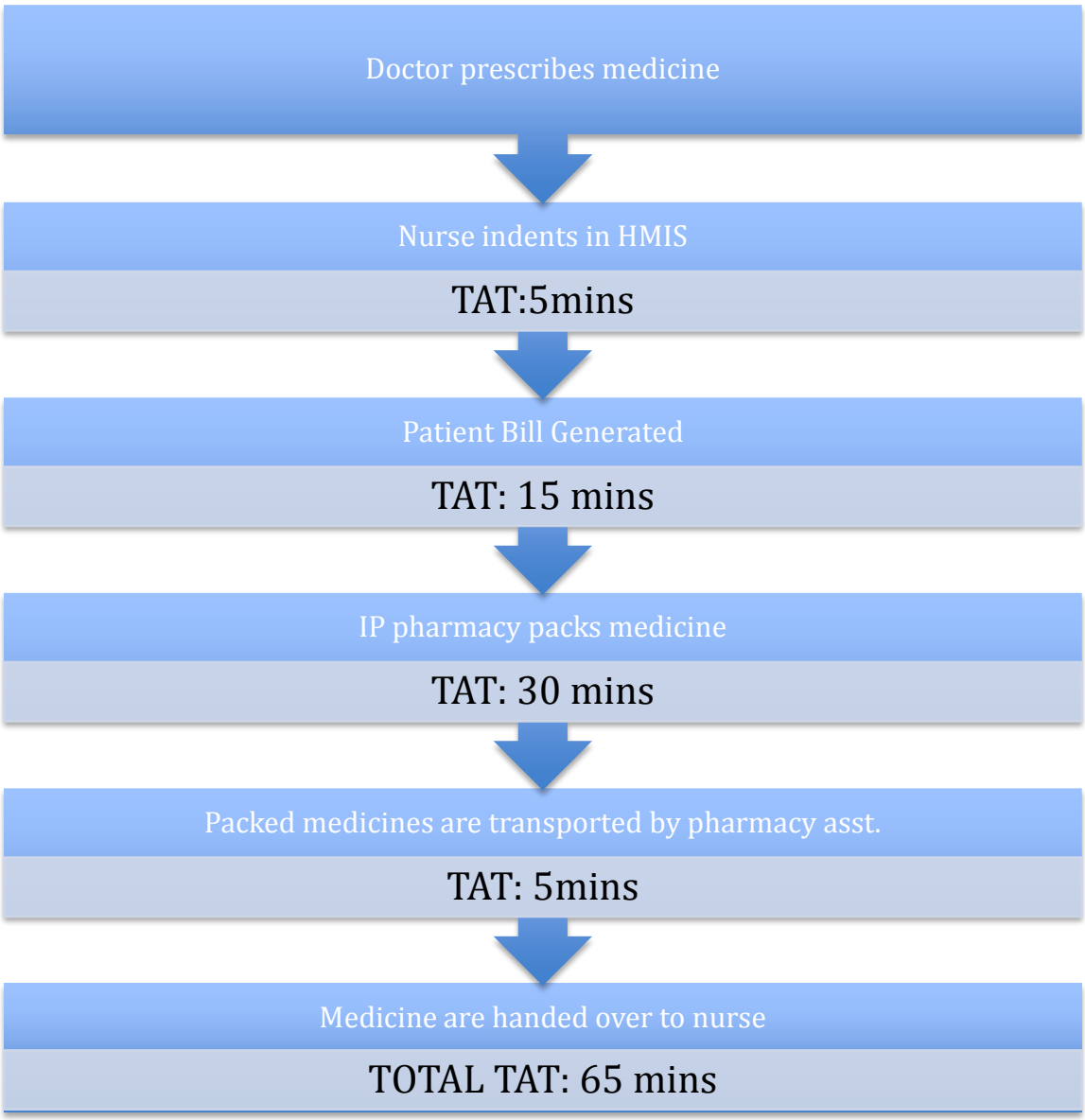

Figure 2.5.1: Process flowchart of medicine delivery

Medicine Return:

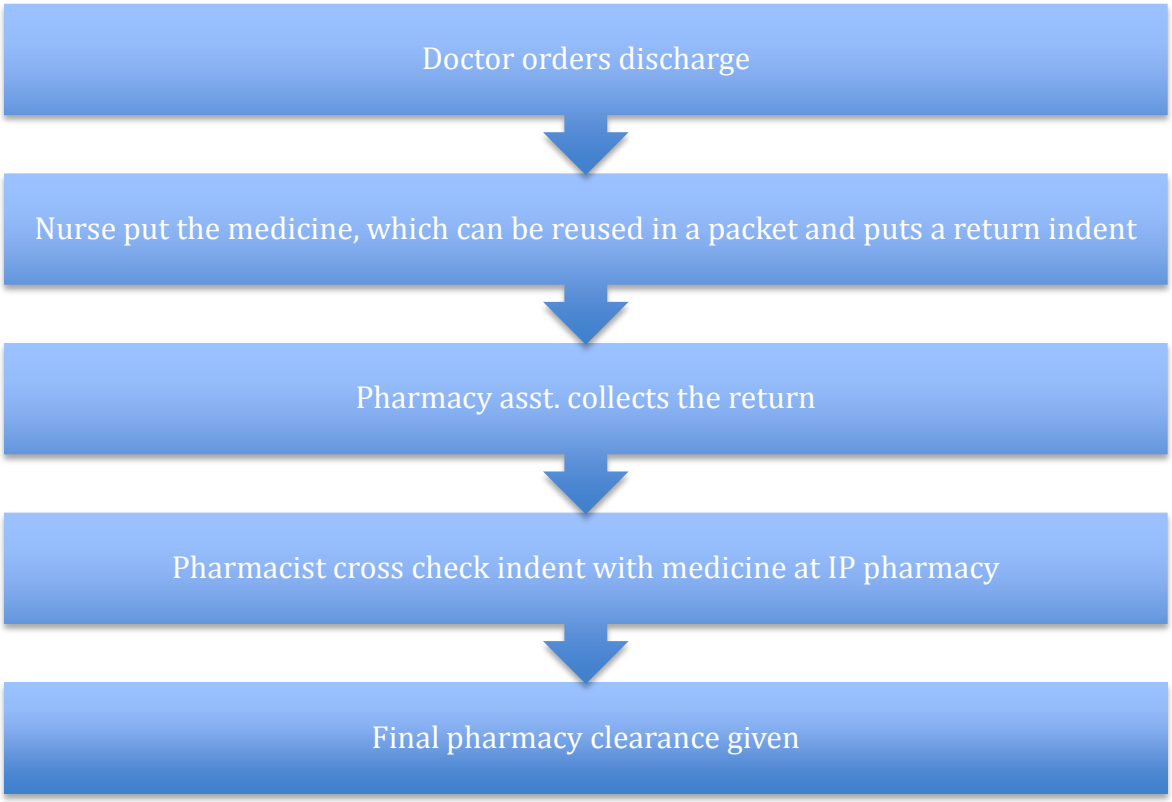

Figure 2.5.2: Medicine return process

The standardized hospital TAT for the above procedure is 40 minutes.

Also medicine is returned against a credit note or cash in the form of cheque from vendor.

Procurement of Medicine:

Everyday an indent can be put in if some new medicine is being prescribed by the doctors or if the store does not have a set of medicines. Bulk order days for pharmacy are Tuesday and Thursday.

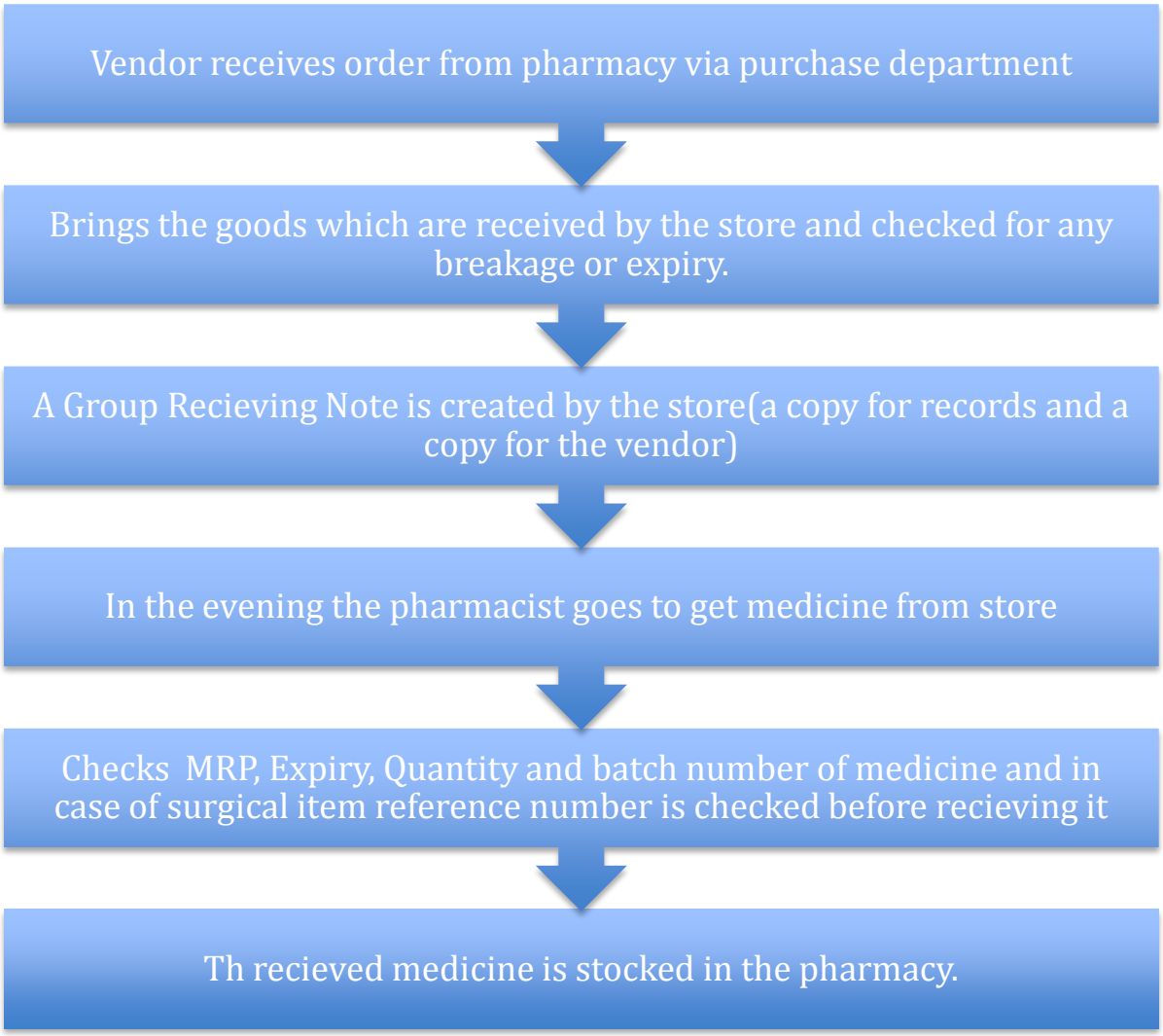

Figure 2.5.3: Process flowchart of procuring medicines

10) Manual Prescriptions are used for the following cases:

1. Medicine for emergency department
2. New admission in the IPD
3. Chemo Drugs
4. Urgent drugs
5. Non available drugs

11) Outlay of the Pharmacy:

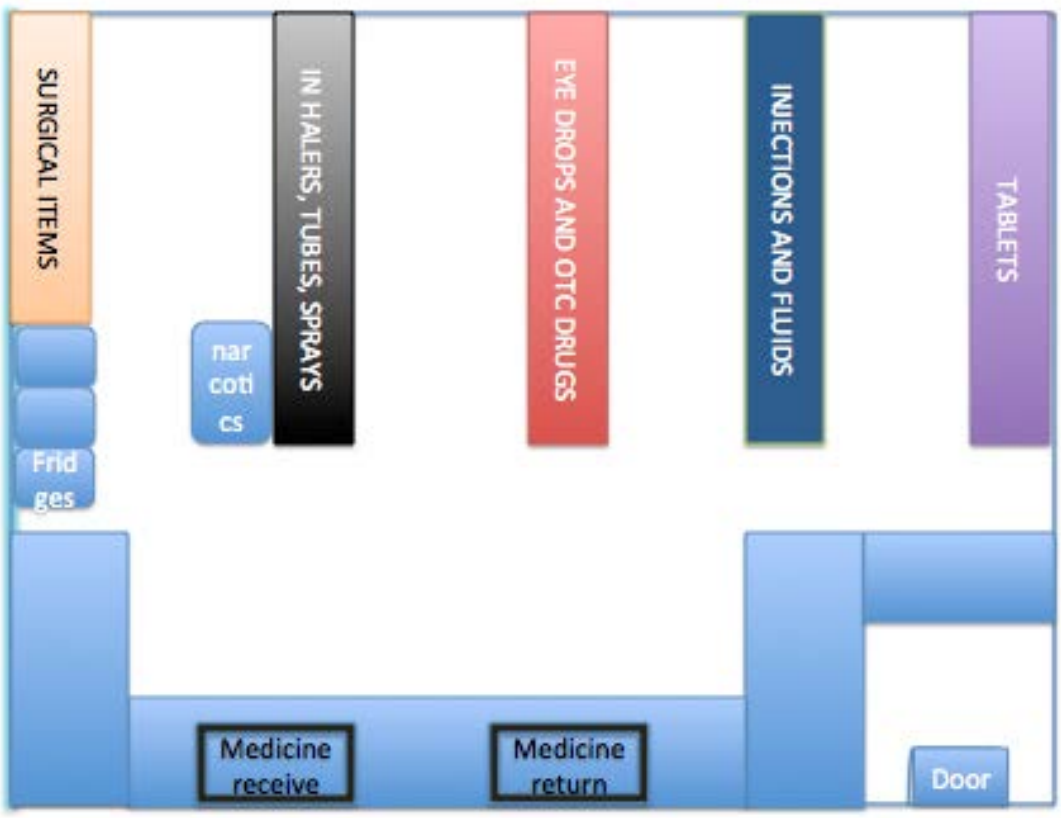

Figure 2.5.4: In Patient Pharmacy Outlay

12) Hospital Formulary:

Every hospital has its own formulary, which is agreed upon by the doctors based on which drugs are ordered and stocked at the pharmacy. This list is quarterly reviewed by the drug committee, which includes General Manager, Head of various departments, Assistant Manager of Purchase Department and finally the Assistant Manager of Pharmacy.

13) Adverse reaction:

In case of an adverse reaction of any medicine, an adverse reaction form is filled by the doctor and the batch no. of the medicine is noted. All the drugs of the batch are discarded from use and returned back to the vendor with the documents mentioning the reason.

2.6 Central Sterile Supply Department

It is responsible for providing seamless supply of sterilized instruments and other devices to the required departments for the smooth working of the Hospital alongwith maintaining the sterility. The aim of CSSD is to reduce hospital acquired infection level to zero.

1) Structure of CSSD

CSSD is divided into 2 areas: **Sterile and Unsterile Area**. Unsterile area is for receiving the unsterile supplies, washing and packing them to proceed for sterilization whereas sterile area is to store the sterile items to avoid any kind of contamination. In the unsterile area, gauze pieces and gamzee roll (of half metre size) are also made for wards and OT which then is packed and sterilized in the Autoclave. For OT, set of 10 gauze pieces are packed together with a single piece of 8 layers and of size 10 by 10 whereas in the ward, a set of 4 pieces are packed with a single gauze piece of 12 layers and of size 7.5 by 7.5

2) Protocols to be followed in CSSD

Everyone is not allowed to enter into the department, most importantly into the sterile area where a person has to change the clothes, footwear and wear the cap & mask to avoid the contamination of sterile items placed in the sterile area.

3) Areas where CSSD supplies are required

- OT
- ICU
- Nursing counters
- OPD

Majorly, metal instruments, plastic and rubber items, dressing materials, etc. used for patients‟ care are required for sterilization in CSSD.

4) Process Flow in CSSD

Every day materials to be sterilized are received in the Department. Metal instruments are received 3 times a day and rubber materials are received 2 times a day as only 2 cycles of ETO can be completed in a day. Issuing of sterilized materials are done 2 times a day from the Issue Counter in the sterile area.

Receiving & Issue Time-

Morning- 9am-10am

Evening-3apm-4pm

Night-9pm-10pm

For sterilization of metal instruments, firstly Ultrasonic machine is used for disinfecting the instruments with Rapid-multi enzyme cleaner(10 ml/litre) and a chemical-Neadishter Iar (10ml/litre) to prevent the instruments from rusting. This takes 15-20 min. to complete the procedure. After completion of the procedure, instruments are washed in running water and then dried. Then these are packed in sets in a double sheet. Packing the instruments in sets for surgical procedures is very crucial because missing or failing of instrument while performing a surgical procedure can be of the great difficulty for the patient as well as the staff performing the procedure. Finally the packed sets are autoclaved at a temperature of 132-134 degree Celsius and 15 lb pressure. The process takes 40 to 50 minutes. Autoclave in CSSD has double door with one door opening in the non-sterilized area from where non-sterilized items are moved to the autoclave and another door in the sterile area.

For sterilization of plastic and rubber items, ETO sterilizer is used. It has an inbuilt tray for the items. It uses Ethylene oxide gas for sterilization which comes in the form of 100ml cartridge. A single cycle takes 10 hrs 20 minutes.

5) Process flow

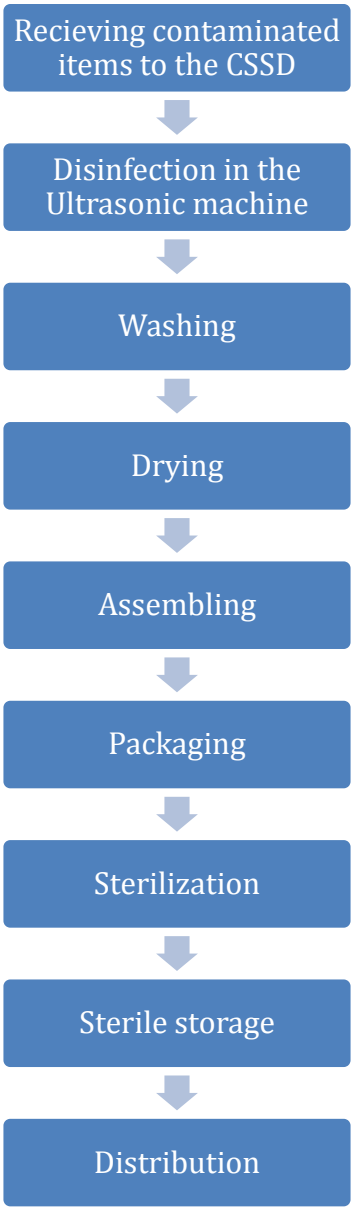

Figure 2.6.1: Flowchart of CSSD sterilization

7) Indicators of sterilization

Two types of Indicators are there: Chemical Indicator and Biological Indicator.

Chemical Indicator is an adhesive tape which is adhered to the packet which after the procedure turns its color indicating the process of sterilization has completed. For Autoclave, Green color turns to Black and for ETO, brown color turns to Green.

Biological Indicator-.Biological indicators are used to confirm autoclave‟s killing efficiency. A kit containing *Bacillus stearothermophilus (*for steam sterilizer) and *Bacillus Subtillus* (for ETO machine) is kept inside the machines; the machines are run for their actual processing time. Then the kit is sent to the lab to identify if the bacteria died or not. After this, the machine is declared fit to run. This test is performed on weekly basis, every Tuesday. Investigation of this test takes 48 hrs.

Other tests to ensure functioning of CSSD Equipments:
For every load**, Steam sterilization Integrator** is also used in both Autoclave and ETO which resembles a strip and changes its color indicating the successful procedure. In case of Autoclave, color changes from White to Blue and in ETO, color changes from Yellow to Green.

Bowie-Dick test or DART (*Dynamic air removal test)* is performed every morning before starting any procedure. A strip is placed in the Autoclave for 15-20 minutes, after which its color turns from Blue to Pink. This test is for checking prevaccum autoclave‟s air removing ability and steam penetration.

Fumigation every week on Monday Night.

8) Manpower and shifts

CSSD Incharge (8:00am-4:30pm)
4 Technicians
General shift-8:00am -4:30pm (1 tech., Incharge& 1 GDA
Morning-8:00am-2:00pm (1 tech.)
Evening-2:00pm-8:00pm (1 tech.)
Night-8:00pm-8:00am (1 tech.)

9) CSSD Layout

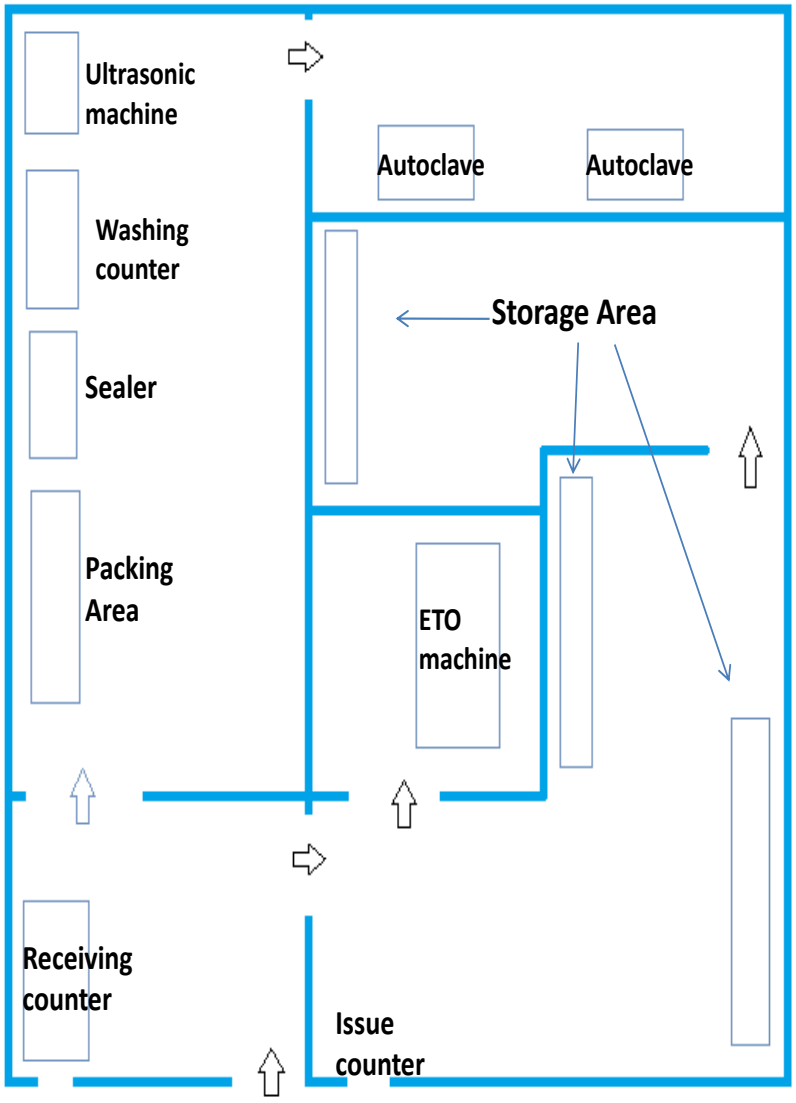

Figure 2.6.2: CSSD layout

2.7 Blood Bank

A blood bank is a bank of blood or blood components, collected from donors, stored and preserved for later use.

Paras Hospital has its own Blood Bank for the need of the hour. Two types of donors come here- one is Voluntary Donors and the other is Donors for Replacement of blood.

Voluntary Donors- Voluntary Donors are those who donate blood according to their own will.

Donors for Replacement of Blood- If a patient, whether OPD or IPD needs blood transfusion then it is to be replaced by a replacement/family donor.

1) Criteria for donor

- A donor can donate blood after every 3 months.
- Age should be between 15-65 years.
- Have minimum of 45 kg of wt.
- Have Hb count of 12.5 gm%
- Should not be on any regular medication.
- Should not have consumed alcohol in 24 hrs.

2) Legal bindings for blood bank

- Drug Controllers are authorized to issue the licenses (validity-5 years) for Blood Banks after receiving the application for the grant and/or renewal of License for the operation of Blood Bnak/processing of Human Blood for components accompanied by License Fees of Rs. 6,000/- and an inspection fees of Rs. 1500/- for every inspection thereof or for the purpose of renewal of License.
- The applicant shall provide adequate space, equipment for any or all the operations of Blood collection or Blood processing.
- The applicant shall provide and maintain adequate technical staff.
- A blood bank shall have an area of 100 square meters for its operations and an additional area of 50 square meters for preparation of blood components.

  It shall be consisting of a room each for –

  1. Registration and medical examination with adequate furniture and facilities for registration and selection of donors.
  2. blood collection (air-conditioned)
  3. blood component preparation.(This shall be air-conditioned to maintain temperature between 20 degree centigrade to 25 degree centigrade)

4. laboratory for blood group serology.(air-conditioned)
5. laboratory for blood transmissible diseases like Hepatitis, Syphilis, Malaria, HIV-antibodies (air-conditioned);
6. sterilization-cum-washing;
7. refreshment-cum-rest room (air-conditioned)
8. store-cum-records.

- Every blood bank shall have following categories of whole time competent technical staff:-

(a) Medical Officer

(b) Blood Bank Technician(s), possessing -

i. Degree in Medical Laboratory Technology (M.L.T.) with six months experience in the testing of blood and/or its components; or

ii Diploma in Medical Laboratory Technology (DMLT) with one year's experience in the testing of blood and/or its components, the degree or diploma being from a University/Institution recognised by the Central Government or State Government.

(c) Registered Nurse(s).

(d)Technical Supervisor(where blood components are manufactured), possessing-

i Degree in Medical Laboratory Technology (M.L.T.) with six months' experience in the preparation of blood components; or

ii Diploma in Medical Laboratory Technology (M.L.T) with one year's experience in the preparation of blood components, the degree or diploma being from a University/Institution recognised by the Central Government or State Government.

3) Layout of Blood Bank

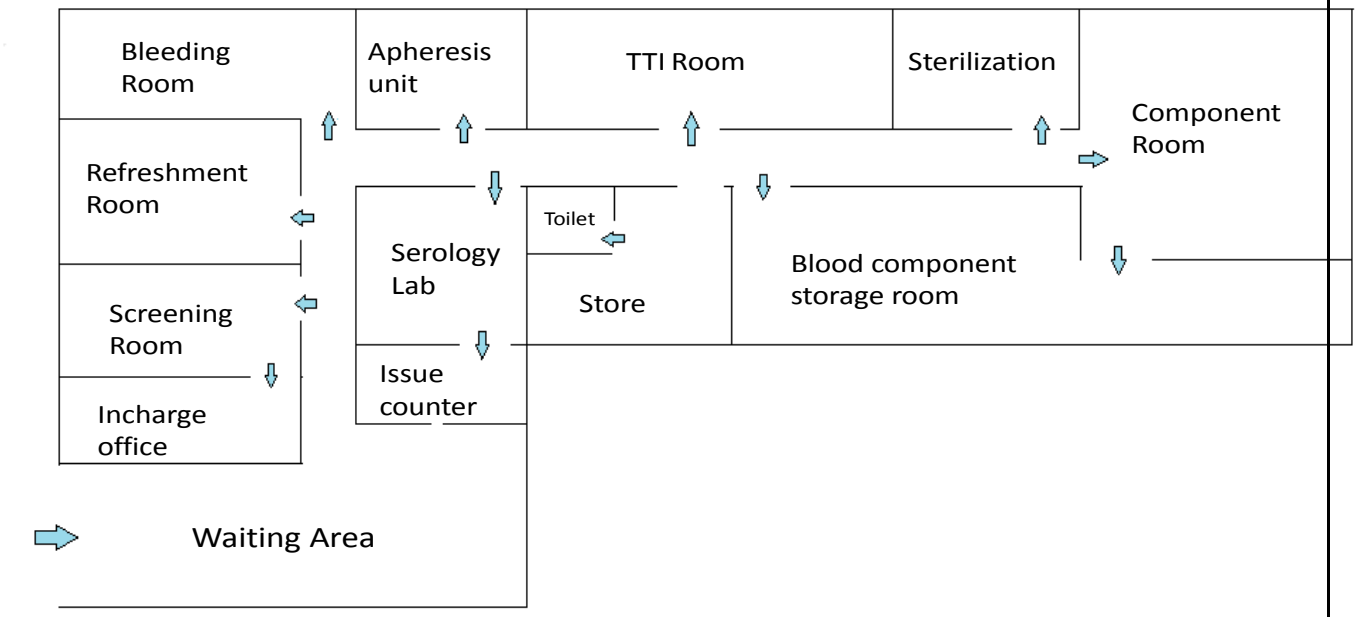

Figure 2.7.1: Blood Bank Layout

(Arrows representing entrances)

Area of Blood Bank is approx. 3388 square feet.

4) Various areas in Blood Bank and their uses.

Blood Bank is divided into following areas/rooms:

- Waiting Area
- Screening room
- Refreshment Room
- Issue Counter
- Cross-Matching/Serology Lab
- Bleeding Room
- Apheresis unit

- TTI Room
- Component Room
- Blood Component Storage Room
- Sterilization Area
- Store

Waiting Area

Waiting Area is for the donors, to wait if couch is not vacant and to fill the „Donor Selection Registration Form" or „Platelet Apheresis Donor Selection Registration Form & Informed Consent Form".

Screening Room

Screening Room is where the donor"s previous history is taken to cross-check the filled Registration form and confirms if donor is fit to donate blood. After history taking, donor"s height and weight are measured and blood sample is collected for Pre-Donation tests, i.e. Blood group and Hb.

Refreshment Room

It is donors" sitting area after donating the blood where they are given Munch, Real Juice and Parle-G. Here donor"s feedback is also being taken in the Donors" feedback Register to know their experience of donating blood.

Issue Counter

From here blood is issued to the IPD or OPD patients after following the concept of „First In First Out". A refrigerator is also kept in this room in which bags entitled for particular patients are kept after the requisition has been made by the Nursing staff.
For patients other than Paras Hospital, blood is issued primarily to MAX Hospital, Gurgaon, Columbia Asia Hospital, Gurgaon and Rockland Hospital, Manesar.
They have maintained Issue Register and Master register where they keep the records of the donors & patients whom the blood is issued.

Cross-Matching/Serology Lab

In this area, recipient‟s and donor‟s blood is being cross-matched. Equipments in this room-

2 centrifuge machines

1 incubator

Bleeding Room

Here the donor‟s blood is collected after he matches the criteria. Blood is collected in single bag, double bag and triple bag depending upon the requirement of component but if patient is less than 52kg, then blood is collected in Single Bag. Blood collecting bags have an anticoagulant –CPDA (Citrate Phosphate Dextrose Adenine) to prevent blood coagulation. Quantity of anticoagulant needed to preserve them:

For Single Bag- 49 ml

For Double Bag- 63 ml

For Triple Bag- 100 ml SAGM (Saline Adenine Glucose Mannitol)

During the procedure, bag used for collection of blood is placed in the combimix which mix the anticoagulant with blood, again to prevent blood coagulation.1 unit of blood collection consumes 5-7 min.

Quantity of blood taken per donation:

- Single Bag- 350ml
- Double Bag- 450ml
- Triple Bag-450ml

After collecting the blood, it is weighed which should be as follows:

- Single Bag- 400-500 gm
- Double Bag- 545-665 gm
- Triple Bag- 675-825 gm

If collected blood is not in this range, then it is discarded after injecting 5ml hypochlorite into it, then autoclaving it for 20 min., discarded into red bag and sent to BMW for incineration.

Following formula is used to calculate the standard weight of Blood Bag after collecting blood:

(350*1.05) + weight of empty blood bag

(450*1.05) + weight of empty blood bag

Apheresis unit

This unit is for Platelet collection. It has 3 machines- one is old and two of them are new. The procedure takes 50-60 min and 6 units collected from Triple Bag is equal to 1 unit of Platelets extracted from Apheresis. The pack made thereafter is also known as Apheresis/Jumbo Pack/Mega Pack/SDP.

SDP is collected as and when required.

Whereas RDP collected from 1 unit of blood consists of 4000-6000 platelet count, SDP collected as a result of Apheresis yields 30,000-40,000 platelet counts.

After collection of blood and platelets, post-donation tests are performed:

- HIV
- HBsAg
- HCV
- VDRL
- MP

First 3 tests are done by ECI and last 2 tests by card.

TTI (Transfusion Transmitted Infections) Room.

Before using the collected blood, TTI testing is done in this room by ECI (Enhanced chemiluminescence immunoassay) for the detection of-

- HIV
- HCV

- HBsAg

Alongwith these tests, blood sample is being sent to Artemis Hospital for NAT (Nucleic Acid Test)

Component Room

Component Room is for making the blood components. In case of Double Bags, blood collected is centrifuged at a speed of 3600 RPM to separate Packed cells and plasma. In case of Triple Bags, two spin is required. In the first spin, whole blood is centrifuged at a speed of 1600 RPM which separates the plasma and in the second spin at a speed of 2398 RPM, RBCs and platelets are separated.

If pediatrics Packs are needed, „laminar airflow" is used to transfer blood from the standard pack to smaller packs of 50 ml. Laminar flow has established UV rays to maintain sterility throughout the procedure.

1 unit FFP- 150-220ml
1 unit RBCs (if made from Double Bag)- 280-320ml
1 unit RBCs (if made from Triple Bag)- 320-370ml

Blood Component Storage Room

All the blood components are stored in this room at the required temperature. 13 Refrigerators are used for this purpose and one mini refrigerator to store refreshment for the Donors. Along with this, Thawing bath is also used to melt the plasma at 36 degree Celsius when needed to be immediately used as plasma is in frozen condition.

Types of Blood components:

- Whole blood
- PRBC (packed red blood cell)
- FFP (fresh frozen plasma)
- Platelets concentrate
- Platelets Apheresis (SDP)

Various Refrigerators and its use:

- Ref.1- To store Tested whole blood at a temperature of 4 degree Celsius.
- Ref.2- To store Tested PRBC at a temperature of 4 degree Celsius
- Ref.3- Platelet Agitator to store Platelets and also untested RDPC (random donor platelet count) at a temperature of 20-24 degree Celsius. It keeps
- Ref.4-To store FFP, which is returned to the Blood Bank due to non-usage, Lipemic FFP and FFP which has been melt but not issued. These components are stored at a temperature of -30 degree Celsius. If RBCs are returned back to Blood bank within half an hour, then it could be again issued to some other patient but after thoroughly inspecting the Physical Appearance of Blood. If Plasma is returned back, then it is stored for 24 hrs. If after 24 hrs, it is not demanded then it is discarded within 1-2 hrs.
- Ref.5- To store FFP at a temperature of -40 degree Celsius
- Ref.6- To store Tested FFP at a temperature of -80 degree Celsius (Not in use currently)
- Ref.7- Sample storage at a temperature of 18-22 degree Celsius
- Ref.9- To store Antisera and card (Reagents) at a temperature of 4 degree Celsius
- Ref.10- To store Reagents at a temperature of 4 degree Celsius Alongwith this, one row is dedicated to untested units and one row is to store Reactive Blood Units
- Ref.11- To store Tested FFP at a temperature of -43 degree Celsius.
- Ref.12- Not in use
- Ref.13- To store Untested FFP at a temperature of -38 degree Celsius
- Ref.14- Refreshment Refrigerator.

Each blood component have a shelf-Life as follows, within which it should be used:
PRBC- 35 days, if extracted From Double Bag and 42 days, if extracted from Triple Bag.
Plasma-1 year.
Platelets- 5 days.

Blood components are stored according to specific color codes to catch the technician‟s eyes which helps to know which type of component is sufficient in the Blood Bank and which is lacking.

Color codes are as follows:

Blood Group A- Yellow

Blood Group B- Red

Blood Group O- Blue

Blood Group AB-White

Sterilization Room

In this room, one autoclave and oven is kept.

This room is specifically to discard the Reactive and unused blood.

Process for discarding the Reactive blood-

10ml of 5% hypo. is injected into the bag

↓

Kept for half an hour

↓

20 min. autoclave

↓

Discarded to BMW (Red Bag)

For the unused or expired blood, process is same except 5ml of 5% hypochlorite is injected into the bag and stored for 5-10 min before autoclaving.

In addition to it, glass tubes used for sample testing are sterilized in oven at 180 degree Celsius for half an hour.

Store

Here the previous years‟ files are kept. For 5 years, Records are kept in the Blood Bank, then after providing the list of „documents to be discarded‟ to Drug Control Officer,

records are sent to MRD. Paras Blood Bank also keeps a copy of the „documents to be discarded" with itself.

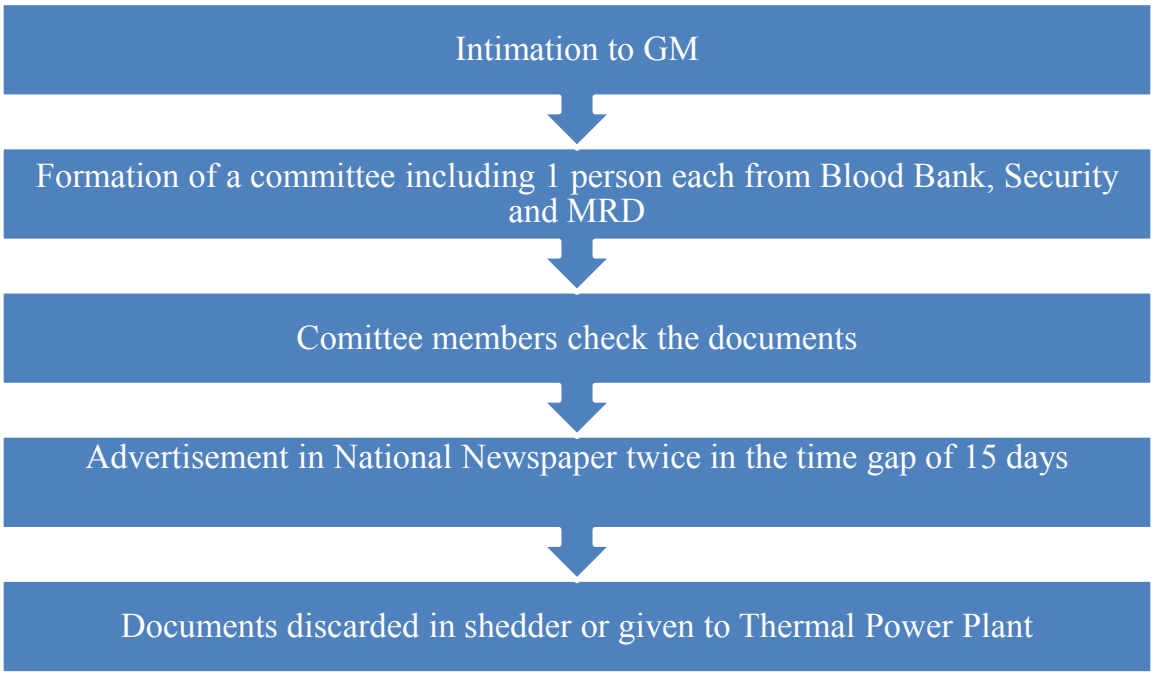

Figure 2.7.2: Process to discard the Documents in MRD

5) Process Flow in Blood Bank

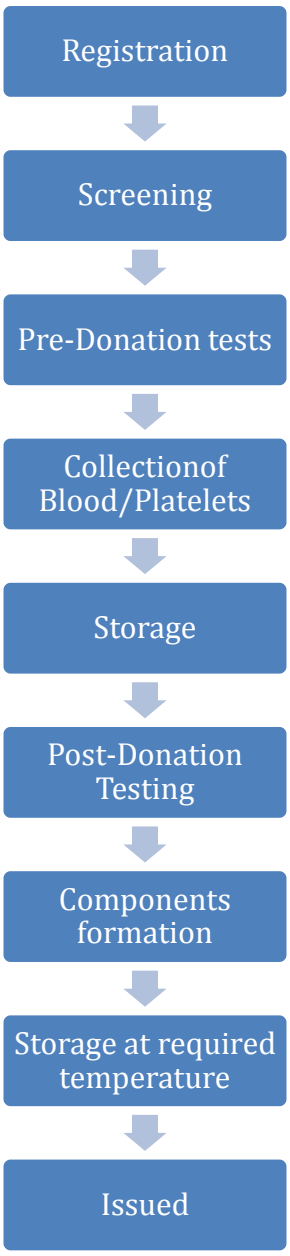

Figure 2.7.3: Process Flow in Blood Bank

6) Manpower

1 Blood Bank Incharge

1 CTO- Chief Technical Officer

1 Male Nurse

9 technicians

2 GDA

1 Housekeeping staff

7) Shifts

Morning shift (3 technicians)- 9:00am to 5:00pm

Evening shift (2 technicians)- 5:00pm to 9:00am

Incharge- 9:00am to 5:30pm

CTO-9:00am to 5:30pm

Male Nurse-9:00am to 5:30pm

2 GDA Morning shift-7:30am-7:30pm

Evening shift- 7:30 pm -7:30am

1 staff for Housekeeping- 7:30am -7:30pm

8) Expiry and shortage of Blood Components

Expiry of Blood components is checked on daily basis and before 7-10 days of expiry, other Hospitals are informed if they need the particular Blood component.

In case of shortage also, other Hospitals in Gurgaon are contacted to meet the demands.

9) Records maintained in the Blood Bank

- Issue Register
- Master Register
- NAT and ECI Test Report File
- ECI Control Report File
- ECI Test Report File
- NAT Report File
- Donor Record Register
- Donor Blood Grouping Register
- Patient Blood Grouping Register
- Component Register
- Blood Donor Form File
- Blood Donor Defer Form File

- Apheresis Donor Form File
- Apheresis Donor Defer Form File
- Lab. Blood Grouping Register
- Blood Requisition Form File
- Donor Feedback Register
- Daily QC- Quality Control
- Blood Bank Dispatch Register
- Unit received from other Blood Bank Register
- Rapid card Register
- Stock Register of Antisera
- Blood Bag Disposal Register
- Thalassemia Record Register
- Antisera opening Register

2.8 In Patient billing and TPA (Third Party Administrator) Department

1) TPA

TPA are separate entities which work as a mediator between the insurance companies and the insurance receiver. As public sector undertakings (PSU), there are four general insurance companies:

1. Oriental Insurance
2. New India Insurance
3. United India Insurance
4. National Insurance

In recent years, a lot of private sector insurance companies such as Bajaj Allianz, ICICI Lombard, TATA AIG etc. have entered the insurance market.

Also an upcoming trend is that all big insurance companies have started their own respective in-house TPA"s so as to cut cost on the TPA commissions. The PSU together formed Raksha TPA and also came up with GIPSA (General Insurance Public Sector Association), which standardized the price of 42 general procedures so as to control the increase in price of such procedures.

There are 4 types of files:

1. OPD file
2. IPD file
3. ESI file: File where no claim is required, permission gets reviewed every seven days.
4. Corporate file

2) Manpower

Manpower at Front desk (shift from 8am to 8pm) of TPA:

TPA incharge-1

Senior executive-1

Executive-2

Manpower in dispatch (shift from 9am to 6pm) department:

Senior executive-1

Executive-2

Manpower in Recovery Department:

Manager

Executives-3 (For TPA-2 & for CGHS/ECHS-1)

3) Empanelment

The tariff version and empanelment of the hospital in various TPAs are taken care by the marketing department. As on date there are *32* TPA which are empanelled and *84* corporate tie ups that the hospital has.

Each TPA has a different tariff version based on previous agreement with the hospital. Some TPAs such as Future general, Dedicated Healthcare service, Star Health, IFFCO, HDFC ERGO and Health India have agreed to follow the current tariff version of 6.0.

4) List of empanelled TPA

Vipul Medicorp	Raksha TPA	ICICI Lombard	Bajaj Allianz	Max Bupa	FHPL
Future General	Medi Assist	Focus Healthcare	Dedicated Healthcare service	Alankit	Cholamandalam
E-Meditek	United Healthcare	MD India	Heritage	Safeway	I-care
HDFC ERGO	IFFCO-TOKIO	Star Health	TTK	Genins	East West
Health India	Apollo Munich	Etc.			

Table 2.8.1: List of empanelled TPA

TPA removed: The TPA removed is Park Med claim because of payment issues.

List of corporate tie ups and facility extended:

Coca Cola	ONGC	NTPC	NHPC	American Express	WNS
Indian Oil	ESI	RICO Industries	Dell	Hero Honda	Power Grid
Maruti Suzuki	Honda Motors	IFFCO	SAP Labs	IBM Daksh	GENPACT
HPCL	British Airways Call Center	Pepsi	Fidelity Investments	Cairn Energy	Etc.

Table 2.8.2: List of corporate tie ups

Corporate tie ups are majorly useful in terms of cash billing discount which does not go beyond 10%.

5) Facility extended by the hospital to insurance beneficiary.

The hospital provides credit billing to the patient after taking the following documents from the patient and a cash deposit of Rs 5000.

1. TPA name and ID card
2. Name of the insurance company
3. Photo ID proof of patient
4. Doctors prescription for advice admission or surgery
5. Previous year policy papers(Some diseases have exclusion, whose cover starts after some set period depending upon the policy)
6. Investigation reports to support diagnosis.
7. MLC/FIR copy if the patient is an MLC.

The attendant of the patient is also made to sign an undertaking that if the TPA does not approve the claim, than the hospital shall not be held responsible and the patient will have to pay the amount due as per the tariff version 5.0. Secondly the patient is suppose to pay for charges that the insurance does not cover. Finally the patient will be allotted the bed which is sanctioned by the TPA. If the patient wants to upgrade than he or she is liable to pay the difference in amount.

6) General Turn around Time fixed as per department

1. Pre-authorization form is supposed to be signed and sent within 6 hours. Else it would be rejected.
2. Discharge process 4hours
3. Query is to be answered in 2 hours
4. Dispatch files should be submitted within 7 days to the TPA otherwise the payment gets delayed.
5. TAT for dispatch department to get the file ready and handle it over to recovery is 3 days

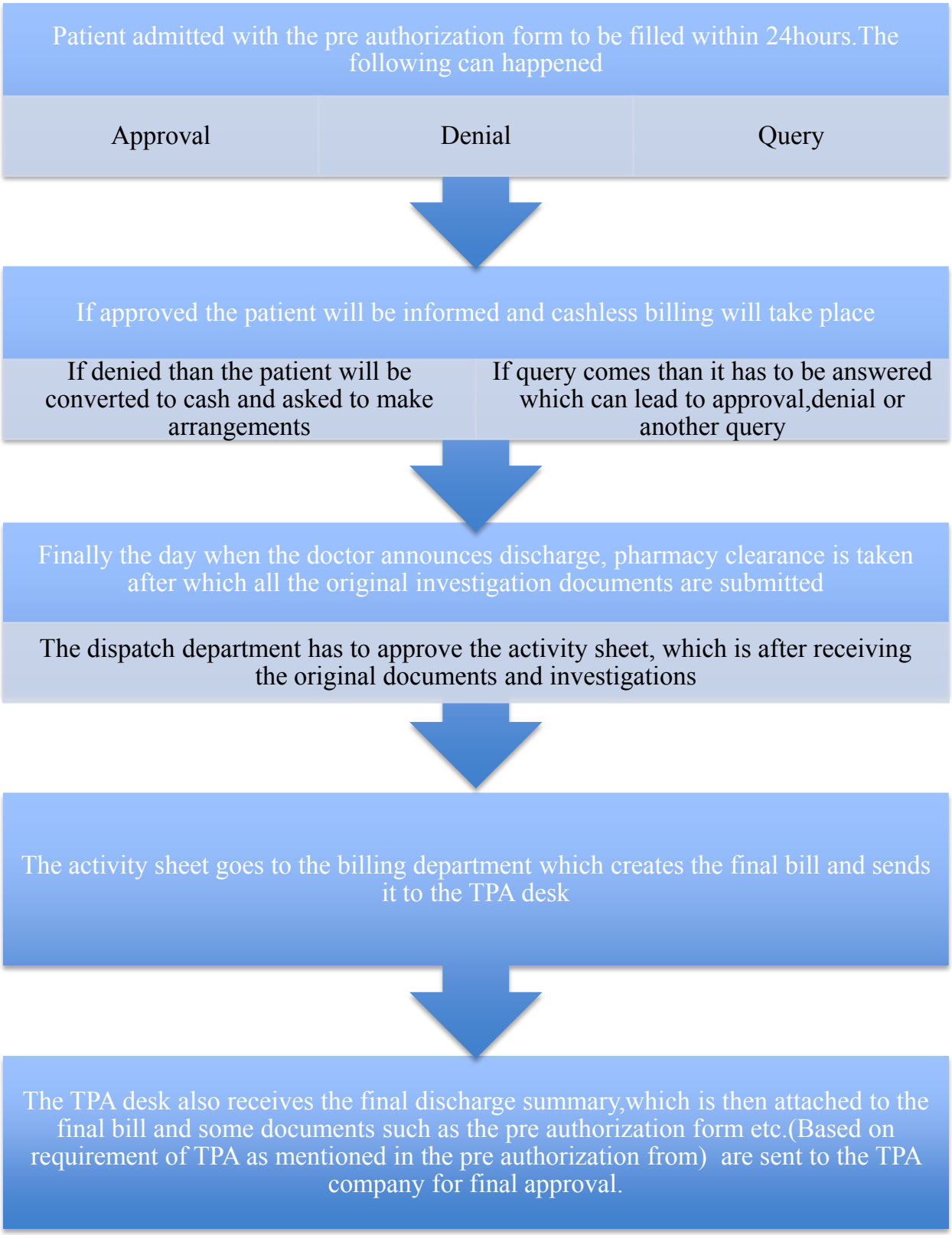

Figure 2.8.1: Process flowchart of TPA patient admission & discharge

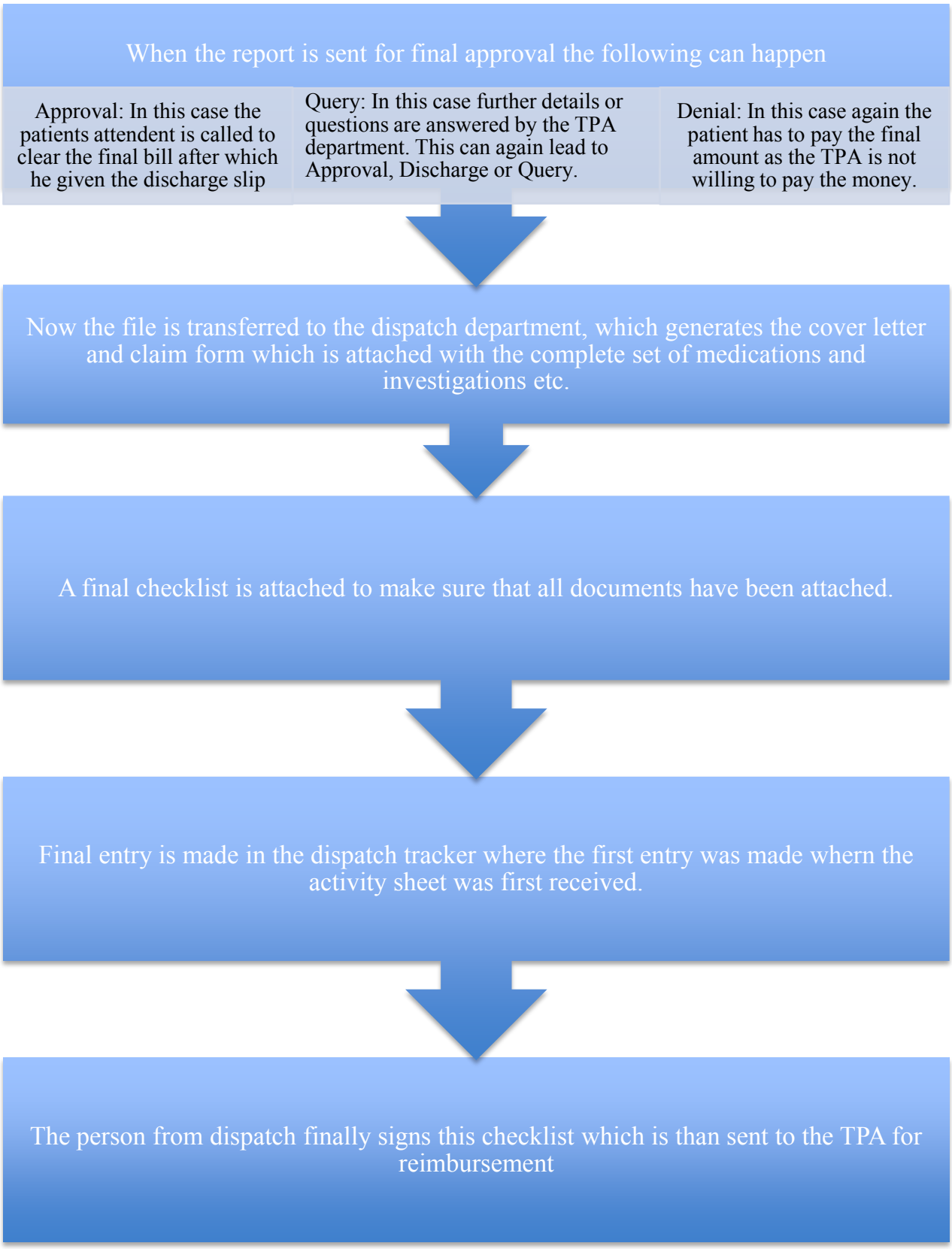

Figure 2.8.2: Process flowchart of TPA patient in the discharge area

Final Check List with patient information and TPA signature which is used for assembling the dispatch files:

1. Covering letter
2. Authorization Letter
3. Pre-authorization Letter
4. I-Card/ID Proof
5. Claim Form
6. Payment Receipt
7. Bill Summary and detail
8. Discharge Summary
9. Radiology Report
10. Radiology Film
11. Laboratory Report
12. Cardiology Report ECG/NST/ECHO/TMT
13. NCV/EMG/EEG
14. CAG/PTCA and Sticker
15. Findus/Tonometry and sticker THR/TKR Sticker
16. Outsourced report
17. Endoscopy reports
18. MLC report photocopy
19. Blood sugar charting photocopy
20. N/P and other deduction test
21. Others
22. Total number of pages

7) Procedure for Employee's State Insurance

ESI is a facility given to employees which earn a salary of Rs15000 or below it. Any company can get a ESI tie up by paying a certain amount for ESI. This amount is generally deducted from the employees salary. The hospital is empanelled by ESI for Cardiology and Oncology department. If there is an emergency case, no matter the

specialty the hospital has to help the patient and later ESI can provide approval for the patient else the patient will be referred to the ESI hospital.

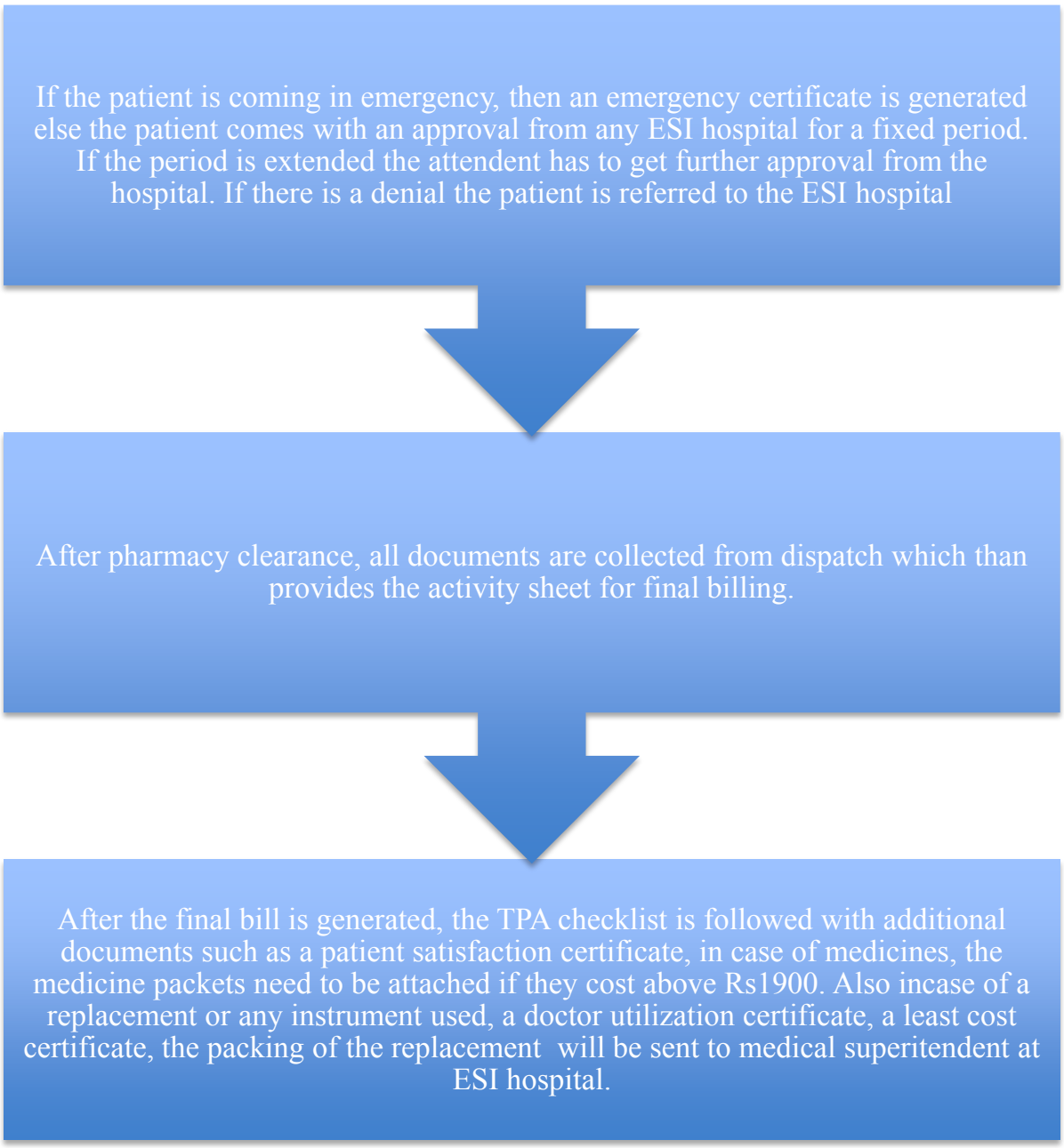

Figure 2.8.3: Process flowchart for ESI patients

8) CGHS and ECHS Billing Department:

This department consists of 2 senior executives and 1 Assistant Manager, who work from (9am to 7:30pm).

CGHS stands for Central Government Health Scheme, which is the insurance facility given to central government employees.

ECHS stands for Ex-serviceman Contributory Health Scheme, which is the insurance extended to ex serviceman from the defense services.

Patient under both the schemes are admitted based on the referral letter which they receive from their respective polyclinic.

Discharge process for CGHS and ECHS are as follows:

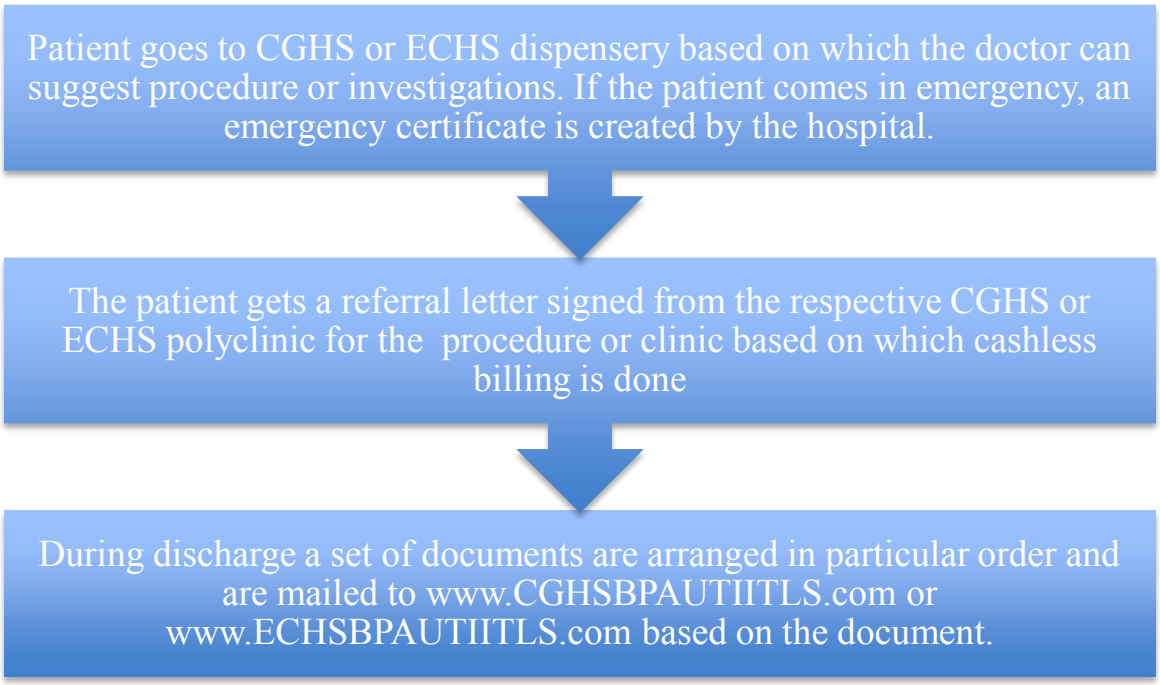

Figure 2.8.4: Process flow for ECHS and CGHS

9) Set of documents to be sent

1. Covering letter mentioning the follows:
    a. UTI TSL (UTI technology and service Ltd) ID
    b. Bill ID
    c. Particular of ESM (Ex-servicemen)
    d. Name of patient and relation with the patient.
    e. Date of admission
    f. Date of discharge
    g. Date of uploading to UTI TSL

2. Referral Form
3. Copy of Membership receipt/card self attestation
4. Emergency certificate if applicable and also all bills should be superscripted in red ink.(i.e. a stamp in red color mentioning emergency stay has to be mentioned)
5. Summary of bill
6. Detailed/Itemized Bill
7. Prior approval if applicable
8. Discharge Summary
9. Drug certificate (if price is above 2000 for CGHS patient or above 1500 for ECHS, then a certificate has to generated from the pharmacy based on norms)
10. Invoice and outer pouch for implant/stents if applicable
11. Investigation reports

After discharge only ECHS patients are given 7 days of medicine in advance. The department is supposed to forward the documents online within 10days in case of an inpatient and within a month for outpatient.

10) IP Billing

The work of IP Billing is twofold. It updates the bills of each patient during the course of stay and also generates the final bill for the patient. This department is responsible for the final settlement every day the patient‟s attendant is updated based on the amount due. Also for people who do cash billing have to pay their final amount at the IP billing desk.

Manpower:

Billing Manager-1
Assistant Manager-1
Senior Executive-1
Executive-6

There are a total of three shifts:

1. Morning: (8am to 430pm):2
2. Evening: (12pm to 8pm):2

3. General : (9am to 5:30 pm): 1
4. Night: (8pm to 8am):1

11) Cash Billing is done in the following way:

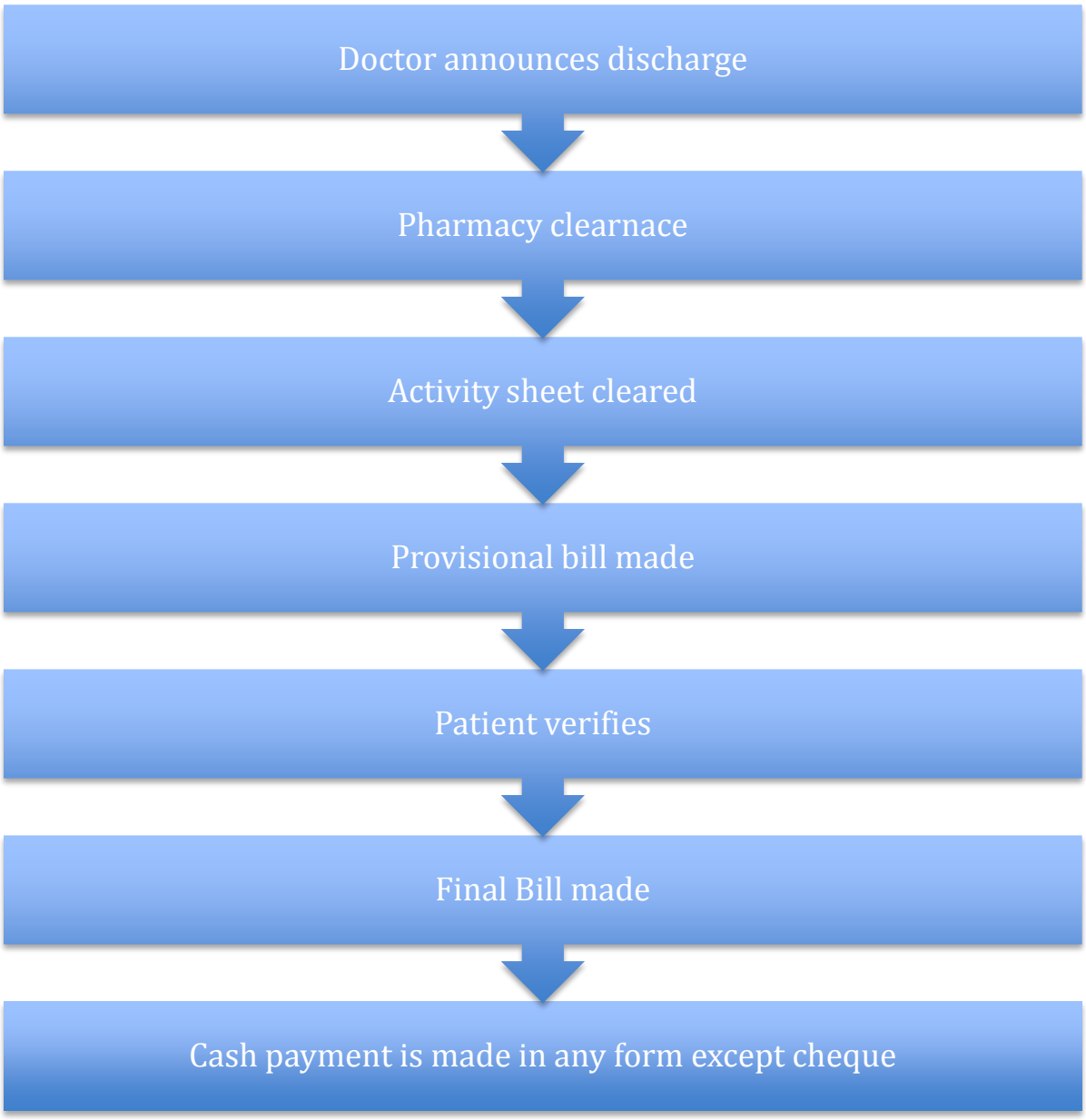

Figure 2.8.5: Discharge process flowchart

12) TPA and IP billing Department Outlay

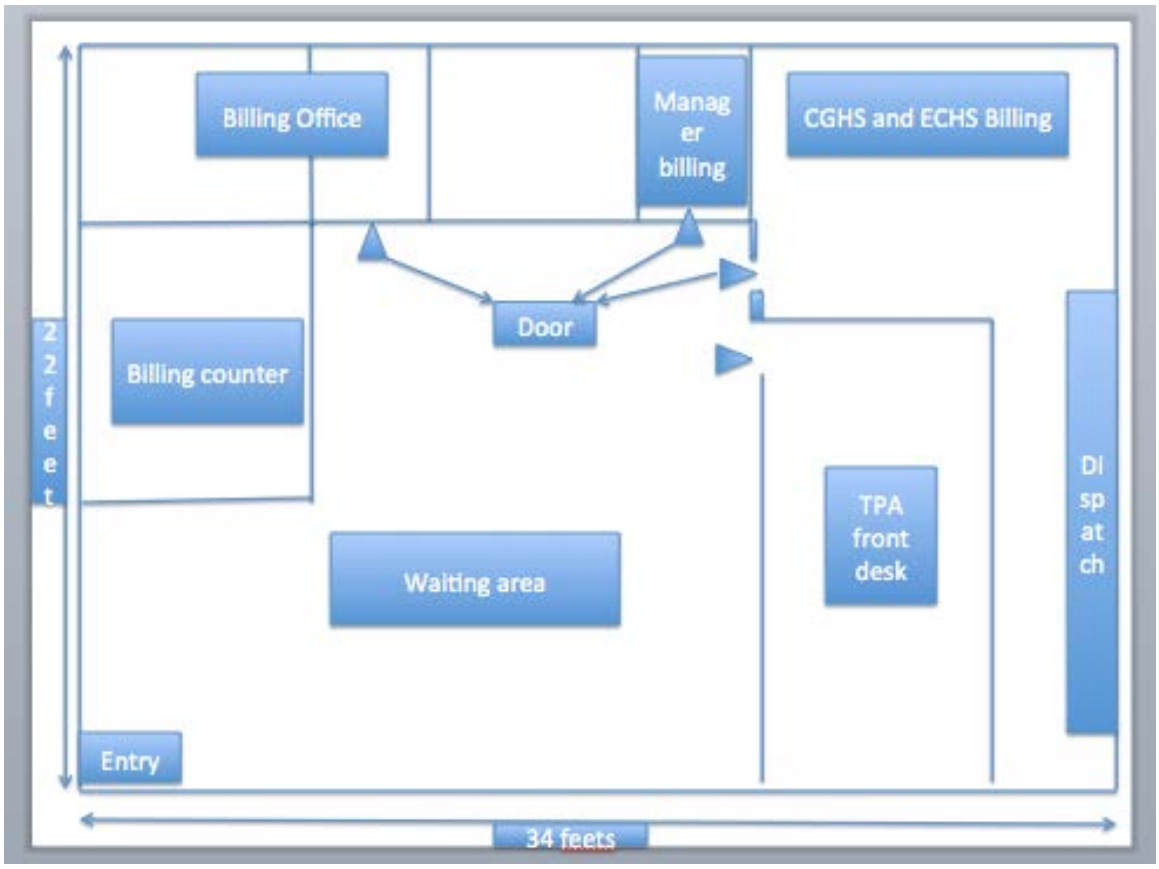

Figure 2.8.6: TPA and IP Billing Department layout

13) In case of emergency

CGHS or ECHS patients will be given a different rate. If the patient is admitted then referral letter will be required the next day. Also cashless billing is allowed to pensioners and ex servicemen alone. Service man will be asked to pay at CGHS rate.

ESI patients need not pay any amount. Cashless billing is given to such people.

In case of corporates generally patient comes with credit letters based on which money can be reimbursed from the company itself.

14) Work load

In general a total of 65 transactions take place on the front desk including discharges (30), pre authorization (25) and query (10).

2.9. Front Office

Location**:** Ground floor

1) **Introduction**

Front Office is the First Interactive Point for a patient coming to a Hospital and is typically a busy, fast-paced hive of activity. Front Office executives do multiple tasks right from taking multiple incoming telephone calls from patients who want to schedule appointments, registration, billing, admission, replying to queries of the patients, dispatching of reports, preparing individual patient file to entering records in HIS The front office also provides information on laboratories reporting results, hospitals reporting on inpatients or scheduling surgeries and other medical services available in the hospital.

2) **Manpower & Hierarchy**

There are 26 people working under Front Office Department.

Hierarchy:

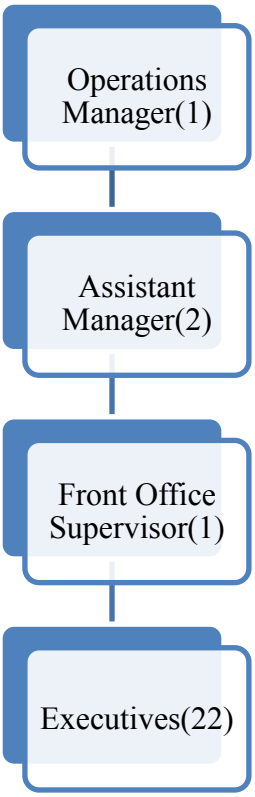

Figure 2.9.1: Organogram of Front Office Department

3) Different Departments in Front office:

- OPD Bill Counter
- Corporate Bill counter
- Report collection counter
- Counselling room
- Bed management
- OPD Counter A to F
- Dialysis unit
- Endoscopy suite
- Radiology unit
- Emergency room
- Sample collection room
- PHC

- Call centre
- Pharmacy

OPD Bill counter

It accounts for registration & billing for any purpose including zero billing (if patient is relative of any staff member then no billing is being done & is called as zero billing) and other patient‟s queries; even corporate billing, Lab Billing, Radiology Billing which have their separate counters. But it is not meant for billing for PHC.

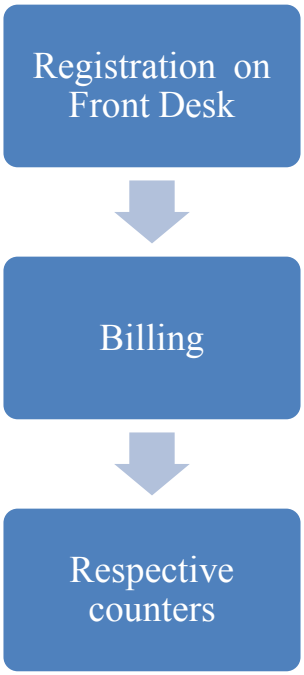

Figure 2.9.2: Process Flow of OPD Patients

Alongwith paying patients, cashless services are provided for ESI, ECHS and CGHS patients. With reference to ESI, ESI benefits are only given to onco and cardio patients. For CGHS patients, if cash, Rs.58/- is being charged and Xerox of ID proof is kept by the Hospital. If credit, referral letter from CGHS Clinic is required, which is valid for 7days. Colored photocopy of card & bill has to be kept.

For ECHS patients, referral letter is required which is valid for 30days. Referral letter can be used for single time only. Cash patients need to pay Rs.58/- along with copy of ID proof.

Corporate Bill counter

This counter is meant for registration and billing exclusively for patients coming from companies with which Paras Hospitals have tied up.

Report collection counter

This is a report collection counter for Lab. Investigations, Radiology, cardiac procedures, Neuro procedures. Reports of endoscopy and PHC are given by the respective departments.

(Normal timings for reporting- if tests are done before 12pm, reports can be collected after 5pm on the same day. If after 12 pm then next day morning.)

Counselling Room

If patient gets admitted in the hospital, patients are explained the estimate of hospital stay, expenses, etc. in this room. And they are allotted room according to their choice and availability.

Bed Management

It is responsible for allotment of bed and shifting of beds on patient"s request. If the desired bed category is not available then the patient is upgraded into the immediate above bed category.

OPD Counters A to F

- **Counter A- Cardiology**

  Manpower on Nursing Counter: 3 nurses.

  Shifts: Morning- 2 nurses (9am -5:30pm)

  Evening- 1 nurse (12pm- 8pm)

  Counter A also includes Cardiac Procedure room. The procedures performed in Cardiac Procedure Room and their Turn Around Time is as follows:

1. ECG-Electrocardiography: 5 min
2. Echocardiography/Color Doppler: 15-20 min
3. Treadmill Test(TMT): 25 min
4. Stress echocardiography: 35 min
5. Dobutamine stress echocardiography (DSE): 40 min
6. Holter monitoring: 24 hrs
7. Transoesophagal cardiography (TEE): 15 min

Procedures done per day (on an average):

1. ECG-7
2. ECHO-15
3. Stress ECHO-2
4. TMT-3
5. DSE-2
6. Holter-1

Manpower in Cardiac Procedure Room:

1 or 2 Doctors

1 Technician

1 Female Nurse

1 Medical Transcriptionist (M.T.)

- **Counter B** involves following specialties:

  Obs. and Gynae.

  Paediatrics

  ENT

  Ophthalmology

Manpower & shifts:

General shift, G1-8:00am-4:30pm (1 nurse)

General shift, G2-9:00am – 5:30pm (1 nurse)

Evening shift-12:00pm-8:00pm (1 nurse)

- **Counter C**- Neurology

  This counter caters to patients coming for Neurology Consultation. Neuro Procedure Room also come under this counter where following Neuro procedures are being done.

  1. EMG-Electromyography
  2. EEG-Electroencephalography
  3. NCV-Nerve conduction velocity test.

  (Time taken by each procedure-45 min.

  Manpower (of the whole deptt.)

  1 nursing staff

  1 Incharge (for neuro procedures)

  3 technicians (for neuro procedures)

- **Counter D**

  Counter D caters to patients coming for General and Lap. Surgeon consultation and this is also a Billing Counter for Lab. and Neuro procedures billing.

  Manpower & shifts:

  General shift, G1-8:00am- 4:30pm (1 nurse)

  General shift, G2-10:00am- 6:30pm (1 nurse)

- **Counter E** includes:

  Internal Medicine

  Orthopaedics & Joint Replacement

  Gastroenterologist

Psychiatry
Rheumatology

Manpower & shifts:
General shift, G1-8:00am- 4:30pm (1 nurse)
General shift, G2-9:00am- 6:30pm (1 nurse)
Evening shift-12:00pm- 8:00pm (1 nurse)

- **Counter F** includes:
  Neurosurgery
  Urology
  Haematology
  Spine clinic
  Psychiatry/Clinical Psychology
  Nephrology

  Manpower & shifts:
  General shift-9am- 5:30pm (1 nurse)

Dialysis unit

Dialysis unit has 5 dialysis machines and 1 dialyzer reprocessor. Dialysis takes 3-4 hrs. to complete the process. So the appointments given to the patients are in 3 shifts as mentioned under:

Morning 8-12
Afternoon 12-4
Evening 4-8

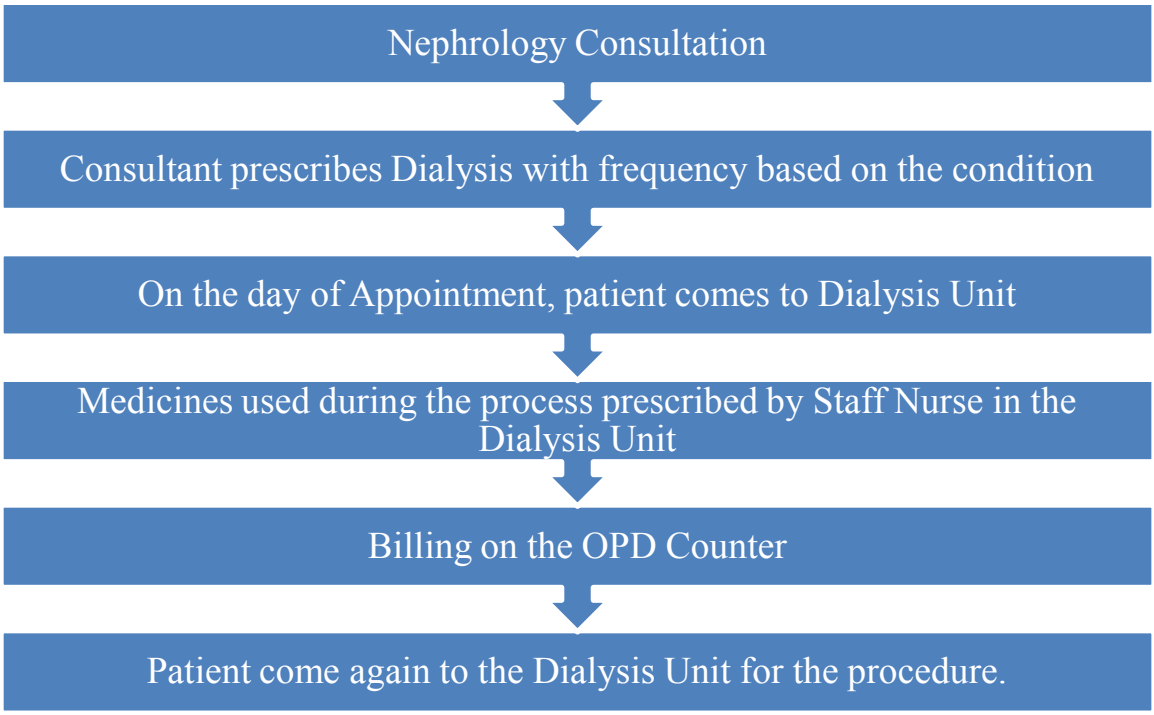

Figure 2.9.3: Process Flow in Dialysis Unit

Manpower:

3 staff nurse

3 technicians-1 senior

-2 junior

1 GDA

1 housekeeping personnel

Endoscopy suite

Consists of procedure room, pre- & post-procedure room and cleaning area.

Procedures done:

1. Colonoscopy
2. Endoscopy
3. Sigmoidoscopy
4. ERCP (done in OT)

TAT for the procedures:

Each procedure takes 10-15 min. If pre-care, post-care and reporting is added it takes 30 min. Only colonoscopy requires 30 min. (only for the procedure)

Manpower:

1Doctor

1 female nurse

1 technician

1 GDA

Radiology unit

Includes Digital X-Ray, CT Scan, MRI Scan, Ultrasound and Fluoroscopy.

X-Ray

There are 4 X-Ray machines:

1 in radiology unit-500 MA

1 in PHC-300 MA

2 portable X-Rays 60 MA & 100 MA

MRI

Currently 1.5 Tesla MRI is being used in Paras Hospital. If MRI is needed for an ICU patient MRI comfortable Pulse Oxymeter, ventilator and O2 cylinder is used. MRI room is kept at a temp. of 16-22 degree Celsius.

CT Scan

16 slices CT is being used by Paras Hospital. Required temperature is same as of MRI. For both CT and X-Ray, lead screen and lead apron is used by the technicians for shielding.

Ultrasound

There are 4 Ultrasound machines in the Hospital:

3 in Radiology

1 in PHC

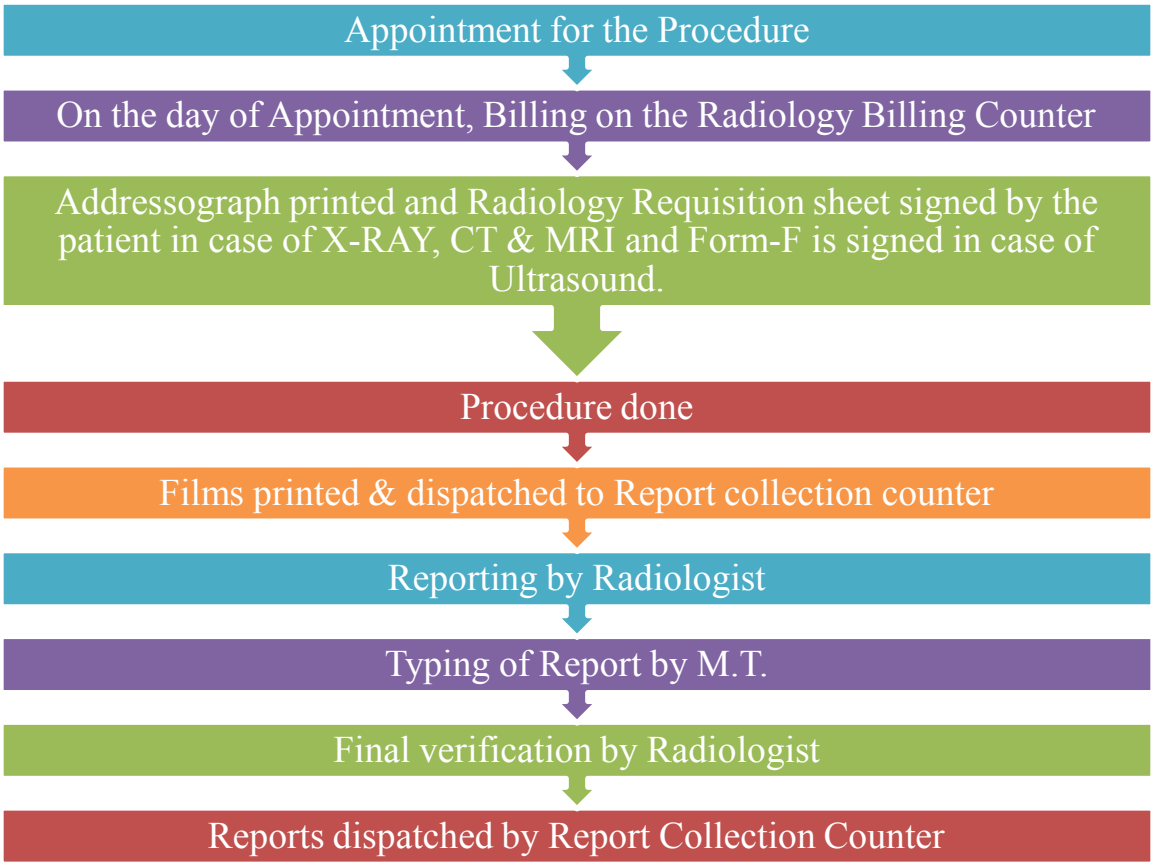

Figure 2.9.4: Process Flow in Radiology

TAT for the Procedures:

	Capturing	Reporting	Typing	Total
X-Ray	5 min	5 min	2 min	12 min
MRI	15-20 min	15-30 min	5-10 min	35-60 min
CT	10-15 min	10 min	5-10 min	25-35 min
Ultrasound	10 min	2-3 min	2-3 min	14-16 min

Figure 2.9.5: TAT for different Radiology Procedures.

Emergency Department

Manpower & Hierarchy:

Emergency Department is headed by 2 CMOs with 20 nursing staff. Hierarchy is as follows:

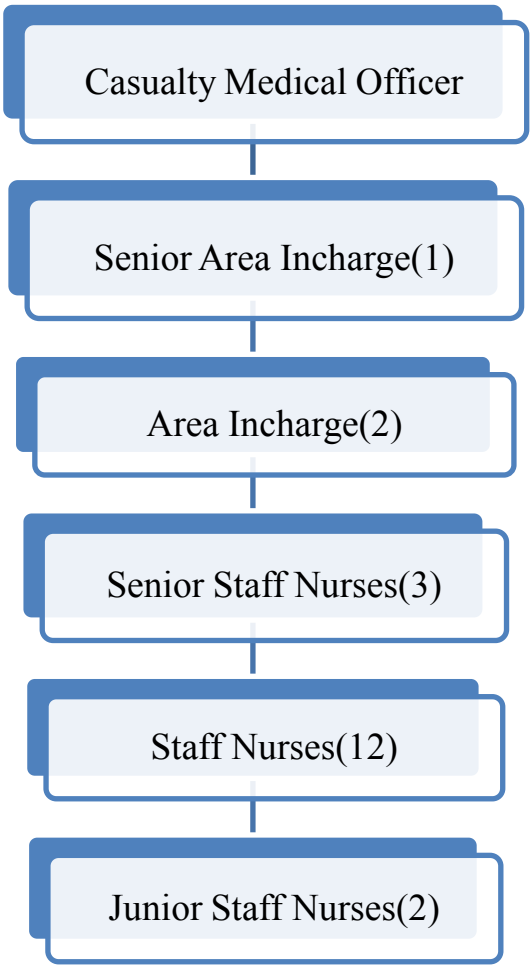

Figure 2.9.6: Emergency Department Organogram

Different Areas in Emergency:

- Registration & Billing Area
- Waiting Area
- Patient‟s area (8 beds)
- Store room
- Utility room
- Minor OT
- Plaster & Dressing Room

- Day care unit (8am to 8pm) for the patients under observation. If they are not found stable upto 8 pm, they are admitted

Sample collection Room

Blood, urine and stool samples are collected in this room and GDA from Lab. come to collect it after every half an hour.

Preventive Health Checks

Manpower:

2 customer care executives

1 Gynecologist

1 Female Nurse with Gynaecologist

1 Physician

3 technicians

Different Areas in PHC Department:

- Billing & Registration Area
- Sitting Area
- Gynae. Room
- Physician room
- Sample collection room
- Change room
- ECG, TMT ,Stress ECHO
- US,ECHO, PFT(Pulmonary Function Tests)
- Mammography, Densitometry(for knowing Bone Mineral Density)
- X-Ray room
- Refreshment area

Call centre

Call centre gives the appointments for consultant Doctors and visiting consultants and respond to other queries. 8 Executives are in place in the Call Centre and work in 3 shifts:

Morning shift: 8:00am-4:30 pm

Evening shift: 11:30am- 8:00pm

Night shift: 8:00 am to 8:00am

Call Centre don‟t give appointments for Radiology, Cardiac procedures, Neuro. Procedures & PHC (upto 4:30pm)

Safety codes are also announced by the call centre except code Black. Code Black is for personal communication between the Code Black Team.

International Marketing

This Department caters to the patients who come to the Hospital from outside countries. International patients come mostly from Arabian countries specially Nigeria, Codan, Iraq, Afghanistan. This Department consists of 5 people and their hierarchy is as under:

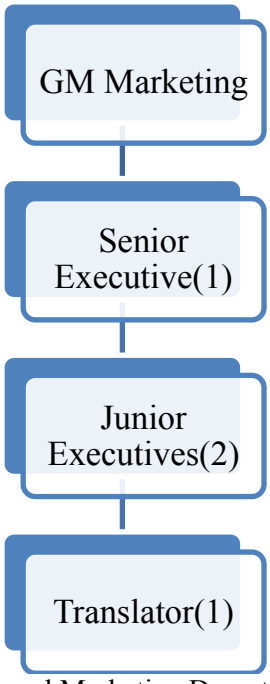

Figure 2.9.7: Organogram of International Marketing Department

OP Pharmacy

OP Pharmacy mainly serves the needs of medicines of the patients prescribed by Doctors. Arrangement of medicines in the OP Pharmacy is according to ABC Analysis and it also follows the Last in First Out and First In First Out concept.

At the end of every month staff in OP Pharmacy manually checked the expiry date of medicines and return the medicines to the vendor 3 months before the expiry date. To avoid the confusion of Look Alike and Sound Alike Drugs, OP Pharmacy have a separate cabinet for these drugs.

Hierarchy:

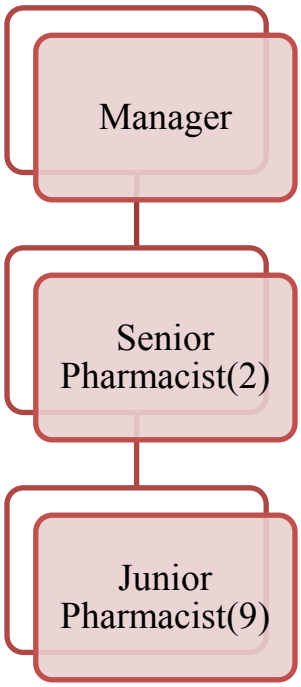

Figure 2.9.8: Organogram of OP Pharmacy.

2.10. Emergency Department

Emergency admissions to hospital are, by definition, unpredictable & unexpected in the individual case even where the system has been properly set up to cater for them. The volume & unpredictability of those admissions is a significant part of health service. The purpose of Emergency department is to ensure patients undergo an immediate care in an urgency that their treatment is initiated in a timely manner & to do triage assessment.

1) Scope of emergency

To cater all emergencies coming to hospital, their stabilization, admission, transfer or referral from emergency department within or outside the hospital.

i. ER provides a comprehensive & uniform emergency service/ care to patient from all medical categories, pediatrics through geriatric, presenting to department (functional 24*7).

ii. All patients are assessed & triaged by a qualified & experienced medical & paramedical staff & provided appropriate level of care in ER department.

iii. The ER department provides medical evaluation & treatment (including rapid resuscitation & stabilization) to presenting patients of various ages & varying levels of illness & injury from minor to critical.

iv. Patients receive medical referral / transfer (including critically ill patients & or those are not in scope of services of hospital & pits/ attendants request as necessary to some other HCO.)

v. Emergency care services provided include-

1. Stabilization of life threatening conditions.
2. Life saving procedures.
3. Immediate treatment of medical & surgical emergencies.
4. Emergency treatment for minor injury or illness.
5. Emergency care for minor / major trauma victims.

2) Admission process flow

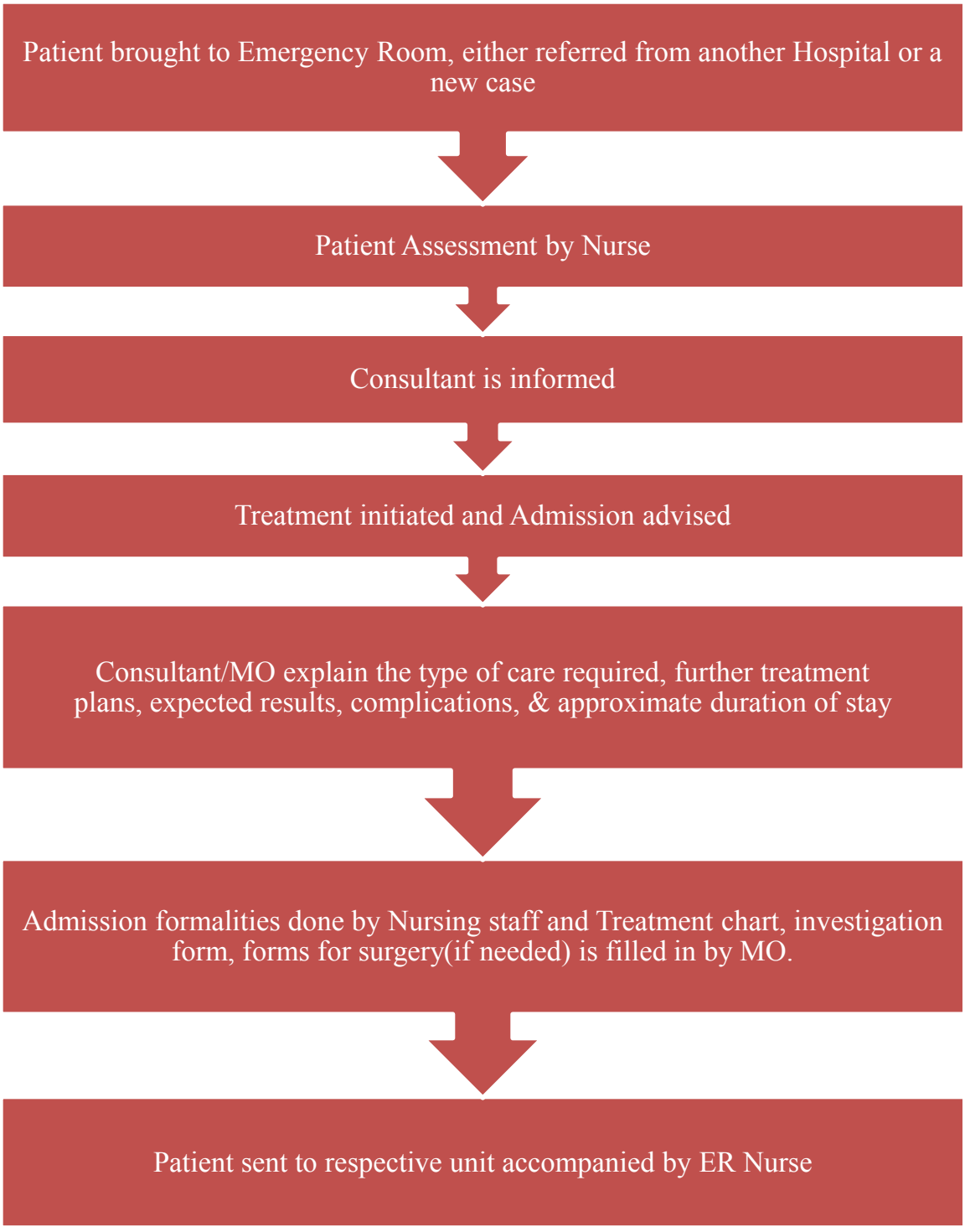

Figure 2.10.1: Process Flow showing admission process in Emergency Department

3) Process Flow in Triage

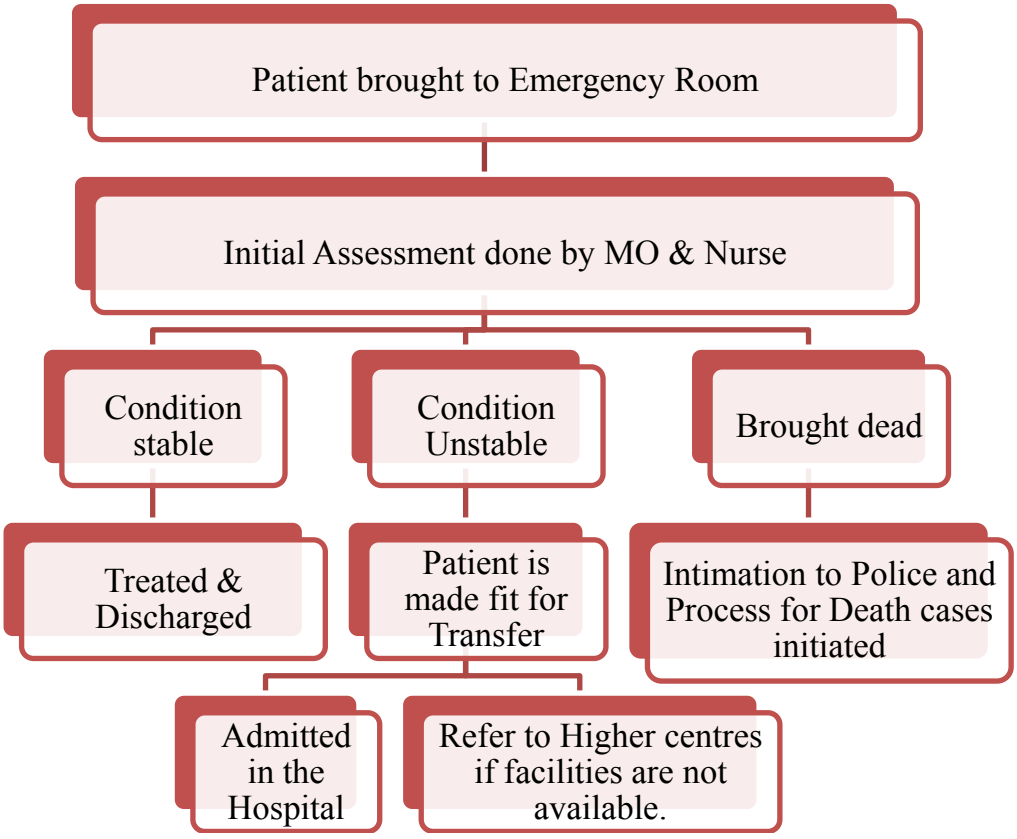

Figure 2.10.2: Process Flow in Triage

4) Overview of the department

ER department is situated at the Ground floor of Paras hospital. It is 24 hour functional & is eight bedded. Hierarchy is as shown:

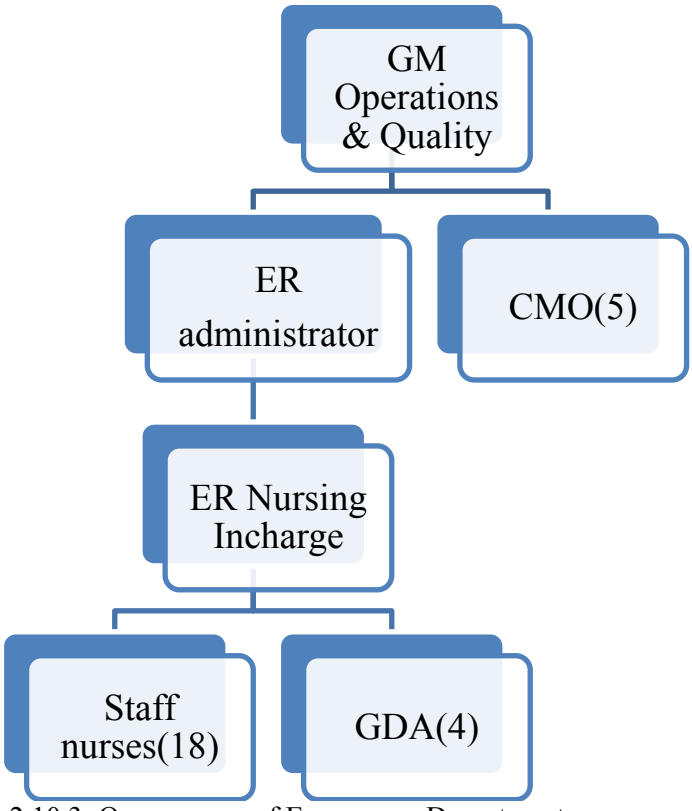

Figure 2.10.3: Organogram of Emergency Department

5) Important medications used in Emergency Department

High alert medications

These are defined as those which could cause an immediate life threatening condition for the patient if an error in administration occurs.

Narcotic drugs & psychotropic substances (NDPS)

These are drugs which required special storage & issue to prevent misuse, pilferage etc e.g. fentanyl, morphine, pethidine, sufentanyl (also known as Schedule 2 drugs).

Each person independently compares the label & product contents in hand versus the written order & EMAR (if it is the first dose) or label. Double check of medications prior to administration by 2 registered nurses after reading the label is mandatory.

Hospital has made some policies regarding the use of Narcotic Drugs which is shown in the Table:

Medicine name	Prescription lines-doctor	Dispensing guide-pharmacist	Administration guide- Nurse
Fentanyl, Morphine, Pethidine, sufentanyl	Prescription of NDPS drugs only on formal written orders with patient id, dosage, duration, Qty etc from credentialed members only in limited quantity. DD12 form must be accompanied duly signed by credentialed person prior to dispensing.	Verify the prescription/ DD12 for details prior to dispensing. No dispensing on verbal orders. To maintain narcotic register. All narcotic drugs shall be kept in double lock & key under the supervision of pharmacy head.	Verify the drug & dose to be administered with the physician‟s order/ medication records. To maintain narcotic register.

Table 2.10.1: Narcotic Drugs and its Guidelines

General guidelines for the Medicines:

- High alert medications dispensed, & administered only on prescription by credentialed personnel / OT/ ICU/ ER in charge doctors.
- High alert medications restricted to critical care & special care areas may be used in other patient care areas in emergency situations.
- Double check of Medications prior to Administration by 2 Registered Nurses by reading aloud:

i. Right medication

ii. Right dose rate, including double check of any calculation & verification of pump settings.

iii. Right route , including line reconciliation.

iv. Right frequency.

v. Right patient.

- High alert medications details will be recorded in Medication Administration Record.
- Storage as per manufacturer packaging instruction.
- Narcotics must be stored under double lock & key.
- In case of expiry/ breakage, excise inspector will be informed accordingly.
- Warning labels for all cytotoxic drug containers, as well as shelves.

6) MLC cases

It is a case of injury or ailment etc where attending doctor after taking history & doing clinical examination of patient thinks that some investigations by law enforcing agencies are essential so as to fix responsibility regarding the said injury or ailment etc according to law.CMO attending the case, label the case as MLC.

Cases labeled as MLC-

Trauma, burns, electrocution, poisoning, industrial accidents, sexual offences, cases requiring age estimation, criminal abortion, animal or snake bite, cases of coma where cause could not be ascertained, cases of starvation including hunger strike, unclaimed newly born, hanging, strangulation, drowning, suffocation etc, cases brought by police or sent by court for medical examination, BID, where death certification due to disease or natural cause is not possible being not apparent, result of medical malpractices.

Chapter 3- Projects

3.1. A Time Motion Study on In-Patient Discharge Process

3.1.1. Introduction

For any patient getting admitted, the top most priority is to get a discharge. The patient is always eager to leave the hospital but if the procedure takes a long time, it is bound to have certain implications on the hospital as a whole. A lengthy discharge process can result in fall of patient satisfaction levels. A benefit of having a fast discharge process is that the patient get discharged much before the new set of admissions take place and the hospital to turn around more beds for new admissions.[1]

The process of discharge is as follows:

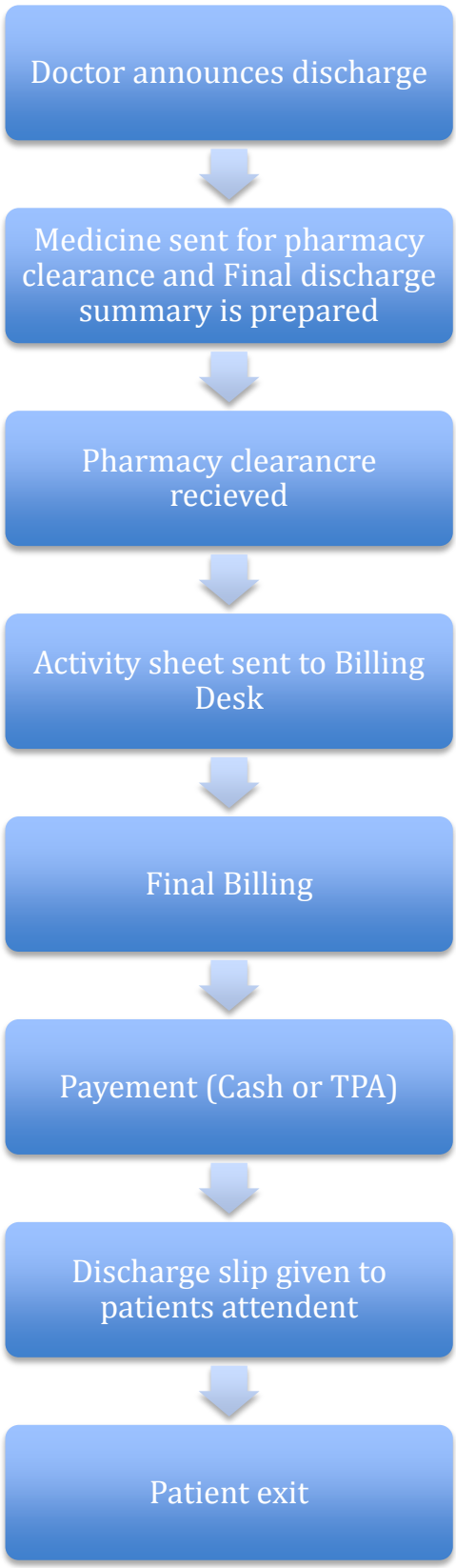

Figure 3.1: Discharge process

3.1.2. Literature Review

If we compare a hospital to a manufacturing unit, then the discharge process can be compared to the final finishing of the manufactured product. If the finishing is not done in a proper manner, the product wont be sustainable for a long time. Similarly, if there are bottlenecks in the discharge process, not only will it cause mental agony for the patient but also might result in a patients revisit due to carelessness of the team discharging the patient. Patient discharge has received critical attention because variation and delays in this process create „bottlenecks" that ultimately delay most care pathways, especially new admissions from the ED[3].

In the United States where hospitals are reimbursed prospectively, one study found that ~7% of hospital days were judged unnecessary and were due to difficulty finding a bed in a skilled nursing facility[4]. Studies have shown that by streamlining the discharge process the median LOS decreased and the average number of inpatient admissions increased[2].

3.1.3. Rationale

The feedback forms from cash and TPA patients indicated that they were not happy with the discharge process. There were lots of complaints regarding the time taken for discharge process. Hence the management wanted to know the delays causing the discharge process to take time above the standard turnaround time set by the hospital. The result would help in reducing the discharge process time and also increase patient satisfaction.

3.1.4. Aim

To study the discharge process of in patients

3.1.5. Objective

- To find out the major causes leading to a delay in discharge process.
- To compare the difference between the time taken for discharge and the standard time set by the hospital.

3.1.6. Research Methodology

- Type of Study: Descriptive
- Location of Study: In-Patient Department, Paras Hospitals, Gurgaon
- Duration of Study: 26 April 2014 to 3 May 2014
- Study Subject: Nurses, GDA, In-patient pharmacy, Billing Department
- Sample size: 50
- Data collection Tool: Observation
- Data Analysis: MS Excel

Daycare discharge or deaths were not included in this study. Only TPA and cash patients were included in this study.

Discharges were divided into four sub- groups:

- TPA planned
- TPA unplanned
- Cash planned
- Cash unplanned

Planned Discharges are those which are informed to the nurses a day prior than the actual discharge.

Unplanned Discharges are announced on the same day without any prior knowledge to nurse.

3.1.7 Data analysis and Interpretation

The following pie-chart shows the division between the number of cash patients and TPA patients:

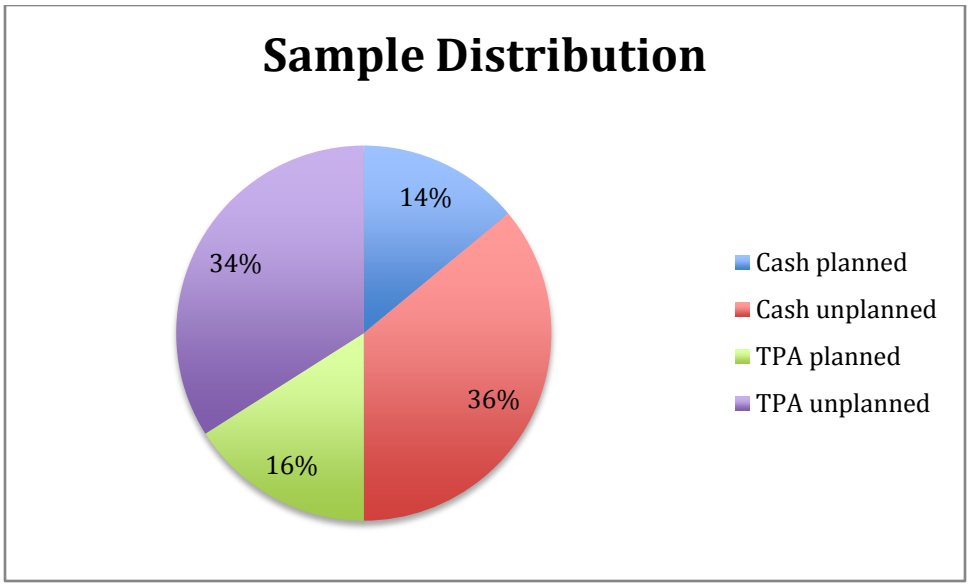

Figure 3.2: Sample distribution pie chart

The following curve shows the time taken at an average for the final bill to be prepared:

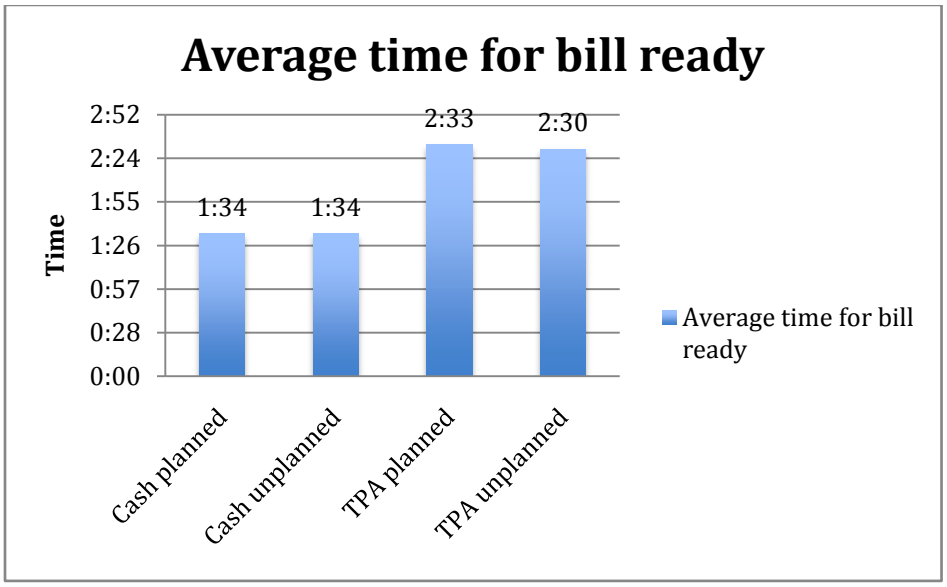

Figure 3.3: Graph of time for bill ready

The curve shows that TPA patients take more time in getting their bills ready as compared to cash patients. This was majorly because before the final bills can‟t be made till the time all the patient‟s original reports are not handed over to the dispatch

department. The GDA might need to take extra rounds till the time all the investigations are handed over to the dispatch department.

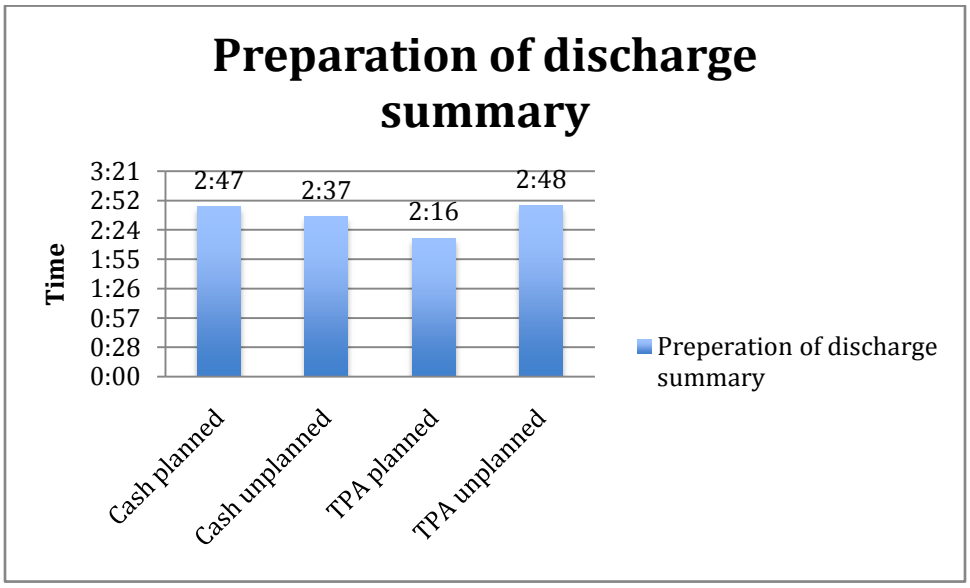

Figure 3.4: Graph for preparation of discharge summary

Then above curve shows time taken for final discharge summary to be prepared. For planned and unplanned both, the discharge summary takes up a substantial time because of its long procedure of writing, draft printing, rechecking and final printing. Also sometimes when the number of RMOs are less, then the files take even a longer time. The following curve indicates from final bill ready to clearance

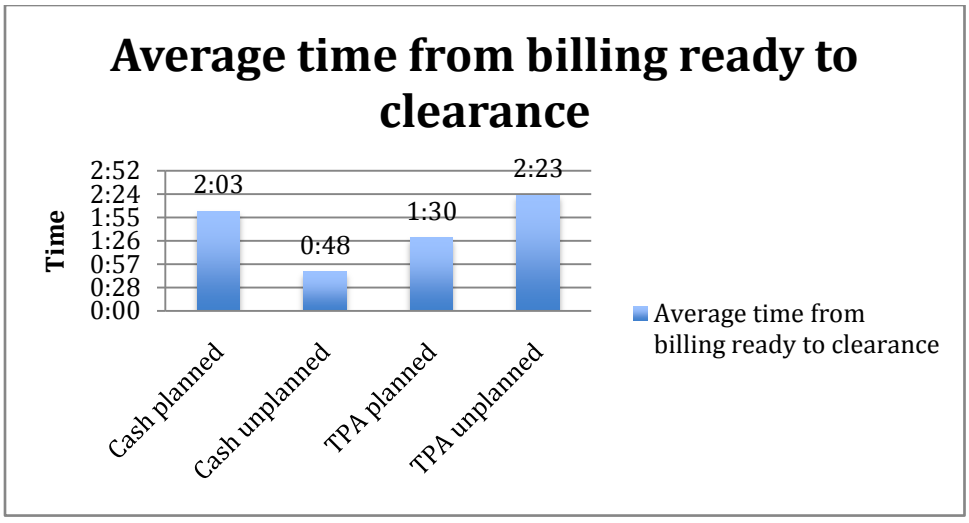

Figure 3.5: Graph for Average time from billing ready to clearance

It was surprising to note that even cash planned discharges took more time than TPA planned discharges. This time can be because of human error due to which the bills need to be reopened or delay from the patient"s end in terms of clearing the bills.

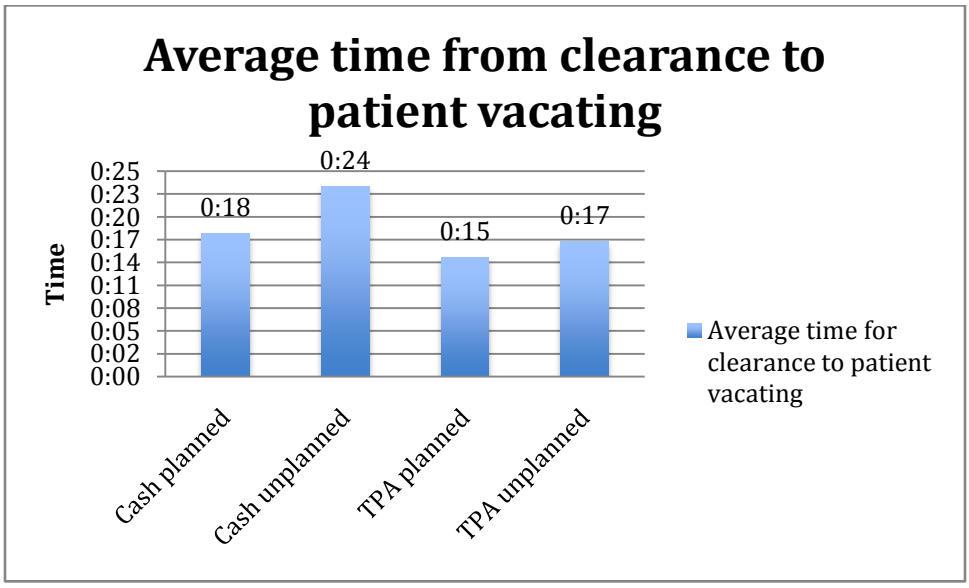

Figure 3.6: Graph for Average time from clearance to patient vacating

Above graph shows the time taken by the patient in vacating the room, this time is roughly fifteen minutes. These fifteen minutes can be used in preparing the room for the next patient.

Following graph depicts the time taken for activity sheets to be transferred from the desk to the billing department after doctor has announced discharge.

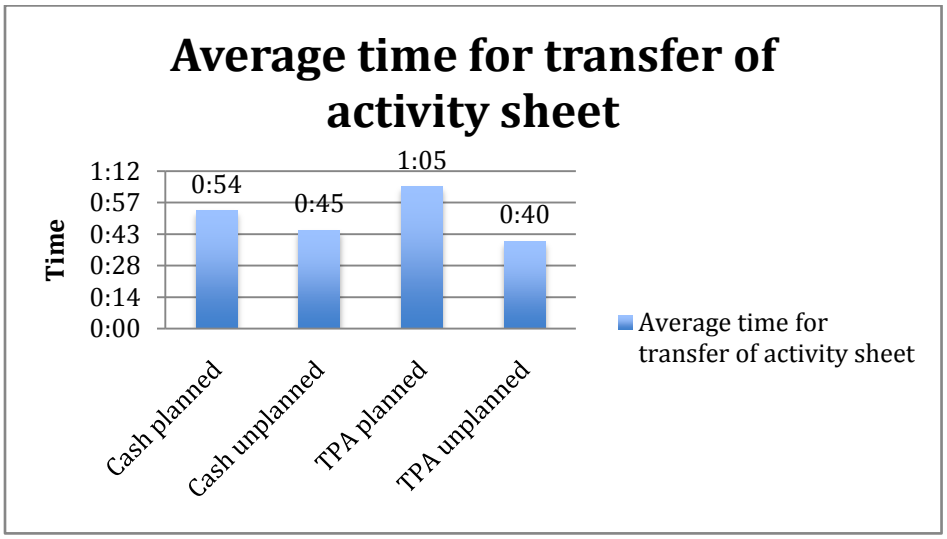

Figure 3.7: Graph for Average time for transfer of activity sheet

The reason why it takes time is twofold. Firstly the nurses are busy with their demanding workload that they sometimes don‟t pay heed if the activity sheet is still on the nursing station. Secondly as GDAs are limited, they are given all the documents at once. Therefore it takes them time to reach the billing department as they have to go to other departments.

3.1.8. Recommendations

1. Two people from billing can be placed on each floor for billing and clearance of the cash patients. This would decrease the TAT for cash patients.
2. GDA should be assigned to each nursing station specifically for delivering and receiving activity sheets and other important documents such as investigation reports.
3. Short discharge summary can be prepared for every patient by the RMO depending upon the patients estimated stay, which can be updated on a daily basis.
4. Nurses should make a policy of asking doctor about the discharge a day prior, so that the number of planned discharges increase and the system has more time to process the discharge.
5. All the lab reports related to the patient planned for discharge should be made ready a day prior.

3.2. A Study on Operation Theatre Utilization

3.2.1. Introduction

Operation Theatre complex is one of the most important departments of the Hospital. An operating theatre is where the surgeries and surgical procedures are conducted by a team of surgeons, anesthetists, OT Technicians, nurses, etc. Surgical operations are an important part of acute hospital activity. For many patients they are the sole reason for admission to hospital hence showing its importance. Surgical facilities represent a central life saving activity. Its performances, successes and failures are highly visible. The activities carried out in this Department can make or mar the reputation of the Institution.

Moreover, OT Complex in a hospital also represents an area of considerable expenditure in a hospital budget owing to technological advancement in medical sciences; hence it requires optimum utilization to ensure maximum cost-benefit.

3.2.2. Review of literature

Dr. Mohammad Faisal suggests that for optimum utilization of Operating units, the Operation Theatre should not be reserved rigidly for use by the particular Department. The establishment of operating room rules and regulations, strict adherence to and enforcement of approved policies and procedures are said to be the essential ingredients for efficient OT Management. Every effort must be made to reduce the number of idle theatre hours [5]

Factors affecting utilization rates include: the accuracy of estimated case times, cancellation rate, number of add-ons available to fill gaps, whether longest cases go first, and other constraints.[6]

In a study conducted at Sher-I Kashmir Institute of Medical Sciences, out of the utilized time, 66% was spent on actual surgery; 21% on supportive services and 13% on making room ready for Operation.[7]

According to Putsep Erwin,[8] time used to cleaning an operation room for the next case varies. In the US cleaning times have ranged from 5 minutes to 7 minutes. The time spent on making room ready can be reduced but at the same time proper attention needs to be given to the aseptic precautions both at the start of the day and in between cases.

Proper and judicious scheduling of cases and adhering strictly to schedule is important, as poor scheduling often said to be the cause of lost OT time. The amount of time allotted to a surgeon should be tabled against the amount of time he actually operates in theatre, says Dr Raghupathy.[5]

3.2.3. Rationale

Optimum utilization of OT Time is a priority area for Hospital Administrators as it is a revenue generating area. By carrying out this study, bottlenecks in the optimum utilization of Operation Theatre can be found and further improvement in this area can be done.

3.2.4. Aim

To study utilization of Operation Theatres in Main OT Complex, identify bottlenecks and recommend optimum utilization**.**

3.2.5. Objectives

- To study the utilization of Operation Theatres for the study period.
- Gap Analysis of scheduled and actual time of surgeries.
- To analyze the time spent in activities done by the supporting staff pre- and post-procedure.
- To evaluate the necessary Documentation done for Surgeries in terms of time when they are done and its completion.

3.2.6. Research methodology

- Type of Study: Descriptive cross-sectional study
- Location of Study: OT complex, 1st Floor, Paras Hospitals, Gurgaon
- Duration of Study: 16 May 2014 to 23 May 2014
- Study Subjects: Patients who are admitted in the Hospital for surgeries.
- Sample size: 50
- Sampling Method: Convenience sampling (Non-Probability sampling)
- Data Collection Tools: Documentation done in OT Complex on daily basis, Observation.
- Data collection Tool: Observation
- Data Analysis: MS Excel

3.2.7. Inclusion & exclusion criteria

Inclusion Criteria:

- Patients who are to be operated in the OT Complex of the Hospital, whether planned or not.

Exclusion Criteria:

- Surgeries in the Minor OT in Emergency.
- Surgeries in the Labor Room.

3.2.8. Data analysis and interpretation

3.2.8.A OT Utilization in the study Period

OT NO.	Name of Specialty
1 & 4	General Surgery
2	Orthopedic and Spine Surgery
3 & 6	Neuro-Surgery
5	Cardio Thoracic Vascular Surgery

Table 3.1. OT Assignment according to the specialties

OT	Total no. of cases	Avg. no of cases/day
OT1	**35**	**5**
OT2	**15**	**2**
OT3	**9**	**1**
OT4	**22**	**3**
OT5	**14**	**2**
OT6	**8**	**1**
Total	**103**	**15**

Table 3.2. No. of surgeries conducted in each OT during the Study Period

Total no. of surgeries conducted in the study period was 103, on an average 15 surgeries per day. Further majority of surgeries conducted were in OT1 followed by OT4.

According to the specialties, major surgeries were of General and Laparoscopic Surgeries followed by Neuro and Urology Surgeries, which is shown as follows:

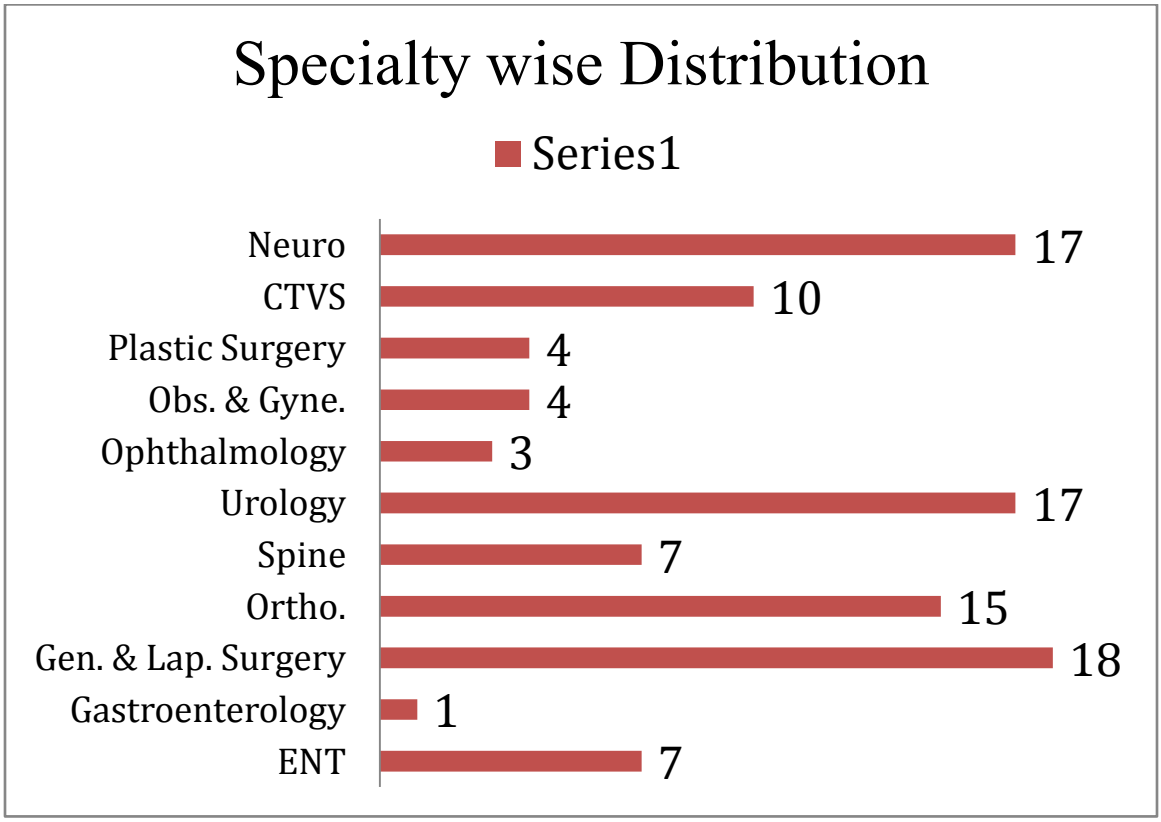

Fig. 3.8. Graph showing no. of surgeries performed in the study period according to the specialties.

During the course of study, Utilisation, Credit Time (Time spent on cleaning and making the Operation Theatre ready for the next patient) and Idle Time was calculated which is shown on the next page.

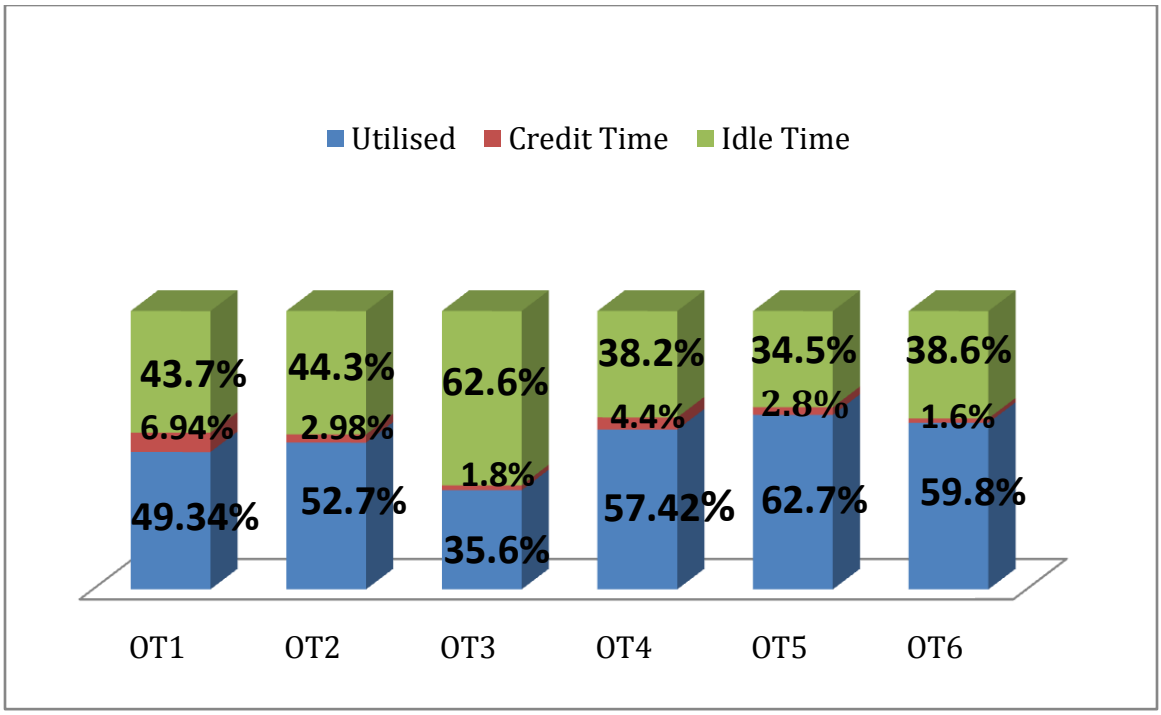

Fig. 3.9. Utilisation and Idle Time in each OT

It is evident from the above figure that OT5 is utilized the most during the study period with the highest Idle time in OT3.

3.2.8.B Gap Analysis between scheduled and actual time of surgeries

Scheduling of surgeries for the next day and adherence to scheduling highly contributes to OT Utilization. Hence Gap Analysis was done.

Total surgeries scheduled during the study period were 85 in number from 8am-8pm.

According to Hospital Manual,

- Procedures/surgeries starting within 15 minutes of scheduled time should be **90%**
- Surgeries rescheduled & cancelled/postponed beyond the scheduled day should be **<10%**

When the Data was analysed and compared to the Hospital Manual, it showed that only **7.06%** surgeries were carried out within 15 minutes of scheduled time and the cancelled surgeries were **29.76%.**

Reasons of cancelled surgeries are as shown in the Figure below:

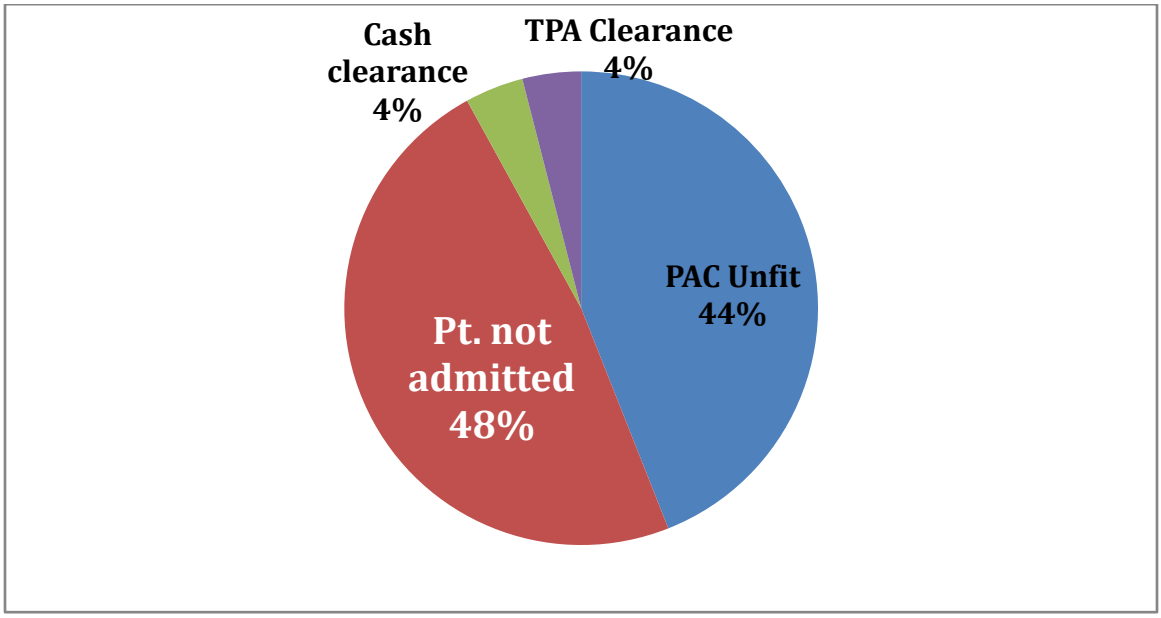

Fig.3.10. Graph showing Reasons of Cancellations of Surgeries.

Other findings:

Cases which were scheduled at the start of the day were 23, out of which 78.26% started late. The reasons for Late starts ware shown in the following figure:

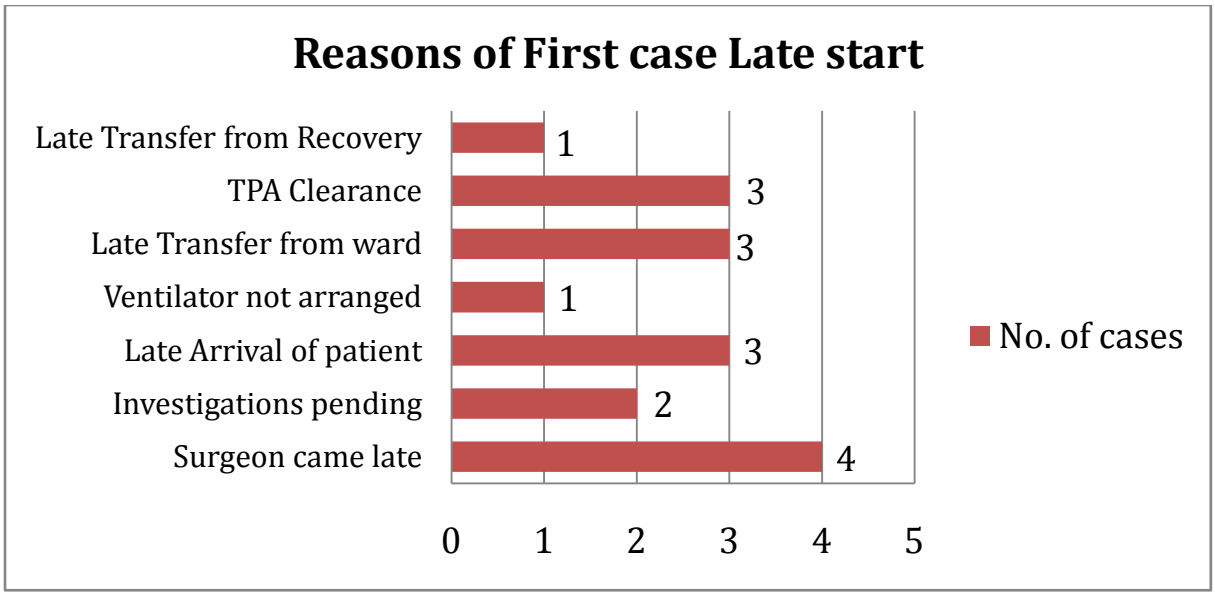

Fig. 3.11. Graph showing the Reasons of First Case Late start

3.2.8.C Time & Motion Study in Operation Theatre

In order to maximize the utilization of Operation Theatre it is essential to know how much time is spent on which activity and thereby identify the factors resulting in under utilization of the facility. In order to view this, Time and Motion Study was carried out in OT 1, 2 & 4 to study the time spent in each step and each activity before and after procedure. For this, Process Flow in the Operation Theatre was designed according to the Activities involved, which is as follows:

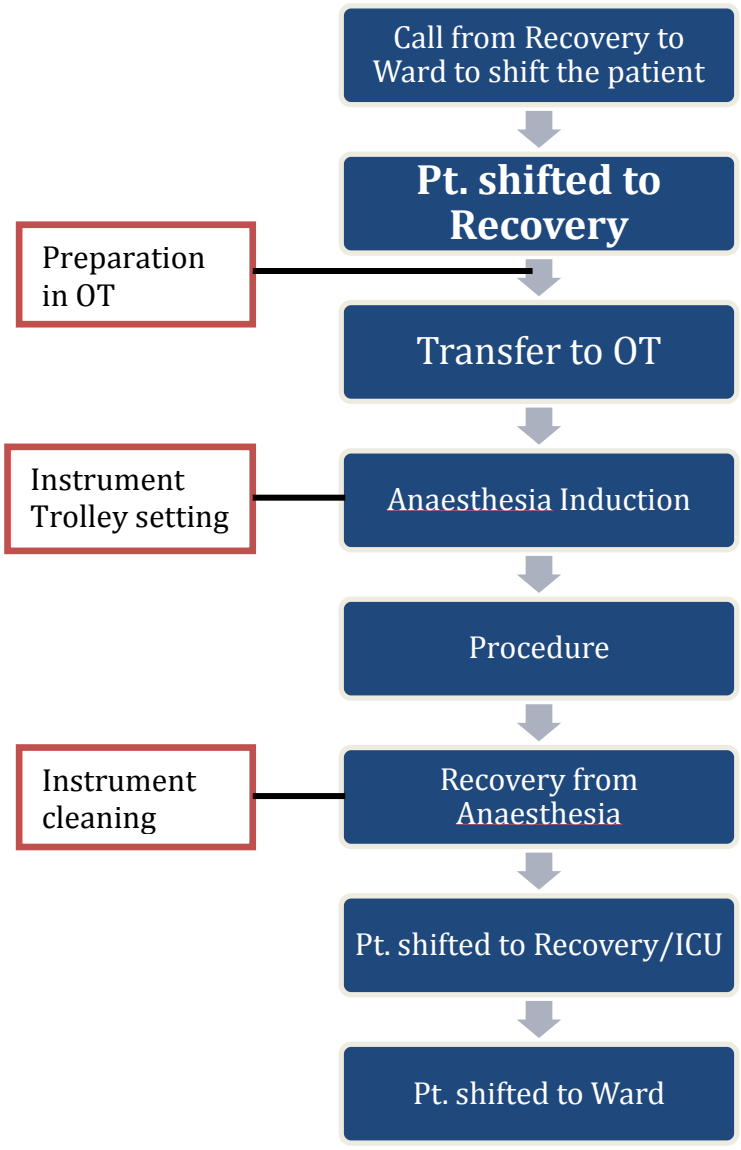

Fig.3.12. Process Flow of surgeries

The **findings** from the Time-Motion study are as follows:

For each step, average time was calculated which is as under:

- Time from „Patient entry into the Recovery Room" to „Patient entry into OT": 40 minutes.
- Time from „Patient"s entry into the Operation Theatre" to „Initiation of Anaesthesia Induction": 7 minutes.

- Time from „End-time of Anaesthesia Induction" to „Procedure start": 7 minutes.
- Time from „End of Procedure" to „Initiation of Extubation by the Anaesthetist": 4 minutes.
- Time from „Patient recovery from Anaesthesia" to Patient wheeled out from the OT": 3 minutes.

Average Time (in minutes) for each activity is as follows:

- Pre-Operative stay in Recovery Room: 40 minutes.
- Preparation of Medicines for Anaesthesia: 7 minutes.
- Bed-Making: 1 minute.
- Cleaning: 3 minutes.
- Anaesthesia induction (SA): 10 minutes.
- Anaesthesia induction (GA): 7 minutes.
- Anaesthesia induction (CSE): 13 minutes.
- Instrument Trolley Setting: 9 minutes.
- Recovery from Anaesthesia: 8 minutes.
- Instrument Cleaning: 10 minutes.
- Post-op stay in Recovery room: 88 minutes.

Pre-Op stay and Post-op stay in the Recovery Room was found to be varied which is shown as follows:

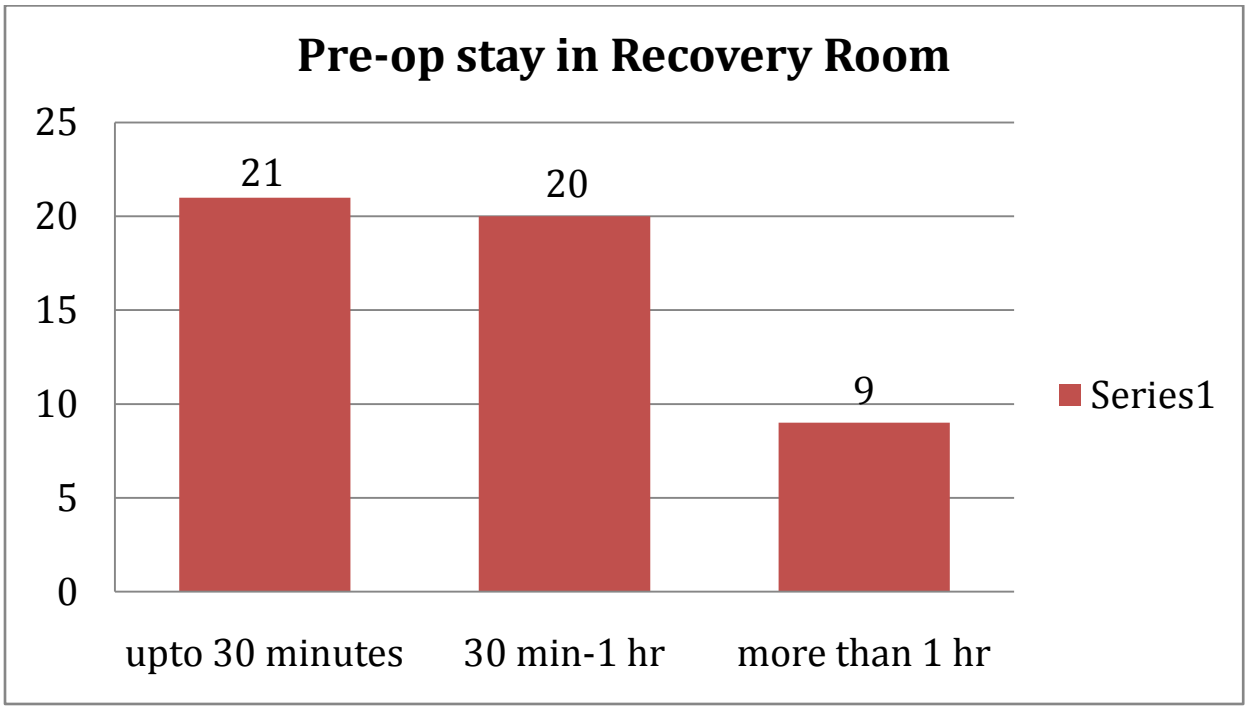

Fig. 3.13 Graph showing Pre-op stay in the Recovery Room

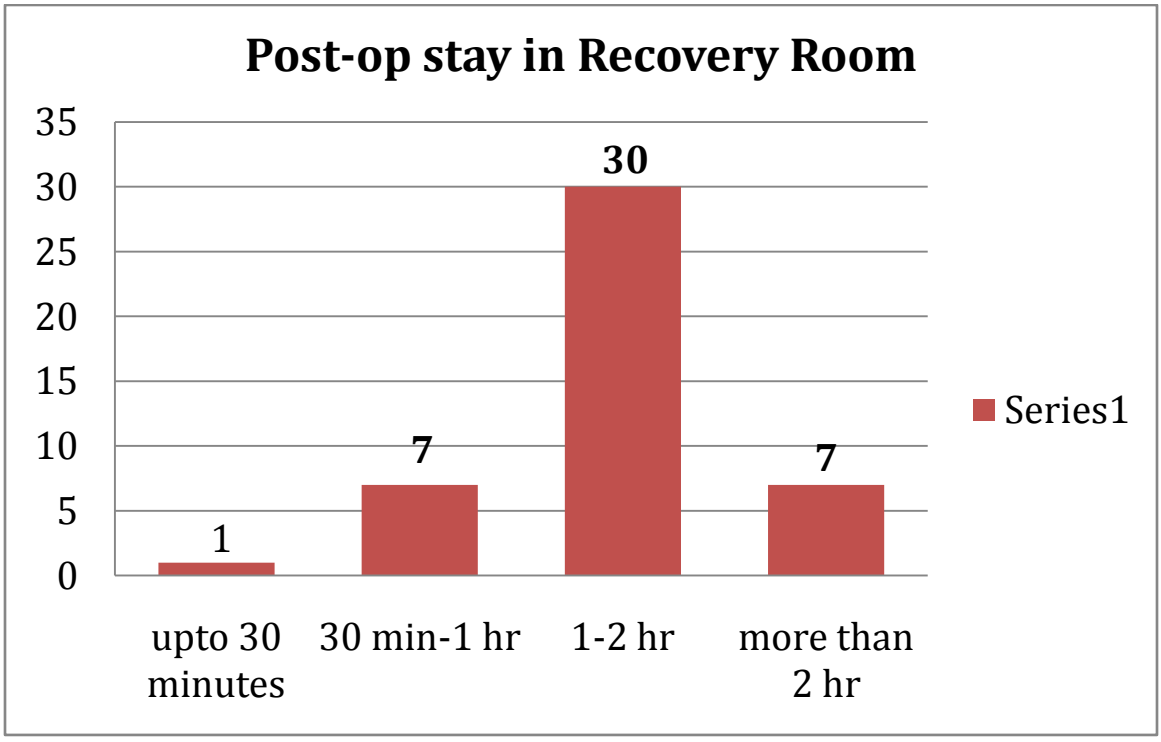

Fig. 3.14. Graph showing Post-op stay in the Recovery Room

The study concluded that the activities which are being performed before and after the Surgery, if done parallel by the staff responsible for it, then the Turn Around Time, i.e. „one patient out to next patient in" in the same OT can be decreased. The staff and their Responsibilities as follows:

	Scrub Nurse	**Circulation Nurse**	**Technician**	**Housekeeping**
Before Arrival of Patient	Bring Surgery sets (1 min)	Medicines from Pharmacy (5 min)	Anaesthesia Medications (6 min)	
After Arrival of Patient	Instrument Trolley setting (9 min)	Help Scrub Nurse	Assist Anaesthetist (9 min)	
After Surgery	Instrument Cleaning (10 min)	Return the Medicines (2 min)	Assist Anaesthetist (8 min)	
After Extubation			Patient Transfer (2 min)	Cleaning (3 min)

Table3.3. Assignment of work to the Supportive staff in surgeries and its duration

3.2.8.D Adherence to Documentation

- Important Evaluation & Documentation pre, intra- and post-surgery:

- Pre-Operative Evaluation Form
- Procedure Consent
- Anesthesia Consent
- High Risk Consent
- Intra-Operative Anesthesia Record
- Post-Operative Evaluation Form

Pre-Operative Evaluation Form is filled by the Anaesthetist to confirm that the patient is fit for surgery, hence showing its importance. It is done on OPD Basis and in some cases, after Admission. Documents in the Files were checked to know the time when PAC is being done and the analysis is as follows:

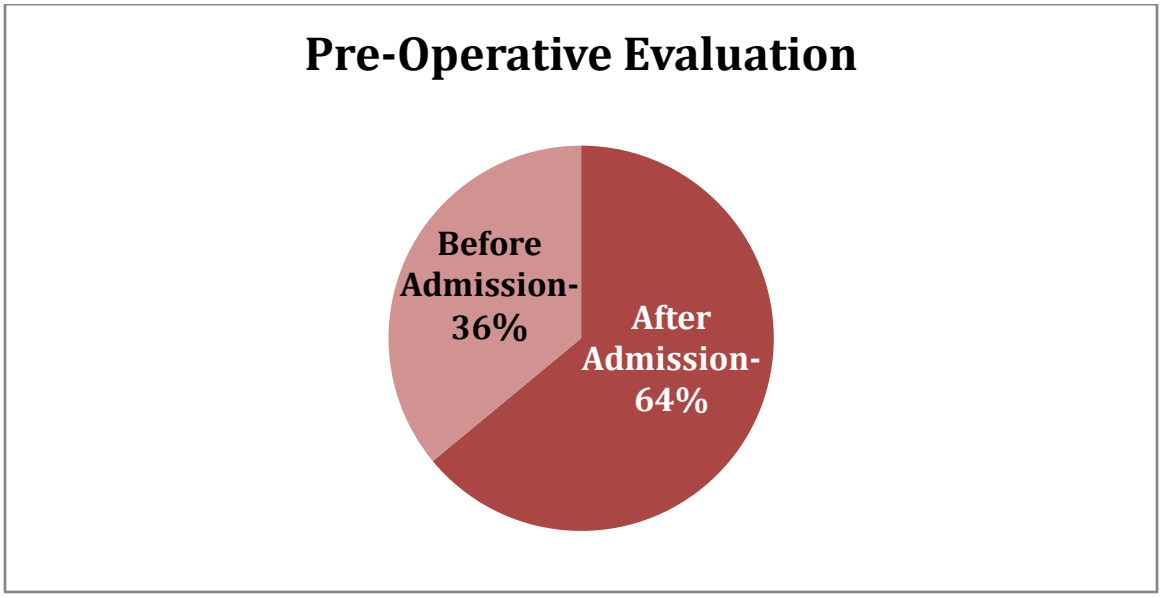

Fig.3.15. Graph showing the percentage distribution of time when PAC is done

Of 64% cases when PAC was done on IPD Basis, it was analysed that how many days prior to the surgery PAC was done, which is as follows:

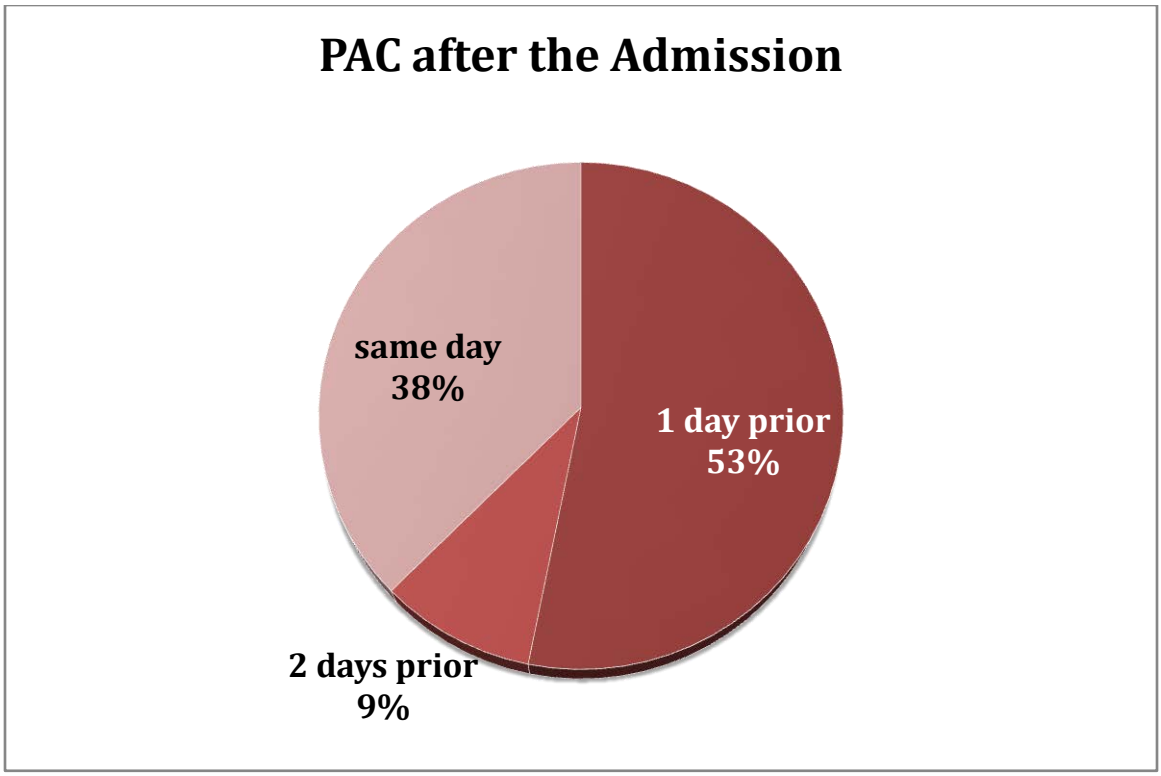

Fig.3.16. Graph showing when PAC is done after the Admission

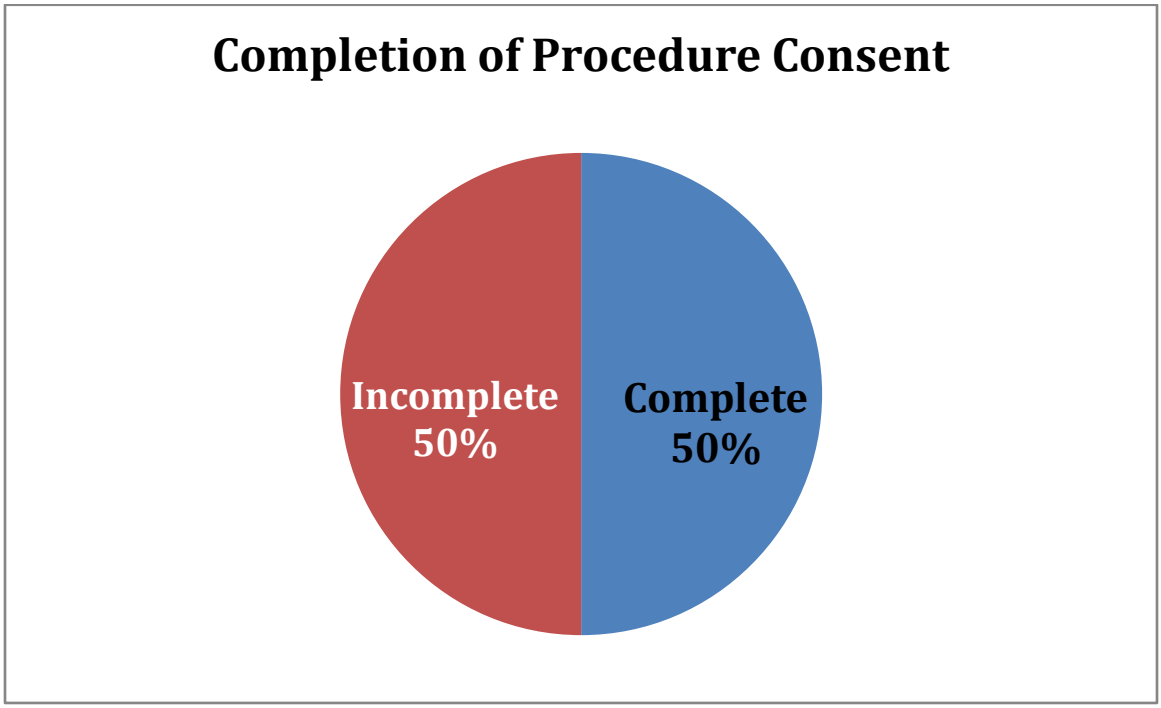

Fig.3.17. Graph showing the completeness of Procedure consent

In the 50% incomplete consents, the information missing was „Witness Signature".

Anaesthesia consent:

In 40% cases, Anaesthesia Consent was taken in the Recovery and its completion is as under:

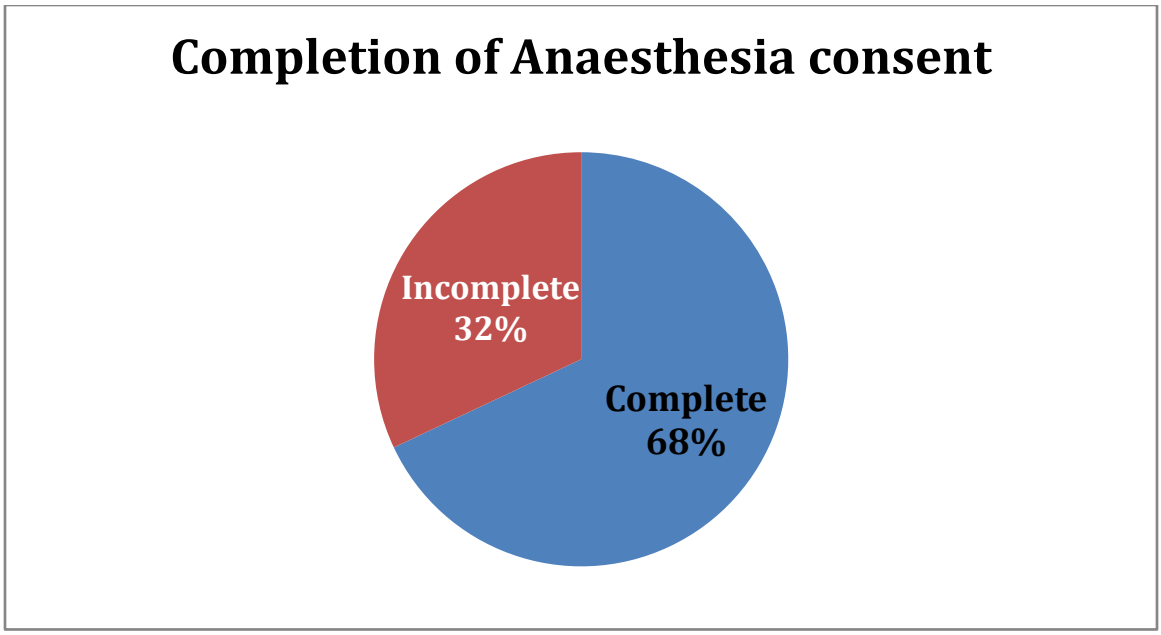

Fig.3.18. Graph showing completeness of Anaesthesia consent

In the 32% Incomplete Anaesthesia consents, missing information was of „Patient"s name".

In contrast, it should be worth seeing that High Risk Consent was found to be **91%** complete.

3.2.9. Recommendations

- ✓ Scheduling:
- After the TPA Clearance & Cash Deposit
- Surgeries should be scheduled right from 8am to utilize the Operation Theatre and manpower in the best possible way. This will also decrease the overtime remuneration we are giving.
- Adherence to Scheduling.
- Booking of equipments as per surgery need to be done.
- Unscheduled surgeries should go to the end of the priority list.
- Surgeon should be intimated for the delay of Surgery.
- Confirmation for the Implants one day prior.
- Intimation from the Surgeon in the OT 30 minutes before for the next case.
- Estimated scheduled duration is required for proper scheduling.
- Instead of telephonic communication OT Requisition slip should be used more frequently.
- OPD Basis PAC should be mandatory to lessen the chances of last moment PAC.
- PAC should be done before 5 pm the previous day to avoid the delays of clearances recommended by Anaesthetist

- ✓ Supplies:
- Packaging by the OT Pharmacy should be done 10 minutes prior to Surgery alongwith good communication between the Pharmacist and OT Manager.

- ✓ Patient‟s confidentiality
- PAC and OPD consultation should be in the PAC Room rather than in the Recovery Room.

- ✓ Post-op check by Anaesthetist:
- At the time of shifting to the ward, Anesthetist should be physically available for the Evaluation.

3.2.10. References

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