

Summer Training
In
Paras Hospitals, Gurgaon
(April 7th to June 6th, 2015)

A Report
By
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Under the esteemed guidance of
Prof. (Dr.) Santosh Kumar
(Associate Professor, IIHMR, Jaipur)

MBA in Hospital and Health Management
2014-2016



CERTIFICATE

This is to certify that **Dr. Shiva Agrawal** has undergone her Summer Training in **Paras Hospitals, Gurgaon** from 7th April, 2015 to 6th June 2015 and has done projects on:

- A system analysis on Dialysis unit in Paras Hospital
- A training need assessment in Paras Hospital
- Time motion study in Radiology department

Her approach to the study has been scientific and analytical. The summer training is in partial fulfilment of the course requirement and is recommended for the award of Master of Business Administration-Hospital & Health Management.

I wish her success in all her future endeavours.



Col. (Dr.) Ashok Kaushik,

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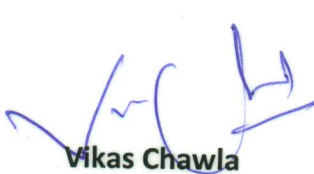
WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Shiva Agrawal** has successfully completed her **Summer Training** in the department of **Clinical Operations** from **7th April, 2015** to **6th June, 2015**.

During her training period, she was found to be sincere and dedicated towards her assignment.

We wish her all the best for her future endeavors.

For Paras Hospitals, Gurgaon



Vikas Chawla

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LIST OF ACRONYMS

- AMC-Annual Maintenance Contract
- AHU-Air Handling Unit
- BME- Biomedical Engineering
- CAG-Coronary Angiography
- CCU- Coronary Care Unit
- CGHS-Central Government Health Scheme
- CMO-Casualty Medical Officer
- CSE- Combined Spinal Epidural Anaesthesia
- CTVS ICU- Cardio Thoracic Vascular Unit
- ECHS-Ex-servicemen Contributory Health Scheme
- ERCP-Endoscopic Retrograde Cholangiopancreatography
- FCU-Fan Coil Unit
- FMCG-Fast Consuming Consumer Goods
- GDA- General/Ground Duty Assistants
- HCO-Health Care Officer
- HMIS-Hospital Management Information System
- HSEB-Haryana State Electricity Board
- HVAC-Heat Ventilation Air Conditioning
- JCI-Joint Commission International
- LDR- Labor Delivery Room
- MICU-Medical Intensive Care Unit
- 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
- OTC-Operation Theatre Complex
- PAC- Pre Anesthetic Checkup
- PACU-Post Anesthetic Care Unit

PART: A

Hospital Orientation

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. Paras is equipped with one of the leading Neurology Sciences centers 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. 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. Paras hospital is also renowned globally for its specialized international patient services. 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-
 - *Compassionately*
 - *Appropriately*
 - *Responsibly*
 - *Efficient*

1.3 Accreditations

National accreditation board for hospital and healthcare providers (NABH) accreditation- Paras are the first multispecialty hospital in Gurgaon to receive this accreditation. Paras diagnostics is accredited by NABL, India's leading accreditation body pathology services. With a team of highly experienced and efficient staff, it provides services strictly adhering to International Quality standards.

1.4 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
- 7 Operation Theaters
- 58 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 one advanced Cardiac life support ambulance and one basic life support 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

1.5 Floor wise Facility Distribution

Fourth Floor

- Nurse Stations
- 4A = Neurosurgery Ward (All Room Categories)
- 4B = Surgery Ward (All Room Categories)
- HDU – 8beds

Third Floor

- Patients' Rooms & Wards
- Labor Room (The Bliss), NICU
- Nursing Stations A, B, C and D.
- PICU

First Floor

- Operation Theaters
- NS ICU
- Medical ICU
- Surgical ICU
- CCU

- CTVS ICU
- Post Operative Recovery Room
- Cath Lab

Ground Floor

- Emergency Room with Minor OT
- Radiology & Imaging
- Pharmacy
- Dialysis Room
- Endoscopy Suite
- Doctors' Consultation Rooms
- OPD
- Visitors' Cafeteria
- Urodynamic

1st Basement

- Kitchen
- Staff Cafeteria
- Physiotherapy
- IT
- Marketing
- Office- Administration
- Laboratory
- Blood Bank
- Dermatology
- Dentistry
- PHC
- Attendance M/C
- Training room
- IPD billing & TPA
- Quality office
- Corporate department

2nd Basement

- Attendance Swiping Machine
- CSSD
- MRD
- Bio medical engineering
- Purchase & Commercial
- Central buying unit
- Morgue
- Parking
- Store
- Maintenance department
- Security
- Clinical research
- IPD Pharmacy
- Linen & Laundry
- Call centre

1.6 Services at Paras Hospital

- Neurology Sciences
- Orthopedics and Joint Replacement
- Mother and Child
- 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
- Neurology, Vascular and Non vascular intervention
- Obstetrics
- Ophthalmology
- 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- Departmental Profile of Paras Hospital

2.1 Clinical services

2.1.1 Outpatient Department (OPD):

Location: Ground floor

OPD has 6 Counters A to F according to their specialty.

Counter A- Cardiology

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. Transoesophageal Cardiography (TEE): 15 min

Counter B involves following specialties:

- Obstetrics and Gynecology
- Pediatric
- ENT
- Ophthalmology

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)

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 bill

Counter E includes:

- Internal Medicine
- Orthopaedics & Joint Replacement
- Gastroenterologist
- Psychiatry
- Rheumatology

Counter F includes:

- Neurosurgery
- Urology
- Haematology
- Spine clinic
- Psychiatry/Clinical Psychology
- Nephrology

2.1.2 In Patient Department (IPD):

“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.

1) Type of wards:

- Double room ward
- Four bed room ward
- HDU
- Single room ward
- VIP Suite
- Deluxe Ward
- LDR suits

IPD in Paras Hospital Gurgaon is situated on 3rd and 4th floor of the building.

Fourth Floor

- Nursing Stations A,B,C
- 4A = Neurosurgery Ward (All Room Categories)

- 4B = Surgery Ward (All Room Categories)
- HDU-8 beds
- 4C

Third Floor

- 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 219 and 58 beds for ICU.

2) Rooms under different nursing counters:

4A Counter:

The counter consists 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.

3) Visiting hours: Pass 1: One Relative: 24 hrs – entire stay

Pass 2: Other Relative:

10:00 am – 12:00 pm

5:00 pm – 7:00 pm

4) 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 up to 8hrs

Half day room rent is applicable

b) Stays more than 8hrs

Full day room rent is applicable

5) Cleaning of rooms and floors

Room cleaning is done 4 times a day.

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

6) Dimensions of Room:

- Single bedded Room (including the Washroom): 15ft x 9ft
- Patient Bed: 6ft x 2.5ft
- VIP suite: Room Area: 15ft x18ft
- Double bedded Room Area: 15ft x10ft
- 4 bedded Room area: 18ft x 15ft

7) Discharge process



Figure 2.1.2.1: Discharge process flowchart

8) Layout of rooms:

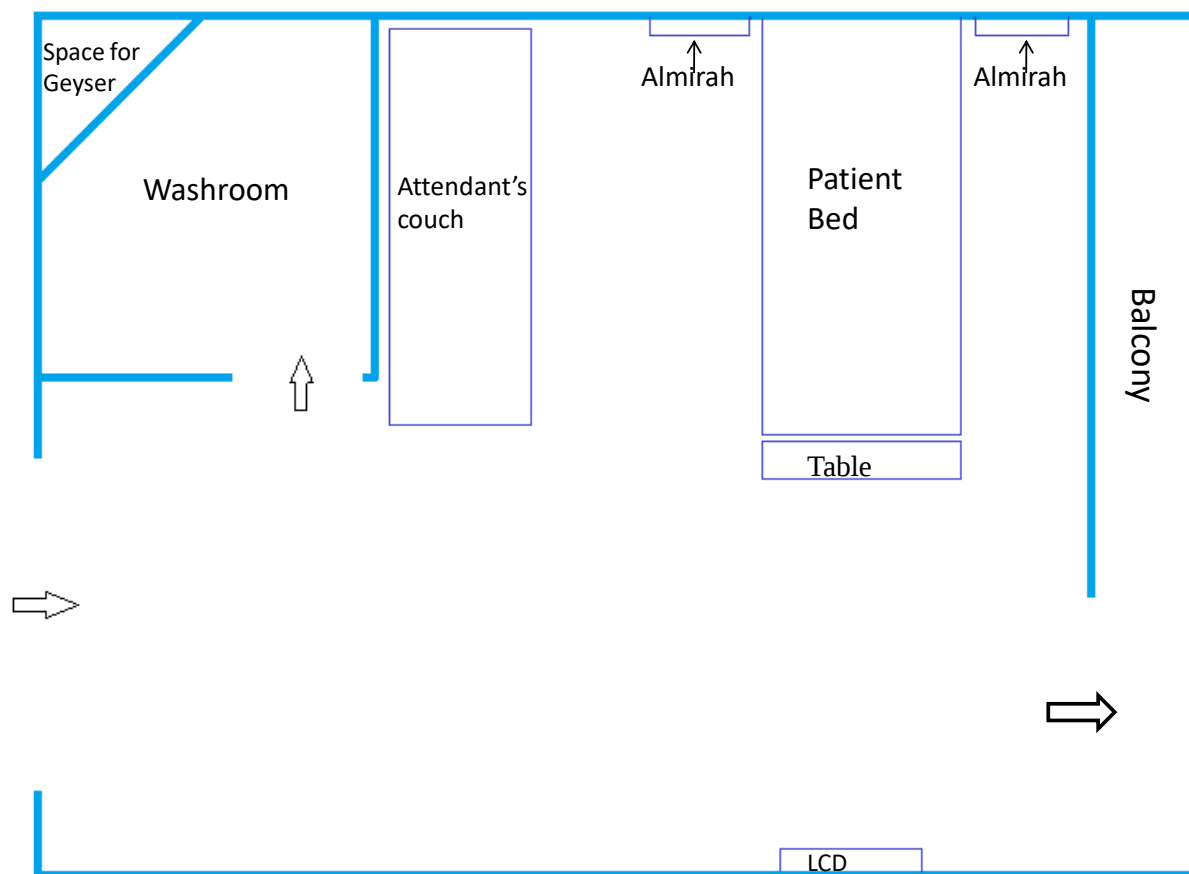


Figure 2.1.2.2: Single Bedded Room Layout (Block Arrow represents Doors)

2.1.3 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. 7 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 anesthetist. Critical patients are directly shifted from OT to ICU for monitoring. Cardiac and Neurology surgery patients are shifted from OT to CTVS ICU and NSICU respectively.

Manpower in PACU:

1 Area Incharge

3 staff nurse

3) Catheterization 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 7 operation theatres in OT Complex. Based on specialties they are classified as follows:

OT 1&4: General surgery but urology cases are preferred to be done in OT1

OT 2: Dedicated to Orthopedic and Spine cases

OT 3: Ophthalmology

OT 5: Dedicated to Cardiac surgeries

OT 6&7: For Neurosurgery

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 x18 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.
- 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
- Debrider- 1
- Crash Cart in OT 1&2
- Suction Apparatus, one in each OT.

- Apple recording system: OT 2 & 6
- Patient shifting trolley, 3 in number
- Lithotripsy: Used to break stones with the help of laser.
- DVT pump: used in spine surgeries.
- Tourniquet machine: To stop arterial supply mainly used in joint replacement surgeries
- Electro diathermy (unipolar & bipolar)
- Navigation machine
- Cusa machine: Used to take out the tumor by vibrating and then aspirating it.
- Heart and Lung machine: to keep the blood circulation in the body normal.
- PHACO machine

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, there is an alarm called “alarm enunciator” 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. 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
5. Technicians (assisting anesthetists)- 15
6. Housekeeping or cleaning staff - 4 (2 inside, 2 outside)
7. GDA- 4 (2 inside, 2 outside)

Sterilization 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.
- c. 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.
- d. 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.
- e. Instrument trolleys are carbolized after each surgery.

5) Scrub stations: 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

7) OT pharmacy

OT has its separate pharmacy with the total manpower of 4. 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.

8) 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

PROCESS FLOW:

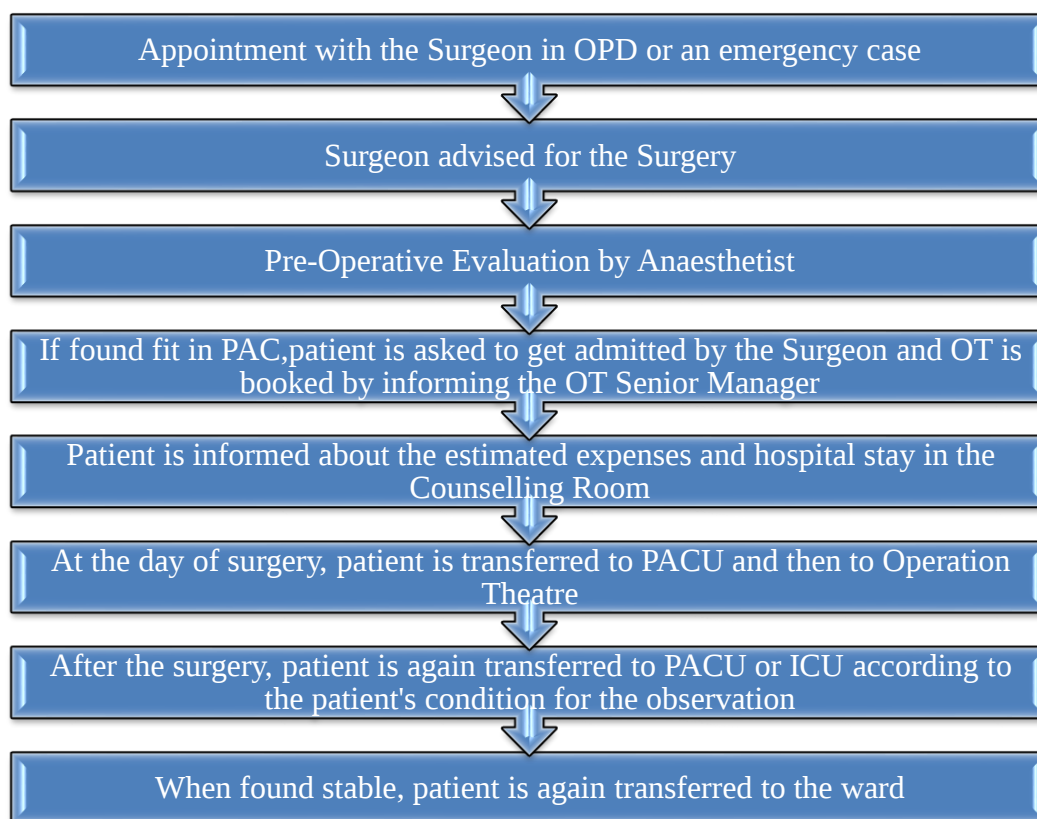


Figure 2.1.3.1: Process flowchart for surgeries

2.1.4 Intensive Care Unit

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

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 Neurology 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.

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 want to take the patient against the Doctor's advice, then they are given LAMA (Leave against Medical Advice).

3) 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.

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.

4) 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

5) Temperature in ICU

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

6) 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.
- ✓ After each Transfer Out or Discharge, bed is carbolized with sodium hypochlorite.

6) Food & beverages

Patients' diet is decided by the doctor by consulting the dietician.

7) 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. On Daily Basis, each Nurse is assigned to check the items of the store for its expiry date.

8) 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 nurse)

9) Patient in and Patient out flow:

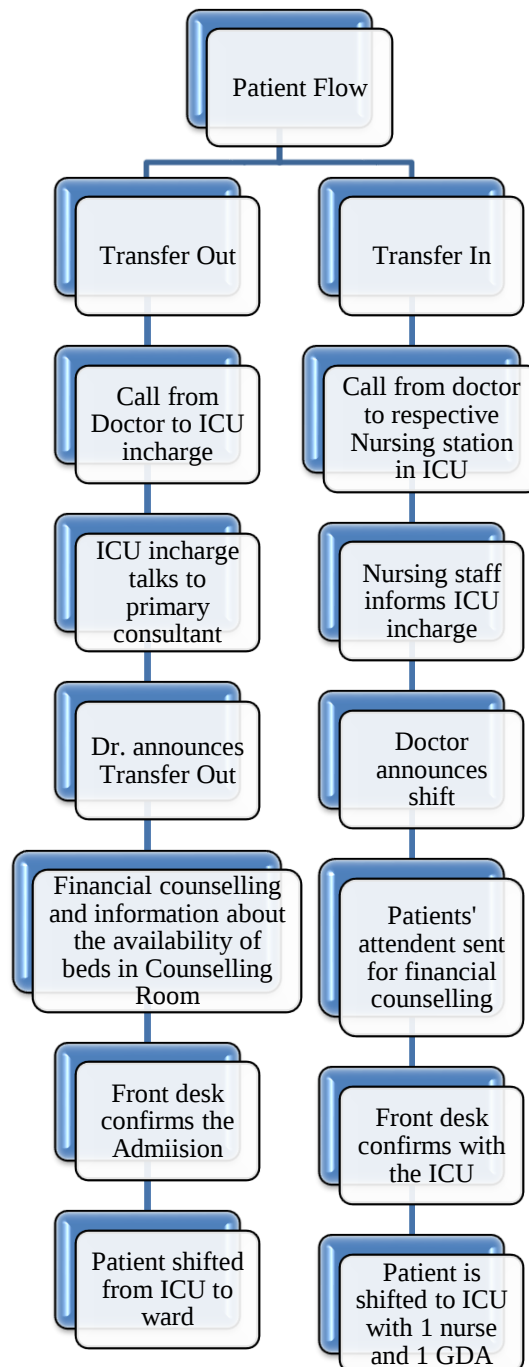


Figure 2.1.4.1: Transfer In Transfer out process chart

10) Different Areas in ICU

- 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.
- It also records the vitals for upto 72 hours.

Specific to PICU:

Pediatric ICU mainly caters children of age 1 month to 15 years. It is 8-bedded ICU.

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 and another is for inside patients. There are total 9 beds in NICU, 3 for the outside patients and 6 for the inside patients.

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.

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.

11) Visitor's Timings in ICUs

Morning- 10:45am-11:00am

Evening- 5:45 pm-6:00pm

2.1.5: Emergency Department

Location: Ground floor

It is 24 hour functional & is eight bedded

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

Manpower & Hierarchy: Emergency Department is headed by 2 CMOs with 20 nursing staff.

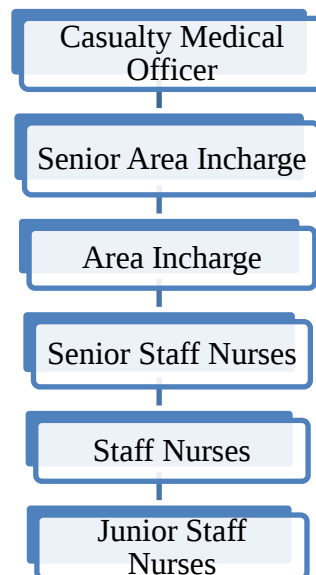


Figure 2.1.5.1: Emergency Department Organogram

1) Scope of emergency

- i. ER provides a comprehensive & uniform emergency service/ care to patient (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) .Patients receive medical referral / transfer (including critically ill patients & or those are not in scope of services of hospital)
- iv. 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.

2) Admission process flow

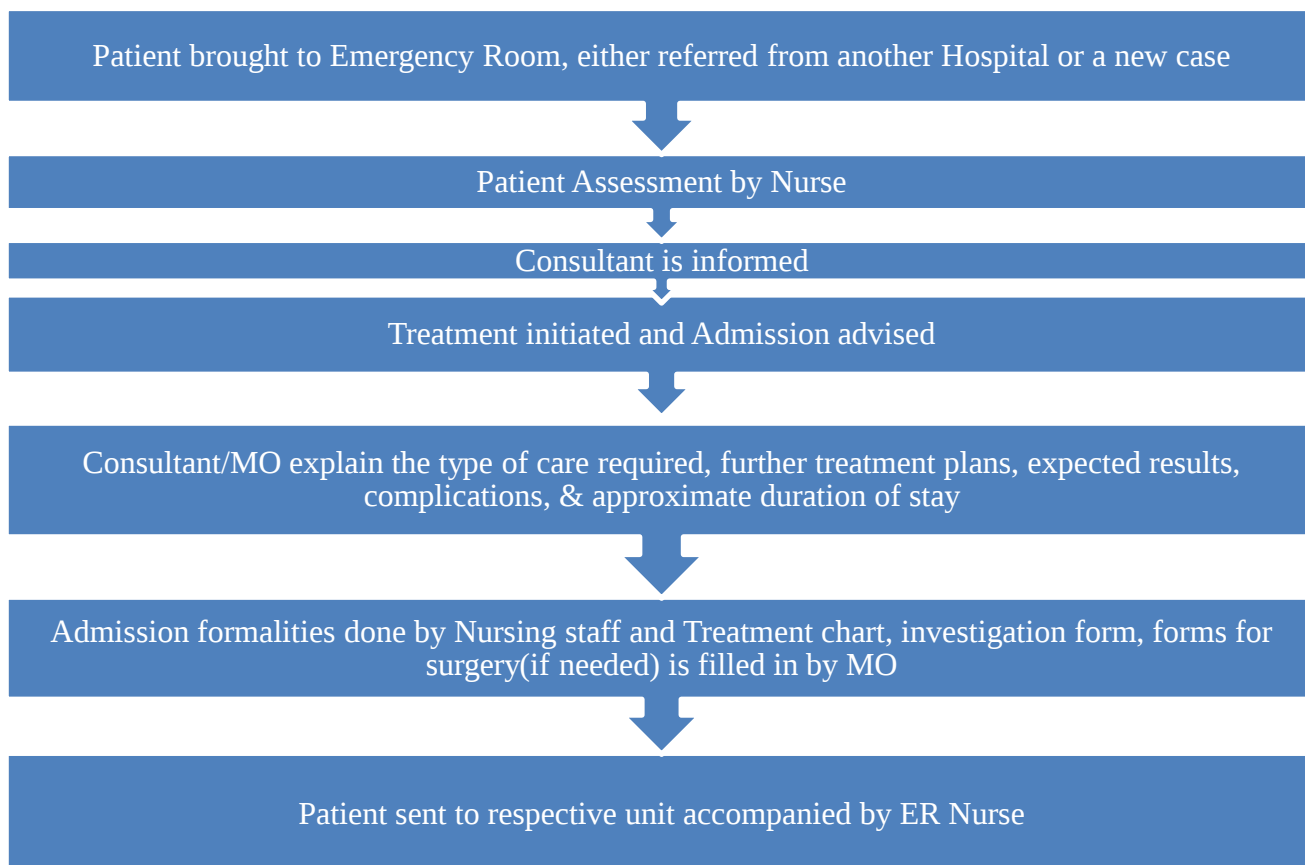


Figure 2.1.5.2: Process Flow showing admission process in Emergency Department

3) 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.

4) Process Flow in Triage

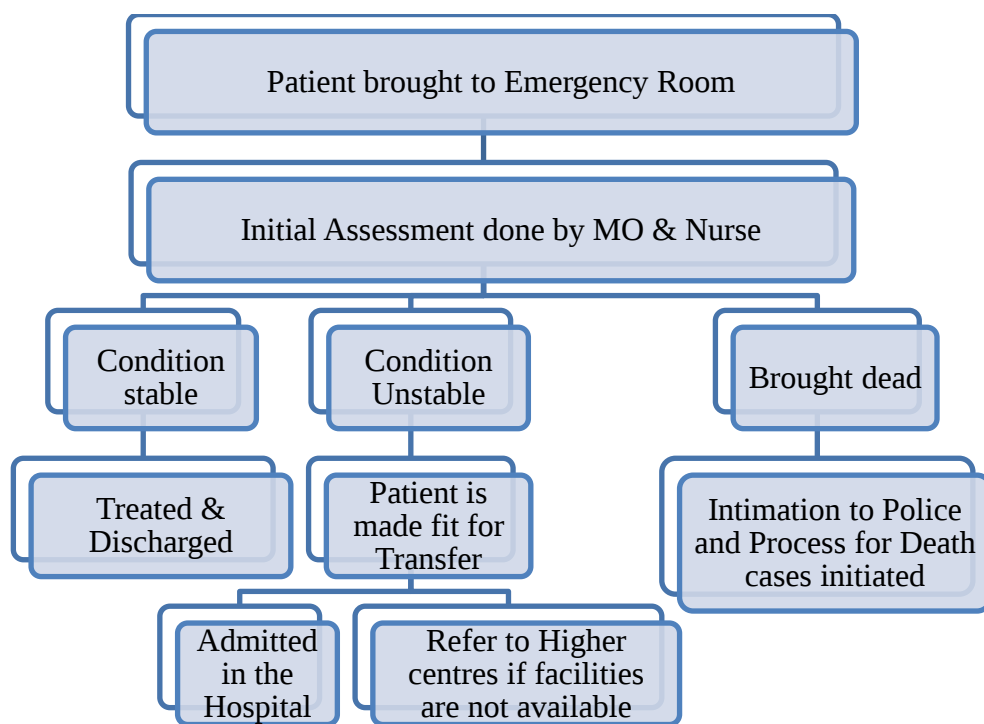


Figure 2.1.5.3: Process Flow in Triage

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

General guidelines for the Medicines:

- High alert medications dispensed, & administered only on prescription by credentialed personnel / OT/ ICU/ ER in charge doctors to critical care & special care areas
- Double check of Medications prior to Administration by 2 Registered Nurses by reading aloud:
 - i) Right medication, Right dose rate, including double check of any calculation & verification of pump settings.
 - ii) Right route , including line reconciliation., Right frequency, 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.

2.1.6 In Patients 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

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.

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 dispensing any of these drugs is more alert.

3) 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. The ROL (Re order level) has a minimum stock marked for 7 days and a maximum for 15 days.

4) 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.

5) 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 four people. Anyone of the four 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 stock narcotics, a separate permit is also required.

6) Storing the drugs:

Drugs are stored based on alphabetical order and are segregated based upon the types.

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.

7) 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.

8) 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

9) Processes Taking Place in the Pharmacy

Medicine Return:

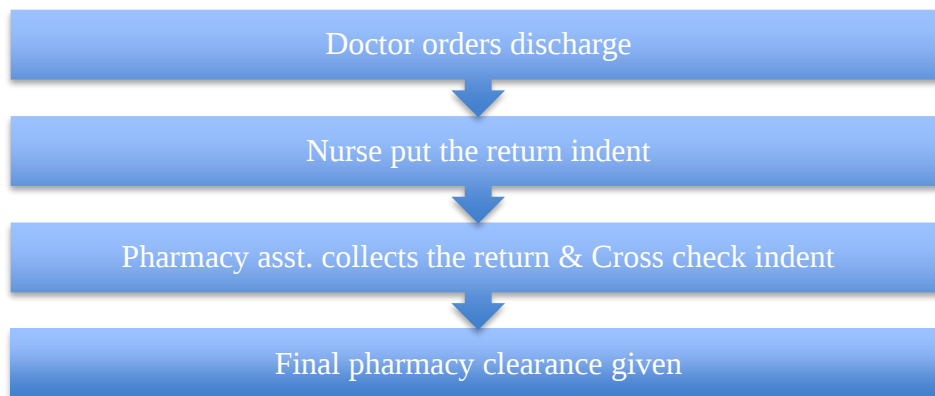


Figure 2.1.6.1: Medicine returns process

Medicine Dispatch:

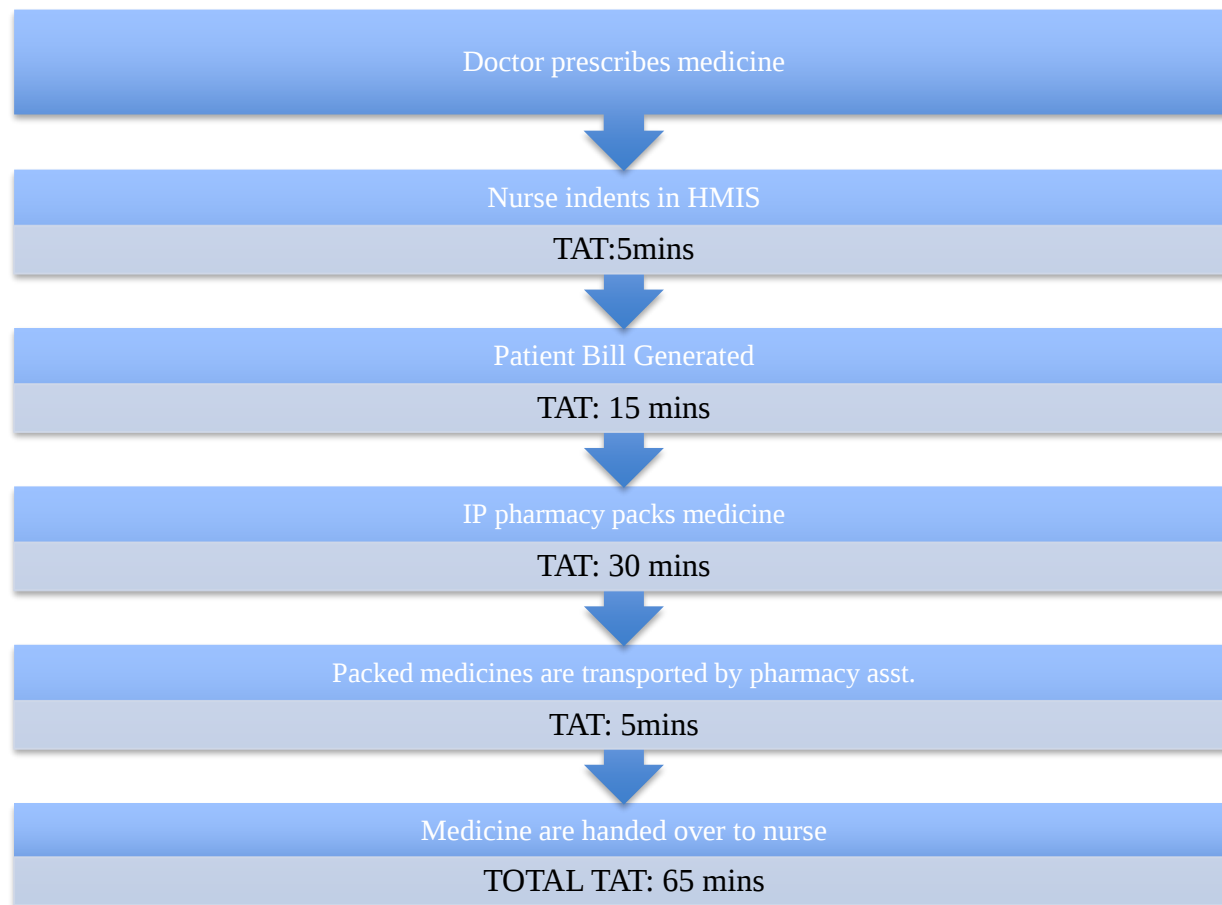


Figure 2.1.6.2: Process flowchart of medicine delivery

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.

2.1.7 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 x 7.5

2) Areas where CSSD supplies are required

- OT& ICU
- Nursing counters & OPD

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. 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

3) Process flow

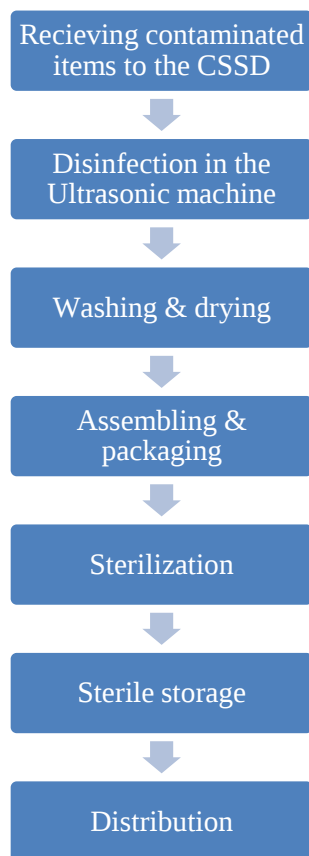


Figure 2.1.7.1: Flowchart of CSSD sterilization

4) 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 Subtilis* (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 prevacuum autoclave's air removing ability and steam penetration.

Fumigation every week on Monday Night.

5) Manpower

CSSD Incharge

4 Technicians

6) CSSD Layout

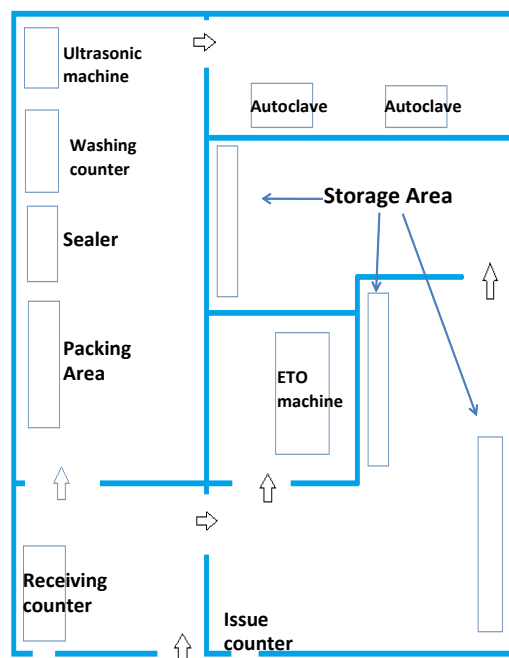


Figure 2.1.7.2: CSSD layout

2.2 Clinical support services:

2.2.1 Blood Bank

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
- It shall be consisting of a room each for –
 1. Registration and medical examination
 2. Blood collection
 3. Blood component preparation (maintain Temperature between 20° c to 25° c)
 4. Laboratory for blood group serology.
 5. Laboratory for blood transmissible diseases
 6. Sterilization & store room

From here blood is issued to the IPD or OPD patients after following the concept of 'First In First Out'.

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

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. Blood collecting bags have an anticoagulant –CPDA (Citrate Phosphate Dextrose Adenine) to prevent blood coagulation

Quantity of blood taken per donation:

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

If collected blood is infected, 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.

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

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 is separated.

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

Types of Blood components:

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

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 and Kept for half an hour. After that autoclave for 20 min.

And then 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.

3) Manpower

1 Blood Bank Incharge

1 CTO- Chief Technical Officer

1 Male Nurse

9 technicians

2 GDA

1 Housekeeping staff

4) Expiry and shortage of Blood Components

Expiry of Blood components is checked on daily basis and before 7-10 days of expiry.

2.2.2 Radiology unit:

Location: Ground floor

Radiology unit includes Digital X-Ray, CT scan, MRI Scan, and Ultrasound.

X-Ray

There are 4 X-Ray machines:

1 in radiology unit-500 MA

1 in PHC -300 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° 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 3 Ultrasound machines in the Hospital:

2 in Radiology

1 in PHC

There is separate billing counter for radiology department.

Process flow:

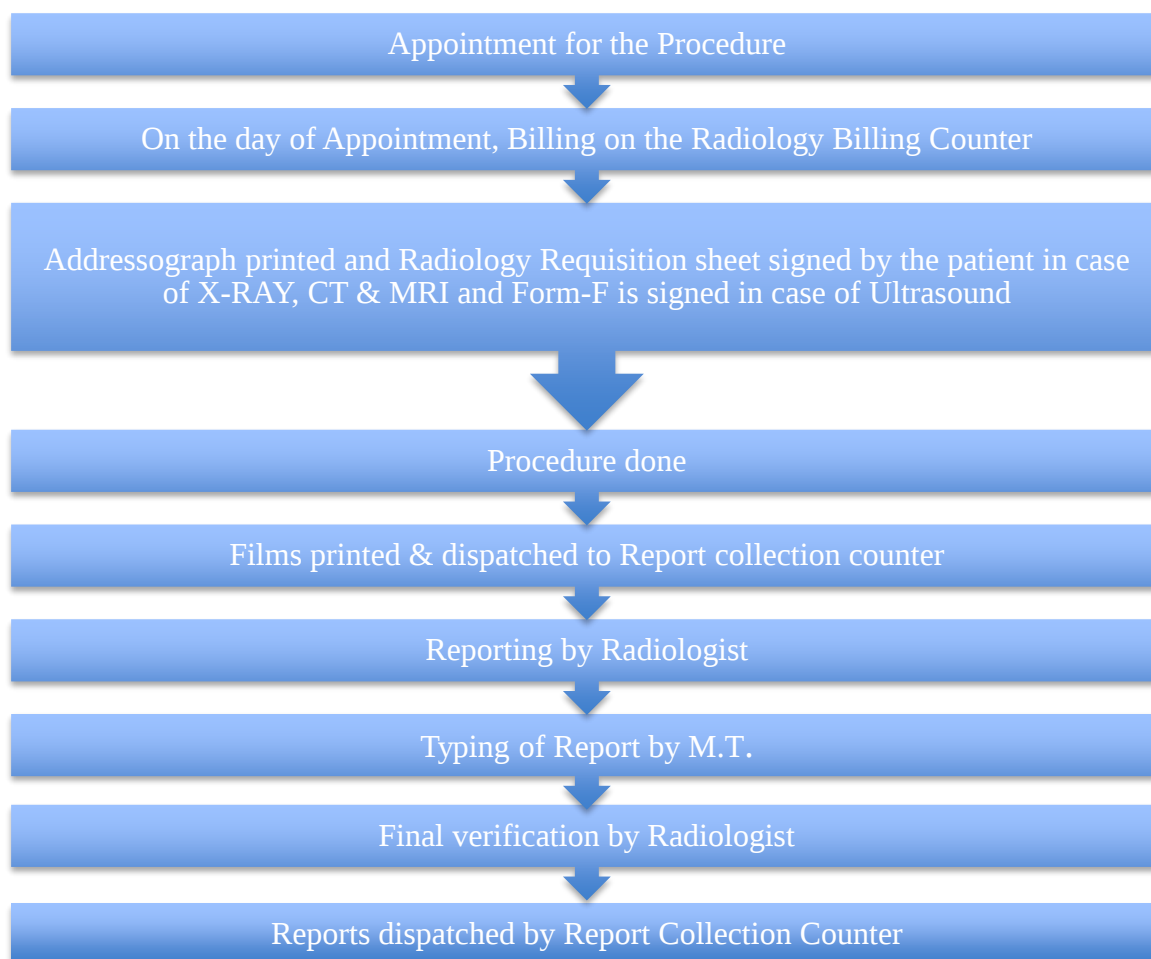


Figure 2.2.2.1: Process Flow in Radiology

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

Table 2.2.2.2: TAT for different Radiology Procedures

2.2.3: Dialysis unit

Dialysis unit has 5 dialysis machines and 1 dialyzer reprocessor. Dialysis takes 3-4 hours to complete the process. It works in 4 shifts as given below. Patient appointments are scheduled accordingly:

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

Manpower:

- 3 staff nurse
- 3 technicians
- 1 GDA
- 1 housekeeping personnel

2.2.4: Endoscopy suite:

The Endoscopy unit consists of procedure room, pre- & post-procedure room and cleaning area.

The procedures done at hospital Endoscopy units are :

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

TAT for the procedures:

Usually each procedure performed by Endoscopes, Siegmoidoscopes, and ERCP takes 10-15 min. If pre-care, post-care and reporting is added TAT for the it takes 30 minutes. The TAT Only colonoscopy requires 30 min. (only for the procedure)

Manpower:

- 1Doctor
- 1 Female nurse
- 1 Technician

- 1 GDA

2.2.5 Clinical Dietetics Department

Location: First 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. 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. 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.

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 can't be performed on obese patients, hence the dietetics department helps patients loose weight.

There are various kind of diets:

1. Clear liquid Diet
2. Diabetic Diet

3. Potassium restricted Diet
4. Loose motion
5. Chemo or Neutropenic Diet
6. Cardiac Diet
7. Renal diet

For seven 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)
7. 9-9.30 Pm(post dinner)

2.2.6: In Patient billing and TPA (Third Party Administrator) Department

Location: Basement one

1) TPA:

TPA is 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, and TATA AIG etc. have entered the insurance market. 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 (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 hospital has tariff version 7. 32 TPA are empanelled and 84 corporate have tie ups.

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

4) 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(for exclusion of policy)
6. Investigation reports to support diagnosis.
7. MLC/FIR copy if the patient is an MLC.

5) General Turnaround 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

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. All diagnostic report & Film
10. Laboratory Report
11. CAG/PTCA and THR/TKR Sticker
12. MLC report photocopy
13. Blood sugar charting photocopy
14. N/P and other deduction test
15. Others

6) CGHS and ECHS Billing Department:

This department consists of 2 senior executives and 1 Assistant Manager.

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.

7) 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. Date of admission & discharge
 - e. Date of uploading to UTI TSL
2. Referral Form
3. Copy of Membership receipt/card self attestation
4. Summary of bill
5. Prior approval if applicable
6. Discharge Summary
7. 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)
8. Invoice and outer pouch for implant/stents if applicable
9. 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.

8) In Patients 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

9) Cash Billing is done in the following way:

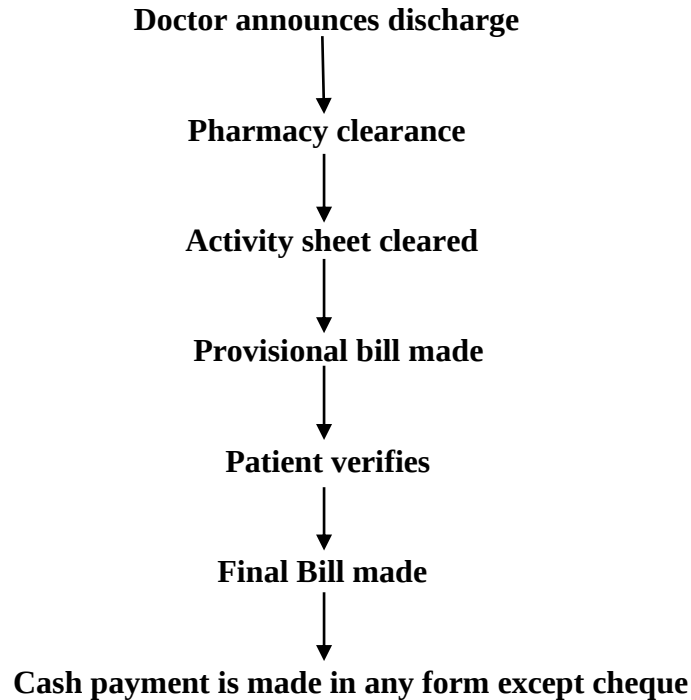


Figure 2.2.6.1: Discharge billing process flowchart

10) 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 corporate generally patient comes with credit letters based on which money can be reimbursed from the company itself.

2.2.7 Front Office

Location: Ground floor

1) Introduction

Front Office is the First Interactive Point for a patient coming to a Hospital. 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

Manpower & Hierarchy:

There are 36 people working under Front Office Department.

Hierarchy:

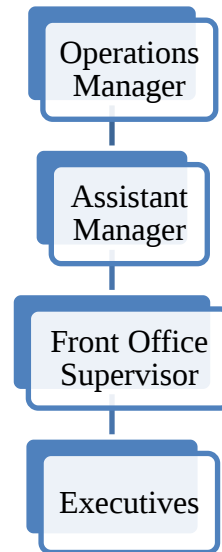


Figure 2.2.7.1: Organogram of Front Office Department

2) Different Departments in Front office:

- OPD Bill Counter
- Corporate Bill counter
- Report collection counter
- Counseling room
- OPD Counter A to F
- Sample collection room
- Preventive health checkup
- International marketing
- Out Patient Pharmacy
- Call centre

OPD Bill counter

It accounts for registration, billing and patient's queries. Moreover hospital has separate counters for corporate billing and PHC billing. The billing for lab and radiology is done in their respective department.

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 report will given next day morning.

Counseling 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.

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 Checkup (PHC)

Manpower:

2 customer care executives

1 Gynecologist

1 Female Nurse with Gynecologist

1 Physician

3 technicians

Different Areas in PHC Department:

- Billing & Registration Area
- Sitting Area

- Gynecologist 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:

Call Centre don't give appointments for Radiology, Cardiac procedures, Neuro. Procedures & PHC (up to 4:30pm)

Safety codes are also announced by the call centre except code Black.

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, Sudan, Iraq, Afghanistan.

Out Patient Pharmacy

Out Patient 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 Out Patient Pharmacy manually checked the expiry date of medicines and returns the medicines to the vendor 3 months before the expiry date. To avoid the confusion of Look Alike and Sound Alike Drugs, Out Patient Pharmacy has a separate cabinet for these drugs

2.3 Utility Services

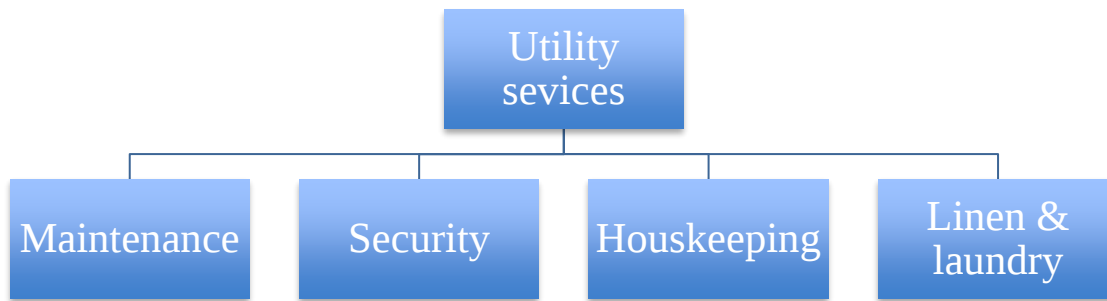


Figure 2.3: Segregation of the utility Services

2.3.1 Maintenance Department:

Location: Second Basement

Overview:

There is 13 contractual staff who is experts in different areas of maintenance. There are 4 employees of Paras hospital in the maintenance department namely Head engineer, senior executive, Junior Engineer and the Lift Manager. There are various kinds 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 tone=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
FCUs and AHUs
2. Electricity

3. Sewage and water supplies
4. Miscellaneous maintenance

1) HVAC system

List of machines

- i. Boilers of Aquatic (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.

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:

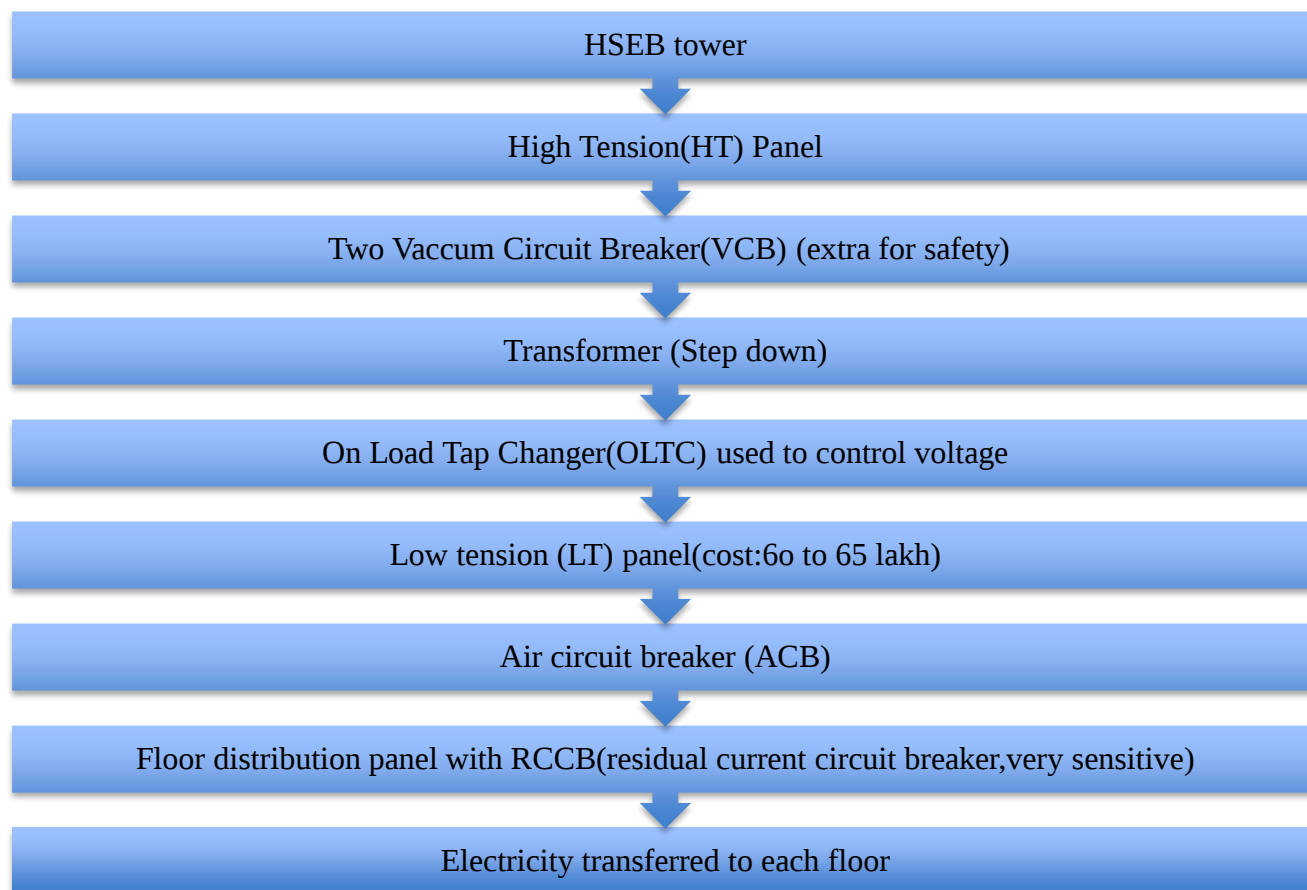


Figure 2.3.1.1: Electricity transfer flowchart

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) Sewage and water supplies

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 then 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.

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.

2.3.2 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. At the entrance, based on the reason of visit, passes are made by the security guard. Parking is separate for staff and doctors, and visitors.

Charges for parking-

30/- for 4 hrs

50/- for 12 hrs

80/- for 24hrs

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

- Returnable Gate Pass (RGP)
- Non- Returnable Gate Pass (NRGP)

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 can't enter the visitors 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.

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 2.3.2.1: Emergency codes

These codes are announced by the call center amongst the staff initially so that the staff can take immediate action. After proper action is taken, an incident sheet is filed based on the incident which is then 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
- CO₂ type: Only for Class B and C
- DCP type: Dry chemical powder (DCP) should not be used in any crowded area as 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.

The ERT would segregate into smaller teams as mentioned

- 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 then the body is shifted into the district hospital.

2.3.3 Housekeeping Department

Manpower:

On Paras Payroll:

1-Manager

1-Assistant Manager

4- Head Supervisor

Contractual Staff:

6-Supervisor

113-Contractual manpower

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. The area, where all the BMW is assembled, is divided into 4 separate blocks namely red, blue, yellow and black.

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. Once 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.

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

Table 2.3.3.1: Color coding for biomedical waste

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.

2.3.4: Linen & 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. The laundry service is outsourced to “Royal and bhushan” 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. Every floor has its own linen room from where linen is dispensed to the floor. Bed sheets are changed three times a day. Before the room is handed 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 + disinfectant
R3	Glass cleaner
R4	Wooden Polish
R5	Air freshener
R6	Toilet Bowl Cleaner
R7	Bathroom Tiles
R9	Multipurpose floor cleaning +heavy duty spots
D7	Steel polishing

Table 2.3.4.1: Chemical list of Johnson Diversey

R1, 2, 3, 9 are generally used in the concentration of 20 to 40 ml per liter. In case of heavy cleaning the concentration is increased to 40 to 60 ml per liter. 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.

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

PART- B

Projects conducted in Paras Hospital

Project 1. A System Analysis Of Dialysis Unit At Paras Hospital, Gurgaon

1.1 Introduction:

Dialysis is a technique of removing fluid and waste products from body. Dialysis is primarily used to provide an artificial replacement for lost kidney function in patients with renal failure.

Dialysis works on the principles of the diffusion of solutes and ultra filtration of fluid across a semi-permeable membrane. Diffusion describes a property of substances in water. Substances in water tend to move from an area where they are in a high concentration to an area of low concentration. Blood flows by one side of a semi-permeable membrane, and a dialysate, or special dialysis fluid, flows by the opposite side. A semi permeable membrane is a thin layer of material that contains various sized holes, or pores. Smaller solutes and fluid pass through the membrane, but the membrane blocks the passage of larger substances.

Haemodialysis utilizes an artificial kidney machine with a special filter to remove waste products and fluid from the blood. The machine is connected to the patient through a fistula or shunt, usually in the forearm, or a permanent catheter in the arm or chest.

Patients receiving haemodialysis also require regular treatment with medications such as calcium, phosphorus, iron, and nutritional supplements to treat the chronic problems of anemia and hypocalcaemia.

Patients receiving haemodialysis also are encouraged to receive immunizations against flu, pneumonia, and hepatitis B.

Type of Dialysis:

Two renal dialysis methods used to treat ESRD.

1) Peritoneal dialysis

- a) Continuous ambulatory peritoneal dialysis (CAPD)
- b) Intermittent peritoneal dialysis (IPD)
- c) Continuous cycling peritoneal dialysis (CCPD)

2) Hemodialysis

Mechanism of dialysis machine :

The dialysis machine mixes and monitors the dialysate. Dialysate is the fluid that helps remove the unwanted waste products from the blood. It also helps get electrolytes and minerals to their proper levels in the body.

- ☐ Two plastic cans hold the liquids used to mix the dialysate. The machine mixes the dialysate, which is made up of an acidified solution, bicarbonate and purified water. The acidified solution contains electrolytes and minerals. The other solution is bicarbonate or bicarb. Both are mixed inside the machine with purified water.
- ☐ A-part contain Na, K, Ca, Mg, Acetic acid, Dextrose, Chloride
- ☐ B-part contain Na Hydrogen carbonate
- ☐ During dialyzing, dialysate and patient's blood flow through the dialyzer (but they never touch). Fresh dialysate from the machine enters dialyzer throughout the process. Impurities are filtered out of blood into the dialysate. Dialysate containing unwanted waste products and excess electrolytes leave the dialyzer and are washed down the drain. A prescribed amount of heparin is drawn up into a syringe then placed on the machine into the "heparin pump. The heparin prevents the blood from clotting.
- ☐ Safety of dialysis machine-.
 - Sense air trapping inside the tube
 - the pressures created by blood inside the blood tubing and dialyzer.
 - monitors the blood flow, temperature and proper mixture of the dialysate.
 - patient's blood pressureif anything goes wrong among these, machine sounding an alarm, blinking lights and shutting down blood or dialysate flow.

The process usually lasts 4-5 hours and is repeated three times a Week. Upon completing the haemodialysis session, it takes an additional 45 minutes or so to set the dialysis machine up for the next patient. So that haemodialysis sessions are scheduled at approximately 5-hour intervals.

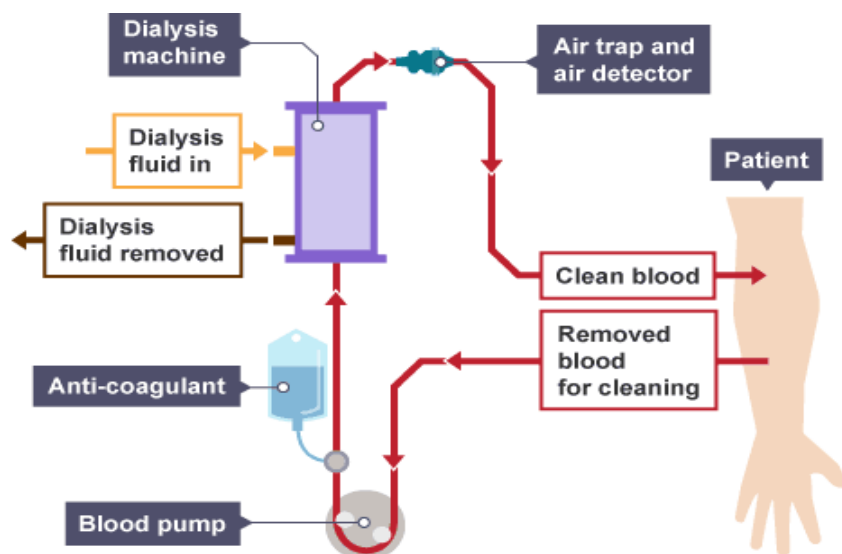


Fig 1.1: Diagrammatic representation of functioning of a dialysis machine

1.2 Literature review:

The burden of chronic kidney disease (CKD) is increasing all over the world including in India. The best-known adverse consequence of CKD is end-stage kidney disease (ESRD). The incidence of end stage renal disease was estimated to be 180 to 200 per million populations¹

In India the first Hemodialysis facility was established in 1961² at the CMC Vellore; soon it was started at 3-4 major centers during that decade viz. CMC Vellore, KEM Mumbai, PGI Chandigarh & All India Institute of Medical Sciences, New Delhi.

It is estimated that currently there are about 1500 HD units in India, about 90% in the private sector. Non- nephrologists and technicians manage a significant proportion of these units³.

The End Stage Renal Disease (ESRD) Program was established in 1972 by federal legislation that extended Medicare coverage to all individuals with end stage renal disease.

ESRD regardless of age who require either dialysis or transplantation to sustain life. This legislation and subsequent regulations established health and safety standards applicable to providers of ESRD services.

It also established ESRD Network Coordinating Councils to serve as liaisons between the federal government and the providers of ESRD services. The ESRD Networks monitor quality of care indicators and maintain timely and complete data on the ESRD program for dialysis treatment and kidney transplantation.

A hospital-based haemodialysis centre usually is located in a hospital that provides the full spectrum of renal services including vascular access, pre-ESRD care, haemodialysis, acute dialysis, and peritoneal dialysis.

Regulatory body of Hemodialysis in India ^{4,5}

1. Ministry of Health & Family welfare Govt. Of India-

Standard treatment guidelines Haemodialysis

2. Indian society of Nephrology Standard of care -

For maintenance Haemodialysis in India

1.3 Aim:

- Orientation of dialysis centre and data analysis of available documents.

1.4 Objectives:

- To get Orientation of dialysis centre
- To analysis the secondary data of documents available
- To study the gap in processing of dialysis unit

1.5 Research methodology:

- Type of study-Phase I Descriptive study, Phase II Analytic study
- Location of study- Dialysis unit, Ground floor, Paras hospital, Gurgaon
- Duration of Study- Phase I April month, phase II in May month
- Population size: - 44 Patients of Dialysis
- Inclusion criteria - Acute and chronic dialysis patients
- Data collection method –
 - Primary data is collected through questionnaire filled by dialysis patient and care takers.
 - Secondary data analysis from the patient file and document maintained by Dialysis staff
- Data analysis tool- Mean and percentage was calculated in MS Excel
- Data representation-Pie and bar diagram is used for representation

1.6 Data analysis and Interpretation:

A) Secondary data analysis:

Orientation of Dialysis centre:

- 1) Frame work
- 2) Resources
- 3) Manpower
- 4) Consumption
- 5) Document

1) Frame work:

- Location- Ground floor
- Adjacent department- Endoscopy, Urodynamic, Day care, Emergency, Nephrologists consultancy cabin
- Area- approximately 30 x 26 square feet
- Infrastructure– 1 nursing counter such that all 5 dialysis bed can be observes easily
- 4 bed in front and 1 bed adjacent to nursing counter , all bed isolate by curtain
- 7 switch and 2 outlet for 1 O2 and suction behind every patient
- 1 RO water supply and 1 for draining water tap for every patient
- Processing room adjacent to nursing counter
- 1 extra bed for rest to the patient if needed
- Waste segregation boxes

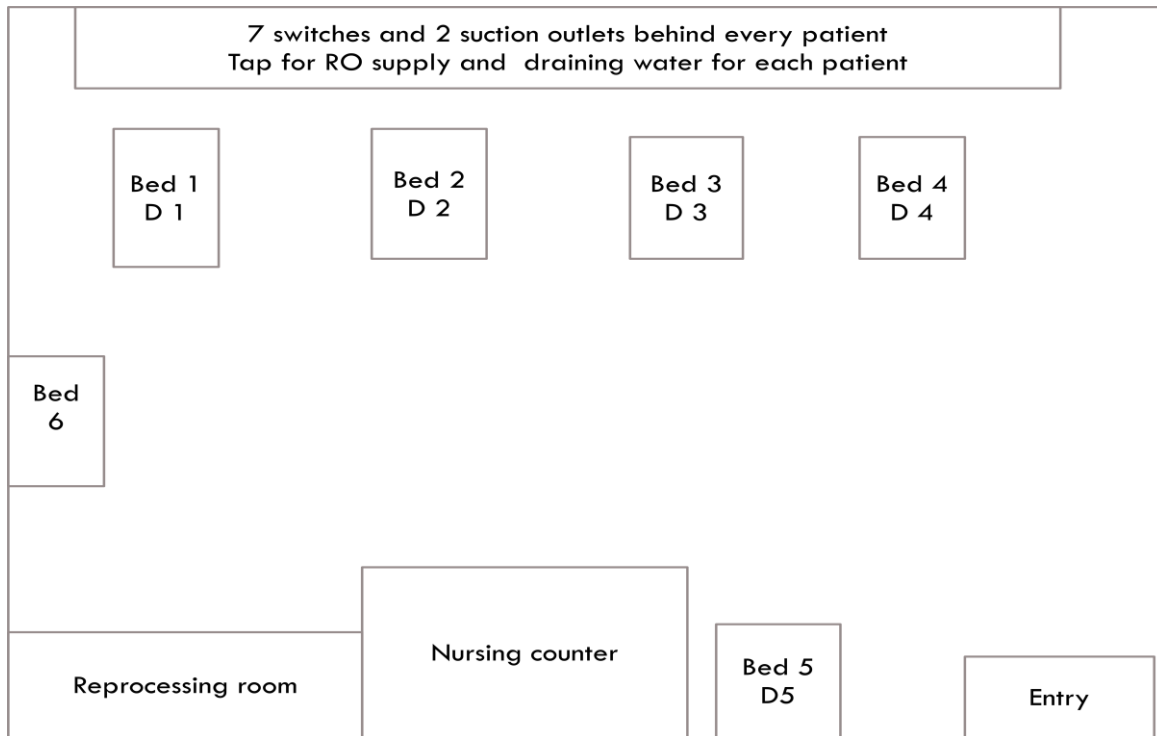


Fig: 1.6.1: Layout of dialysis centre in Paras hospital

2) Recsources:

i) Equipments in dialysis:

- 5 Dialysis machine
- 6 patient bed
- i.v. Stand
- Cardiac monitor
- Dialyzer reprocessing system machine
- O2 cylinder
- Ambu bag
- Laryngoscope Nebulizer
- Needle destroyer
- Dressing trolley
- Crash cart
- Weighing machine
- B.P. Apparatus

- Stethoscope
- Thermometer
- B- part mixing tank

ii) Dialysis machine:



Fig: 1.6.2: Dialysis machine in Paras hospital

Display in dialysis machine:

- Arterial pressure
- Venous pressure
- TMT (Trans membrane pressure)
- Process time
- UF rate
- UF Volume
- Heparin rate
- Blood flow

iii) Dialyzer:

- Dialyzers are two type- single use and reuse type according to patient's choice and their financial condition.
- Single use dialyzer is used only once and reuse dialyzer is used 4-5 times for a patient.

- Reuse dialyzer is first rinse with RO water, then dialyzer is placed in reprocessing machine which pass the dialyzer for reuse or if not passed then discard the dialyzer.
- Renalin is the chemical solution use to check the potency of a reuse dialyzer.

iv) Medicine:

- Inj. Heparin, Inj. Fesolin, Inj. Neomol, Inj. Buscopan, Inj. Tramadol, Inj. Avil, Inj. Perinorm etc
- High alert medicines- Inj. Xylocain, Inj. Deriphylline, Inj. Eptoin

v) Extras: Fridge, T.V. , 2 Almirah, 1 Portable fan

vi) Water treatment system:

Dialysis patients requires control and monitoring of water quality to avoid excesses of known or suspected harmful elements being carried in the water and transmitted to the patient.

The water treatment is provided by a water pre-treatment system which may include various components such as sediment filters, water softeners, carbon tanks, micro-filters, ultraviolet disinfection units, reverse osmosis units, ultra filters and storage tanks, distribution piping system ⁶.

Flow of water in RO plant:

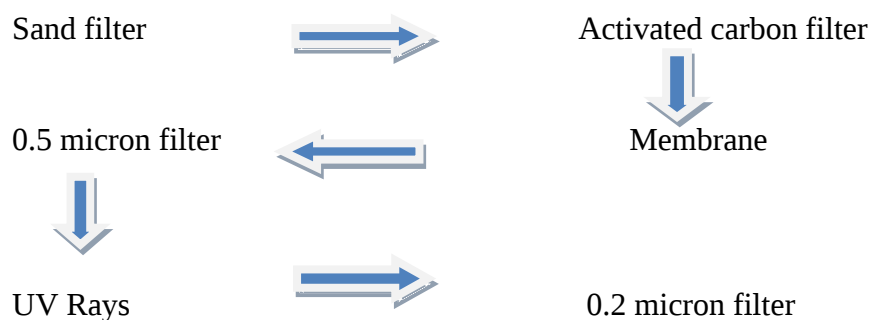


Fig: 1.6.3: Flow of water in RO plant



Fig: 1.6.4: RO water treatment plan for dialysis in Paras hospital

Daily check list for R.O. Plant(dialysis):

Parameter	Frequency	Standard parameter
RO Plant surrounding area clean	Daily	Clean
Check any water leakage	Daily	No leakage
Back wash of filter	Daily	Washed
Check valve function	Daily	Normal flow
Cleaning/flushing of membrane	Weekly	Proper discharge
Cleaning of tank	Fortnightly	Clean with 1% solution of sodium hypochlorite
Changing of filters	Half-Yearly	Change
Check conductivity	Daily	< 15

Table: 1.6.1: Daily check list of RO water in Paras hospital

3) Manpower of dialysis:

- 1 Nephrologist
- 1 Dialysis incharge

- 4 technicians
- 1 renal transplant coordinator
- 4 nurses
- supporting 1 GDA and 1 housekeeping

4) Consumables use per dialysis:

- Sterile gloves -2
- Unsterile gloves Sterile -4
- Dialyser-1
- Blood tubing-1
- Transducer-1
- IV set-1
- Syringe 20 ml-1
- Syringe 5 ml-1
- Hansa plast- 2 for AVF
- Heparin- 5000 IU and 25000 IU for permacath
- Bicarb- 1 packet, 1 packet can be use for 2 patients
- NS- 1 litre for single and 2-3 litre for reuse
- 1 Micropore for permacath
- 1 Durapore for permacath
- 1 pair Fistula needle for AVF
- Medicine:
 - Inj. Espogen/Erythropoitin(4000 IU/10000 IU) s/c according to need
 - Inj. Nephrosteril 250ml

5) Documents maintained in Dialysis:

- Consent form
- C.S.S.D. Register- No of set sent and received daily
- C.G.H.S. Patient register
- Duty roster register

- Inventory maintenance
- Laboratory
- Application and counselling- for staff performance
- 5-S register- Dressing trolley inventory, Crash cart, utility, nursing counter inventory
- Store item receiving register
- Equipment breakdown cum complain register
- TPA register
- Consumption maintenance register
- Water quality check report register

Quality indicator of dialysis:

- TAT(Turn around time)- 4 hr for every patient
- Infection control
- Adverse event if any
- Biomedical waste segregation

Investigations:

- Once in a month -RFT(urea, creatinine, Na, K, Ca, Po4), CBC(Hb, TLC, Platelets)
- Serology- every 3 month (HBsAG, HCV, HIV)
- Others- Albumin, ALP, iPTH, Iron, TIBC, Ferritin, TSAT, Bilirubin, OT/PT, GGPT

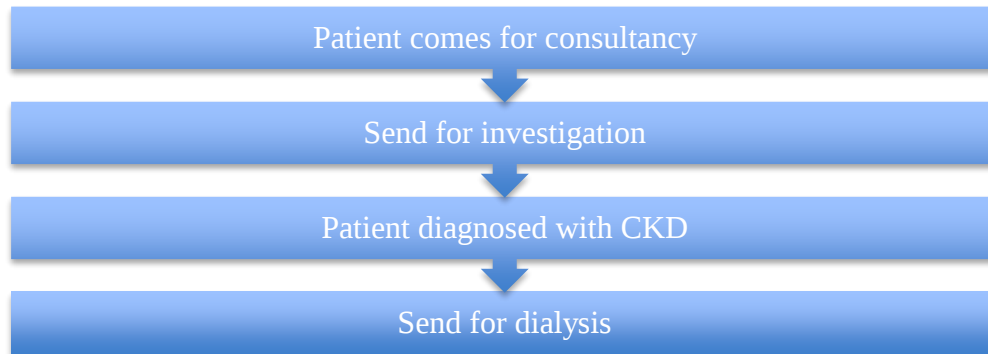
Flow of patient:

Fig: 1.6.5: Flow of patient comes in dialysis

Flow from dialysis:

- 1) Dialysis
- 2) Investigations
- 3) Consultancy
- 4) Medicine
- 5) Vascular access procedure
- 6) Surgery
- 7) References to other faculty
- 8) Hospital admission
- 9) Dietary consultancy

Code for dialysis:

1001	For reuse dialyzer
1002	For single use dialyzer
1005	For patient who require portable dialysis machine in IPD
1009	SLED

Table: 1.6.2: Code of dialysis

Vaccines which is mandatory in dialysis process :

- Hepatitis B
- Anti HBS Titre
- Pneumococcal
- Influenza

Post dialysis instructions:

- Fluid restriction- 1 to 1.5 litre liquid/ daily including tea, coffee, milk or any other liquid
- Dietary instruction- patient should avoid juices and dry fruit.
- Vascular access care- If AVF patient should do regular exercise to maintain the prominence of vein. If patient is on permacath, then no water wetting, dressing, cleanliness, and hygiene maintenance.

Vascular access:

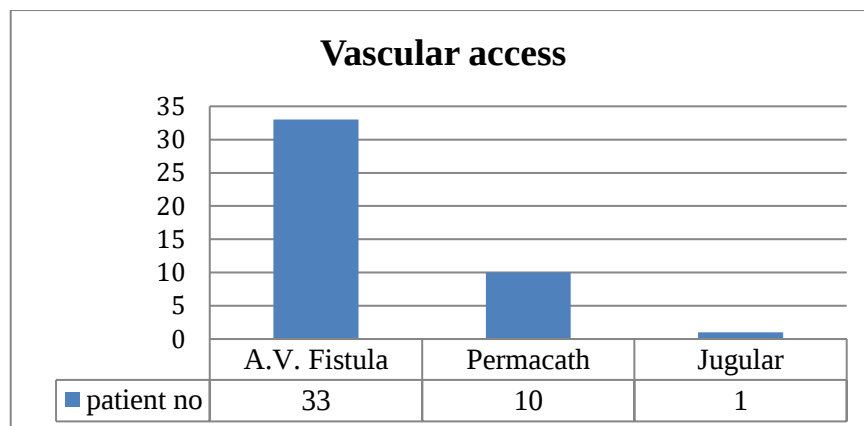


Fig: 1.6.6: Showing number of patient with vascular access

Vascular access infection:

- Out of 44 patients, followed since 1 ½ year, 5 patients suffer vascular access infection, 4 patient were on permacath and 1 patient on AVF

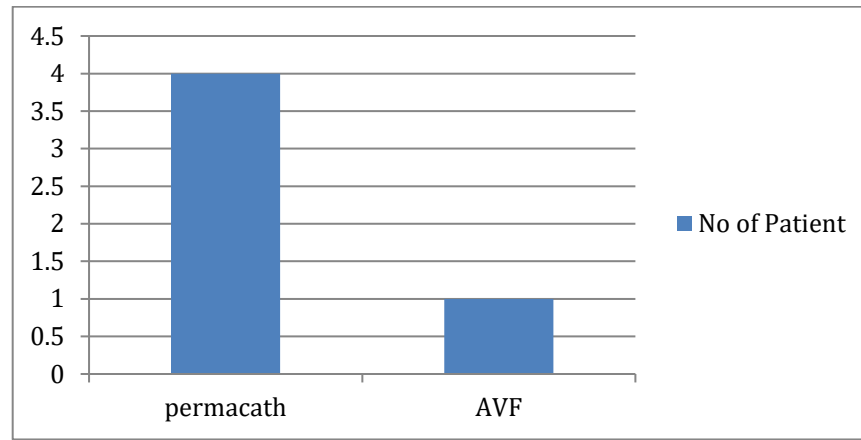


Fig: 1.6.7: Showing vascular access infection

Vaccination:

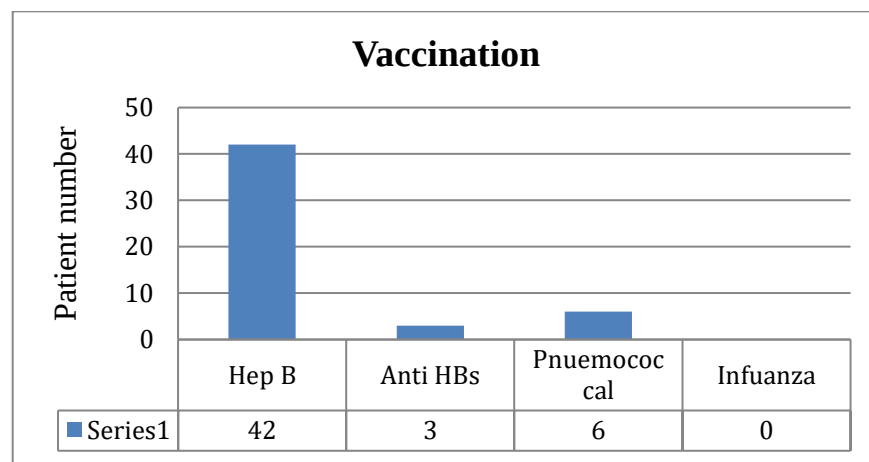


Fig: 1.6.8: Vaccination of patients

Frequency of Dialysis:

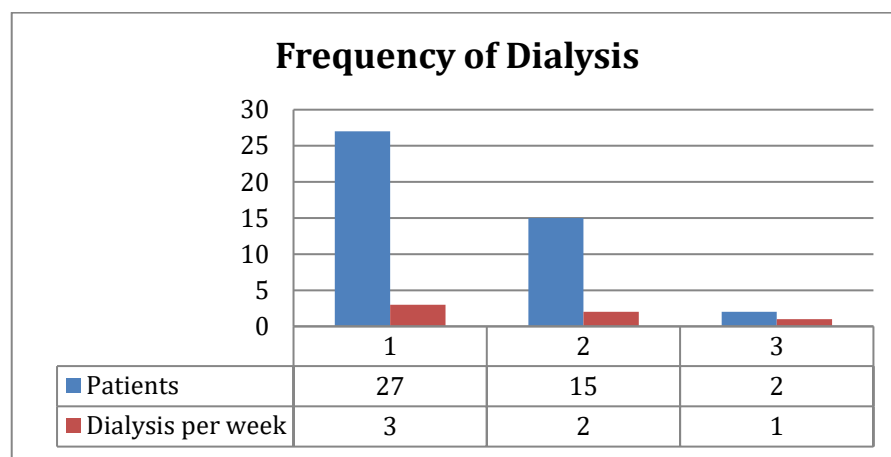


Fig: 1.6.9: Frequency of the dialysis per week

Mode of dialysis:

Mode of dialysis	No. of patients
Single use dialyzer without package	21
Reuse dialyzer without package	6
Single use dialyzer with package	11
Reuse dialyzer with package	6

Table: 1.6.3: Payment mode of dialysis

Cost of Dialysis for OPD patients:

Patients	Cost
Single use dialyzer without package	2700/-
Reuse dialyzer without package	2300/-
Single use dialyzer with package	2250/-
Single use dialyzer with package	1850/-

Table: 1.6.4: Cost of dialysis

Package of investigation:

Investigation	Cost
Dialysis panel 1(CBC, RFT)	1375/-
Serology (HBsAG, HBC, HIV)	1650/-
Iron and TIBC	750/-
ESR	100/-

Table: 1.6.5: Package of investigations

Cost Analysis of April month:**A) OPD patients**

	No. of dialysis	Cost/Dialysis	Total
Patients on single use dialyzer without package	187	2700/-	504900/-
Patients on reuse dialyzer without package	81	2300/-	186300/-
Patients on single use dialyzer with package	158	2250/-	355500/-
Patients on reuse dialyzer with package	87	1850/-	160950/-
		Total	12,07,650/-

Table: 1.6.6: Cost of dialysis of OPD patients

B) IPD patients

Total patient admitted in April month- 08

S.no.	Name of the patients	Dialysis charges	Vascular access charges
1	Mr. RC	9490/-	-
2	Mrs. M	16000/-	IJ or SC 1725/-
3	Mr. SK	8442/-	IJ or SC 4221/-
4	Mr. PK	8316/-	Permacath 6930/-
5	Mr. K	5800/-	Permacath 6930/-
6	Mr. P	10800/-	IJ or SC 3150/-
7	Mr. S	2300/-	-
8	Mr. N	6776/-	-
		Total	90880/-

Table: 1.6.7: Cost of dialysis and vascular access procedure in IPD patients

Investigation cost of April month:

Investigations	Patient no* cost	Total cost
Dialysis panel 1	25*1375/-	34,375/-
Serology	2*1650/-	3300/-
Iron profile	2*750/-	1500/-
	Total	30175/-

Table: 1.6.8: Investigation cost of April month

Department	Profit
OPD	1207650/-
IPD	90880/-
Investigation	30175/-
Total gross profit	1328705/-

Table: 1.6.9: Total gross profit of April month

Consumables use per dialysis:

(For AVF and single use dialyzer)

Consumable	Item no.	Cost per piece	Total cost
Sterile gloves	2	9.84/-	19.68/-
Unsterile gloves	4	1.69/-	6.76/-
Dialyser	1	530/-	530/-
Blood tubing	1	131/-	131/-
Transducer	1	8.4/-	8.4/-
I.V. set	1	9.74/-	9.74/-
Syringe 20 ml	1	7.9/-	7.9/-
Syringe 5 ml	1	2.22/-	2.22/-
Hansa plast	2	5/-	10/-
Heparin 5000 IU	1	92.22/-	92.22/-
Bicarb	1	204/-	204/-
NS 1000 ml	1	29.53/-	29.53/-
Fistula needle	1	16.8/-	16.8/-
		Total cost	1063.65/-

Table: 1.6.10: Consumable cost used per dialysis

Gross expenses of April month:

Expenses	Cost
Equipment maintenance-	12,230/-
Consumable per patient x 550	1063.65 x 550=585007.5
Total Salary of staff per month	1,75,000/-
Total gross expenses	7,72,237/-

Table: 1.6.11: Gross expense of April month

Approximate revenue in April month:

Gross Profit- Gross Expenses 13, 28,705- 7, 72,237 = 5, 56,468/-

Average revenue per occupied patient (ARPOP) (data obtain from hospital record)

ARPOP= Total Revenue in a particular month/ Total no of dialysis in that month

Month	Revenue in lac	No. of Dialysis	ARPOP
Nov'14	11.2	415	2698.795
Dec'14	11.21	454	2469.163
Jan'15	12.3	508	2421.26
Feb'15	12.08	490	2465.306
March'15	12.97	555	2336.937

Table: 1.6.12: Average revenue per occupied patient

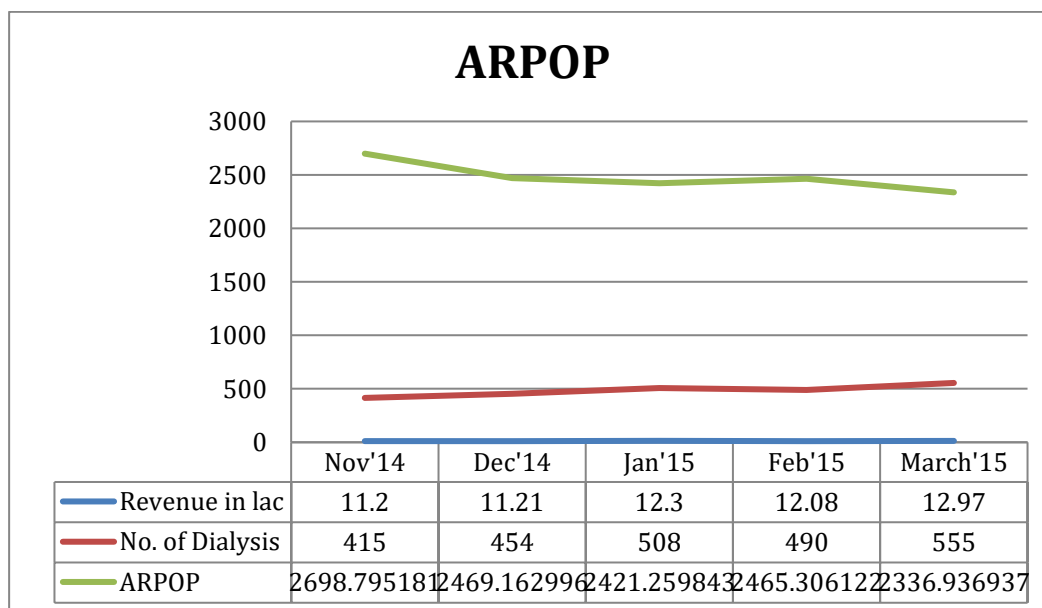


Fig: 1.6.10: Graph showing ARPOP

Although revenue is increasing and no of dialysis is also increasing but the average revenue per occupied patient is decreasing.

Annual trend of Revenue of dialysis centre (April'14-March'15)

Revenue - Variable cost = Contribution factor

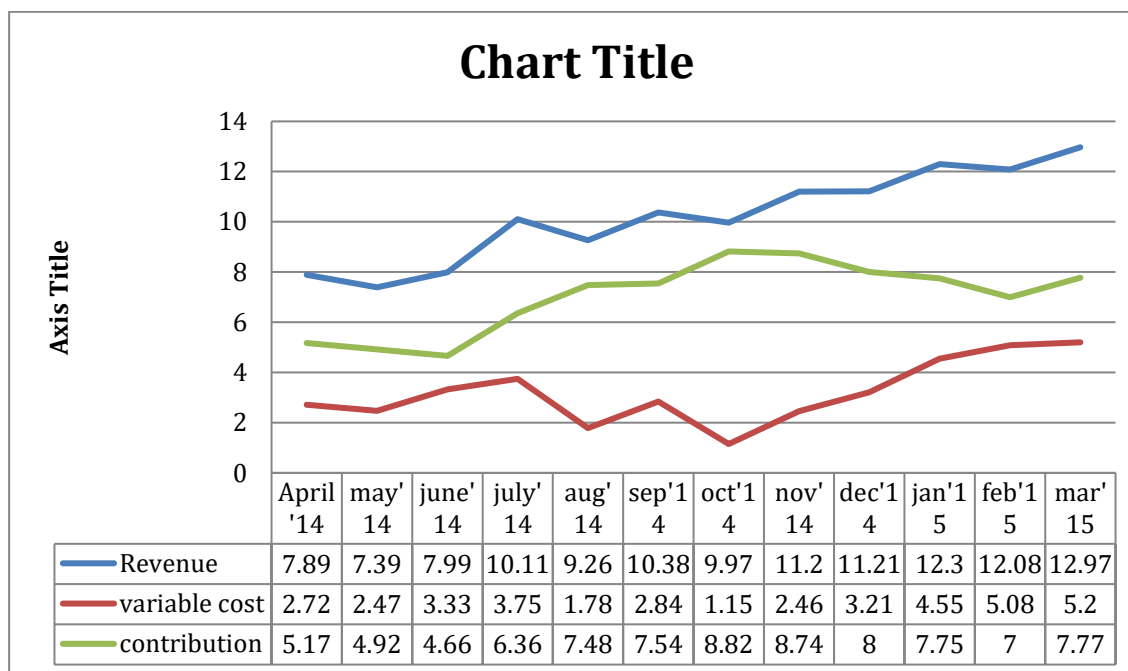


Fig 1.6.11: Graph showing annual trend of contribution factor

Functional capacity:

$$\text{Functional capacity\%} = \frac{\text{Actual (total patient treated per week)}}{\text{Capable (total dialysis machine in use x shift x 6 day in a week)}}$$

>100% - Over capacity

100% - Full capacity

85-99% - Near capacity

<85% - Under capacity

Functional capacity (FC) of dialysis centre at Paras hospital:

Average patient per week - 122 patients/week

- Capability- $5 \times 4 \times 6 = 120$ patient/week
- $FC = 122 \times 100 / 120 = 101.6\%$

Result- as actual no dialysis per week is exceeding the capacity of dialysis machine, it means dialysis machine is overused.

B) Primary data analysis (Questionnaire in Annexure 1)

- 35 patients are above 40 years and 11 patients are below 40 years
- 16 patients are females and 28 are males
- Underlying cause for CKD is hypertension in 26 patients and diabetes mellitus in 2 patients and both hypertension and diabetes mellitus in 9 patients and other cause in 7 patients
- 23 patients are on dialysis since <1 year, 6 patients are on dialysis since 1-2 years, 10 patients are since 2-3 years and 4 patients are since > 5 years.
- 39 patients are attached to the Paras Hospital since they are started with dialysis. 5 patients started their dialysis from another hospital, then shifted to Paras Hospital.
- 32 patients are on single use dialyzer and 12 patients are on reuse dialyzer.
- 40 patients admit in hospital during dialysis mainly because of vascular access procedures either in day care or IPD
- 42 patients satisfied with the service provided by the staff compare to other hospital. In patient's word
 - Service is good
 - Personal attention is better here
 - Other hospital have long waiting time
- Pickup & drop-off services and nice facilities for attendants is the top priorities of patient and Wi-Fi is the least priority
- The most convenient time for the patient to receive dialysis are Monday and Friday morning

1.7 Key Finding:

- There is no separate reprocessing room.

- There is no standby dialysis machine for emergency cases.
- There is over capacity of dialysis machine.

1.8 Recommendations:

- There should be one standby dialysis machine for any emergency cases
- There is need for expansion of dialysis centre
- Pickup and Drop-off services can be started by the hospital for the dialysis patient according to survey results.

1.9 Conclusion:

Dialysis unit in a hospital is one of the important areas. It also contributes a significant part in revenue of hospital. By improving the facility and removing the gap, we can increase the patient number and improve patient satisfaction because these patients are chronic patient and attach to the hospital for a long time period.

1.10 References:

1. Rajapurkar M and Dabhi M. Burden of disease – prevalence and incidence of renal disease in India Clinical Nephrology,2010; 74 – Suppl.1(S9-S12)
2. Chugh K S Three decades of nephrology J Postgrad Med 1994;40:103-108
3. Indian Society of Nephrology Guidelines for Hemodialysis Units. Indian Journal of Nephrology. Vol 22,Supplement, December 2012
4. Standard treatment guidelines haemodialysis -The Clinical ... [clinicaestablishments.nic.in / WriteReadData/358](http://clinicaestablishments.nic.in/WriteReadData/358)
5. Rules and Regulations for licensure of renal soswy.state.wy.us/rules/rules/2943
6. Dialysis Water Pre-treatment for In-Centre and Satellite Haemodialysis Units in NSW: A Set of Guidelines. WATERGuidelinesNSW_June2008.doc 06/06/08

1.11 Annexure-1 (Questionnaire)

Date:

Name:

Age/Sex:

Date of initiation of dialysis:

Medical history/underlying cause of CKD

Q. 1) Since when you are on dialysis?

- a) < 1 year b) 1-2 years c) 2-5 years d) >5 years

Q.2) Since when you are attach with Paras hospital?

- a) <6 months b) 6 months to 1 year c) 1 year to 2 years d) >2 years

Q.3) Are you on single use or reuse dialyser?

- a) Single use b) Reuse

Q.4) How many time you hospitalize during dialysis in Paras hospital?

- a) 1 b) 2 c)3 d)4 e) >4 f)none

Q.5) Are you satisfied with service provided in dialysis centre of Paras hospital?

- a) yes b) no

Q.6) Please rank the following services that you would like a dialysis centre to offer from 1 to 7 according to your personal preferences; 1 being the most important and 7 the least important.

Pick-Up and Drop-Off— Services

Personalized TV Screen

Wi-Fi

Package Pricing— (One combined price for medicines, dialyzer and dialysis)

Counseling— (How to better take care of yourself; dialysis friendly recipes, etc.

Flexible scheduling

Nice facilities for attendants

Q.7) Please mark the three schedules that are most convenient for you:

M Tu W Th F S

Morning(7:00-11:30)

Afternoon(11:30-17:00)

Evening (17:00-21:30)

Night (00:00-6:00)

Project 2: A Study on Training Needs Assessment:

2.1 Introduction:

Training is a learning experience that seeks a relatively permanent change in an individual that will improve his ability to perform on the job.

Training plays an important role in manpower development. Employees need training to perform their duties effectively, eliminate wastage and reduce accident.

Advantage of the organization:

- It improves the job knowledge and skills at all levels of the organization.
- It improves the morale of the workforce and helps people to identify with organizational goals.
- It leads to improved profitability.
- It helps in developing leadership skill, motivation, loyalty and better attitudes.
- It helps to improve corporate image & reduce outside consulting cost.

To the employees:

- Encourages self-development and self-confidence.
- Facilitate employees to handle stress, tension & conflict.
- Helps in better decision making and problem solving.
- Improves leadership skills, communication & attitude
- Enhances group cohesiveness.
- Increases job satisfaction, reduce labor turnover & absenteeism

Linkage of Training with organizational Goal

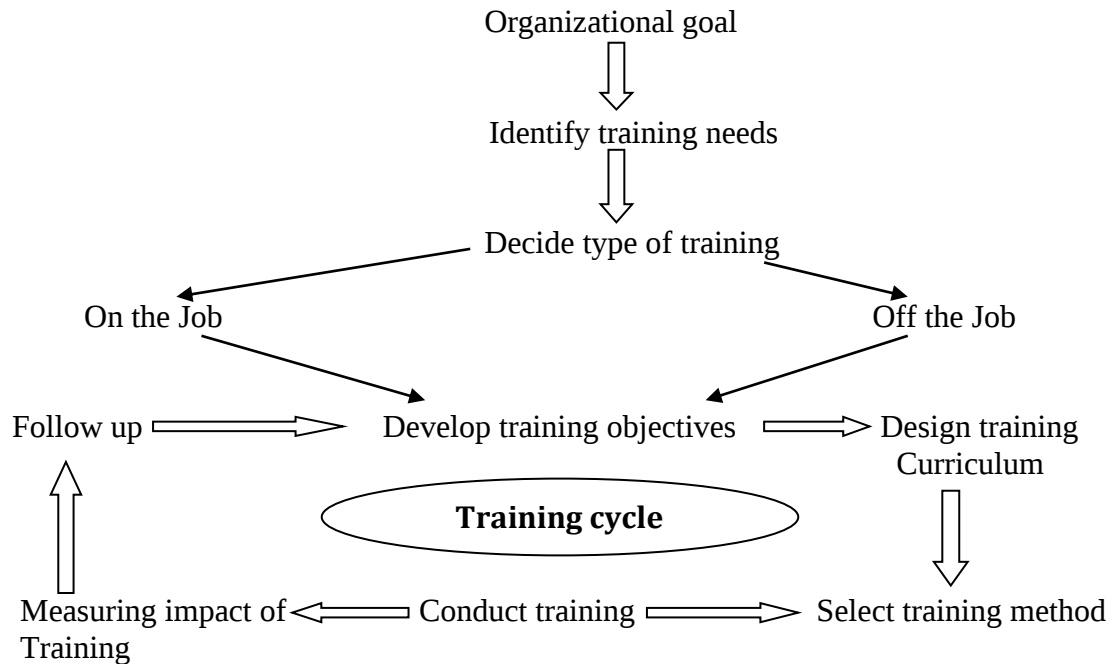


Fig.2.1.1: Linkage of Training with organizational Goal

Identification of Training Needs/Training Need Analysis:

- The need for training should be considered when
- New methods or work procedures are introduced.
- Employees lack a sense of purpose and commitment to the company.
- Cost of operations is increasing without apparent reasons.
- Accidents are increasing.
- Pride in the job and company is missing.
- Complaints and grievances are excess.
- High turnover and absenteeism are prevalent.

Training methods:

- Class room lectures
- Conferences/seminars
- Group discussions/case study analysis
- Role playing/games
- Audio-visual/film shows
- Simulation

2.2 Literature review:

The Training Need Analysis is a significant first step in the successful designing and implementation of training programmes. TNA is a primary phase in the designing and development of training programmes (Dierdoff & Surface, 2008). Conducting systematic needs assessment can significantly impact the overall effectiveness and quality of training programmes (McGehee & Thayer, 1961).⁽¹⁾

Identification of training needs, design and implementation of training programmes, transfer of training, and evaluation of programme benefits are key activities (Krishnaveni & Sriprabaa, 2008) in addition to studying general training variables such as types of training, selection of trainees, selection criteria, evaluation instruments, etc.⁽²⁾

2.3 Aim: Identify the training need of nursing department**2.4 Objectives:**

- To identify the training need in various training programme
- To categorized the staff for further training programme

2.5 Research methodology:

- Department involve: Nursing
- Type of study: Analytic study
- Duration of study: 15 May- 30 May 2015
- Sample size: 35 people for each training programme

- Sample selection: Convenient sampling
- Method of Data collection: Primary data collection from the questionnaire prepared
- Data analysis : Bar diagram is use to represent analysis
- Questionnaire type: Fill in the blank, yes & no type and open ended
- Topics on which training is been given:
 - Goal setting
 - Professional etiquette
 - Work place etiquette
 - Time management
 - Empathy
- Training method: Questionnaires are filled by the staff before and after the training session that is called Pre test & post-test. The difference between the score of post test and pre-test is called learning index.

$$\text{Post test score} - \text{pre-test score} = \text{Learning Index}$$

Based on learning index we can measure the training need of particular staff.

Type of training need:

- Advance training
- Regular training
- Basic training

2.6 Data Interpretation & Analysis:

Goal Setting:(Annexure 1)

	Test score	Pre	Post
Goal setting	>3	14	0
	3to 5	18	0
	5 to 7	1	2
	>7	0	33

Table: 2.6.1: Goal setting

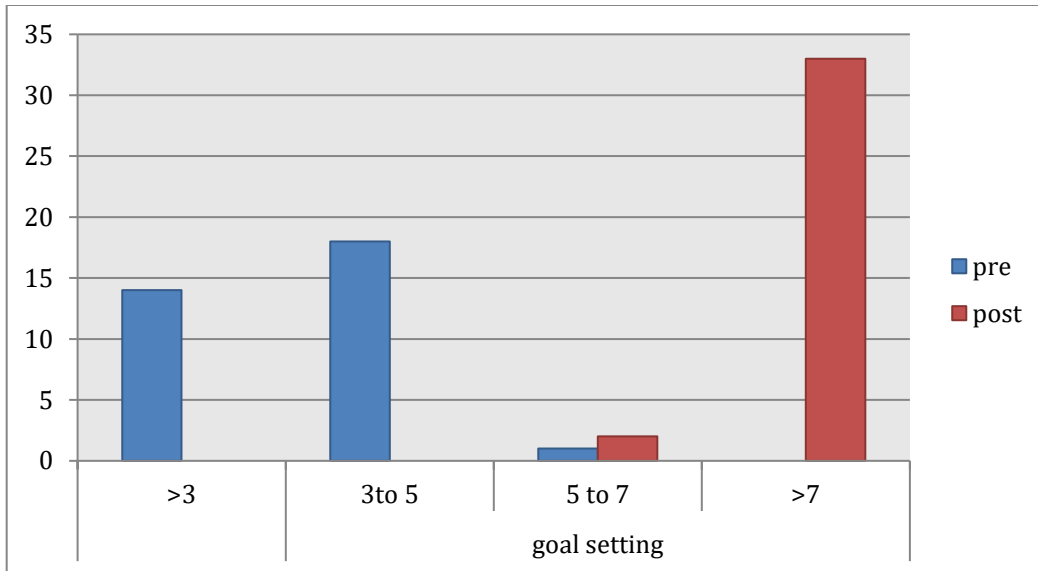


Fig: 2.6.1: Goal setting

Work Place Etiquette: (Annexure 2)

Work etiquette	place	Test score	pre	post
		>3	5	0
		3to 5	3	0
		5 to 7	13	7
		>7	14	28

Table: 2.6.2: Work place etiquette

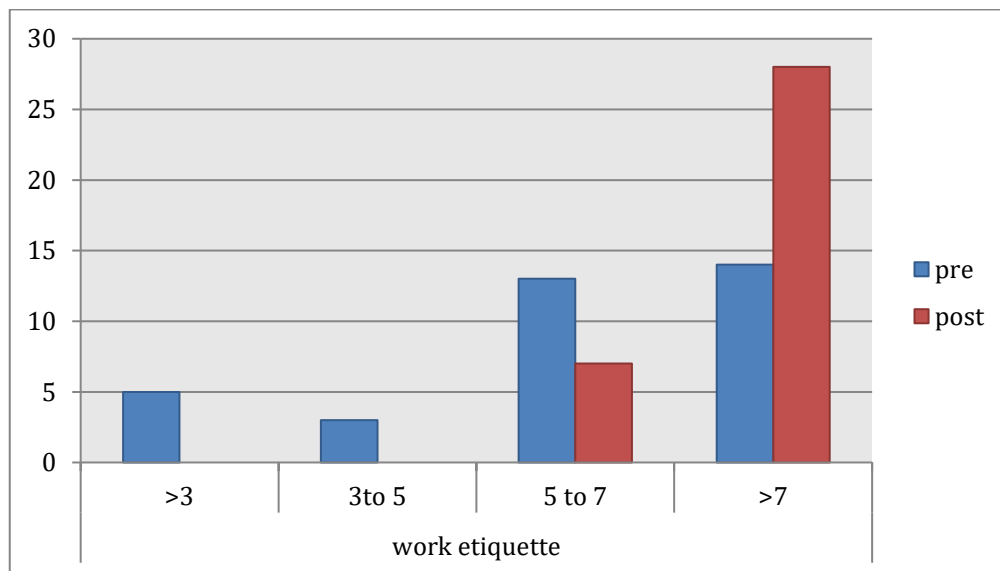


Fig: 2.6.2: Work place etiquette

Professional Etiquette: (Annexure 3)

Professional etiquette	Test score	pre	post
	>3	1	0
	3to 5	7	0
	5 to 7	23	2
	>7	4	33

Table: 2.6.3: Professional Etiquette

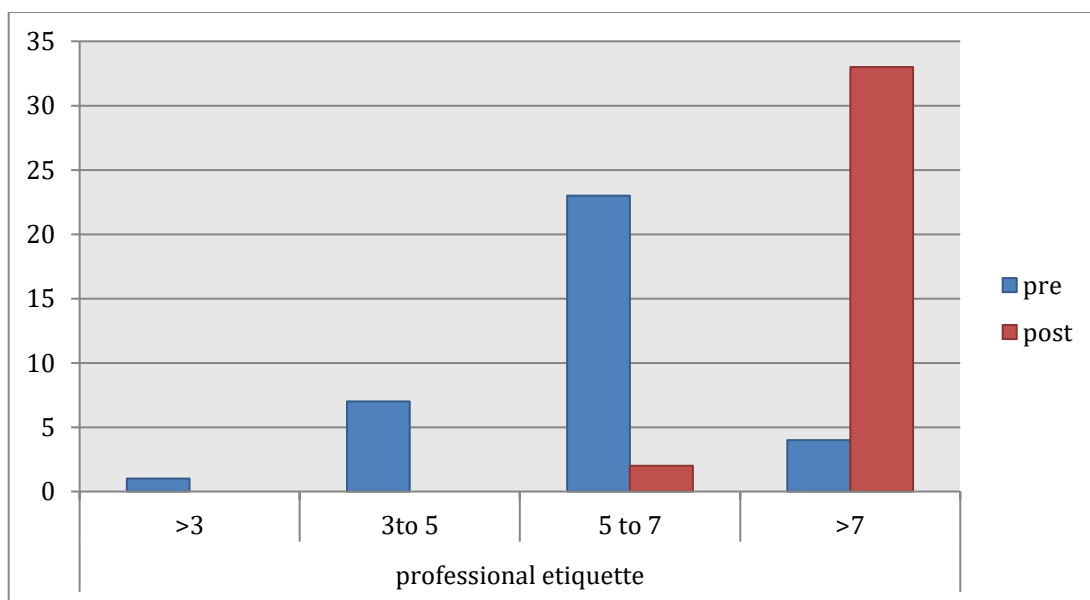


Fig: 2.6.3: Professional Etiquette

Empathy: (Annexure 4)

Empathy	Test score	pre	post
	>3	10	0
	3to 5	20	1
	5 to 7	5	1
	>7	0	33

Table: 2.6.4: Empathy

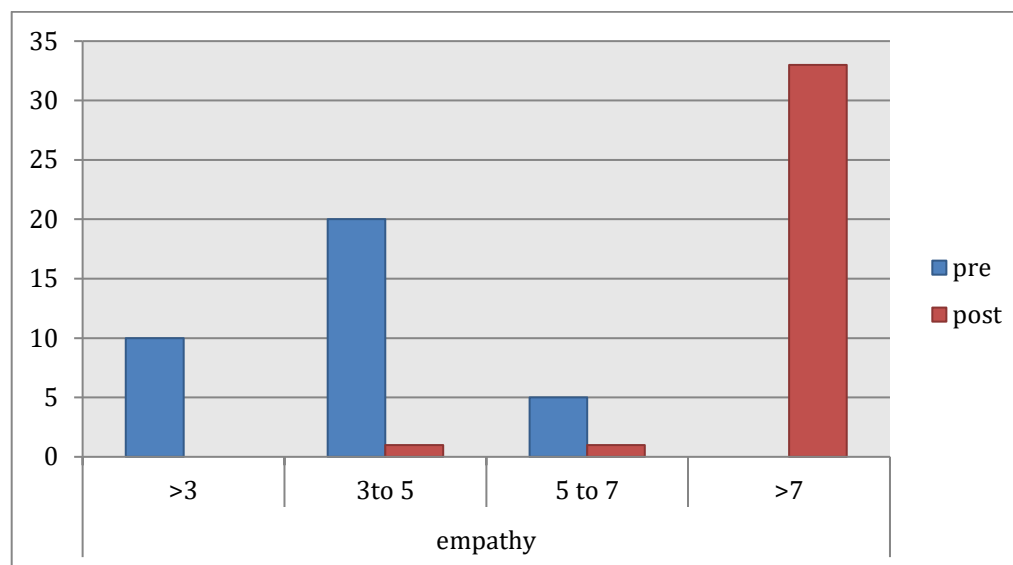


Fig. 2.6.4: Empathy

Time management: (Annexure 5)

Time management	Test score	pre	post
	>3	16	0
	3to 5	19	0
	5 to 7	0	8
	>7	0	27

Table: 2.6.5: Time management

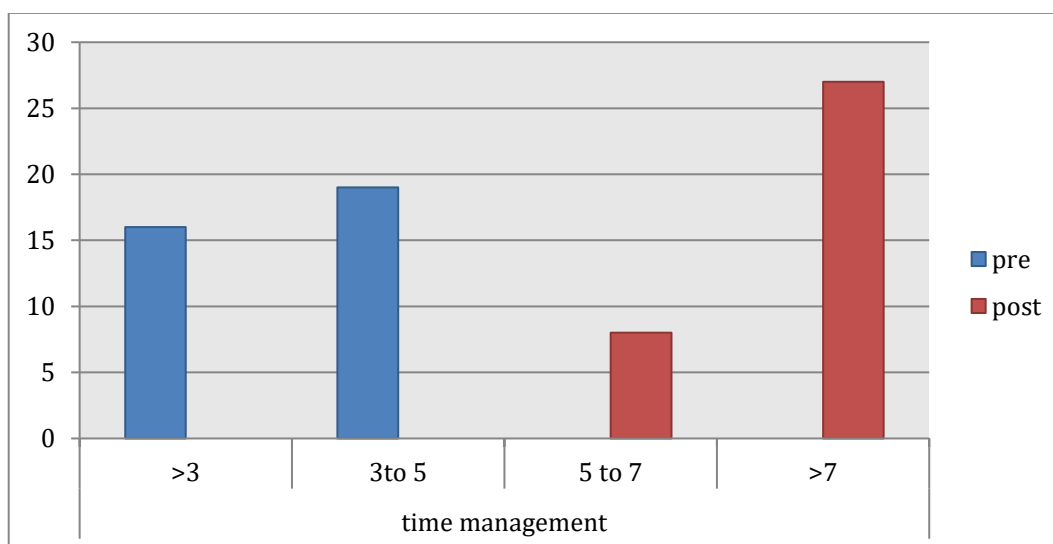


Fig. 2.6.5: Time management

Learning index:

	Workplace etiquette	Empathy	Time management	Professional etiquette	Goal setting
pre test (avg.)	5.9	3.4	2.3	5.3	2.6
post test(avg.)	8.9	8.7	8.3	9.5	9.2
Learning index(avg.)	3	5.3	6	4.2	6.6

Table: 2.6.6: Learning index

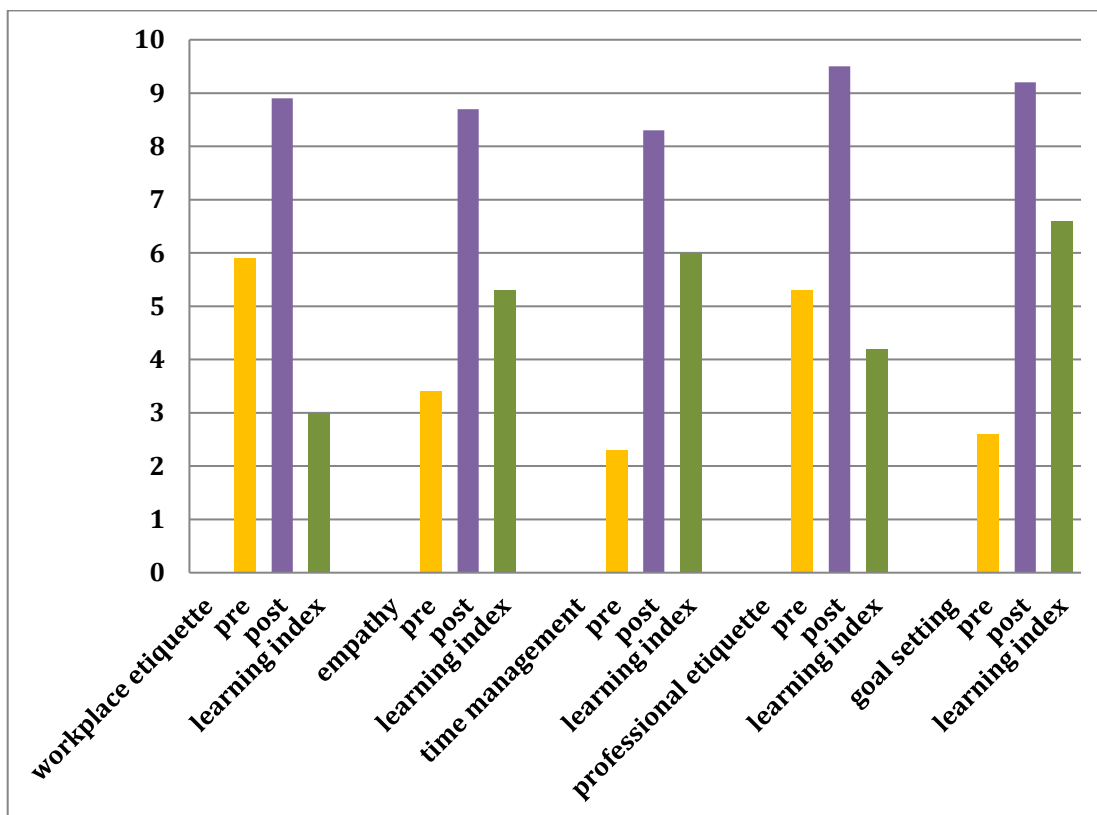


Fig: 2.6.6: Learning index

The graph above shows that post the training session, the employees' performance improved by a great margin.

The difference in the heights of the graphs depicts that people performed better in the post-training test of empathy, goal setting and time management whereas the short range of the graph of the post-

training test of professional etiquette and workplace etiquette shows that most people were already aware of the etiquettes on the workplace.

Hence, the learning index was high for goal setting, empathy and time management.

People score more than 7 in post test– (Superior)

These people have good learning capacity, they actively participate in training session, eager to learn and want to improve their profession skill.

Recommendation- They require advance level of training.

People score 3 - 5 and 5 - 7 marks in post test- (Good)

These people have average learning capacity.

Recommendations- They require regular training session.

People score less than 3 marks in post test- (Average)

These people may have less learning capacity due to low level of confidence, language barrier, high level of hesitation.

Recommendation- these people required more of basic training session, personal interview, counseling, language training to reduce the hesitation level, improve understanding. A special task can be given to them and followed by incharge to check the improvement level.

2.7 Recommendation:

- Provide training sessions to the people according to their potential.
- It can help in the retention of superior employees and for below average employees it helps to improve their working capability which overall improves the growth of the organization.

2.8 Conclusion:

- As we have done this training need assessment in nursing department, staff of the any department of the hospital can be trained in same way.
- With the help of the given training assessment, we can reduce the attrition of employees and the biasness at the time of appraisal.

2.9 Reference:

- 1.Dierdoff, C. Erich, & Eric A. Surface (2008). Assessing training needs: Do work experience and capability matter? (zenithresearch.org)
- 2.Krishnaveni, R., and Sripirabaa, B. (2008).Capacity building as a tool for assessing training and development activity: an Indian case study. International Journal of Training and Development.(zenithresearch.org)

2.10 Annexure:

Annexure – 1 (Questionnaire) Goal setting

1. _____Prevents individuals from achieving their best.
(Low goal setting)
2. Goal setting is the skill which can make the difference between_____and
_____Performance. (Superior and average)
3. Goal setting is about writing down wants and setting deadline to achieve (True/False)
(True)
4. The power of goal often excites the achiever to face the future with anticipation of achieving
(True/ False) (True)
5. It is about setting well-defined goals and the advantage of self motivation (True/False)
(True)
6. Smart goal are S_____, M_____,A _____,R _____ ,and T_____.
(Smart, Measurable, Achievable, Relevant and Time bound)
7. There are two type of goal and these are 1._____Goals & _____goal.
(Long term, Short term)
8. Long term goals are generally from_____ year to _____year.
(1, 10)
9. Short term goals are generally from _____day to _____year.
(1, 5)
10. A goal with no plan is just a wish. (True/false).
(True)

Annexure – 2 (Questionnaire)

Work Place Etiquette

1. A professional should dress appropriately at work place. (True/False)
(True)
2. A professional should always be punctual at workplace. (True/False)
(True)
3. To become a superior professional one should maintain good communication with internal and external customers. (True/False)
(True)
4. A professional should always work to remain self motivated.(True/False)
(True)
5. _____ Is an attitude of respect towards other people and what they are attempting to express. (Listening)
6. Listen = _____ (Silent)
7. To become a superior professional one should be respectful and courteous to fellow co-workers.(True/False) (True)
8. To become a superior professional one should participate in inappropriate conversation. (True/False) (True)
9. To become a superior professional one should arrive at workplace unprepared. (True/False)
(False)
10. To become a superior professional one should engage in non-work related activities. (True/False) (False)

Annexure – 3 (Questionnaire)

Professional etiquette

1. Use _____ to meet with clients or vendors, when reprimanding a junior or a for personal call.

(Conference room or meeting room)

2. Seek _____ by knocking or establishing eye contact before entering a cubical or room.

(Permission)

3. In case of overhear some confidential information, pretend you did _____ hear and do not spread _____.

(Not, gossip)

4. Use your _____ voice when speaking in a cubical or room.

(Library)

5. 4A's of complain handling are 1. _____ 2. Acknowledge 3. _____ 4.

Action (Attitude, Apology)

6. Answer the phone within _____ rings.

(3 ring)

7. Put your _____ on silent or vibration mode when in cubical, room or with patient

(Mobile or Phone)

8. Personal grooming (eg. Neat & combed hair, clean shaven, clean & ironed uniform Etc.) is not an integral part of customer service excellence.(True / False)

(False)

9. Having short neat and tidy hair is an integral part of grooming in customer service (True/False)

(True)

10. Do talk too loudly over phone while moving in a lift or lift. Do set loud ring tone in your mobile phone (True/ False)

(False)

Annexure – 4 (Questionnaire)

Empathy

1. Empathy in customer service is _____
(Putting yourself in other people shoe.)
2. Acknowledge your customer means using words like _____
3. Our customers are very important to us. Make them feel that. (True/False)
(True)
4. Treat our customers the way we want us to be treated. (True/False)
(True)
5. The easiest way to separate sympathy from empathy is to remember :

Empathy is about _____ , while sympathy is about _____
(Feeling & action, action)

6. If any customer likes our services & praises, the empathetic statements can be _____
(Thank you)
7. If a customer criticizes , the empathetic statement can be _____
(Sorry)
8. The four power words in customer service are (a) _____
(b) _____ (c) _____ (d) _____
(Wonderful, absolutely, great, that's good to hear)
- 9) The four listener feedback words are (a) _____
(b) _____ (c) _____ (d) _____
(Alright, I see, Ok, I understand)
- 10) The four empathy statements are (a) _____
(b) _____
(c) _____
(d) _____

Annexure – 5 (Questionnaire)

Time management

1. What are the time wasters (any four?)
(a. Lack of discipline b. Worrying c. Too much socializing d. not finding resources)
2. What is the way to deal with time wasters? (Any Three)
(a. Reading books b. Planning c. Think about your goal)
3. Time management is about organizing your competing priorities in the limited time available
(True/False) (True)
4. Time management has very little to do with time. (True/False) (True)
5. You must educate your friend and, family member & colleagues to respect your work space & time (True/ False) (True)
6. The quadrant of necessities has ____importance and____urgency tasks.
(High, High)
7. The Quadrant of quality has____importance and____urgency tasks.
(High, Low)
8. The quadrant of deception has ____importance and ____urgency tasks.
(Low, High)
9. The quadrant of waste has _____importance & _____urgency Tasks.
(Low, Low)
10. What is pareto principle in time management?
(80% of success comes from 20% of right efforts.)

Annexure: 6 Data Sheet

[illegible]

Project 3:

A Time Motion Study On Radiology department

3.1 Introduction:

The department of radiology provides a full range of imaging services for every age group right from the infant to the old age person at Paras hospital, Gurgaon. Patients visit to radiology department for various reasons, like to get their diseases diagnosed & for further treatment and consultation, not only for treatment but also as a preventive measure in case of preventive health measure.

Scope of services of radiology department:

The imaging centre at paras hospital is equipped with the following-

- ✓ Digital X ray including portable x-ray machine
- ✓ Ultrasound
- ✓ CT scan
- ✓ MRI
- ✓ Mammography
- ✓ DEXA & BMD procedures

Function of radiology department:

- To conduct the radiological investigations as per mentioned scope of services.
- To provide quality services based on quality assurance system.
- To ensure staff safety while conducting the radiological procedures & follow the defined safety parameters.
- To deliver the reports within defined TAT for every test.
- To ensure calibration status of all the equipments are updated.

X-Ray and Ultrasound procedure:

Purpose:

To diagnose medical conditions like structural, pathological & functional abnormalities.

Process flow of X-ray:

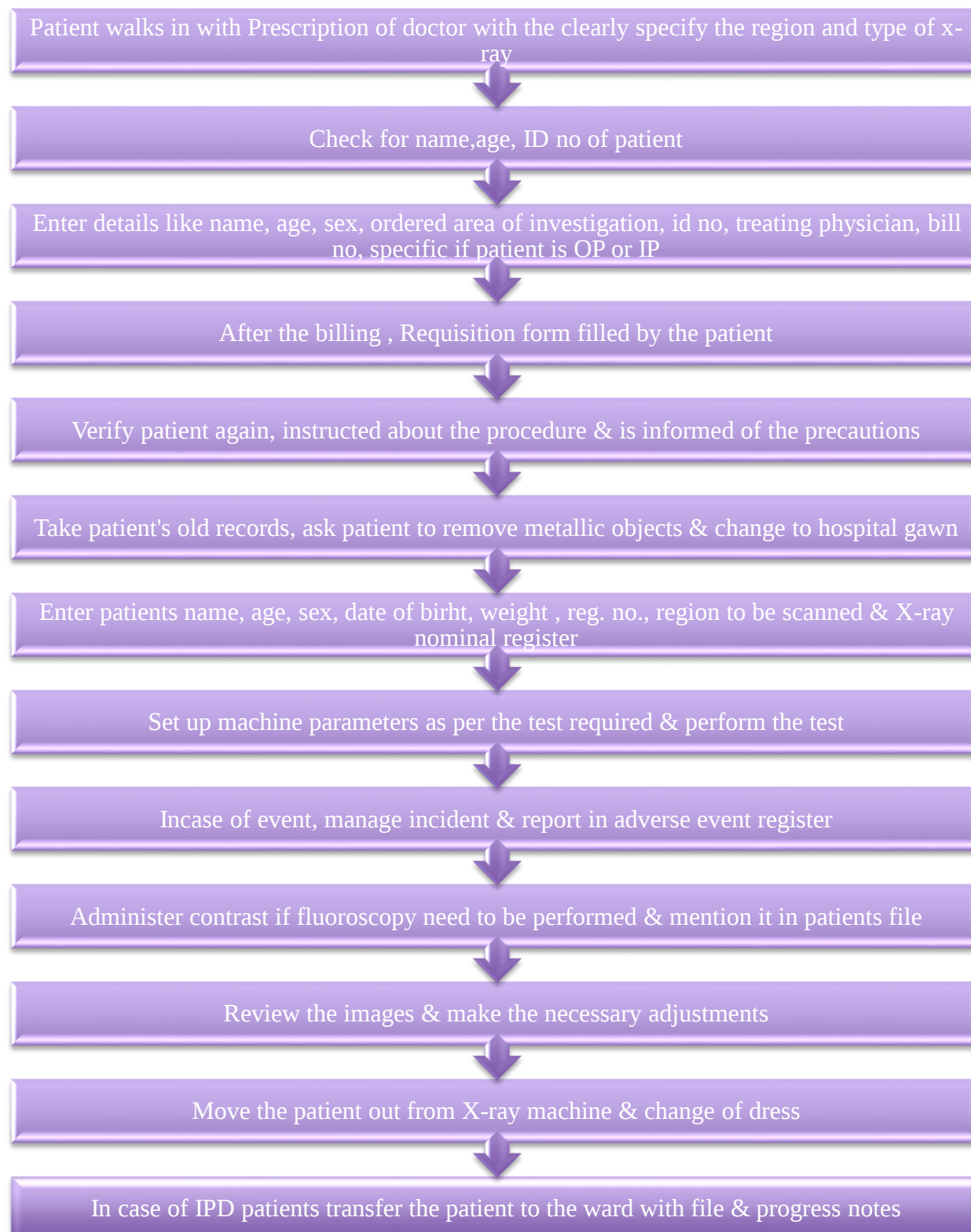


Fig: 3.1.1: Process flow of X-RAY

Ultrasound process flow:

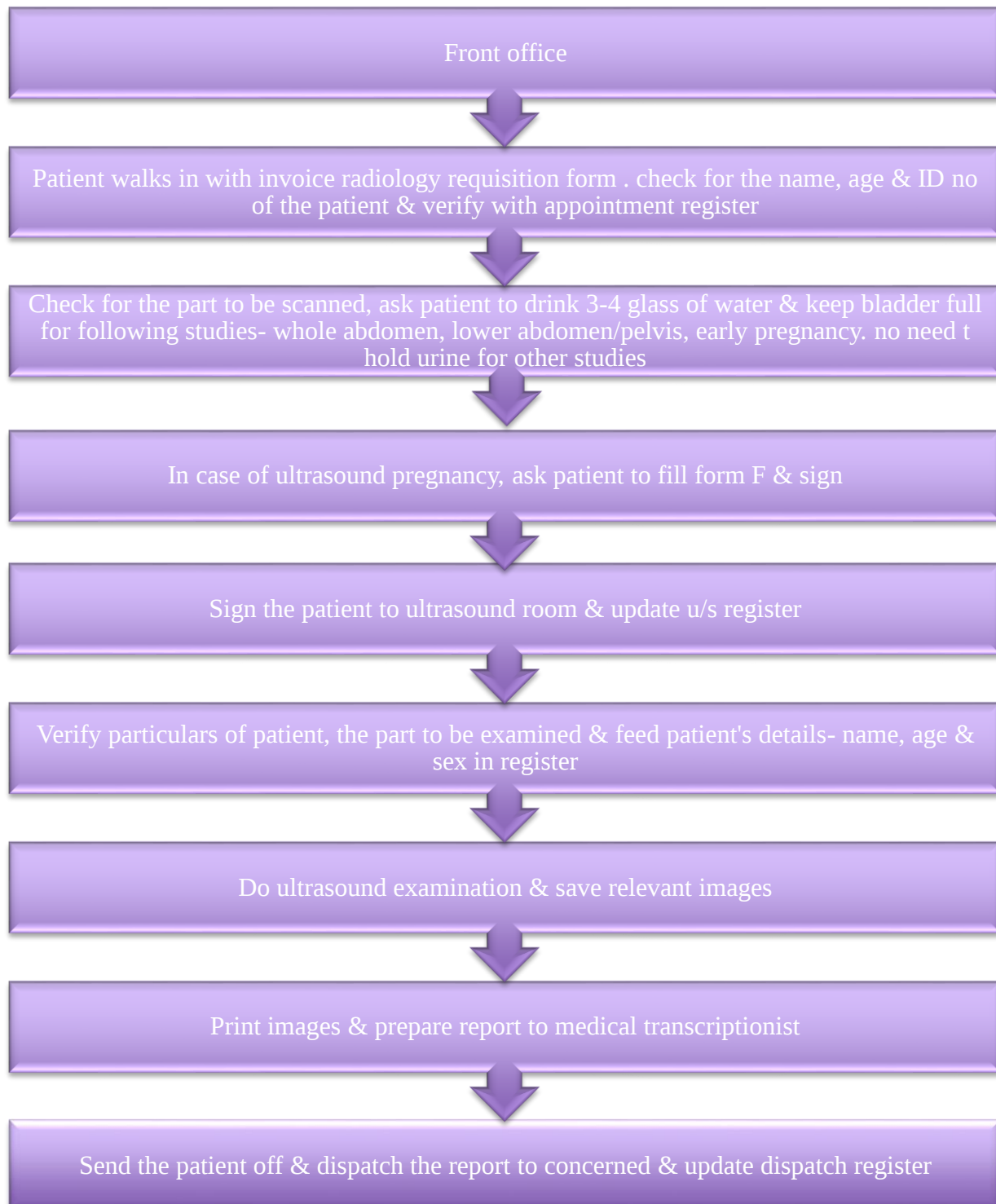


Fig: 3.1.2: Process flow of ultrasound

Turnaround time (TAT):

From the time patients arrives, till the time patient enters in the procedure room is turn around time. The standard TAT for appointment patients is 15min.

3.2 Literature review:

Health care processes are difficult to define because of their complexity [1]. Assessing time definitions in clinical processes can help to analyze workflows in hospital information systems (HIS) and to identify weak points [2]. Due to increasing costs in health care it is important to improve the efficiency of clinical workflows

In January 2010, the Hurley FAHC, in collaboration with North Shore-LIJ Health System, implemented a process improvement project to reduce patient turnaround time (TAT) and improve quality in the internal medicine residency clinic.

The premise of this project was that decreased patient wait-times in the internal medicine clinic would increase overall patient satisfaction (3)

3.3 Aim:

- Study the TAT of X-Ray and ultrasound in radiology department.

3.4 Objective:

- To study the TAT for X-Ray & Ultrasound procedure in radiology department.
- To identify the problem in the processes & service delivery system from patient's perspective leading to delay.
- To analyze the collected information & suggested recommendations for the same.

3.5 Research methodology:

- Study Design: analytical study
- Study Area: Paras Hospitals, Gurgaon
- Study duration: 10 April 2015 to 25 April 2015
- Study subjects: Patients coming in radiology department to get the X-Ray & Ultrasound done.
- Sample size: 93 patients out of which 35 patients of ultrasound & 58 patients of X-ray.
- Sampling technique- simple random sampling

- Study time- 9am – 4pm
- Inclusion criteria- patients who have come for ultrasound & X-Ray both OPD & IPD patients.
- Data collection methods-

Primary data- by observation of patients

3.6 Data analysis & interpretation:

For Ultrasound:

USG	
Waiting time	No. of patients
>15 min.	10
15-30 min.	13
<30 min	12

Table: 3.6.1: TAT for Ultrasound

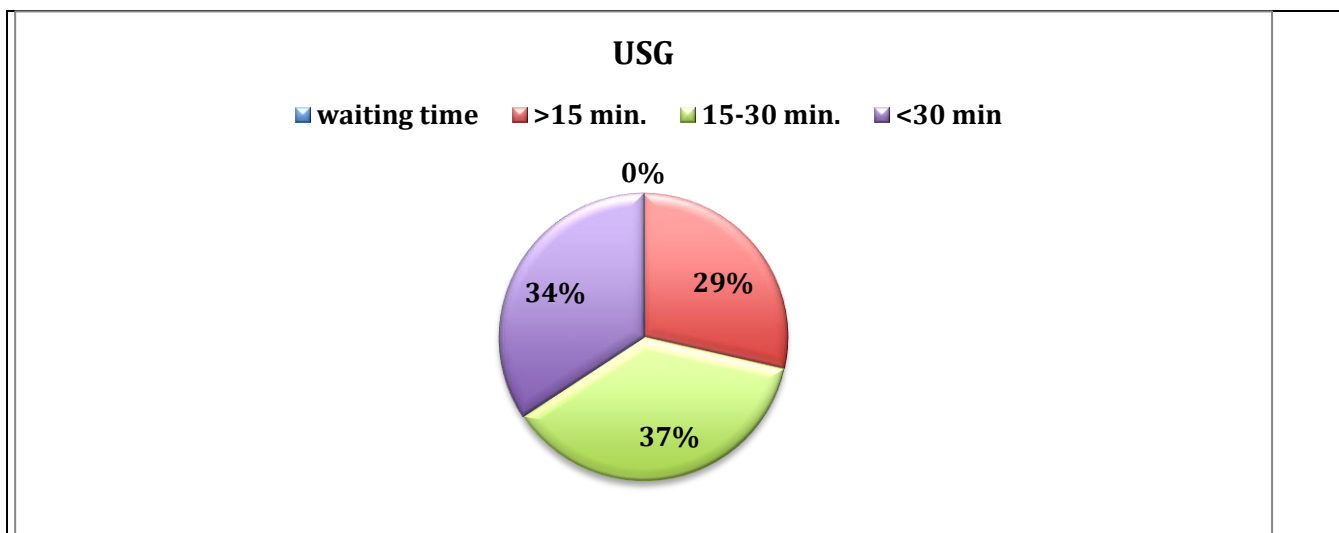


Fig: 3.6.1: Pie chart depicting waiting time for Ultrasound procedure

Out of 35 patients 34% has to wait for more than 30 minutes , 37% patients get the procedure done within the 15to 30 minutes & 29% patients has to wait for less than 15 minutes.

For X-Ray:

X-RAY	
Waiting time	No. of patients
>15 min.	18
15-30 min.	29
<30 min	11

Table: 3.6.2: TAT for X-RAY

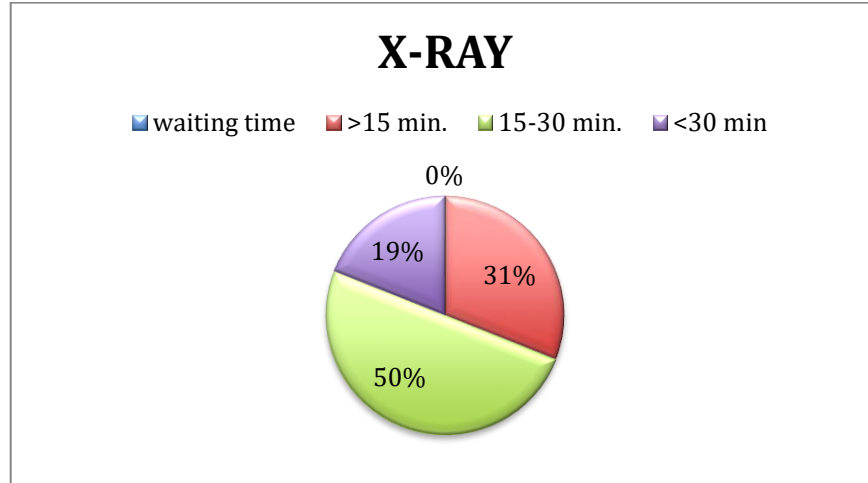


Fig: 3.6.2: Pie chart showing waiting time for X-ray
 Out of 58 patients 19% patients have to wait for more than 30 minutes, 50% has to wait for 15-30 minutes & 31% patients have to wait for less than 15 minutes.

Findings:

- Communication gap between front desk staff & staff inside X-Ray & ultrasound room.
- No crosscheck of appointments.
- Patients are not being counseled regarding fasting, number of bottles to be taken per oral, holding of urine.
- Patients need to have other investigations done.
- Only one common changing room which is common for all four radiological procedure.
- Only one cassette reading & digitizer machine for X-ray (both portable and fixed) & mammography.
- Shortage of radio technician and GDA staff.
- Human resource management is not done properly.
- Common counter for registration, billing and report dispatch of radiology department.

3.7 Recommendations:

- Counseling of patients should be done in terms of-
 - ✓ Hours of fasting prior to the procedure.
 - ✓ Specify number of bottles to be taken per oral.

- ✓ Holding of urine as per requirement of the test.
- ✓ If any investigation has to be done prior.
- Crosscheck of appointments should be done so that walk in patients could be adjusted.
- Counter for report dispatch should be separate.
- Changing room should be inside the X-ray room.

3.8 Conclusion:

Healthcare is a process of many handoffs. Reducing turnaround time (TAT) at any one of those handoffs speeds the entire process and puts critical information in the hands of clinicians when they need it most, increase patient satisfaction and it helps to improve the revenue also.

3.9 References:

- 1.Ammenwerth E, Ehlers F, Eichstädter R, Haux R, Pohl U, Resch F: Systems analysis in health care: framework and example. *Methods Inf Med* 2002, 41(2):134-40. PubMed Abstract | Publisher Full Text
2. Lenz R, Buessecker F, Herlofsen H, Hinrichs F, Zeiler T, Kuhn KA: Demand driven Evolution of IT Systems in Healthcare. *Methods Inf Med* 2005, 44(1):4-10. PubMed Abstract | Publisher Full Text
3. Improving Process Turnaround Time in an Outpatient Clinic www.isixsigma.com › Industries › Healthcare

3.10 Annexure-1 (Data Sheet)

[illegible]

