



A Time Motion Study on Radiological Procedures (MRI and Ultrasound)

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CERTIFICATE

This is to certify that Dr. Swati Agrawal has undergone her summer training in Paras hospital, Gurgaon from 1st April, 2014 to 1st June, 2014. The candidate herself carried out all the studies related to her summer training. Her approach to the study has been scientific and analytical. This summer training is partial fulfilment of course requirement is recommended for the award of post graduate diploma in hospital management.

I wish her success in all her future endeavours.



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May 31, 2014

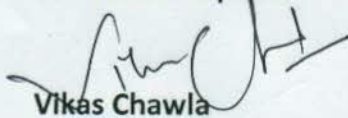
WHOMSOEVER IT MAY CONCERN

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

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

We wish her all the best for future endeavors.

For Paras Hospitals



Vikas Chawla
Manager – Human Resource

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Acknowledgement

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LIST OF ABBREVIATION

- CT- Computed Tomography
- ECG- Electrocardiograph
- ECHO-Echocardiogram
- F&B-Food and Beverages Department
- FRRO-Foreign Registration Regional Office
- GDA- General/Ground Duty Assistants
- HR- Human Resource
- HSEB- Haryana State Electricity Board
- HCF- Healthcare Facilitators
- ICU- Intensive Care Unit
- IPD- In-Patient Department
- MLC- Medico Legal Case
- MRD- Medical Record Department
- MRI- Magnetic Resonance Imaging
- NABH- National Accreditation Board for Hospitals and Healthcare Providers
- NABL- National Accreditation Board for Testing and Calibration Laboratories
- OPD- Out-Patient Department
- PHC- Preventive Health Check
- TMT- Treadmill Test
- TAT-Turn Around Time
- TPA- Third Party Administrator
- USG- Ultra Sonography
- UPS- Uninterrupted Power Supply

1.0 Overview Of The Hospital

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

1.1 Vision

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

1.2 Mission

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

- *Appropriately*
- *Responsibly*
- *Efficiently*

1.3 Quality Policy

Paras Hospitals believe in partnership with the communities they serve

- Paras Hospitals provide uniform patient treatment and care, use of evidence based medicine and excellence in clinical outcomes.
- Knowledge enhancement for staff, clinicians and patients.

Delivering superior customer service and complying with statutory regulations

1.4 Accreditations

National accreditation board for hospital and healthcare providers (NABH) accreditation-

Paras is the first multispecialty hospital in Gurgaon to receive this accreditation. Primarily focusing on patient care, safety, continuous quality improvement and innovation, NABH (Accredited by ISQ, International Society for Quality in Health Care) has been set up to bring the world's best Health care quality standards to India. This accreditation is testimony to the fact that Paras care pathways are protocol driven reflect global practices and ensure that patients consistently receive Quality care.

Paras diagnostics is accredited by NABL, India's leading accreditation body pathology services. This reiterates Paras diagnostics position as a premier provider of pathology services in India. With a team of highly experienced and efficient staff, it provides services strictly adhering to International Quality standards. Its well organized sample management practices and state of the art automated equipments ensure that patients receive quick and accurate results.

1.5 Paras Hospitals, Gurgaon

- 250 - bedded Multi super specialty hospital, spread over 3 Acres with covered area approx 2.1 Lac sq. ft. spread over 7 stories
- 6 State of the art Operation Theaters
- 70 critical care beds
- Region's most Advanced Neurosciences & Trauma Center
- Flat Panel Cath Lab
- 24 Hr ER forms backbone of the hospital services

- Round the Clock three Cardiac ambulances with all the life-saving equipment.
- Advanced Mother & Child Care Unit with Level III Neo – Natal ICU
- Fully automated Blood Bank with component facilities and advanced facilities for collection & processing

1.6 Floor wise Facility Distribution

Fourth Floor

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

Third Floor

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

First Floor

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

Ground Floor

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

1st Basement

- Kitchen
- Staff Cafeteria
- Visitors' Cafeteria
- Physiotherapy
- IT
- Marketing
- Office- Administration
- Laboratory
- Blood Bank
- Dermatology
- Dentistry
- PHP
- Attendance M/C

2nd Basement

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

1.7 Services at Paras Hospital

- Anesthesiology
- Cardiac sciences
- Dental Surgery
- Dermatology
- Dietetics and Nutrition
- Emergency and Trauma centre
- Endocrinology
- Geriatrics
- Gynecology
- Hematology
- Head and Neck Oncosurgery
- Internal Medicine
- Laparoscopic, Gastrointestinal and Bariatric Surgery
- Mother and Child
- Neuro Sciences
- Neuro, Vascular and Non vascular intervention
- Obstetrics
- Ophthalmology
- Orthopedics and Joint Replacement
- Pediatrics
- Physiotherapy and Rehabilitation
- Plastic and Reconstructive Surgery
- Preventive Health Checkups
- Psychiatry and Psychology
- Pulmonary and Critical care
- Radiology
- Renal sciences and Urology
- Rheumatology

PROJECTS

A Time Motion Study
On
Radiological Procedures
(MRI & Ultrasound)

Radiology department

2.1 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.

2.2 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

2.3 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.

MRI PROCEDURE

Purpose-

To conduct Magnetic Resonance Imaging in diagnosing medical conditions used to identify structural, pathological & functional abnormalities.

Scope-

All MRI investigations eg. MRI Brain, MRI Neck, MRI Spine etc.

Process flow of MRI-

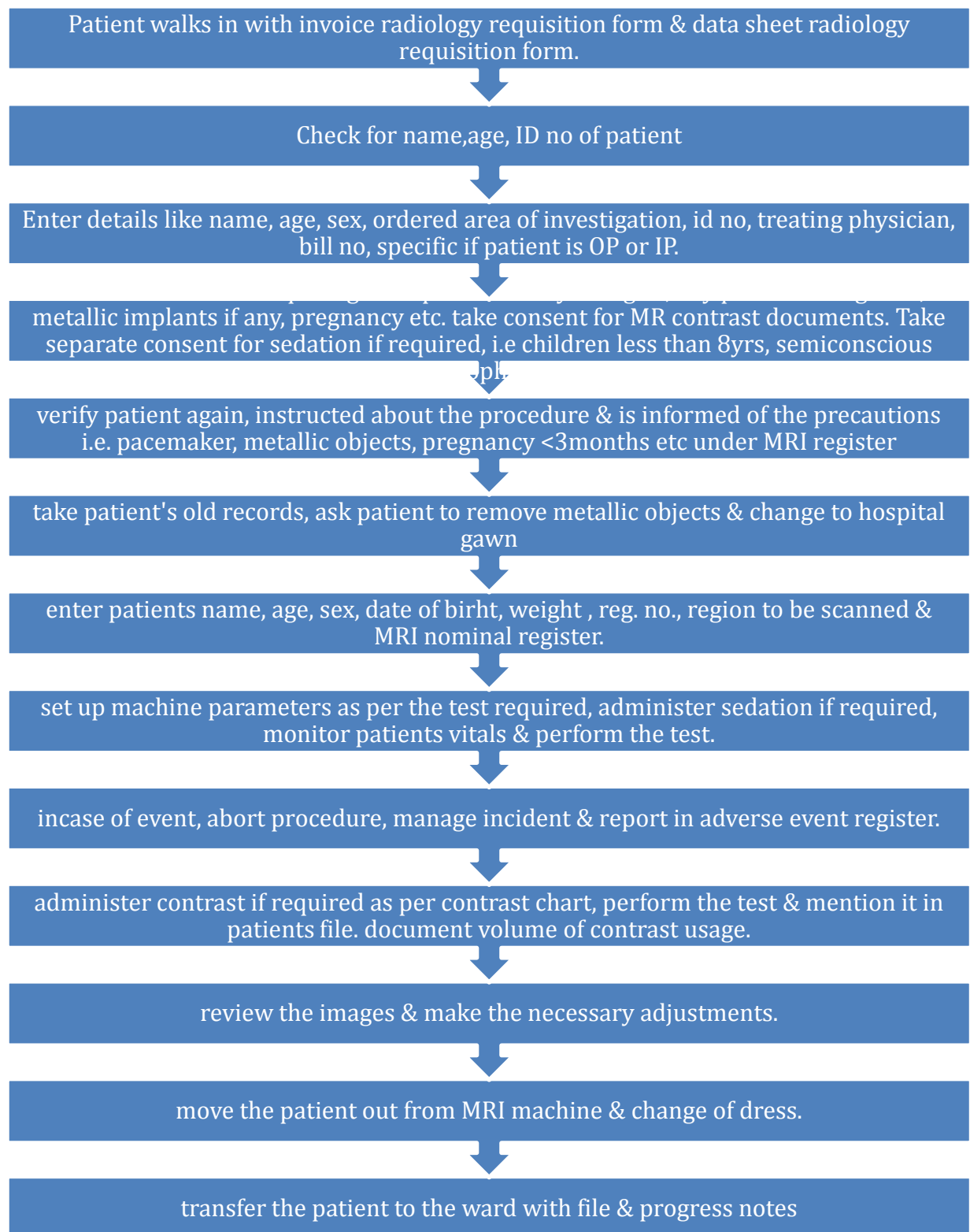


Fig2.1: process flow of MRI procedures

Ultrasound process flow-



Fig:2.2 process flow of ultrasound patients

2.4 Aim:-

To study the TAT of MRI and ultrasound in radiology department & delay in the procedure, if any.

2.5 Objective:-

- To study the turn around time for MRI & 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.
- To determine the number of cases falling out of the standard turn around time.

2.6 Rationale of the study-

In today's fast moving world & increase in sedentary lifestyle the risks of various diseases is increasing day by day and due to increased education people have become aware about the diseases and want to get themselves checked and cured.

Radiology plays a major role in diagnosing and treating diseases, and due to lack of time people want these services without any delay & as it was realized that there is delay in the procedure and in the dispatch of report, therefore, periodical study of processes & services of radiology are required for continuous improvement to achieve service excellence.

The study was conducted in the radiology department of Paras hospital. It was felt that there is need to study the time taken by various procedures in radiology department starting from the point when the patient arrived till the time reports get ready to dispatch.

2.7 Review of literature-

1. A 3 year case study of 1, 60,000 reports was done. This was presented at the integrating healthcare enterprise symposium of radiological society of North America 2001 annual meeting, NOV25-30 2001. This paper analyze the use of structured radiological reports since 1997 at Midway hospital medical centre which is a full modality of 150 bedded hospital located in los angles, California . They describe the transition from conventional transcription based reporting system to one in which radiologists create reports for 12 radiological modalities directly through a structured reporting system. More than 1, 60,000 reports have been created by this system. Compared to transcription structured system has 1. Improved quality and consistency of reports. 2. Enabled instantaneous dissemination of reports. 3. Eliminated transcription costs. The success of this system depends upon the completeness of structured reports as well as the ability to produce natural English sentences from structured input.

2. At Columbus Regional Hospital, patient flow in the Radiology Department was enhanced through a succession of Lean Sigma projects that improved procedure cycle time, increased capacity and accelerated flow through four areas: CT, MRI, Ultrasound, and Diagnostic Imaging. Significant operational improvements were followed by increased volume and revenue for the hospital. Columbus Regional Hospital (CRH) is a 325-bed medical center providing care to a 10-county service area surrounding Columbus, Indiana. With a goal of improving patient flow in the Radiology Department, CRH leadership chartered a succession of Lean Sigma projects in CT, MRI, Ultrasound, and Diagnostic Imaging. Using the framework followed similar paths to sustained improvement.

Ultrasound Improvements

- Cross-trained all techs for both Ultrasound and Vascular exams
- Changed exam scheduling browser to schedule exams to rooms instead of to tech
- Added to and updated list of frequently asked scheduling questions
- Implemented procedure kits for exams and restocked using a pull system
- Scripted pre-procedure call to remind scheduled patients of exam time, preps, labs, etc.
- Expanded hours of coverage

29.6% Increase in RVU's per Hour and 10.1% Increase in Revenue.

Using the disciplined, standardized approach of Lean Sigma, the Radiology Department at Columbus Regional Hospital was able to improve processes, reduce procedure time, and increase volume and revenue. A significant factor in these was the increased capacity that allows the departments to flex up and down, depending upon demand.

2.8 Research methodology-

- Study Design: descriptive study
- Study Area: Paras Hospitals, Gurgaon
- Study duration: 6 May 2014 to 14 May 2014
- Study subjects: Patients coming in radiology department to get the MRI & Ultrasound done.
- Sample size: 121 patients out of which 61 patients of ultrasound & 60 patients of MRI
- Sampling technique- convenient sampling
- Study time- 8am – 6pm
- Inclusion criteria- patients who have come for ultrasound & MRI both appointment & walk in patients.
- Exclusion criteria- patients who have come for procedures other than ultrasound & MRI.
- Data collection methods-
 - Primary data- by observation of patients
 - Secondary data- review of records

What is TAT (turnaround time)??

Time when patients arrives till the time patient enters in the procedure room the. The standard TAT for appointment patients is 15min.

TAT for reports is, if the test is conducted till 12pm then the reports should get ready by 5pm in the evening on the very same day, but if the test is conducted after 12pm then the reports should be ready by 12pm next day.

2.9 Data analysis & interpretation-

For ultrasound-

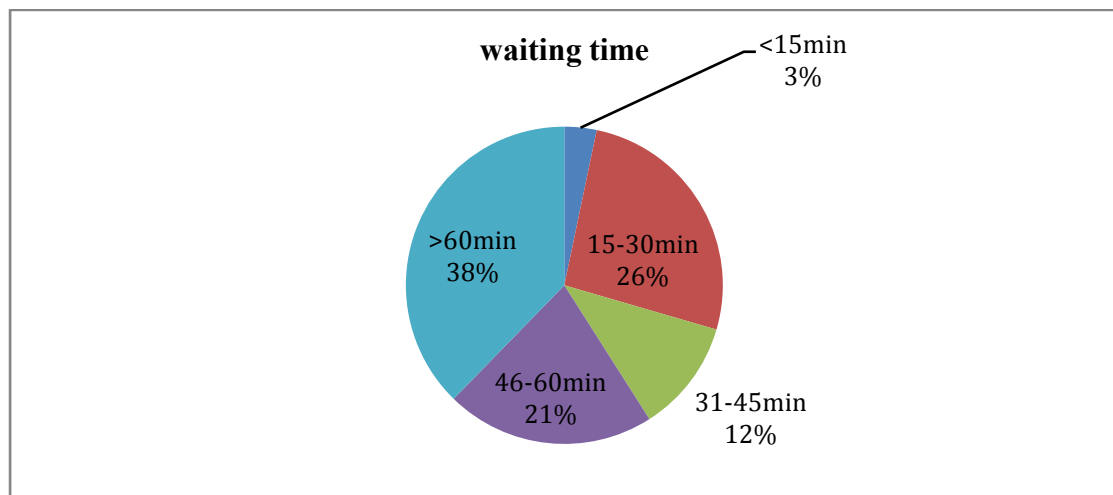


Fig 2.3. Pie chart depicting waiting time

Out of 61 patients 38% has to wait for more than an hour and only 3% patients get the procedure done within the standard time span. The most common reasons for delay are- 1. IPD patients 2. Patients are not being counseled regarding fasting, number of bottles to be taken per oral, holding of urine. 3. GDA are mostly busy with maintaining registers 4. Patients need to have other investigations done.

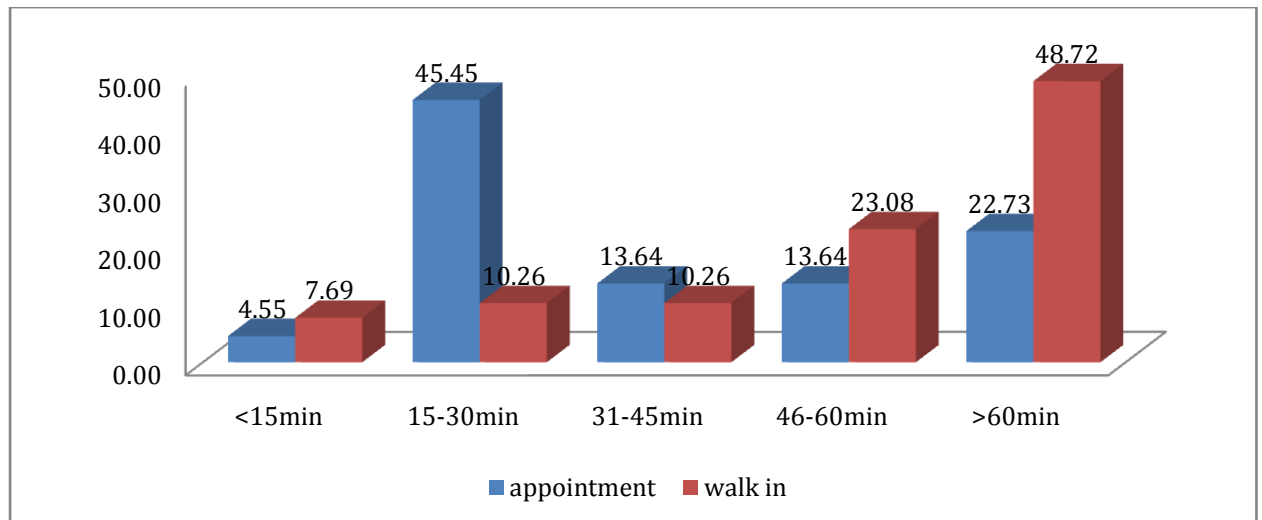


Fig 2.4: bar graph showing waiting time of appointment and walk in patients.

This graph shows that even appointment patients has to wait for their turn to come for the procedure to be done. 45.5% of patients wait for more than 15min & 22.7% patients wait for more than an hour.

Delay in reports-

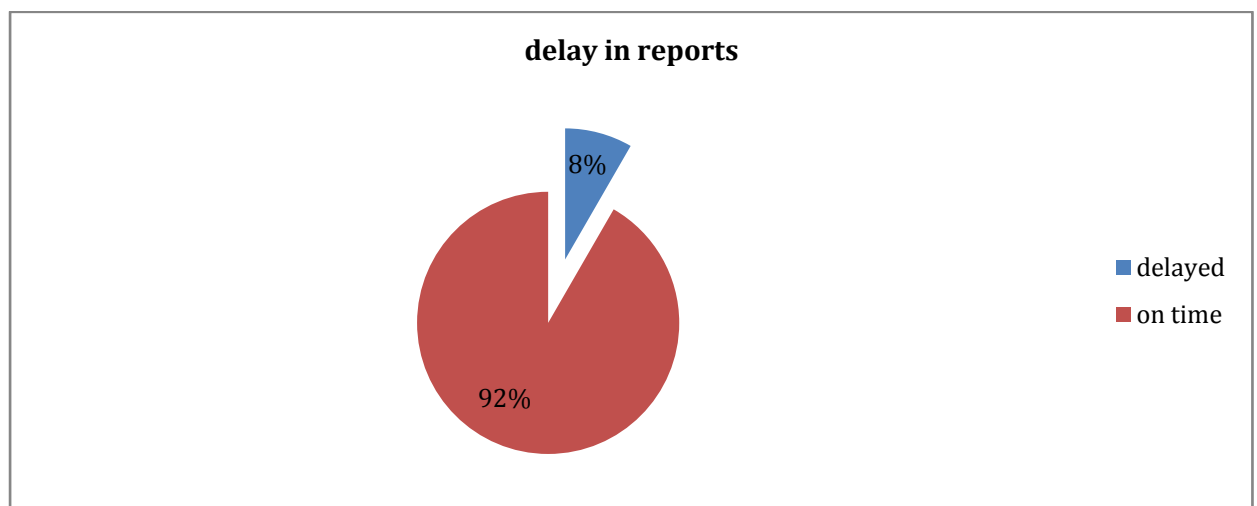


Fig 2.5: pie chart showing delay in reports.

This graph shows that most of the reports are on time i.e. according to the standard protocols.

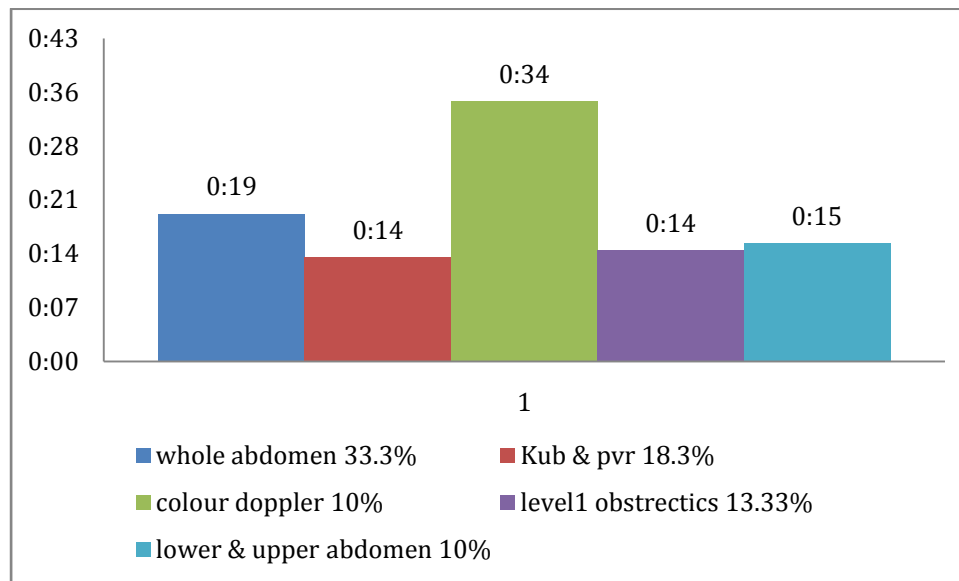


Fig.2.6 graph showing average time taken by each procedure.

MRI-

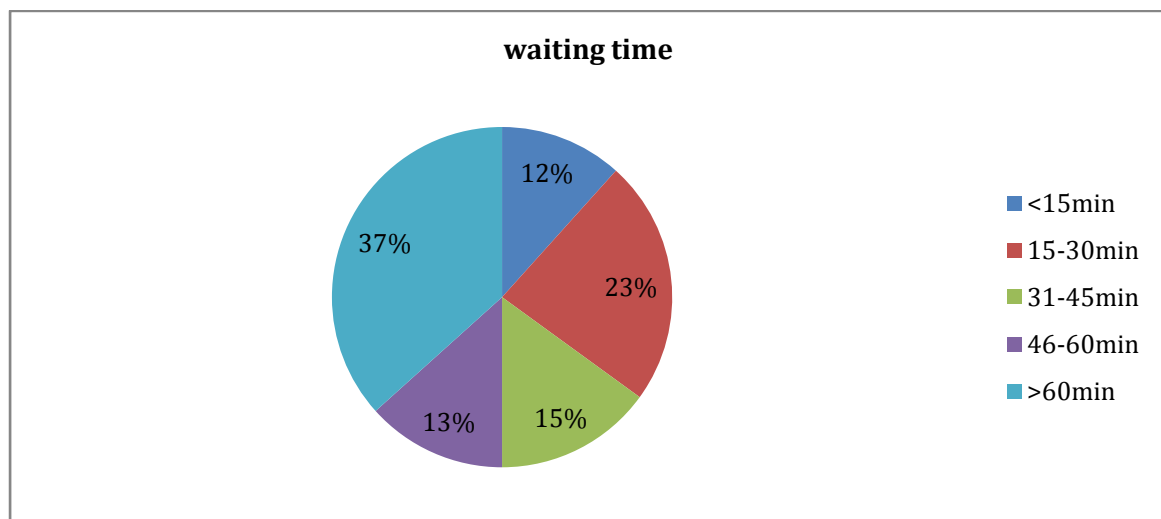


Fig 2.7: pie chart showing waiting time for MRI

Out of 60 patients 37% patients has to wait for more than an hour & only 12% get their procedure done on time. Reasons for delay are 1. IPD patients. 2. sometimes patients are not cooperative, few have claustrophobia.3. Certain procedures require prior investigations to be done.

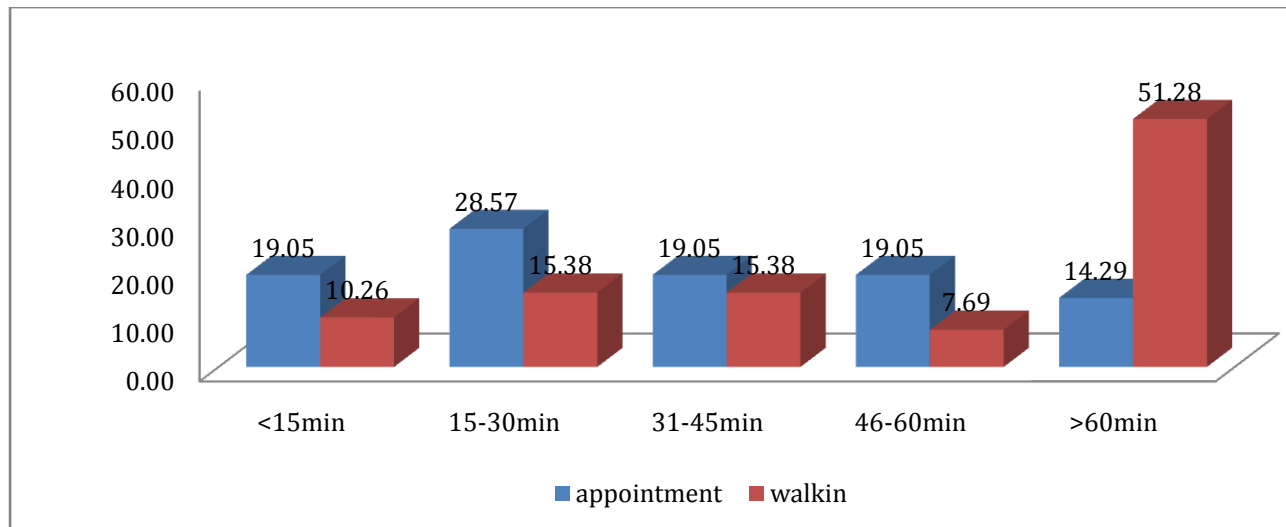


Fig 2.8. bar graph showing waiting time for appointment & walk in patients.

This graph shows that even the appointment patient has to wait for their procedure to be done. 28.6% of appointment patients have to wait for 15- 30 min, whereas only 19.1% patients get their procedure done within the time span.

Delay in report-

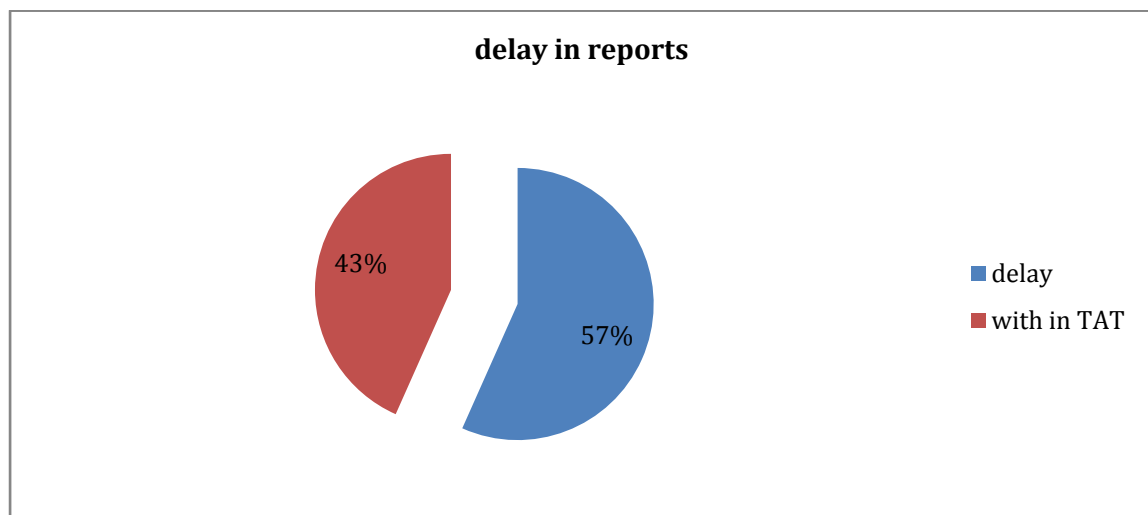


Fig 2.9: pie char showing delay in reports

57% of the total reports are delayed i.e. are not within the standard time limits. Reasons for delay are 1. The human resource management of department is not up to the mark. 2. Outsourcing of reports.

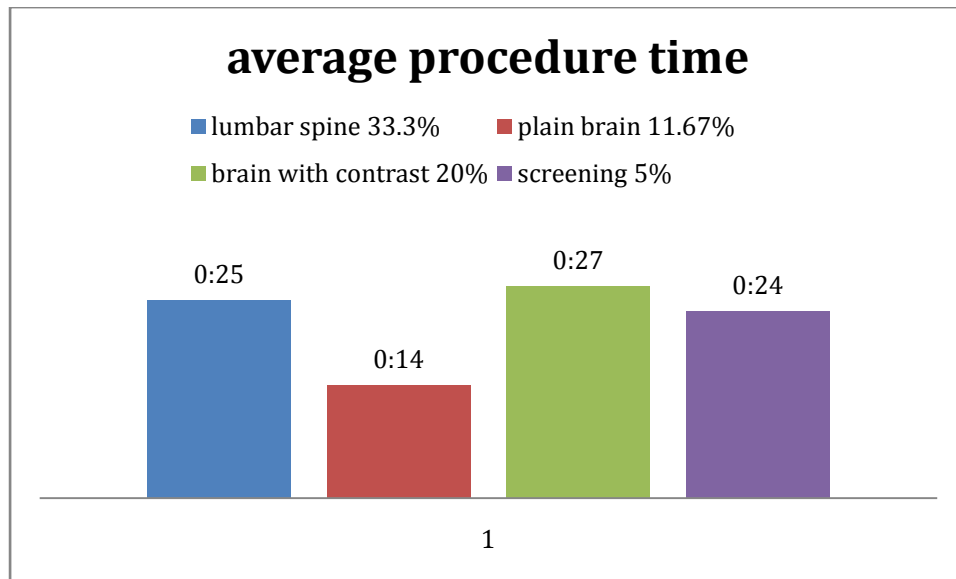


Fig.2.10 graph showing average procedure time of MRI

2.10 Findings-

- Different time slots for IPD patients, before 9am and 1pm- 4pm which is not being followed & ultimately increases the waiting time of patients.
- Communication gap between front desk staff & staff inside MRI & ultrasound room. (Radiology department).
- No crosscheck of appointments.
- Counseling of patients is not done properly.
- No follow up of pending work is being done by the staff.
- Appointment slots are not made properly.
- GDA's are busy in maintaining registers.
- Human resource management is not done properly.

2.11 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.
- Reconfirm the patient's appointment date & time.
- Counter for report dispatch should be either front desk or radiology department.
- Appointments slots should be made according to the average time taken for the procedure.
- IPD patients should be called only during their time slots, only exception would be any emergency & if no appointment or walk in patients are there.
- Authority to call IPD patient should lie with the front desk staff (radiology department).
- Review of pending work e.g. Reports should be done on the daily basis by the staff during morning hours.
- Job specifications should be made clear to the staff.

A Time Motion Study
On
Admission process
For
Emergency department

3.1 Emergency department

Emergency admissions to hospital are, by definition, unpredictable & unexpected in the individual case even where the system has been properly set up to cater for them. The volume & unpredictability of those admissions is a significant part of health service.

3.2 Scope of emergency-

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

- i. ER provides a comprehensive & uniform emergency service/ care to patient from all medical categories, pediatrics through geriatric, presenting to department (functional 24*7).
- ii. All patients are assessed & triaged by a qualified & experienced medical & paramedical staff & provided appropriate level of care in ER department.
- iii. The ER department provides medical evaluation & treatment (including rapid resuscitation & stabilization) to presenting patients of various ages & varying levels of illness & injury from minor to critical.
- iv. Patients receive medical referral / transfer (including critically ill patients & or those are not in scope of services of hospital & pits/ attendants request as necessary to some other HCO.)
- v. Emergency care services provided include-
 1. Stabilization of life threatening conditions.
 2. Life saving procedures.
 3. Immediate treatment of medical & surgical emergencies.
 4. Emergency treatment for minor injury or illness.
 5. Emergency care for minor / major trauma victims.

Purpose-

To ensure patients undergo an immediate care in an urgency that their treatment is initiated in a timely manner & to do triage assessment.

Admission process flow-

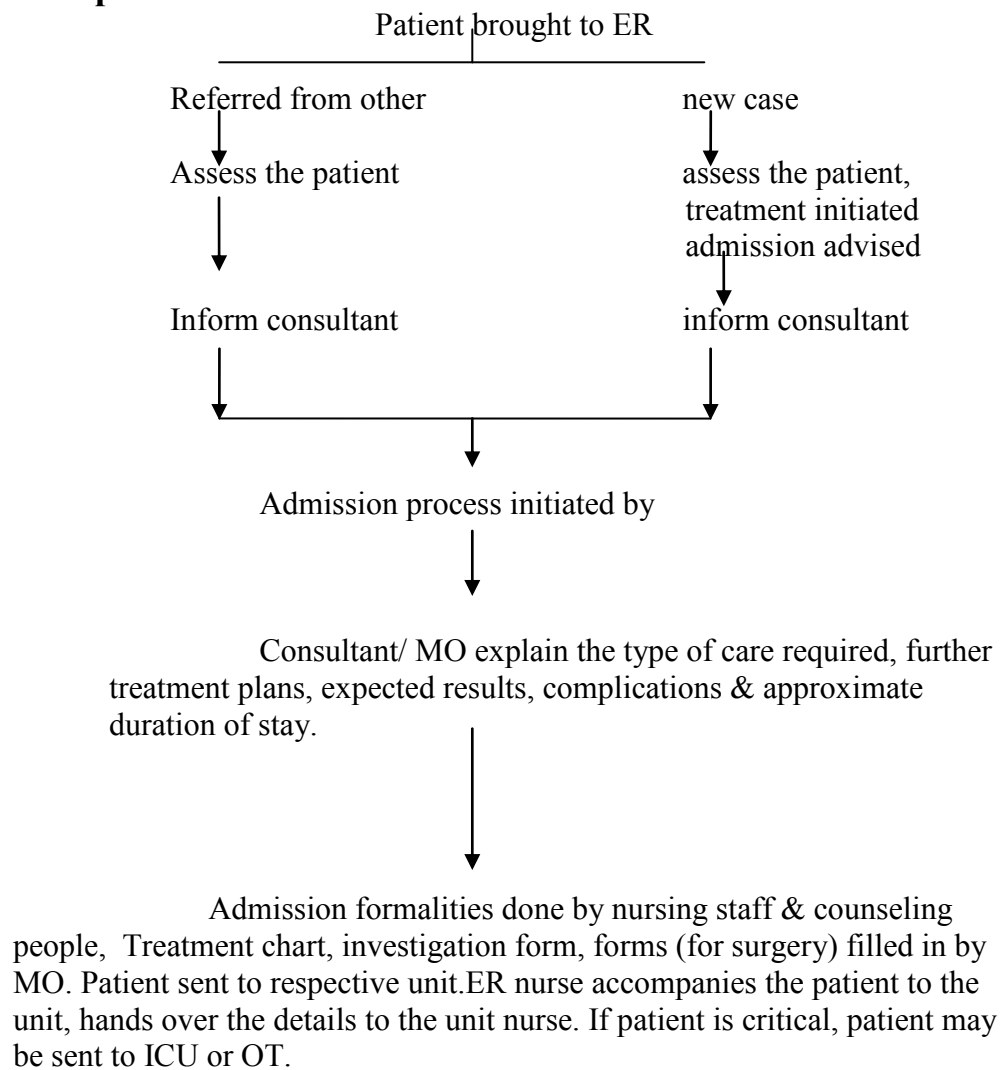


Fig 3.1 flow chart showing admission process in emergency department.

Triage

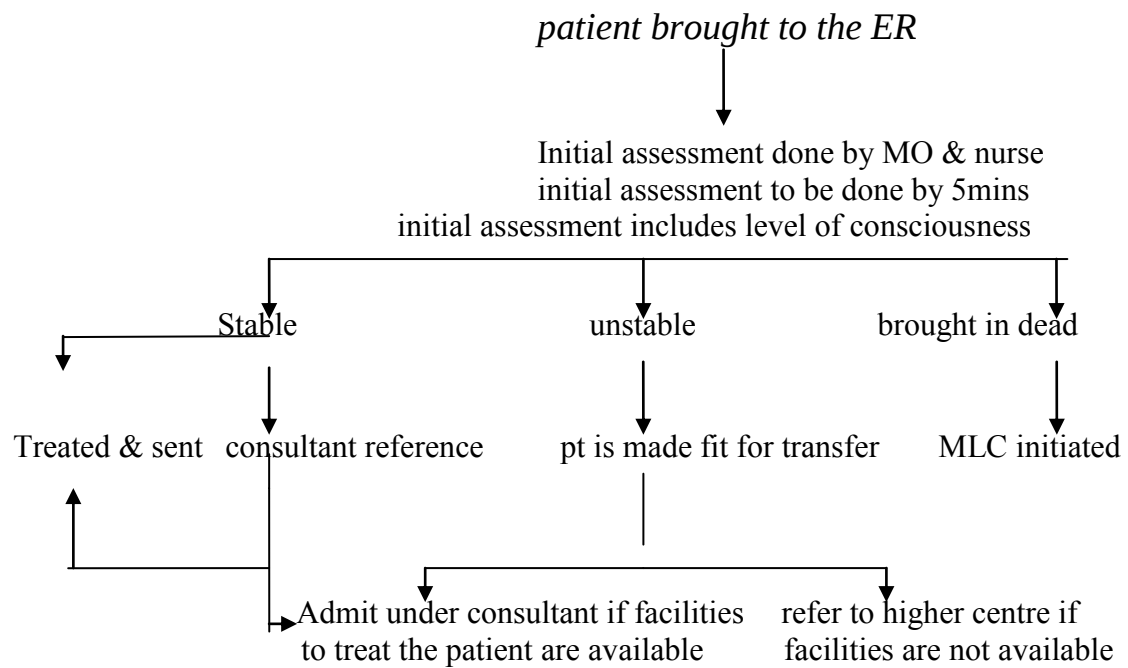


Fig 2.2 flow chart triage process

3.3 Overview of the department-

ER department is situated at the ground floor of Paras hospital. It is 24hour functional & is eight bedded.

Hierarchy-

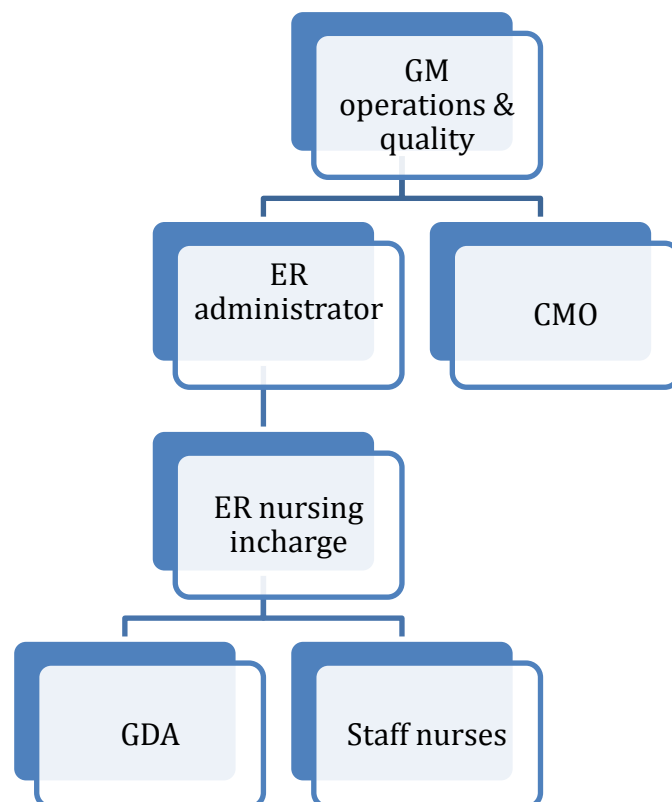


Fig.2.3 flow chart showing hierarchy.

Manpower-

- CMO - 5 (8:30am – 2:30pm, 2:30pm- 8:30pm, 8:30pm,8:30am)
- staff nurses – 18 (8am- 4:30pm, 8am- 2pm, 2pm- 8pm 8pm- 8am)
- GDA- 4

3.4 Review of literature-

1. A study was conducted by Mohammad A. Tashkandy, Zohair Jamil Gazzaz, Mian Usman Farooq, Khalid O. Dhafar Al-Noor Specialist Hospital – Makkah, Kingdom of Saudi Arabia to study delays in admission of inpatient from emergency. Objective of the study was to highlight the reasons which contributed to longer stay of patients in ER who were advised admission. This study was conducted from August 4 to 11, 2004 as a retrospective review of the ER cards of patients admitted to inpatients wards of Al-Noor Specialist Hospital, Makkah, Saudi Arabia. Most of the factors responsible for delay in our study were same as in Miro's and Rehmani's studies, e.g., waiting for an on call doctor, time taken for investigations and results, file making process and delay due to financial and personal constraints, Waiting for inpatients beds by admission advised patients was the most common reason of delay. Conclusions of the study was that out of admitted patients 67% were delayed mainly due to late advised admission with major reason of delay were multiple consultations.
2. A study was conducted to improve the access to emergency care is the first report of the Physician Hospital Care Committee, a tripartite committee of the Ontario Hospital Association, the Ontario Medical Association and the Ontario Ministry of Health and Long-Term Care. By 2031, approximately 25% of Canada's population will be over the age of 65, almost doubling the current proportion of 13%. Proportionately more patients with complex multi-system disease are being seen in Ontario's emergency departments; the highest visit rate is now in the 75 and older age group, and this visit rate has increased over 50% since 1992. This report recommends performance targets together with standardized data elements for overall emergency department length of stay, as well as a performance indicator and standardized data elements for a subset of overall length of stay, emergency department time to admission. The main overarching causes of overcrowding are twofold: a lack of bed availability, and a lack of integration between community and hospital healthcare resources. The number of acute care beds in Ontario fell by 22% during the mid to late 1990s. Acute care bed occupancy rates rose from 85.6% in 1994/95 to 96% in 2000, and have remained consistently well above 90% since then. Occupancy rates above 85% are linked with poor patient flow, including delays in admitting patients from the emergency department, and with a lack of bed surge capacity this report provides a rational framework, clearly linked to accountability, to assess whether funding of additional acute care capacity is required. Funding of acute care capacity may include funding of additional acute care beds, long-term care beds, mental health beds, rehabilitation beds, complex continuing care beds, convalescent beds and community resources. The report also provides recommendations to enhance integration between community and hospital healthcare settings. Finally, a practical toolkit of evidence based interventions to assist healthcare organizations improves access to emergency care and patient flow is supplied.

3.5 Aim-

To study admission process of the emergency department and to study the delay during the process, if any.

3.6 Objectives of study-

1. To prioritize patient as per as triage.
2. To keep the casualty beds vacant for catering new emergencies.
3. To curtail the treatment or admission of non casualty patient through casualty (basically this is practiced by consultants for their convenience).
4. To increase the actual casualty footfall/ conversions from casualty.

3.7 Rationale of study-

Patients coming to ER are those who required immediate care i.e right care at right time in a right manner. This study is being conducted to see whether patients who are in actual need of emergency care are getting treated or not & if not then one should streamline the process so that we can made services available to them without any delay.

3.8 Study Design and Methods:

- Study Design: descriptive study
- Study Area: Paras Hospitals, Gurgaon
- Study duration: 16 May 2014 to 24 May 2014
- Study subjects: Patients coming in emergency department for admissions
- Sample size: 60 patients. 10% of the total patients coming to the emergency department for admissions.
- Sampling technique- convenient sampling
- Study time- 8am – 8pm
- Inclusion criteria- patients who required admission.
- Exclusion criteria- patients coming for day care procedures.

Data Collection Tools: Observation, review of records

3.9 Interpretation of data-

Source of the patient (OPD/ Emergency)-

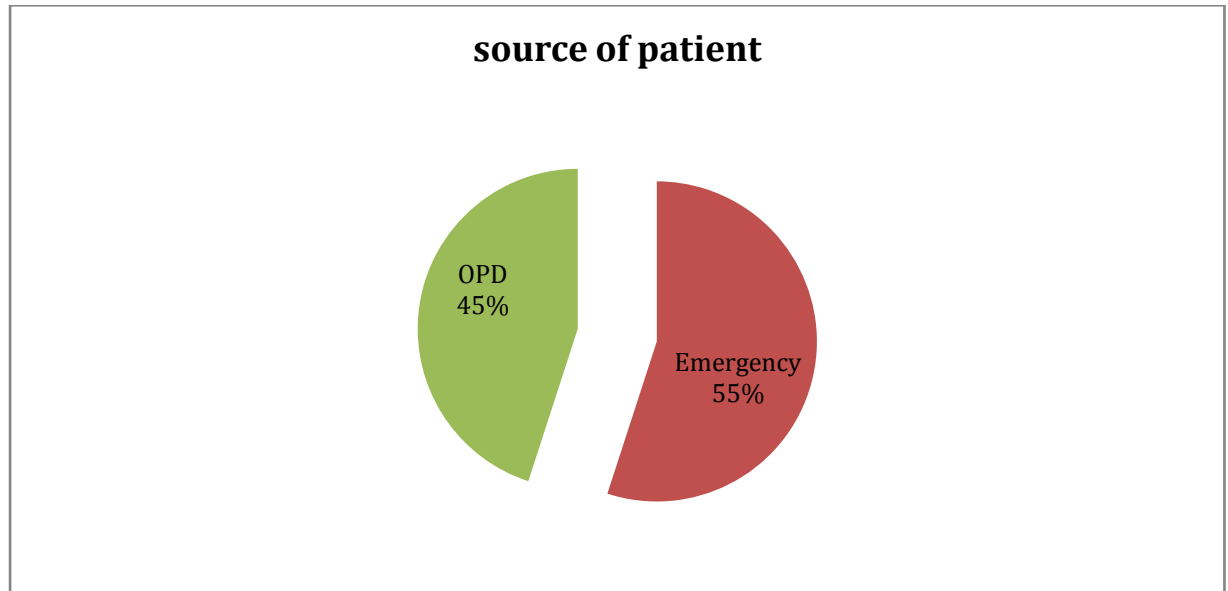


Fig.3.4 pie chart showing source of patient

The above graph shows that out of the total sample of 60 patients 55% are the emergency patients whereas 45% are OPD patients. Doctors advice admission of OPD patient for their own convenience.

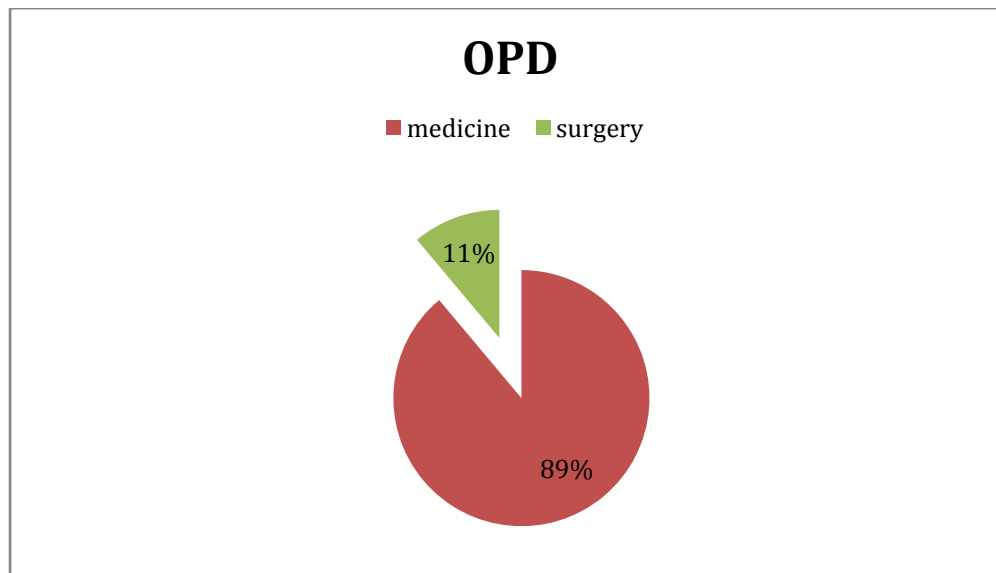


Fig.3.5 graph showing percentage of surgery patients out of 45% opd patient's admissions.

Shifting process-

Shifting of patients to ward post admission request. The standard TAT for this process is 30min.

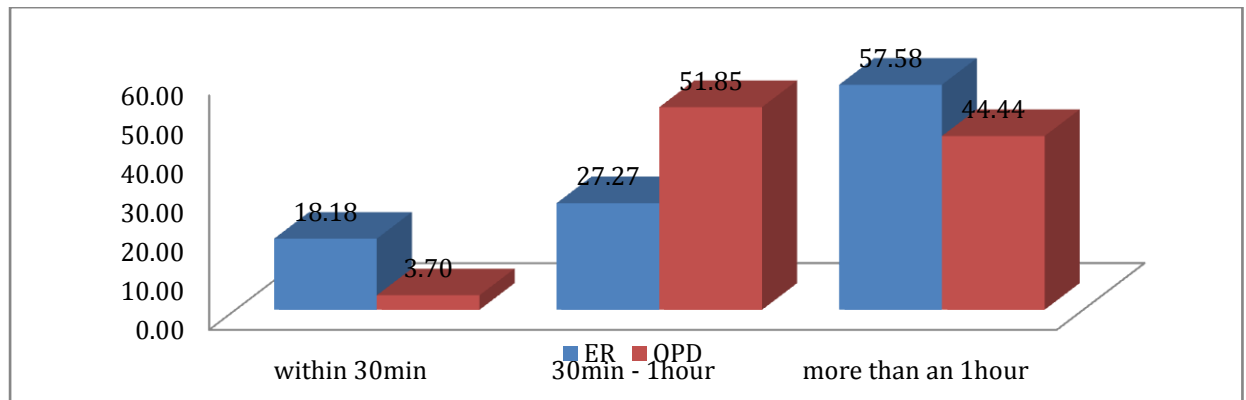


Fig 3.6 bar graph showing shifting process

This graph shows that only 18.18% of ER patients got shifted into wards within the standard TAT i.e. 30min whereas only 3.7% of OPD got shifted into wards within the time set. 57.58% of ER patients got delayed by more than an hour. Reasons for delay are 1. Communication gap between front desk of casualty & front desk lobby. 2. Communication gap between nursing station of wards & ER staff. 3. Bed category not available. 4. GDA not available. 5. Patient's relative not available.

Admission process-

This includes time taken to get the file ready of the patients which primarily includes the billing part, room allotment & all the formalities as per the hospital protocols. The standard TAT to get the patient's file ready is 20min irrespective of cash patient & TPA/ECHS/CGHS patient.

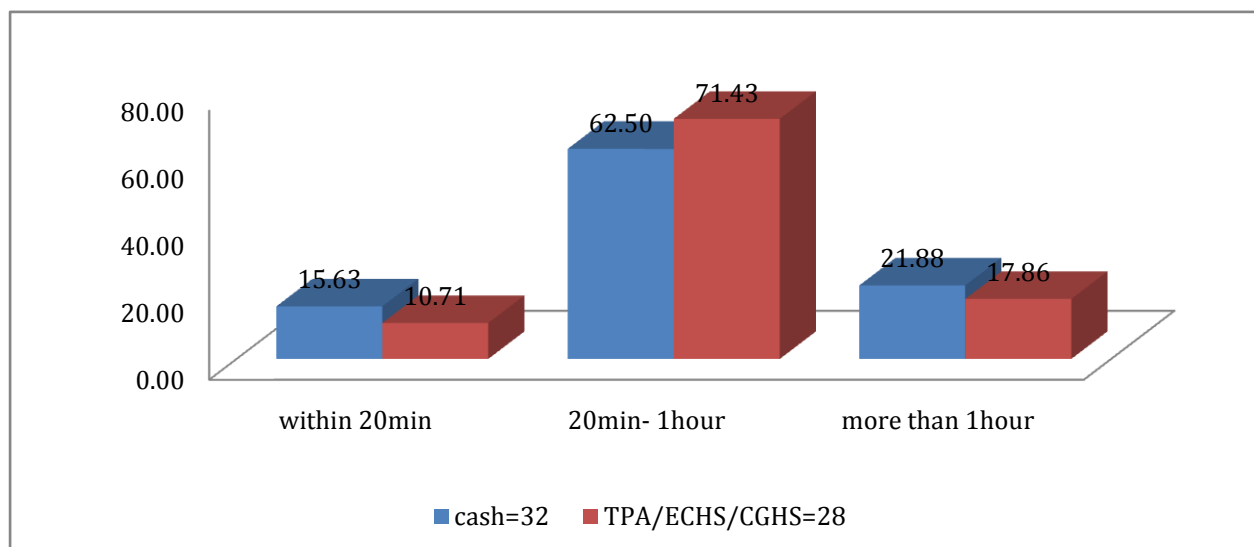


Fig 3.7 bar graph showing time taken for file preparation

Out of the total sample collected files of only 15.6% of cash patients got ready within standard TAT i.e. 20min whereas only 10.7% of files of TPA patient got ready within time set. Reasons for delay of files are-1. Patients are themselves unaware of their medical policy.2.primary approval from the insurance companies.3. bed category not available 4. IT problem

Average time-

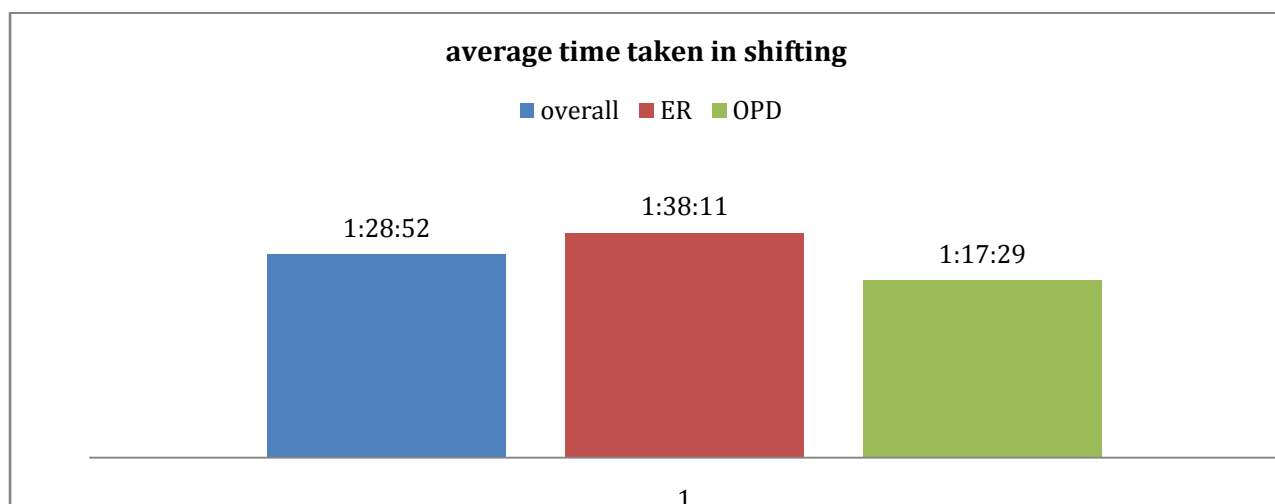


Fig 3.8 bar graphs depicting average time taken in shifting

Total conversions-

Out of total patients coming to the emergency department for treatment how many got admitted to the wards. Total number of patients are 399 out of which 134 patients took admission i.e. total conversions are 33.58%

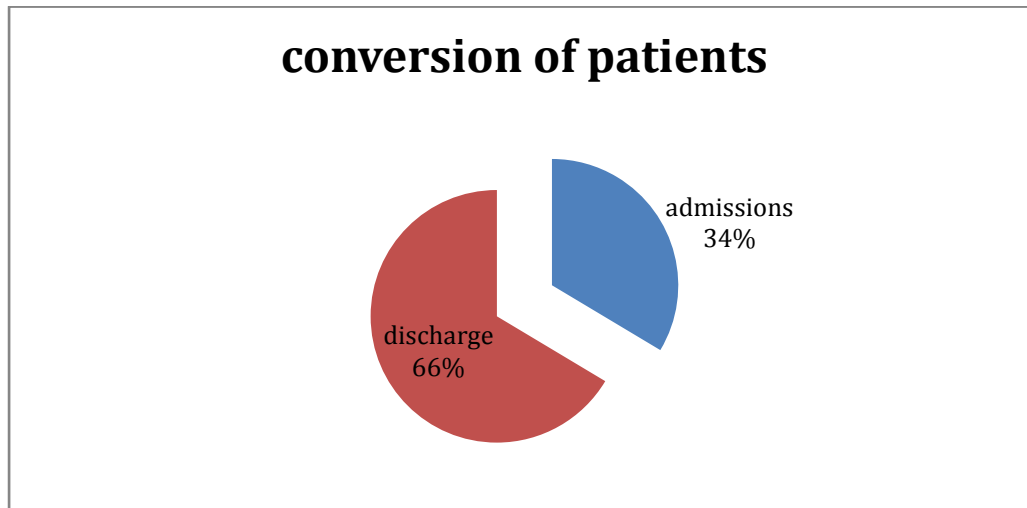


Fig. 3.9 pie chart showing conversion of patients

Findings-

- Admission of OPD patients through emergency instead of having separate admission counters for them.
- Delay in shifting of patients to the wards. Most common reasons for delay are not availability of beds, time taken for investigations and results, file making process and delay due to financial and personal constraints, IT problem , miscommunication between the staff
- Delay in admission process
- Triage area is too small to handle 2 -3 emergencies simultaneously.

3.10 Recommendations-

- Admission of OPD patients should not be allowed through emergency, doctors should be asked not to advise admission through emergency just for the sake of their convenience.
- Rooms should be allotted only after confirmation.
- Communication gap between emergency billing counter & front desk counter.
- Increase the triage beds as we have only two trolley allotted to triage & only one ventilator.