

A Study On Turnaround Time Of The Patients Undergoing MRI Examinations

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INTRODUCTION

The project is done in Medica Super speciality Hospital which is a 500 bedded hospital in Kolkata. By this project hospital will get to know how to improve the patient investigation and management in MRI department of Radiology department for the prime purpose of patient satisfaction. It determines the time taken to get the result of MRI.

The TAT assessment leads to rapid management of patients as they can show the reports to the referring physician earlier.

Turn around time in MRI is defined as from the time of entry of patient into the department, preparing patients and doing scan up to reporting the finding.

MRI is the most important equipment in radiology. In radiology department, more focus was given to MRI machine. In Medica hospital, MRI is done by taking appointments.

MRI is a non-invasive imaging technology that produces three dimensional detailed anatomical images without the use of damaging radiation. It is often used for disease detection or diagnosis. It is based on sophisticated technology that excites and detects the change in the direction of the rotational axis of protons found in the water that makes up living tissues. MRI employ powerful magnets which produce a strong magnetic field that forces protons in the body to align with that field.

MRI scanners are use to image the non-bony parts or soft tissues and joints of the body. They differ from computed tomography (CT), in that they do not use the damaging ionizing radiation of x-rays.

Types of MRI scan:

- Brain
- MR Angiography & Venography (Blood Vessels)
- Musculoskeletal MRI
- Cardiac MRI

AIM AND OBJECTIVES

Aim –

- To determine the turnaround time of patients undergoing MRI.

Objectives –

- To estimate the time from patient enter in radiology to patient exit with report.
- To determine gaps and provide suggestions for improvement to the department based on the results.

Rationale –

- Turnaround time is one of the major concern of patients in radiology department as investigation is one of the important aspect in diagnosis of disease.

LITERATURE REVIEW

Proper time management is an important problem in many radiology department of hospitals (Random House Kernerman Webster's College Dictionary @2010 K Dictionaries Ltd. Copyright 2005, 1997, 1991 by Random House.Pg 1920-25).¹

Major issue of Turnaround time in radiology, Study on Time Utilization of Radiology Department (Venus D. Marco, Lisa Smith (2012): The Healing Journey of My Bodacious Ta Ta's: Healed by Grace and on a Budget. Pg 41 author house).²

An evaluation of alternative approaches to improve radiology efficiency (Frances T. Fischbach, Marshall Barnett Dunning (2009): A Manual of Radiology and Diagnostic Tests. 8th edit. Printed in china. Pg 16).³

Turnaround time is king in Radiology, A two-step approach for optimizing patient flow in radiology (Randolph H. (2006): Patient Flow: Reducing Delay in Healthcare Delivery. USA, PG).⁴

A three-phase approach to improve radiology efficiency in terms of overtime as well as waiting time while improving department Radiology (2010): Health Policy Studies Improving Health Sector Efficiency. pg 36.⁵

Text book on Healthcare Operations Management authored, Daniel B.McLaughlin and John R.Olsan(third edition).⁶

METHODOLOGY

Area of study –

- The study was conducted at MRI examination room in Radiology department of MSH, Kolkata.

Problem Statement –

- Patient flow in MRI

Design –

- Descriptive Study Design

Sampling Plan –

- Method – The data collected was based on convenient sampling
- Size – 150 samples selected randomly during the study period
- Period of the Study – 2 months (3rd April 2019 – 3rd May 2019)
- Inclusion criteria – only Out Patients were considered for the study
- Exclusion criteria – Inpatients and emergency cases were excluded from the study

MODE OF DATA COLLECTION

- The primary data for the study was collected through observation and shadowing (observing at each step) of MRI patients.
- Data collection format-
- Date of collection
- Patient Registration Number
- Elements of TAT (T1, T2, T3 and T4)
- T1 – The Time interval between patient entry in radiology department till billing process
- T2 – Waiting Time of Patient outside the Procedure Room
- T3 – Time taken to conduct specific scan
- T4 – Time taken to generate report

Chart 1: Process Flow Of Patients In MRI Department At Medica Super speciality Hospital

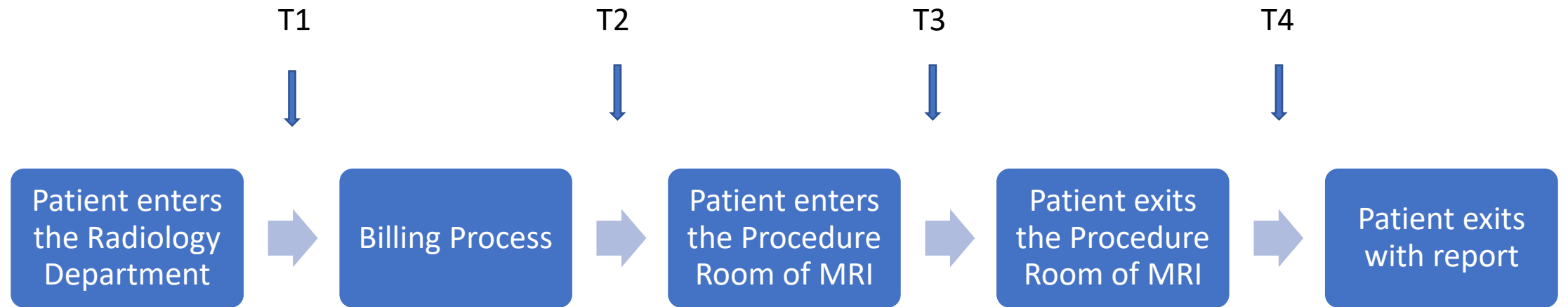


Table 1- Shows Number Of Different Types Of Procedures Under Study

Name of the Scan	Number of cases studied
Abdomen	20
Brain	41
Knee	28
MRA	1
MRV	1
Spine	44
Knee	7
Cardiac	1
MRCP	3
Shoulder	4

Data Compilation, Analysis and Result

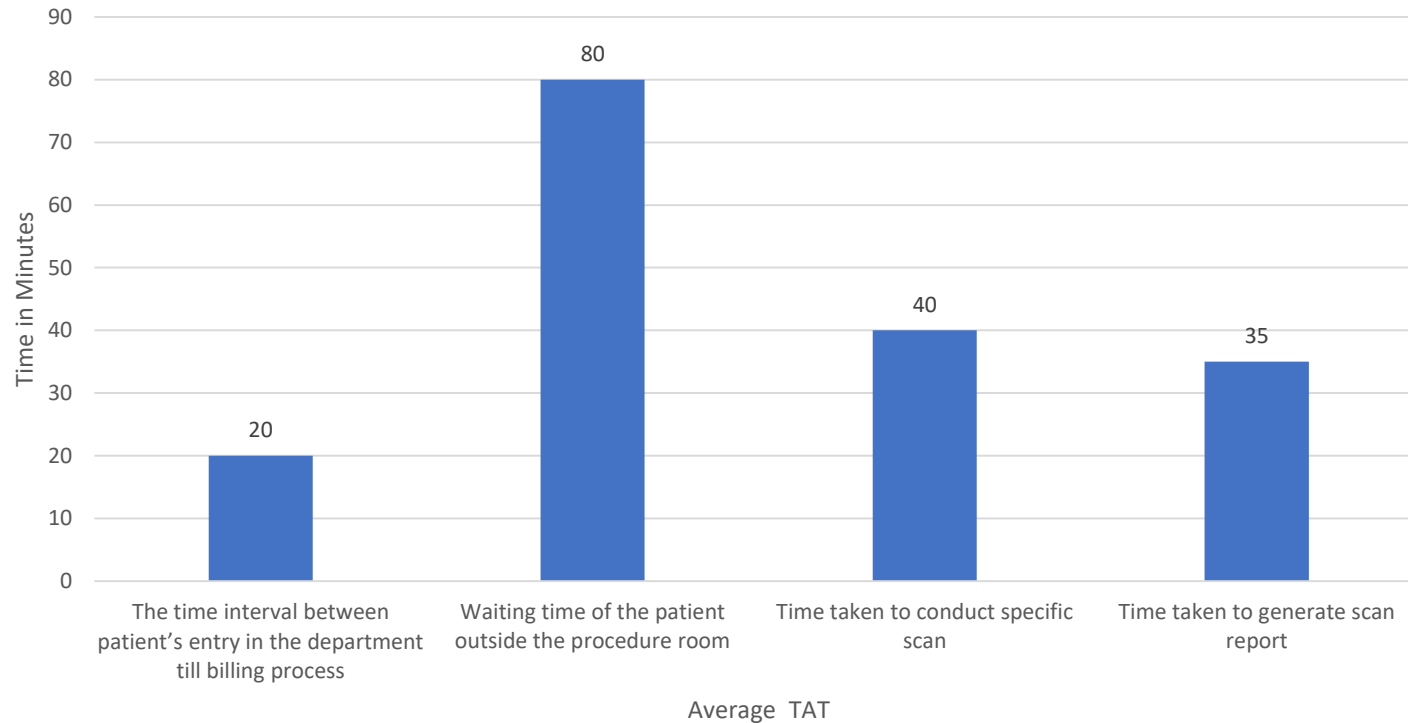
Data was collected from MRI department of MSH and analysed using MS Excel and presented through tables and graphs.

Table 2-The Following Table Shows The Average Turnaround Time For MRI

Steps	From-To	Average time taken in minutes
T1	The time interval between patient's entry in the department till billing process	20
T2	Waiting time of the patient outside the procedure room	80
T3	Time taken to conduct specific scan	40
T4	Time taken to generate scan report	35

As mentioned above the time interval from patient's entry to the department to billing process is 20 minutes (T1). Then waiting time of the patient outside the procedure room is 80 (T2). Later time taken to conduct specific scan is 40 minutes (T3). Lastly time taken to generate scan report is 35 minutes (T4). Thus, the average Turnaround time for MRI is 2 hours 55 minutes.

Graph 1 – Showing Average Turn Around Time Taken In Minutes

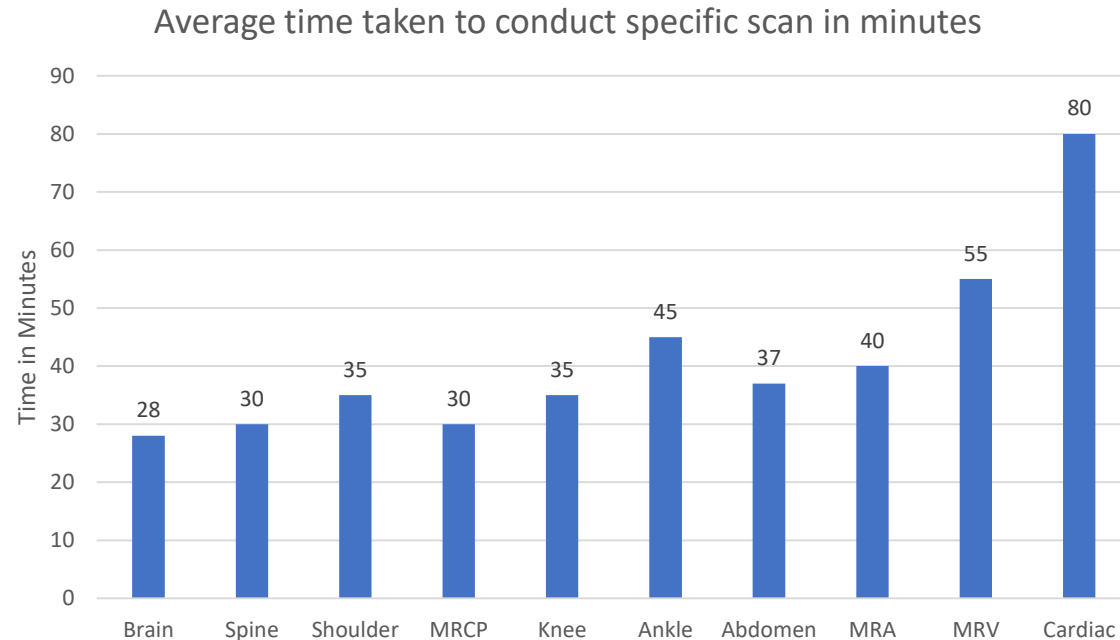


The above graph shows that the average time interval between patients' entry in the department till billing process is 20 minutes. The average waiting time of the patient outside the procedure is 80 minutes. And the average time to conduct specific scan is 40 minutes. Lastly the average time to generate report is 35 minutes. Overall average time of TAT for MRI is 2 hours 55 minutes.

Table 3 – Average Time Taken To Conduct Specific Scan (T3)

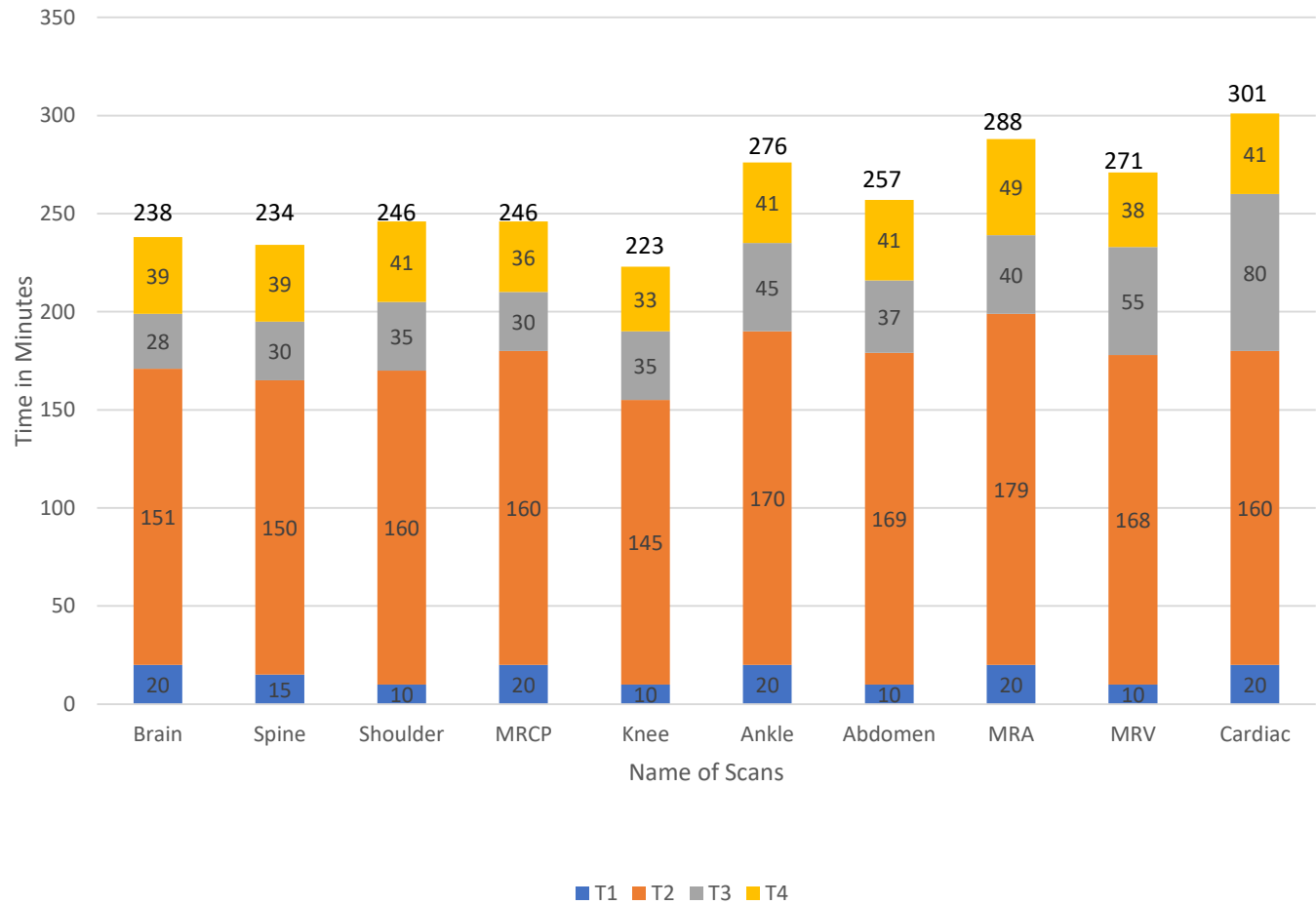
Name of Scan	Average time taken to conduct specific scan in minutes
Brain	28
Spine	30
Shoulder	35
MRCP	30
Knee	35
Ankle	45
Abdomen	37
MRA	40
MRV	55
Cardiac	80

Graph 2 – Shows The Average Time Taken To Conduct Specific Scan



The above table and graph show the Average time taken to conduct specific scan such as for Brain is 28 minutes, Spine is 30 minutes, Shoulder is 35 minutes, MRCP is 30 minutes Knee is 35 minutes, Ankle is 45 minutes, Abdomen is 37 minutes, MRA is 40 minutes and MRV is 55 minutes.

Graph 3 - Shows The Average T1, T2, T3, T4 and Total TAT of Various Procedures Under Study



RESULT

Gaps For Increased TAT

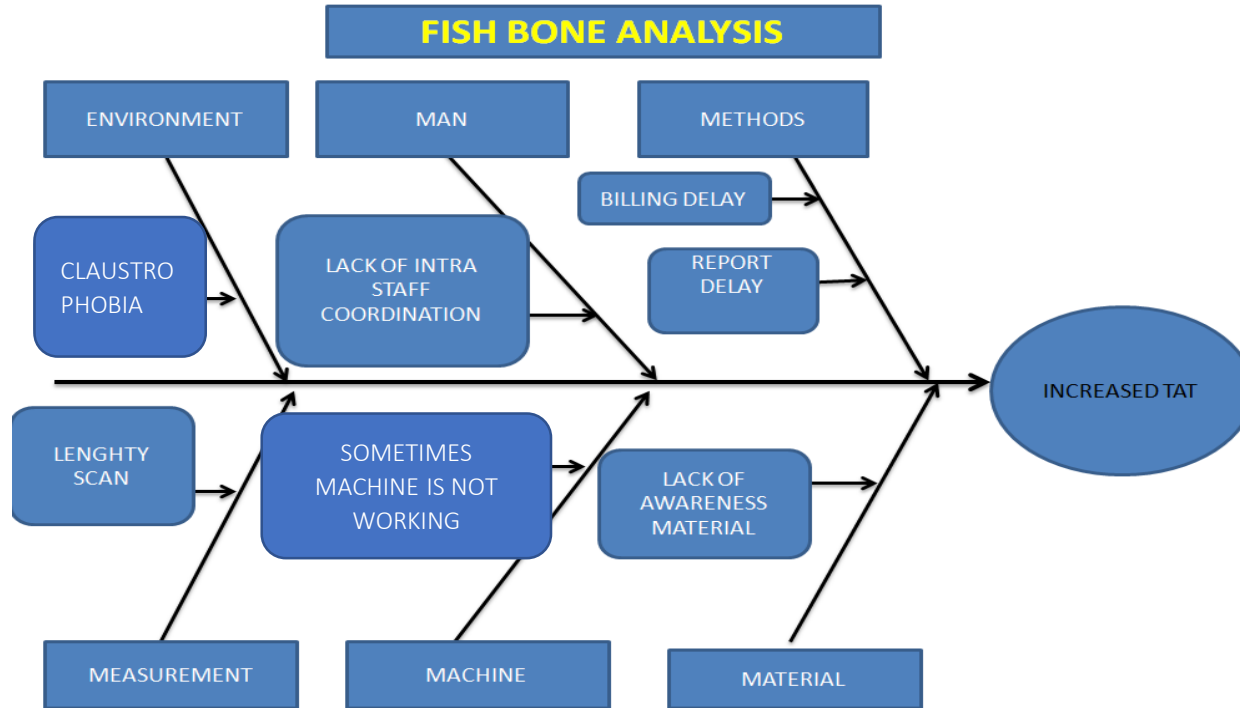


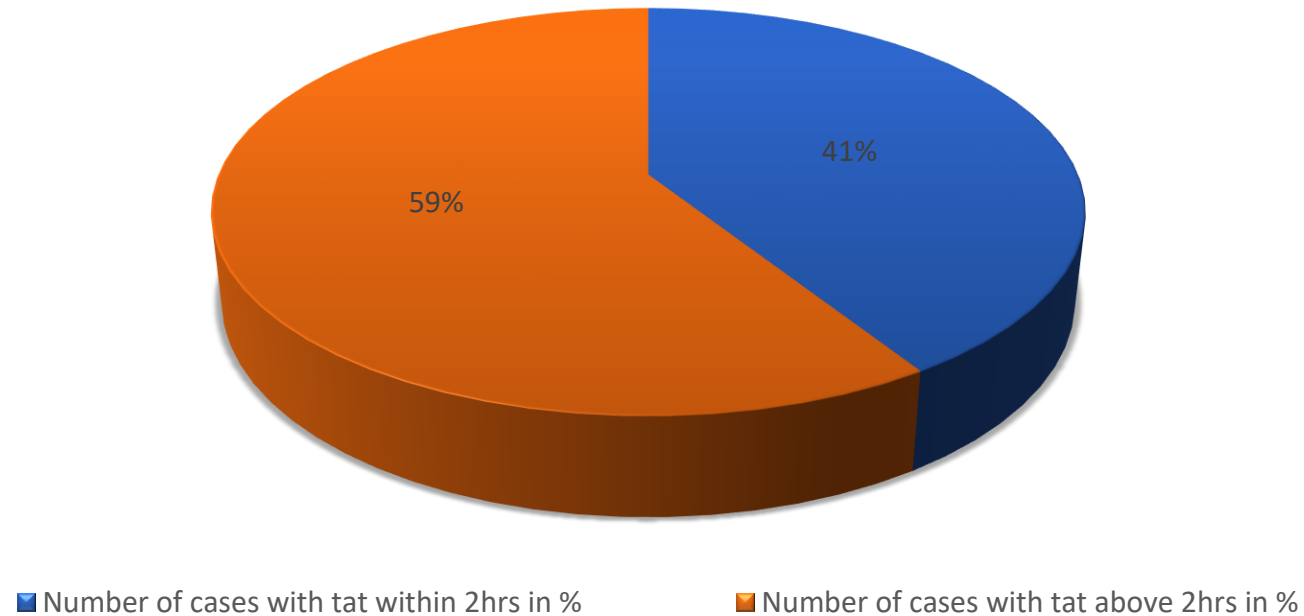
Fig- showing the reasons for increased TAT

RESULT

Average TAT for different procedures

1. MRCP – 246min
2. MRA – 248min
3. MRV – 271min
4. Abdomen – 257min
5. Knee- 223min
6. Ankle – 276min
7. Brain- 238min
8. Spine – 234min
9. Shoulder – 246min
10. Cardiac – 301min

Chart 2 - Showing The Number Of Patients With TAT Within 2 Hours and Patients With TAT Above 2 Hours Among 150 Patients



The above chart showing the distribution of patients with TAT. The total number of patients included in the study were 150 outpatients. Among 150 patients, TAT for 41% patients (66 patients) is within 2 hours with 59% patients(84 patients) whose TAT is above 2 hours . The average TAT of 150 patients is 2hours 55 minutes.

SUGGESTIONS AND CONCLUSION

Suggestions

- Patient may inform one day prior for the test on phone.
- Effective communication can be obtained by organizing knowledge enhancement training to registration staff regarding various protocols of MRI procedures.
- Patient can be called in MRI department according to appointment wise in MRI department.
- Everyday morning working of Machine should be check.
- MRI billing should be done according to appointment.
- Implementation of Pneumatic tube in Radiology.

Conclusion

- In the study, 150 patients were taken among which 66 cases (59%) were with TAT above 2hrs and 84 cases (41%) were within 2hrs. Hence overall average TAT was 2hrs 59 minutes. So, by adopting appropriate suggestions turnaround time can be possibly reduced to 2 hours and utilization of MRI machine can be increased.

REFERENCES

- Random House Kernerman Webster's College Dictionary @2010 K Dictionaries Ltd. Copyright 2005, 1997, 1991 by Random House.Pg 1920-25.
- Venus D. Marco, Lisa Smith (2012): The Healing Journey of My Bodacious Ta Ta's: Healed by Grace and on a Budget. Pg 41 author house.
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- Handbook of Healthcare Operations Management Methods and Applications by Brian T. Denton
- Introduction to Healthcare Quality Management by Patrice Spath(third edition)

THANK YOU