

**Summer Training at
Narayana Hrudayalaya Hospital, Jaipur
(April - June, 2013)**

- 1. Fixed Asset Management: - An Internal Control.**
- 2. Increasing Asset Utilization in Radiology Department.**

**By
Prashant Kumar Mishra**

**Under the guidance of
Dr. Ashok Kaushik**

**Post Graduate Diploma in Hospital and Health Management
2012-2014**



**Institute of Health Management Research,
Jaipur
2013**

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CERTIFICATE

This is to certify that Prashant Kumar Mishra, student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from Institute of Health Management and Research, Jaipur Batch 17th has undergone summer training in Narayana Hrudayalaya Hospital, Jaipur and has done project on:

- Fixed asset management :- An internal control
- Increasing asset utilization in Radiology department

The candidate has successfully carried out the above mentioned studies assigned to him during summer training from April 8th, 2013 to June 8th, 2013 and his approach towards the study has been sincere, scientific and analytical.

I wish him success in all his future endeavors.

Dr. ASHOK KAUSHIK

Dean, Academics and Student affair, Mentor
IIHMR, Jaipur

NH/HRD-Off/2013/210

Date: 10th June 2013

TO WHOM SO EVER IT MAY CONCERN

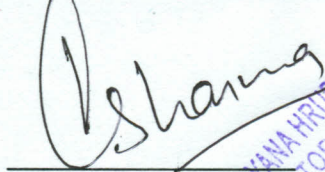
This is to certify that **Mr. Prashant Kumar Mishra** has completed his Summer Internship Successfully in Narayana Hrudayalaya Hospital, Jaipur from 8th April, 2013 to 8th June 2013.

His Work during the Period was Commendable and appreciable. His character and conduct was good.

The project was on "Fixed Asset Management, An Internal Control" & "Increasing Asset Utilization in Radiology Department"

We wish him success in future endeavors.

For Narayana Hrudayalaya Hospital, Jaipur



Vishnupriya Sharma
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ACKNOWLEDGEMENT

I take pleasure in extending my appreciation to all those who have directly or indirectly helped me in the completion of my summer training.

I am grateful to Colonel Ashok Kaushik, dean student affairs and my mentor in IIHMR Jaipur, for his competent, technical and professional guidance.

I owe a great debt of gratitude to Mrs. Vishnu Priya, Manager, Human Resource (Narayana Hrudayalaya, Jaipur) for allowing me to carry out my project in this esteemed hospital.

My profound thanks to Mr. Subhashish Bhattacharya, Manager, Operations (Narayana Hrudayalaya, Jaipur) for his constant guidance, encouragement and sharing his views inspite of his busy schedule. It has been my privilege to work under his dynamic supervision in the hospital.

A special thanks to Miss Bhavna, Executive, Human Resource (Narayana Hrudayalaya, Jaipur) for her constant support and encouragement.

Finally, I would like to extend my heartiest gratitude to each and every employee of Narayana Hrudayala, who spared their time and extended their full co-operation.

PROJECT:- INCREASING ASSET UTILIZATION OF RADIOLOGY DEPARTMENT

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**COLLEGE- INDIAN INSTITUTE OF HEALTH
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**COURSE- POST GRADUATE DIPLOMA IN HEALTH
AND HOSPITAL MANAGEMENT**

BATCH:-17th

INDEX

1. INTRODUCTION

2. OBJECTIVE

3. EXECUTIVE SUMMARY

4. FINDINGS AND DISCUSSION

5. METHODOLOGY

6. RECOMMENDATIONS

7. BIBLIOGRAPHY

INTRODUCTION

ABOUT NARAYANA HRUDAYALAYA HOSPITAL GROUP

Narayana Hrudayalaya has now, without a shadow of doubt been, the spark that has radically changed the scenario of accessibility, pricing and state of the art healthcare in India. Originally, Dr Devi Shetty's radical new concept, which started with the Spartan Narayana Hrudayalaya heart hospital Bangalore in the year 2001, we are now a truly global healthcare provider .Our current facilities allow 4000 beds and we positively look at being able to equip and service 30000 beds by 2015.

Dr Devi Shetty has over the past three decades re affirmed his commitment to 'An equitable distribution of world class healthcare for the masses at an affordable cost'. Our group's firm belief in its core values and mission statement helps reinforce our everlasting commitment to the people of Rajasthan. Narayana Hrudayalaya, Jaipur will bring this very same revolutionary concept to the state and its people with the promise of an affordable one-stop health-solution.

ABOUT NARAYANA HRUDAYALAYA HOSPITAL, JAIPUR

We are located on Hrudayalaya avenue, off Kumbha marg at Pratapnagar in New Sanganer, Jaipur. This sprawling 4.7 acre campus has its commitment for all to view as you arrive at the campus, in a multi-faith place of worship .It reaffirms our commitment to society, with no distinction in classes, religion or faith. This is a 'Temple of healing 'and that sentiment echoes throughout a patient's experience at NH hospital.

You see a hospital that is functional as phase 1 with a capacity of 220 beds that includes tertiary intensive care beds with additional intermediate care areas and wards. We offer centers of excellence that have a unique multidimensional approach to patient care - The Heart centre, The center for Bone, Joint and Spine, The division of Renal sciences and Transplant Urology ,The Advanced center for Minimal Access surgeries and the Maternity and Child unit to name a few.

Ensuring quality medical treatment at Narayana Hrudayalaya Hospital Jaipur, are the most comprehensive facilities available in Rajasthan which includes a 64 slice CT scan machine, 1.5 tesla MRI, Nuclear medicine, touch screen monitors, world class dialysis facility , and a flat panel Cath lab, to name a few.

The idea is to bring together our group's vision, its eclectic view of healthcare for the common person and the expertise of multi-disciplinary specialties whose brief description as follows:

CARDIOLOGY AND CARDIAC SURGERY

Narayana Hrudayalaya Hospital, Jaipur has put together a team of experts for achieving excellence in cardiac treatment .The cardiac operation theatre is equipped for cardiac bypass and off pump beating heart surgery, exclusive cardiac surgical ICU recovery, new top of the line cath lab and a advanced heart command centre with latest monitoring system which provides comprehensive invasive and non invasive services by highly trained and skilled medical and Para-medical staff.

NEUROSCIENCES

The Department of Neurosciences at Narayana Hrudayalaya Hospital, Jaipur offers evaluation and care of patients with Stroke, Backache, Spinal disorders, Neuro Oncology, Epilepsy, Facial Pain and Headache etc in specialty clinics. The Hospital offers state-of-the-art surgical facilities for Microscopic Neurosurgery as well.

The department is backed by most advanced Neuro-Imaging for accurate diagnosis like 64 Slice CT Scan & Magnetic Resonance Imaging.(MRI) and treatment of most Neurological disorders, and Electrophysiological tests.

NEPHROLOGY AND UROLOGY

At our dedicated Nephrology unit, there is a dialysis centre equipped with state-of-the art 16 dialysis machines and a dedicated RO (reverse osmosis) water plant. Acute & chronic renal failure cases would be accepted. Two CRRT machines would be available to enhance the dialysis repertoire.

GASTROENTEROLOGY

The specialized teams of doctors conduct advanced treatment for disorders of the liver, biliary tract, pancreas, and other GI endoscopy and ERCP, sclerotherapy, banding, stenting polypectomy, and so on. Bariatric surgery would also be undertaken.

ORTHOPAEDICS AND JOINT REPLACEMENT

The Narayana Hrudayalaya Hospital is fully equipped for joint replacement surgery (knee, hip, ankle and shoulder). Two dedicated Operation Theatres of International level where high-end procedures and minimally invasive surgeries (arthroscopy) are performed. They are equipped with-

- Laminar flow systems
- State of the art implants
- Infection free post operative care
- State of Art Physiotherapy & rehabilitation Centre

TRAUMA CARE AND EMERGENCY SERVICES

The Narayana Hrudayalaya Hospital, Jaipur has well-equipped seven bedded triage and an emergency Operation Theatre supported by ICU where Critically ill and poly trauma patients are attended in an integrated manner and supported round the clock by team of physician, Radiologist, Anesthesiologist, General ,Orthopedic and Neurosurgeon and specially trained nursing staff.

The Hospital has Code Blue team comprises a team of a emergency Physician, Cardiologist, Anesthetist and a Nurse who responds to all such Emergencies.

The distance between emergency –Triage- Operation Theatre Cathlab has been kept minimal for the speedy approach of facilities and medical staff.

CRITICAL CARE

The patients who require acute advanced care are taken to Critical Care unit which does round the clock observation. The Critical Care Unit facilitates:-

- Forty Three bedded Critical care unit with nurse to patient ratio of 1:1 having advanced ventilators and monitoring systems.
- International Protocols of Nursing care
- Bedside arterial blood gas analysis & Imaging i.e. X-ray, ultrasonography, echocardiography, peripheral Doppler
- Bedside Haemodialysis, endoscopy and bronchoscopy.
- Microprocessor controlled capable of providing ventilatory support to adults and children

MOTHER AND CHILD CARE

The Narayana Hrudayalaya Hospital provides ideal set-up both for mother and child alike. A dedicated LDR complements the other labour rooms and state-of-the-art foetal monitoring system for complete safety of both mother and child are available. Laparoscopic as well as other gynecological surgeries are undertaken. The labour rooms can well facilitate all emergency cases round the clock. For Child health care the hospital is equipped with:

- Level 3 neonatal intensive care facilities for babies
- Implementation of clinical contemporary protocols of resuscitation at birth,
- Timely immunization, feeding advice and health ante-natal & post natal checkups.
- Special clinics for asthma, epilepsy, adolescent health, child psychology and high-risk newborns.

At NARAYANA HRUDAYALAYA HOSPITAL, we offer pain free delivery for first time in Rajasthan by a team of highly experienced staff.

PULMONARY MEDICINE

The centre offers an integrated approach for the treatment and management of pulmonary diseases as well as respiratory problems. Procedures like broncho-alveolar lavage, brush cytology, bronchial / transbronchial biopsy, needle aspiration cytology and interventional bronchoscopy are performed.

BURNS, PLASTIC SURGERY, COSMETIC & RECONSTRUCTIVE SURGERY

Specialized corrective procedures for congenital anomalies, facial injuries, scars and reconstructive work are undertaken. Treatment for acute burns and related post burn corrective procedures are performed by highly experienced doctors.

INTERNAL MEDICINE

Protocols for evidence-based medicine are followed in the treatment of general medical disorders including infections, degenerative and metabolic disorders and clinical immunology etc.

DIABETES & ENDOCRINOLOGY

With the change in lifestyles, advanced therapeutic modalities for complicated disorders of thyroid, pituitary and other metabolic diseases like diabetes, hormonal and growth disorders are thoroughly investigated here.

- Adult & Childhood Diabetes
- Adult and Childhood Obesity
- Metabolic and Lipid disorders

- Thyroid disorders

PHYSIOTHERAPY & REHABILITATION CENTRE

Chest Physiotherapy (CTVS) and rehabilitation for joint diseases, stroke, backache, trauma and so on is provided by well trained staff and facilitated by latest gadget

NUTRITION

Professionally managed Dietetics Department supervise all meals with special emphasis on disease specific menu, and Nutritional requirements.

Preventive Health Check Unit

Well designed comprehensive and preventive health packages for executives as well as for general population, including an array of blood tests, X-rays, Ultrasound, TMT, ECG, Pulmonary Function test, Echocardiography, Eye and Dental check up.

RADIO DIAGNOSIS AND IMAGING

The Narayana Hrudayalaya Hospital Jaipur is equipped with,

- Highly advanced 64 slice CT scan machine
- 1.5 tesla MRI machine.
- 500 MA X ray machines

"The World Class Dialysis Program supported by ARCS, USA, enhances the delivery with reducing variability in delivery of care for patients undergoing Dialysis."

Sonography unit caters for multifaceted services for abdomen, small part and Obstetric mapping round the clock. Equipment consists of colour & power Doppler and interventional ultrasound.

PATHOLOGY & MICROBIOLOGY

Pathology services include biochemistry, microbiology and histopathology & Range of tests offered exceeds 3000 from routine to rare ones. It strictly follows the protocols of the college of American Pathologists (CAP). The result is cutting edge accuracy and speed in investigation, enabled by the high-tech procedures and state of the art equipment.

COMFORT, SAFETY AND SUPPORTIVE CARE

Total environment control with proper treatment of air and water, well-provided waiting space, sophisticated and well stocked pharmacy and facilities for communication and refreshment enhance patient comfort.

The hospital is networked for global connectivity and supported by state-of-the – art medical gas system, central sterile supply, laundry and full backup power generation.

OBJECTIVES

1. To evaluate the utilization of fixed assets namely CT, MRI and X RAY in the radiology department of Narayana Hrudayalaya Hospital.
2. To study the patient flow in the department of radiology
3. To examine the lead time of the procedures on various days.
4. To evaluate the turnaround time for the procedures namely CT and MRI.
5. To find the turnaround time of the reports for the various procedure being carried out.
6. To evaluate the utilization of the manpower in the radiology department.

EXECUTIVE SUMMARY

Utilization of in the department of radiology department

In the present healthcare scenario, increasing operational efficiency and reducing costs whilst improving services provided to the patient are a constant challenge. Advances in engineering and information technology, particularly during the last few decades have revolutionized medical care. The availability and utilization of various healthcare equipment, at all levels, in the health system for effective and efficient service delivery was amply emphasized in the Alma-Ata declaration at the International Conference on Primary Healthcare in 1978, Which was later included in the strategy paper of Health for All by 2000 AD. The sophistication in the medical field has led to the development of specialized care centers in an attempt to provide high quality care.

Medical equipment plays a very significant role in healthcare delivery system and revenue generation

The equipment has become more complex and requires regular specialized maintenance and repair, which is very expensive, Hospital equipments falls into an extremely wide spectrum ranging from a simple patient trolley to a high- tech CT and MRI scanner. The term “equipment” in context to the hospital, generally means any instrument, apparatus, tool, appliance, machine or any other related article used for various preventive, diagnostic, therapeutic, supportive, and control procedures for the day to day patient care activities.

Hospital equipment can be broadly classified into:

- Biomedical equipment
- Laboratory equipment
- Ward equipment
- Support service equipment

All these account for a major part of any hospital project cost, which could go up to almost 60 percent. Of this the biomedical equipment could account for nearly 50 percent of the costs. Keeping this in view, it is essential to ensure maximum utilization of the equipment with minimum downtime.

With the adaption of proper maintenance techniques and management

systems one can utilize resources optimally and reduce the breakdown and related maintenance.

An optimum utilization of the equipment will result in:

- Optimal patient handling and rapid turnover
- Minimum possible costs
- Quality patient care and satisfaction

Utilization essentially means the use of the equipment to its full potential:-

Utilization index or use coefficient is one of the important parameters to monitor the functional status of the equipment. It is the parameter to assess the productivity of a service or equipment.

The formula used applied to measure the utilization rate is as follows:

$$\text{Utilization Rate} = \frac{\text{Total number of scans in a month}}{\text{Total number of scans that can be done in a month}} * 100$$

If the utilization rate is less than 50 percent the asset is considered to be under utilized and hence a bad investment. However life saving equipments cannot be subjected to this kind of assessment. And it also depends upon the time for which the machine is functional as initial time is required to attain the break even.

The aim of the study was to find out the utilization of CT, MRI and X RAY machines and suggest ways to increase the efficiency of these equipments by better utilization.

For this purpose various approaches were considered and the data was collected and analyzed for six months.

UTILIZATION OF MRI MACHINE

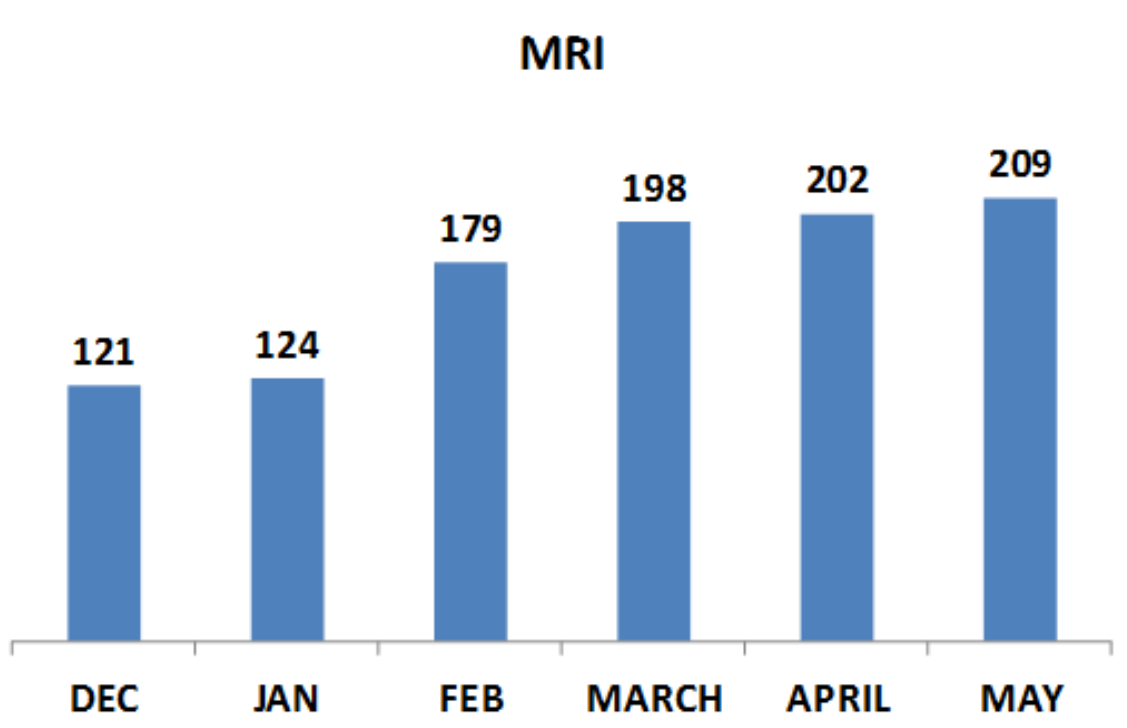


Figure: - Number of patients in MRI

Interpretations of the figure:-

In the above figure, there is a gradual increase in the number of patients in the MRI scan from December 2012 to May 2013. In the initial phase an increase of 0.9% is seen from the month of December to January, which further kept on increasing. A further increase of 16.5% was noticed from the month of January to February. A further increase of 6% was noticed from the month of February to March and a increase of around 1.2% was noticed from the month of March to April.

In the month of May the utilization increased up to 2.1% , when compared to that of April.

Recommendations:-

- The utilization of the MRI machine can be increased by increasing the working hour's i.e from eight to twelve hours in a day.
- Proper allocation of the duties to the MRI technicians to prevent under utilization.

UTILIZATION OF CT MACHINE

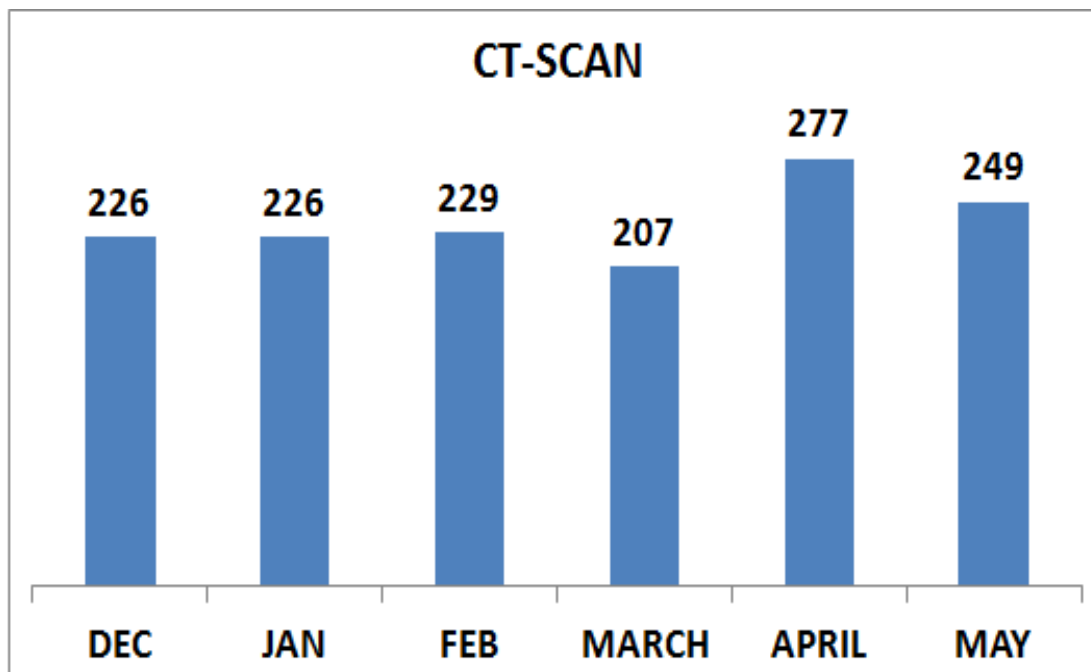


Figure:- Number of patients in CT

Interpretation of the figure:-

The following figure indicates the number of patients for CT scans from the month of December 2012 to May 2013.

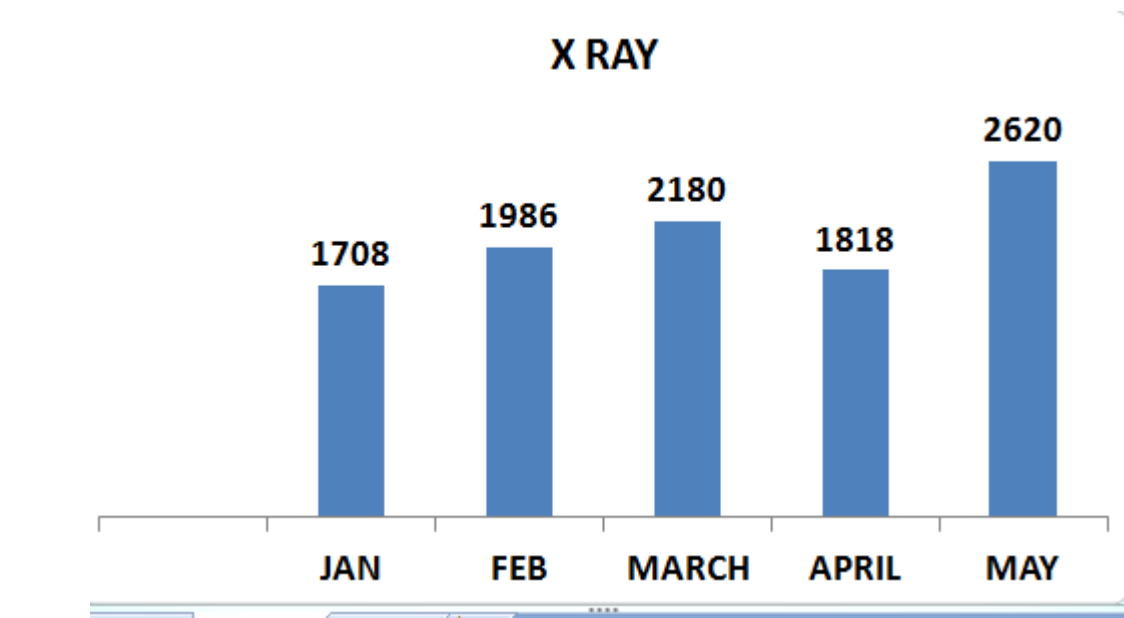
The figure indicates same number of patients both the month of December and January. However there was an increase of 0.9% from the month of January to February, which further declined to 6.6% from the month of February to March 2013.

There was remarkable increase of 21% from the month of March to April. However there was decline of 8.2% from the month of April to May

Recommendations:-

- To increase the number of working hours of the CT machine
- To provide an addition CCA staff to assist prompt patient movement..

Utilization of X RAY



I nterpretation of the figure:-

The following figure suggests that there is a increase of 8.34% in the number of X RAY scans done from January to February 2013. This further increased to 5.82% in the month of March. There is a decline of 10.86% been noticed from the month of March to April 2013.

However there is a remarkable increase of 24.06% from the month of April to May 2013.

Recommendations:-

- The X RAY machine is highly utilized so, increasing the number of working hours can further increase revenue.
- To fix proper responsibility for timely reporting as soon as the film is ready to enable patient satisfaction.

PROCESS FLOW DEPARTMENT OF RADIOLOGY(IPD)

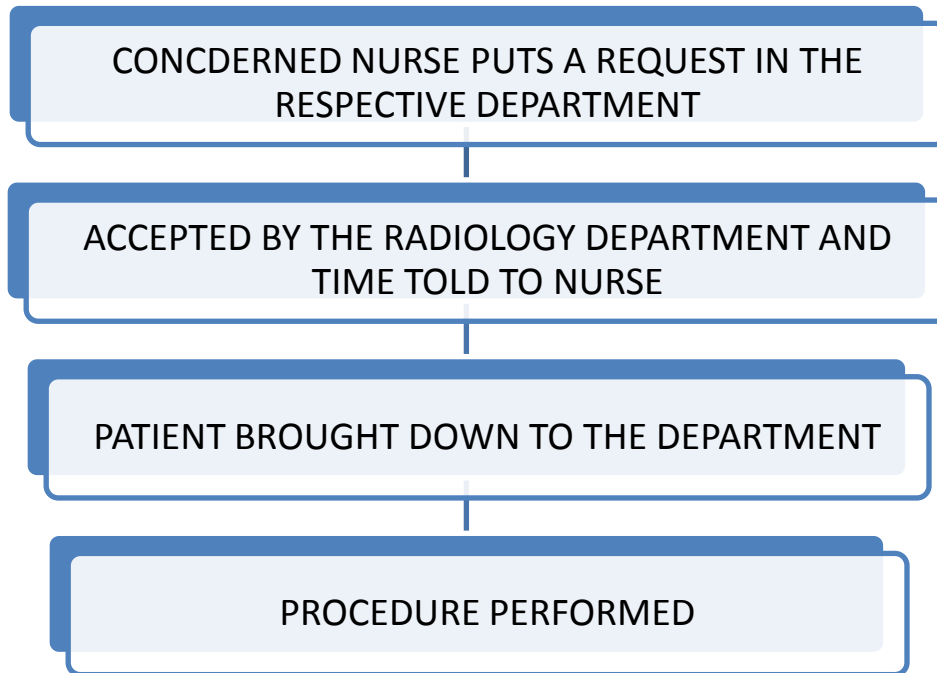


Figure: - Process flow in the department of radiology for Inpatients

The above Figure depicts the process flow in followed for inpatients in the department of radiology. In patients receives priority in the scans, when compared to the outpatients as the urgency required for the scans are higher.

At first, a request is put by the nurse in the respective department. Which is further been accepted by the radiology department and a slot is provided, the patient is then brought to the department and the procedure is performed

PROCESS FLOW IN THE DEPARTMENT OF RADIOLOGY(OPD)

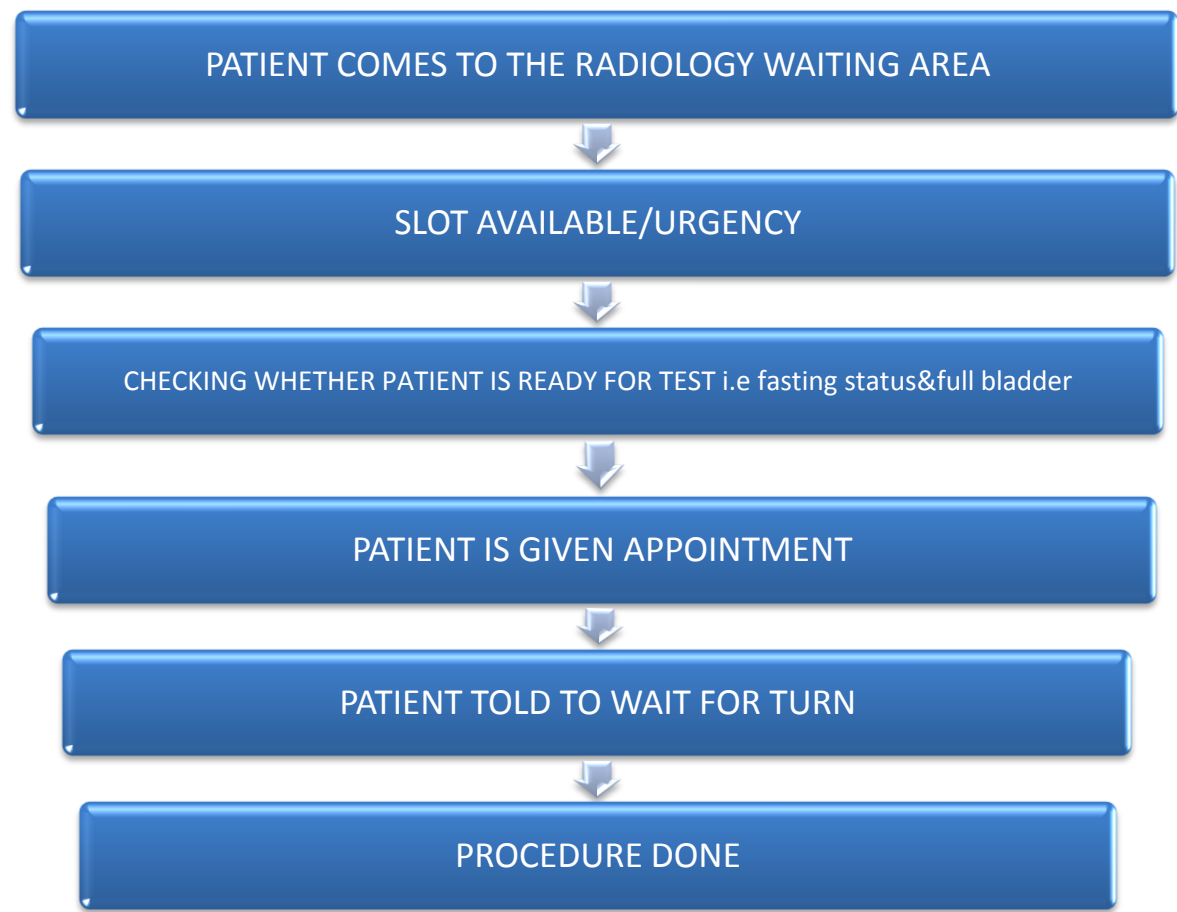


Figure:- Process flow in radiology department for outpatients

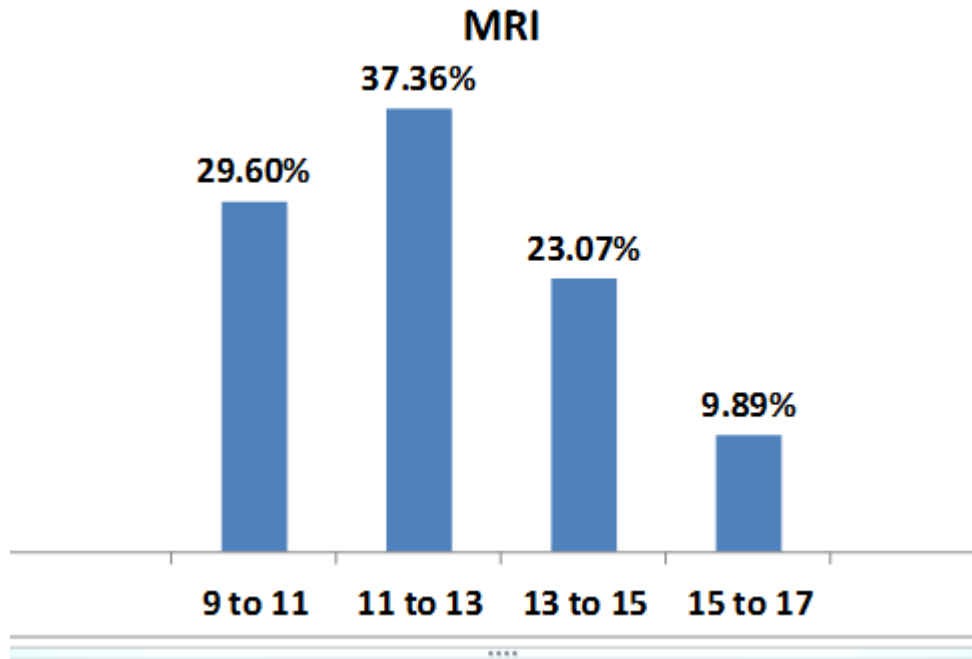
The above flow chart depicts the process flow in the department of radiology.

Firstly, the patient comes to the radiology department after been prescribed by doctor for the scan. The availability of the slot required is then checked by the receptionist of the department. Once the slot is checked, the requirements for the scan i.e condition of the patient required to undergo the scan is checked.(Eg proper creatinine level for renal patients).

After that the patient is been provided the appointment and been told to wait for his turn.

Finally the procedure is been performed.

LEAD TIME FOR MRI ON VARIOUS DAYS IN A WEEK

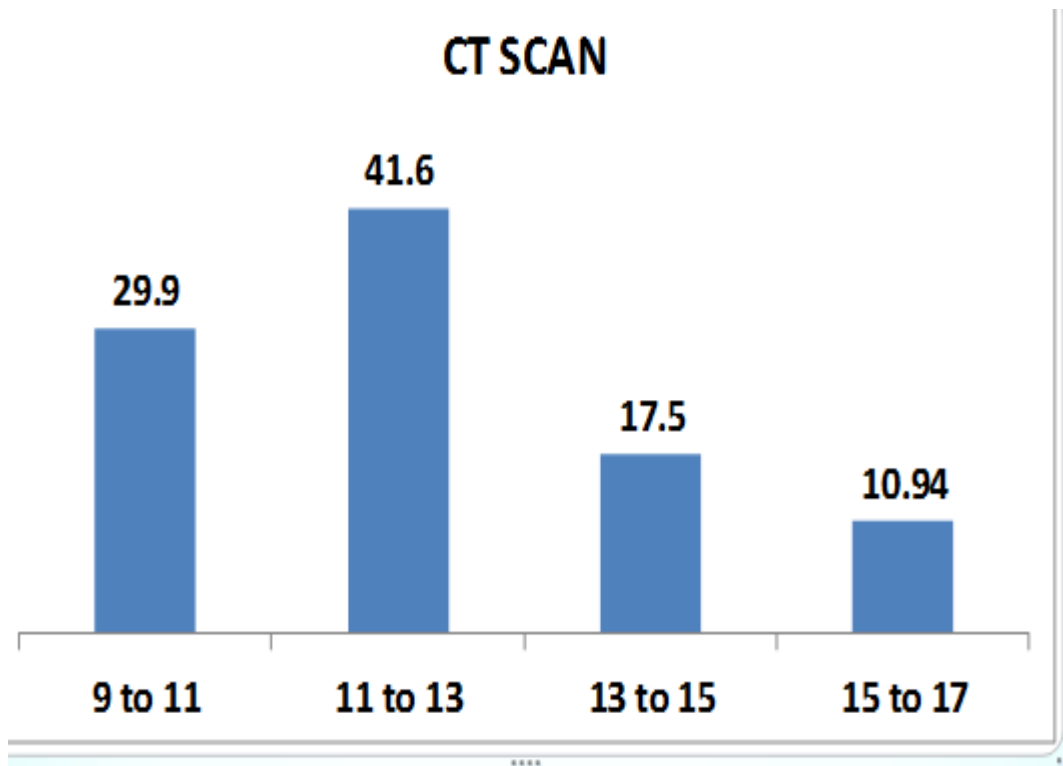


Interpretation of the figure:-

The lead time in the utilization of the MRI in the department indicates the highest utilization between 11 to 1 pm i.e 37.36%, with the second highest utilization time between 9 to 11 am i.e 29.60%.

The least utilization is between 3 to 5 pm in the evening with utilization around 9.89%.

LEAD TIME FOR THE UTILIZATION OF CT MACHINE

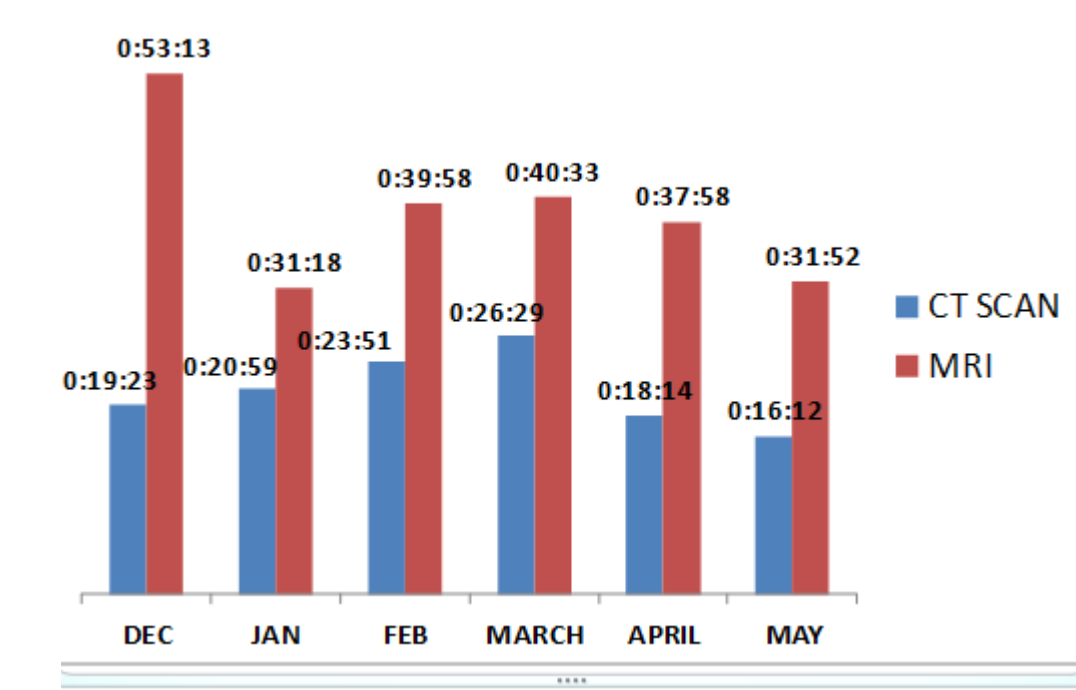


Interpretation of the figure:-

The above figure indicates the lead time in the utilization of the CT machine. The figure clearly indicates highest utilization i.e. 41.6% in the time frame of 11 to 1pm, followed by 29.9% in the time frame of 9 to 11 am. With the utilization of 17.5% time frame of 1 to 3 pm stays in the middle.

The least utilization is found between the time frame of 3 to 5 pm with utilization of 10.94%.

TURNAROUND TIME PATIENT WAITING FOR CT AND MRI



Interpretation of the figure:-

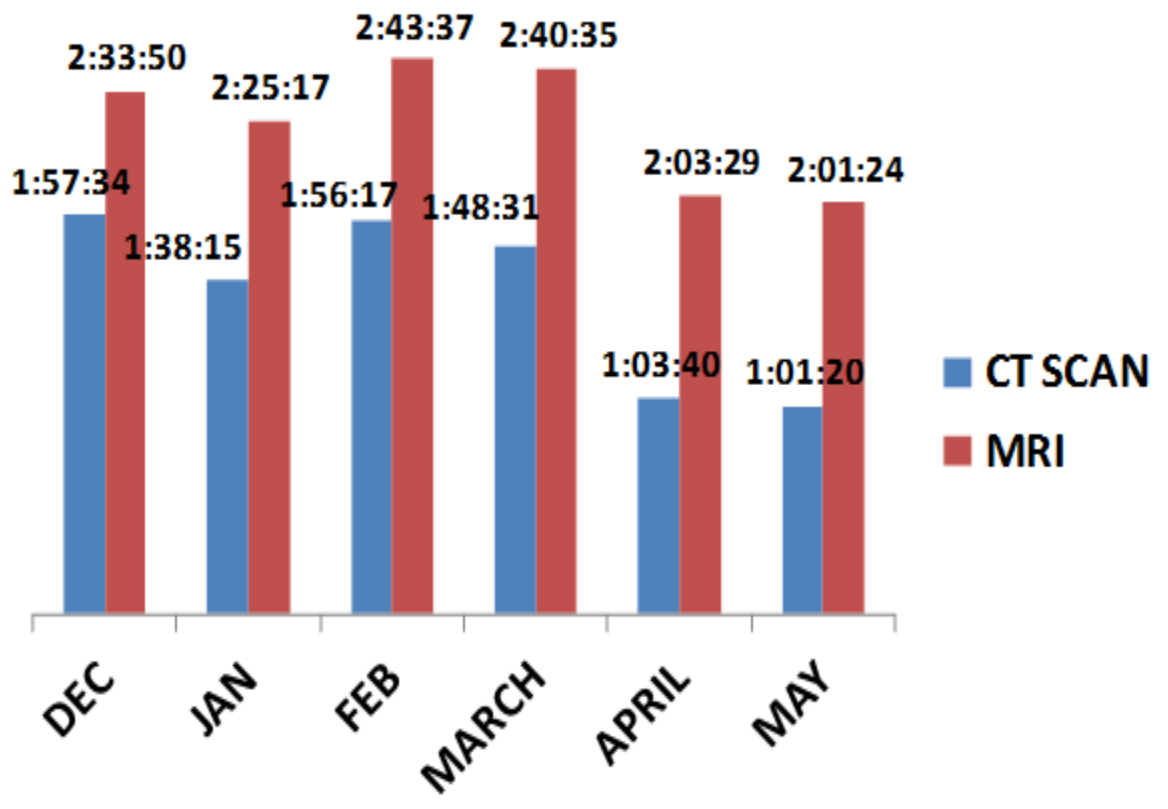
Turnaround Time (TAT) for the patient waiting time for the CT and MRI procedures of the six months from December 2012 to May 2013 shows fluctuating figures the turnaround time appears to decrease remarkably from December 2012 to January 2013.

A nearly consistent figure is seen on the months of till the month of April 2013. This further decreased in the month of May 2013.

Recommendations:-

- The turnaround time for waiting can be reduced by allocating more counters for procedure billing.
- Proper guidance to the patient for the availability of these facilities
- Allocating an addition CCA staff in the department to make the process fast and prompt.

TURNAROUND TIME FOR REPORTS BOTH CT AND MRI



Interpretation:-

The Turnaround time data (TAT) for reports examined from the month of January to March 2012 shows a remarkably high, which declined in the month of April 2013, which showed a slight decrease again in the month of May 2013.

Recommendations:-

- The turnaround time in reporting can be reduced by ensuring the availability of typist in the working hours of the department.
- To make a proper roaster of the typists for replacement during leaves.
- To ensure the availability of doctors at the time of report making.

UTILIZATION OF MANPOWER IN THE DEPARTMENT

Utilization of CT technician:- The utilization of the CT technician can be found by dividing the total productive hours divided by the number of hours the staff is paid ,On an average eight CT are done in a day and each CT takes around 15 minutes .So the utilization can be found by:-

Utilization CT technician:- $\frac{\text{Total productive hours}}{\text{Total paid hours}}$

$$= \frac{2}{8} \times 100$$

$$= 25\%$$

Utilization of MRI technicians:- The utilization of MRI technician can be found out by applying the above formula. Here the MRI procedures takes around 30 minutes and on an average there are five MRI per day. So utilization of each MRI technician is.

Utilization of MRI technician:- $\frac{\text{Total productive hours}}{\text{Total hours paid}}$

$$= \frac{2.5}{8} \times 100$$

$$= 31.5\%$$

It means utilization of each technician is 15.62%.

Utilization of the CT and MRI doctors:- The reporting time for CT and MRI and X RAY are in between 2 to 5 pm on an average 3 hours against 8 hours of paid working .

$$\begin{aligned}\text{Utilization of the doctors are:} &= \frac{\text{Total productive hours}}{\text{Total paid hours}} \\ &= 3/8 * 100 \\ &= 37.5\%.\end{aligned}$$

UTILIZATION PERCENTAGE OF CT AND MRI

The utilization for the CT and MRI was found for the first week of May and the following methodology was applied.

$$\begin{aligned}\text{Utilization for the CT machine} &= \frac{\text{Number of hours the machine is used in a week}}{\text{Total working hours}} \\ &= \frac{16.92}{48} * 100 \\ &= 35.25\%.\end{aligned}$$

$$\begin{aligned}\text{Utilization of MRI machine} &= \frac{\text{Number of hours the machine was used in a week}}{\text{Total working hours}} \\ &= \frac{20.21}{48} * 100 \\ &= 42.10\%\end{aligned}$$

