Summer Placement

at

RAJIV GANDHI CANCER INSTIUTE AND RESEARCH CENTRE

(March 11th to June 14th , 2022)

A Report on

Assessment of Quality Assurance in Radiology Department Of a 500 Bedded Hospital:

A Cross-Sectional Study

By

Dr. Angika Tiwari

Post -graduate Diploma in Hospital and Health Management

2020-2022

IIHMR DELHI

International Institute of Health Management Research , New Delhi

Annexure C (Title Page)

Internship Training

at

Rajiv Gandhi Cancer Institute and Research Centre

On

"Assessment of Quality Assurance in Radiology Department Of a 500 Bedded Hospital: A Cross-Sectional Study"

by

Name Dr. Angika Tiwari

Enroll No. PG/2020/009

Under the guidance of

Dr. Vinay Tripathi

PGDM (Hospital and Health Management)

2020-22

IIHMR DELHI

International Institute of Health Management Research

New Delhi

Completion of Dissertation from Rajiv Gandhi Cancer Institute and Research Centre

The certificate is awarded to

Dr. Angika Tiwari

in recognition of having successfully completed his/her Internship in the department of

Quality Department

and has successfully completed her Project on

Assessment of Quality Assurance in Radiology Department Of a 500 Bedded Hospital: A Cross-Sectional Study

From: 11th March to 14th June 2022

at

Rajiv Gandhi Cancer Institute and Research Centre , Rohini , New Delhi

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning.

We wish her all the best for future endeavors.

Training & Development

Zonal Head-Human Resources

Dissertation Writing

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Angika Tiwari** _student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at **Rajiv Gandhi Cancer Institute and Research Centre , Rohini , New Delhi** from **11th March** to **14th June 2022** .

The Candidate has successfully carried out the study designated to him during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all her future endeavors.

24/6/2022

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Mentor

IIHMR, New Delhi

Certificate of Approval

The following dissertation titled "**Assessment of Quality Assurance in Radiology Department Of a 500 Bedded Hospital: A Cross-Sectional Study**" at "**Rajiv Gandhi Cancer Institute and Research Centre** " is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood thatby this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr Nikita Sabherwal	
DIVYA AGGARWAL	
Date - 24/6/22	
RAHUL KHANDELWAL	

Annexure E

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Assessment of Quality Assurance in Radiology Department of a 500 Bedded Hospital: A cross-sectional study and submitted by (Name) Dr. Angika Tiwari ..... Enrollment No. PG/2020/009 under the supervision of Dr. Vinay Tripathi for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from 11th March to 14th June embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Angika Tiwari (ANGIKA TIWARI)

Signature

FEEDBACK FORM
(IIHMR MENTOR)

Name of the Student: Dr. Angika Tiwari

Internship Institution: RGCI

Area of Summer Internship: Quality Assurance

Attendance: She was with the organization throughout her internship.

Objectives met: Yes.

Deliverables: She has successfully submitted her dissertation report and mock presentation.

Strengths: Excellent calculation (with vessel & working)

Suggestions for Improvement: —

Signature of the Officer-in-Charge (Internship)

Date: 24.06.2022

Rajiv Gandhi Cancer Institute and Research Centre

Ref: HR/22

17/06/2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Angika Tiwari**, from IIHMR Delhi, has completed her internship on the topic of **'Assessment of Quality Assurance in Radiology Department of a 500 bedded Hospital'** in the department of **Quality** from **11th March 2022 to 16th June 2022.**

During the above period, her performance was good.

We wish her all the best for her future endeavor.

Jeevan Singh
Manager -HR

Rajiv Gandhi Cancer Institute & Research Centre
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Renu
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FEEDBACK FORM

Name of the Student: Dr. Angika Tiwari

Name of the Organisation in Which Dissertation Has Been Completed:
Rajiv Gandhi Cancer Institute and Research Centre

Area of Dissertation: Quality

Attendance: 100% Satisfactory

Objectives achieved: Satisfactory

Deliverables: Satisfactory

Strengths: Good Observer, Great Communication skills, Confident, Hard Working, Leadership Qualities. Good Presentation Skills.

Suggestions for Improvement: NA

Suggestions for Institute (course curriculum, industry interaction, placement, alumni): Satisfactory

Rewa

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

Date: 17.06.2022
Place: Delhi

ACKNOWLEDGEMENT

- Above all and everyone, I thank the almighty and my parents for their love, support and everything.
- Any attempt at any level, cannot be satisfactorily completed without the support and the guidance of learned people. I owe a great debt to all the professionals at Rajiv Gandhi Cancer Institute and Research Centre , New Delhi , for sharing generously their knowledge and time that inspired me to do my best during the summer internship.
- I would like to express my sincere gratitude to **Dr. Pinky Yadav (Medical Superintendent)** and **Ms. Renu Chaudhary (Head of Quality Department)** ;my mentor inRGCIRC , for their continuous guidance who in spite of being busy with their duties , tooktime to hear me and guide me and gave helpful advice and constructive comments throughout the project . Their valuable inputs made this project possible .
- I am glad to acknowledge **Dr. Vinay Tripathi** , Associate Professor, IIHMR Delhi who is my mentor for incorporating right attitude into me towards learning and for helping and supporting whenever required.

Table of Contents

ABBREVIATIONS

- CR. No.: Central Registration Number
- HIS : Hospital Information System
- RIS : Radiology Information System
- PET –SCAN : Positron Emission Tomography
- MRI : Magnetic Resonance Imaging
- CT-SCAN : Computed Tomography Scan
- OPD : Outpatient Department
- IPD : Inpatient Department
- IAU : Internal Assessment Unit
- PAC : Pre-Anesthetic Checkup
- FDE – Front Desk Executive
- TAT: Turnaround Time
- DMAIC : Define , Measure , Analyze , Improvement and Control
- TPA: Third Party Administrator MRD: Medical Record Department

PART-1

OVERVIEW OF HOSPITAL

RAJIV GANDHI CANCER INSTITUTE AND RESEARCH CENTRE

INTRODUCTION

- The "Rajiv Gandhi Cancer Institute & Research Centre" (RGCI & RC) has access to cutting-edge technologies as one of Asia's leading cancer centres. The Institute has been accredited by "NABH" (National Accreditation Board for Hospitals and Healthcare) and "NABL" (National Accreditation Board for Laboratories and Laboratories) for the services it provides (National Accreditation Board for Testing and Calibration Laboratories).. It is a visionary project of the "Indraprastha Cancer Society and Research Centre" to offer the patient with the care that he or she needs. The "society registration act" was used to form this organisation in 1994.

- In spite patient’s care which is considered to be the main objective of the society, it also works on theinvestigation of the disease incidence, distribution, symptoms and the cause.
- The institute began operations on July 1, 1996, with “Hon'ble Smt. Sonia Gandhi” performing theopening ceremony.
- On the “20th August 1996,” President of India “Dr Shankar Dayal Sharma” performed the formal inauguration, which was also attended by other dignitaries. RGCI & RC offers a wide range of medical,surgical, and radiation-related treatments.
- Super specialists also employ an organ-specific multidisciplinary approach to diagnose and treat cancer, with the Tumour Board acting as a more critical second opinion. The RGCIRC is the country's largest cancer treatment facility.
- There are 57 consultation rooms and well-designed "Radiation Therapy Rooms" scattered across three floors of outpatient services. Eight modular operating rooms with three-stage air filtration and gas scavenging systems, as well as two minor operating rooms for day-care surgeries, are available at the RGCIRC.
- There are 27 beds in the Surgical ICU and 11 beds in the Medical ICU at the facility. Certain supportive services, such as "Renal Replacement Therapy," are available.
- RGCIRC is one of India's top ten "Oncology Hospitals," as well as the winner of the 2014 Healthcare Achievers Awards for "Best Oncology Hospital in India."
- The Institute has a 51-bed surgical intensive care unit, a 21-bed medical intensive care unit, a dedicated Leukemia ward, a separate Thyroid ward, and an independent

22-bed bone marrow transplant unit that iscredited with pioneering unrelated donor transplants, MUD transplants, and stem cell transplants. Renal Replacement Therapy, different endoscopies (including EBUS and Endoscopic Ultrasound), and other supportive services are available

- RGCIRC has continuously been recognised among India's Best Oncology Hospitals and has won numerous accolades, including the National Business Leadership & Service Excellence Award 2017 forBest Oncology Hospital in India, the Indywood Medical Excellence Award 2017, and others.
- India Today (Reader's Digest) named us the Most Trusted Hospital in Oncology in 2017, India's Most Trusted Hospital for Oncology (Readers' Digest Most Trusted Brands 2016), and runner-up in the Fire &Security Association of India's Finest India Skills & Talent Award 2020.
- RGCIRC is an excellent example of a "not for profit" organisation augmenting government efforts inthe healthcare field.

VISION , MISSION AND VALUES

1. **VISION :-**

- To Provide Affordable Oncological Care Of International Standard And Help To Eliminate Cancer FromIndia Through Research, Education, Prevention & Patient care .

2. **MISSION**

- To be India's leading cancer care provider, with patients, caregivers, faculty, and students choosing usabove others**.**
- By Offering comprehensive services at an affordable price
- And excellence of our personnel leveraging best technology

ACCREDITION :-

- NABH Accreditation for Hospital
- NABH Accreditation for Blood Bank
- NABH Accreditation for Ethics Committee
- NABL Accreditation for Laboratory Services
- NABH Certification for Nursing Excellence
- Green OT Certification from Bureau Veritas

SERVICES PROVIDED BY HOSPITAL :-

SERVICES

A) Standards : International

B) Emergency Department : Yes

C) Bed Availability (Rohini) : 498 (Currently)

OTHER SERVICES

- Physiotherapy
- Palliative
- Day Care
- Emergency
- Counseling
- Telemedicine
- Pharmacy
- Prevention
- Preventive
- Physiotherapy
- Palliative

EMERGENCY CODES

CODES	SITUATION
BLUE	INDIVIDUAL DISASTER
RED	FIRE EMERGENCY
PINK	MISSING PERSON
YELLOW	EXTERNAL DISASTER
PURPLE	DANGEROUS PERSON
BLACK	BOMB THREAT

Treatment of Cancer

"Blood Cancer Treatment"
"Bone Cancer Treatment"
"Bone Marrow Transplant"
"Breast Cancer Treatment" "
Cervical Cancer Treatment"
"Head & Neck Cancer Treatment"
"Liver Cancer Treatment" "Lung Cancer Treatment"
"Pancreatic Cancer Treatment"
"Paediatric Cancer Treatment"
"Prostate Cancer Treatment"
"Mouth Cancer Treatment"
"Throat Cancer Treatment"

Strategies

"RGCI&RC has executed strategic alliances with internationally renowned institutes such as Thomas Jefferson University; this has catapulted RGCI & RC into global league of select hospitals that are pioneersin a new approach to treating cancer".

Conclusion

RGCI & RC is a one-of-a-kind cancer care institution in Northern India, capable of diagnosing and treatingall types of cancers. The hospital's distinguishing feature is its highly qualified doctors and employees, as well as an experienced management team. Its research programme contributes to the continuous enhancement of therapy and care for patients of all types.

Their management / administration team eases out every situation / issue faced by the patient effectively. Ambience of the hospital, services provided to the patient is excellent .

GENERAL WORKING OF DEPARTMENTS

Reception - Centrally located **May I Help You Desk** near main Reception is there to guide patients to their respective OPDs/ IPD / Support service areas.

Registration - Registration Counter within main Reception area carries out Registration of all new patients who visit the hospital for the first time. Central Registration Number (CR.NO) is generated and a Medical Records File of the patient is made which is used in all future OPD and IPD visits to document the patient's treatment journey.

- For registration, patient needs to provide copy of Photo ID proof and address proof along with Pan Card / Aadhar Card. International patients, need to provide a photocopy of their passport (First page, Last page and Visa page).

Admission centre - Obtain basic information, provide vital information about your hospital stay, and respondto your questions before scheduling your doctor's appointment.

Cash counter - All cash and credit bills of hospital cash account management will be centralised controlled and settled by the cash counter module. It increases financial discipline and successfully creates checks andbalances to control all cash activities connected to receipts and payments, obviating the possibility of hospital finance manipulation .

Out- Patient Department (OPD)- All OPDs are well planned with adequate space and waiting area. Waiting areas are furnished with televisions and token display screens. Drinking water facility, male /female wash rooms and wash rooms for differently able

patients/ attendants are present in all OPD floors.

In-patient reception (IPD) - After being seen by a physician, the patient or their proxy must fill out an admissionform at this reception as directed by the physician .

Admissions may be in two ways :-

- Through the "Emergency Department"
- Through OPD

Administration - To enhance the hospital staff's ability to manage and organize hospital effectively andprofessionally**.**

Human Resource Department - HR managers oversee employee administrative affairs in organization. Arrange training programsfor the staff .

Finance Department . - This dept. monitors and controls the hospital finances and setting of budgets on an annualbasis

Quality Department – Assures programs and services are implemented at the highest standards and patients receive the highest level of care . Quality Managers are responsible for monitoring and updating policies and procedures to include regulatory changes .

Information& Technology - Using the most advanced and relevant information technology to provide youwith the highest and most complex level of care possible.

Medical Records - Documentation of a single patient's medical history and care across time within thejurisdiction of a single health care practitioner.

CSSD - The department of CSSD works on 24hrs shifts all 365 days. All the

processes of cleaning,disinfection and sterilization are done under total aseptic condition in house.

Sample Collection Rooms :- for lab investigation are located in all OPD areas. These have attached Pneumatic Tube Chutes for quick sample delivery in lab.

Dressing rooms/ PICC Line dressing rooms, **Ostomy care room** and **Procedure rooms** are present in all concerned OPD areas.

Staff canteen/F&B - Includes the hospital food & beverage. hospital kitchen prepares patient's meal as perdietician's recommendations, while it constantly calculates the material requisition for cafeteria, fast food centre, kitchen etc. it effectively tracks the required stock such as utensils, cutlery .

Linen/Laundry - Linen management has a significant impact on patient satisfaction, infection rates, andoperating expenses, as well as physician satisfaction.

CT Scan - Each check-up is tailored to the patient's unique needs, and radiation exposure is minimisedthanks to the staff's efforts.

ECHO/ECG/TMT - An electrocardiogram (ECG) is a test that looks for issues with your heart's electricalactivity.

X-ray - The Radiology Department uses X-rays and Ultrasound scans to provide a high-quality diagnostic service to in-patients, out-patients, day care, and emergency patients. These radiological services produce images that can help with patient diagnosis and therapy.

Cath lab - A catheterization laboratory, often known as a Cath lab, is a room in a hospital or clinic equippedwith diagnostic imaging technology for visualising the arteries

and chambers of the heart and treating any stenosis or abnormalities discovered .

Emergency - A medical treatment facility that specializes in emergency medicine, or the acute care of patients who arrive without an appointment, either on their own or via ambulance, is known as an emergency department (ED), also known as an accident and emergency department (A&E), emergency room (ER), or casualty department.

OPERATION THEATRE - An operating theatre, often known as an operating room (OR) or operating suite, is a sterile medical facility where surgical procedures are done.

INTENSIVE CARE UNIT - Patients that require constant monitoring are admitted to the Intensive Care Unit (ICU). Patients maybe extremely ill as a result of an acute illness or have been involved in an accident that resulted in major andlife-threatening injuries.

Pharmacy - Pharmacy often stock a larger assortment of pharmaceuticals than community pharmacies, including more specialised and exploratory medications (medicines that are being tested but have not yet been approved). It is not a retail store and usually only distributes drugs to hospitalised patients.

General ward - When medical staff determines that patients no longer require such close monitoring and one-on-one care, they are transferred from the critical care unit to a normal ward. For many people, this is avital stage in their journey from critical illness to recovery.

Ward (Semi private) - A very basic curtain that is somehow filled with the magic of privacy creates privacy. But, in reality, this room is the temporary home for two patients–you and a 14-year-old stranger who is also recuperating, together with their medical team and any entourage they bring with them.

Dietician - A dietician (or dietician) is a professional who specialises in dietetics, or human nutrition and diet regulation. A dietician adjusts a patient's diet based on their medical condition and unique requirements.Dieticians are the only certified healthcare practitioners who can examine, diagnose, and treat dietary issues.

Physiotherapy - Physical therapies such as massage, heat treatment, and exercise, rather of medications orsurgery, are used to treat sickness, injury, or deformity

Biomedical Engineering - The engineering department conducts a wide range of responsibilities that can be assigned to multiple departments. It is responsible for the operation of all equipment, machinery, and repairsin particular. Preventive maintenance, building operations maintenance, mechanical and electrical maintenance .

Infection control & Prevention - Infection control is a practical (rather than academic) branch of epidemiology concerned with preventing nosocomial or healthcare-associated infections. It's a crucial part of the health-care system that's frequently disregarded and underfunded.

DEPARTMENTS OBSERVED /VISITED/ WORKED

1. Initial Assessment Unit
2. Pre-anesthetic Check-up
3. Out-patient Department
4. In-Patient Department
5. Radiology Department

OBSERVATIONS AND LEARNINGS :-

a) Initial Assessment Unit :-

- **Initial Assessment Units** are located in all OPD areas. Here a detailed patient history, past medical history, and history of present illness are taken to ensure nothing is missed while making a diagnosis.

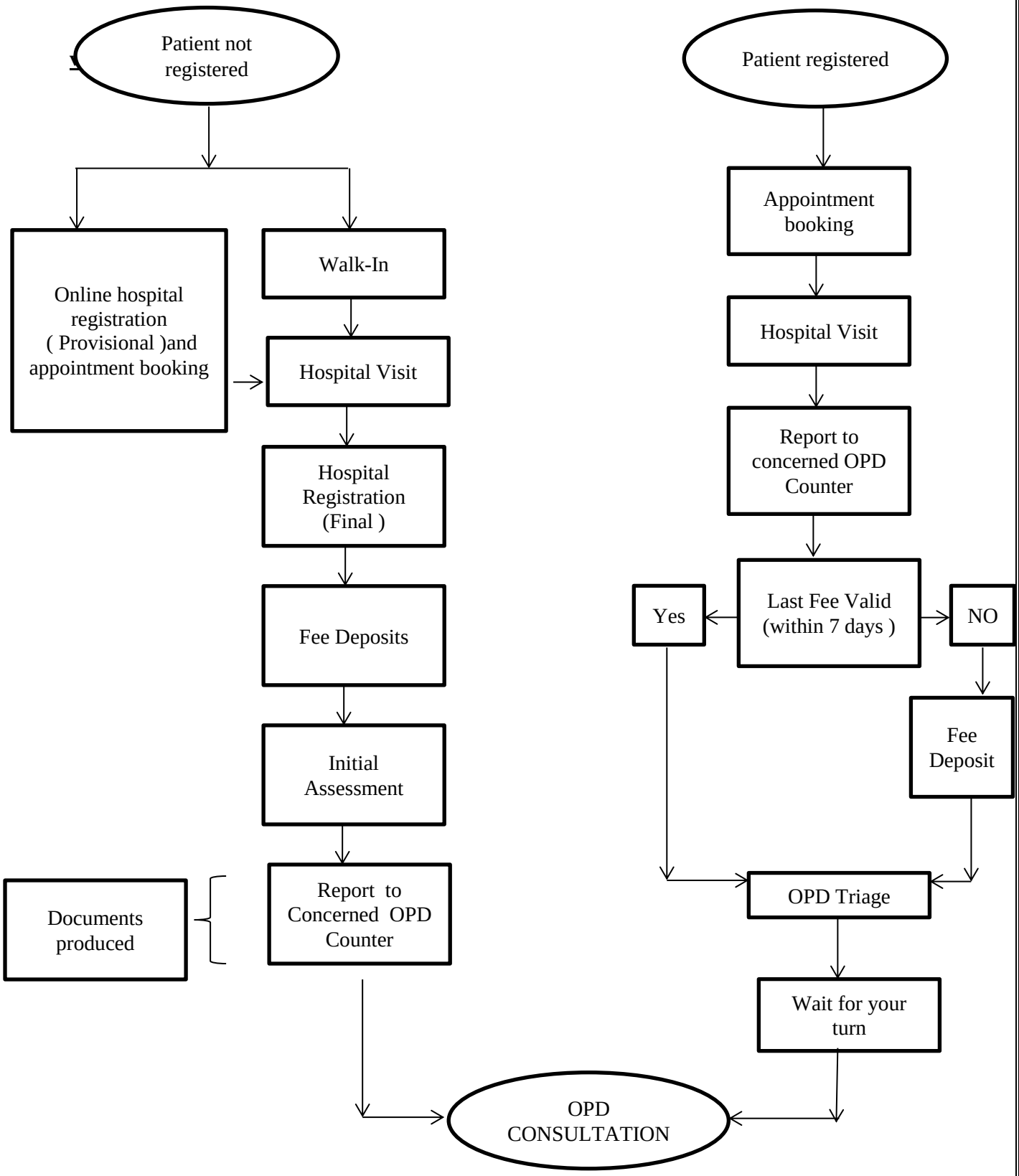
- It is a first point of contact for OPD patients where vitals (Height , weight , Pulse , BP) was checked by the Nurse and their medical history was studied and the patient was further counseled by the Junior Doctor and then the patient's file was further sent by GDA to respective Consultant or Physician for further process .

b) Pre Anesthetic Check-up :-

- • It has been defined as the clinical assessment process that occurs prior to the administration of anaesthesia for surgical and non-surgical procedures.
- Any preoperative evaluation must include a thorough history and physical examination that focuses on risk factors for cardiac and pulmonary problems, as well as a determination of the patient's functional capacity.

c) OUT- PATIENT DEPARTMENT :-

- Flow of patients :-



OPD :-

- It is present on 3 floors of D-Block of the hospital –

a) Ground Floor

b) First Floor

c) Second Floor

OPD Timings:

- General OPD (Tuesday & Friday): 2:00 p.m. to 5:00 p.m. (last card is made till 04:45 pm)
- Regular OPD hours: 9:00 a.m. to 5:00 p.m. (All weekdays)
- **Appointments Counter** is located at main reception, where you can book next OPD visit appointment. However you can also take appointment telephonically or online through website.

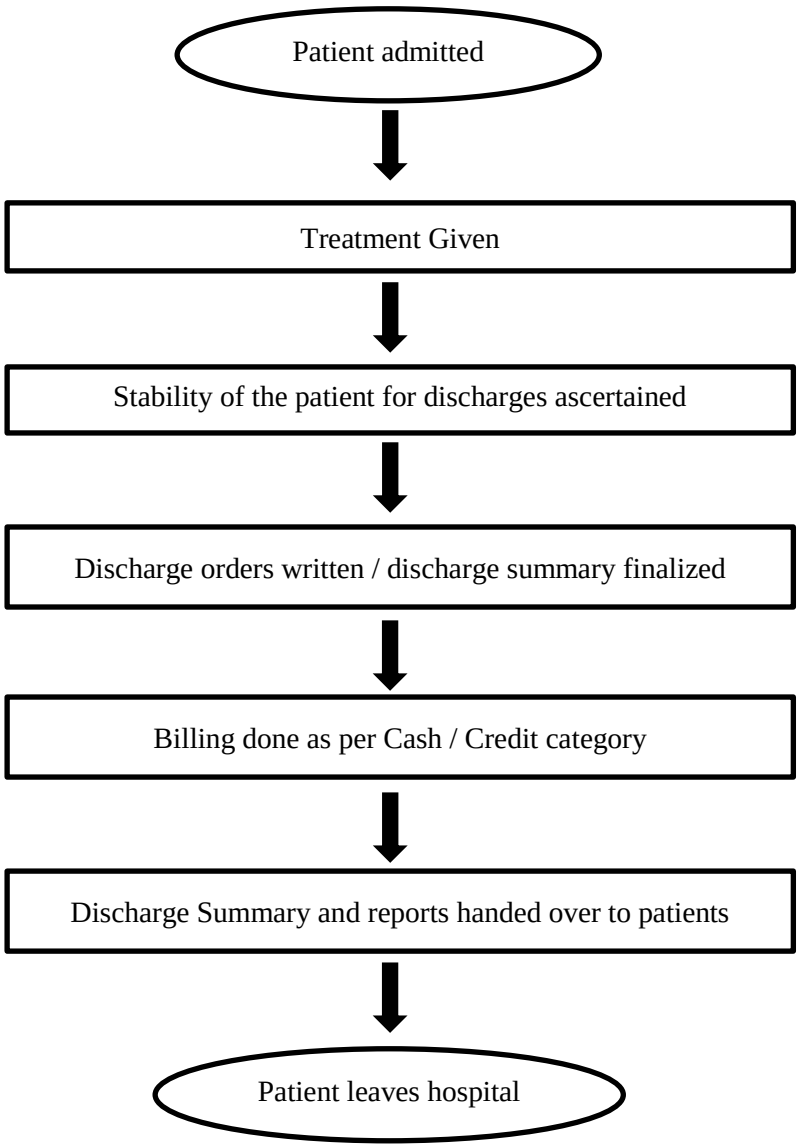
Triage service is available in OPDs for checking of patient vitals and to identify cases which require urgent attention.

Mothers' Feeding Pod has been specially designed for mothers of pediatric patients where they can feed their baby in privacy and is placed in the Ground floor OPD.

- All OPDs are well planned with adequate space and waiting area. Waiting areas are furnished with televisions and token display screens. Drinking water facility, male /female wash rooms and wash rooms for differently able patients/ attendants are present in all OPD floors.

d) In-patient Department :-

- FLOW OF PATIENTS :-



- **Admissions can happen in one of two ways.**

1. With the help of the "Emergency Department"

2. Through OPD

- If the doctor determines that the patient requires inpatient care, he or she will be given an Admission slip-I detailing the type of treatment necessary and the patient's projected length of stay.

- The doctor will also notify you of the approximate cost of your admission. He or she must next travel to the Admission counter on the ground floor of 'the new building.'

- If a room or bed is available, the admissions staff will assign it to you. In the event of non-availability, the staff will place the patient's name on a waiting list and contact him or her when space becomes available.

- The room will be assigned after a verification of availability and payment of at least 80% of the first estimate given by the patient's doctor.

BED ALLOTMENT PREFERENCE

If there is a long wait for a certain bed type, bed allotment is done according to the following preference:

• Patients from M ICU, SICU, and HDU who have been advised to transfer to ward • Patients from M ICU, SICU, and HDU who have been advised to transfer to ward

• Patients admitted on a regular basis

PAYING CATEGORY

In the hospital, there are three payment options: cash, credit, and advance.

- **Cash**

Patients that pay out of pocket for their treatment and inquiry are classified as Cash Paying. These patients are charged according to the cash category charge schedule.

- **Credit**

Patients from Health Insurance companies (TPAs) who have been referred by empanel PSUs fall into this category.

Patients at the PSU

Patients are required to present a company authorisation letter, which must be handed over to the billing department at the time of admission.

Recipient of Health Insurance

Pre-admission authorisation is required for all cashless services for any planned medical treatment. • In all credit cases, it is the beneficiary's responsibility to inform and obtain credit authorization from the concerned PSU/TPA.

Advance

Patients in this category must pay a deposit with the billing department in advance. Services are available till the account amount is depleted.

DISCHARGE PLANNING

• Prior to release, the physician or treatment team will provide instructions on activity, diet, medications, precautions (if applicable), and further hospital visits. At the time of discharge, a discharge summary/advice will be handed over/explained.

• From the time the treating consultant gives discharge advise, the discharge process takes at least 3 hours. If the patient has not yet had a procedure, a referral doctor visit, or any medicine, the discharge process will begin only once the required procedure has been completed, regardless of the time of the doctor's discharge advise.Discharge process consists of finalizing of the discharge summary, pharmacy return and indent/ purchase of discharge medicine and final billing. The patient will be intimated by the Ward Incharge about the time of finalizing billing, before that he/she need not visit the billing department.

• Once the billing is completed, the billing department will provide the patient a bill receipt, which he or she must show to the sister-in-charge at the appropriate nursing counter, who will then give you your discharge summary, which will be delivered to you by your assigned sister.

E) Radiology Department :-

• The Radiology Department is a well-equipped facility with cutting-edge technology that rivals the best in the world. It's a one-of-a-kind facility with a fully working PACS and secure private cloud storage for all of our diagnostic imaging services in a totally digital environment.

- **The departments that were observed were :-**

a) X-RAY
b) CT-SCAN
c) PET-SCAN
d) MAMMOGRAPHY
e) ULTRASOUND
f) MRI

1. RADIOLOGY RECEPTION

- Appointments are done online/telephonic /walk in(if slots available)
- *No appointment needed for X-Ray .(Walk in)
- Only appointed patients are scheduled for the tests, only in just case of emergency the slot of same day or time is given to critical

2. CASH COUNTER

Billing is done:

- Either online or by physical means.
- At main cash counter or radiology reception.

X-RAY

1. X-RAY

- **Pregnant females** are not allowed .
- No fasting required
- Metallic / Jewelry wear should be removed before going for X Ray .

3. EXAMINATION ROOM

4. EXIT OF PATIENT

CT-SCAN

- **Requirements (CT-SCAN with contrast)**

1. 4 hours fasting
2. KFT report : Should not be older than 15 days .**No Requirements for (CT-SCAN without contrast)**

- ***Requirements for Interventional Procedure**

1. Pt.'s feasibility of Biopsy/FNAC is checked. If it's come out to be possible then patient is asked to go for tests like Coagulation Profile , CBC , Hb, Platelets , INR .
2. Next Day of appointment is given to patient.
3. Dr. checks the reports , if it's is under limits then, procedure is done .
4. Pt. is sent to DAY CARE for 2-3 hrs.
5. Pt's comes again in CT-SCAN department .
6. Exit of the patient

MAMMOGRAPHY and ULTRASOUND

1. MAMMOGRAPHY

- **Women- 40yrs. and above** Screening mammography every year for women, beginning at age 40.

- **Women :Below 40 yrs.:** Women who have had breast cancer and those who are at increased risk due to a genetic history should seek expert medical advice about whether they should begin screening before age 40 and about the frequency of screening.

2. USG

- **Requirements**

1. 4 hours fasting
2. Bladder should be Full .

MRI

- Avoid Any Metallic Object
- Wear Comfortable & Loose Cloth
- Inform Known Allergy
- 4-6 Hrs. Fasting for Contrast
- Inform If Pregnant
- Claustrophobia : Sedative Requires Fasting
- Any Implants: Must Inform the Doctor Before Scan
- Special Precautions for Children

3. WAITING AREA → Average waiting time : 15-20 min.

4. CHANGING ROOM → Pt. is asked to wear fresh gowns (*Ultrasound – Only In case of Breast)

5. EXAMINATION ROOM → Positioning of patient with all safety measures.

6. EXIT OF PATIENT →

- Removal of cannula if there.
- Post procedure instructions given .
- Pt. is asked to collect reports after 24 hours from Central Dispatch Counter

PROBLEMS and ISSUES IN EACH DEPARTMENT :-

1) Initial Assessment Unit :-

- On busy OPD days , the patient load increases which directly increases the load on IAU unit , which includes a Nurse , a Junior Doctor and GDA and also increases patients waiting time in patient waiting area and causes inconvenience during Rush hours .

2) Pre-Anesthetic Check –Up :-

- There were no proper signage's for PAC which caused inconvenience to patients .
- For vitals check patients had to go to other end of the floor for which no signages were there, as a result patients were confused and took longer time in the pre – anesthetic check up .
- Mismanagement of patient's file was observed .
- Increased waiting time for patient's who were further referred to cardiology .
- During observation it was found that there was only one Dr. in PAC and work load was there during rush hours and busy OPD days which impacted the patients waiting time and doctor's efficiency too .

3) Out-Patient Department :-

- During observations it was found that consultants whose OPD was there, came late which

increased waiting time of patients .

- During Rush hours, there was a chaos in patients waiting area.
- Patient who were there on 1st floor OPD had to go to ground floor for Cash counter service which caused inconvenience to patients but later on the cash counter service was started on 1st floor also.

4) <u>In-patient Department</u>

- During observations , it was found that nurses had to maintain the discharge tracker manually and it was not maintained electronically . So, errors were found in records which was entered by the on –duty nurses .
- During observations , patients complaint of :-

a) Longer waiting time between the discharge announcement and physical discharge of patients .

- Patients were not satisfied with the soft skills showed by TPA staff (Third Party Administrator) .
- Mismanagement of patient's file .

<u>RADIOLOGY DEPARTMENT :-</u>

- No Proper signages for PET Scan department .
- Less area for waiting . = Too conjusted , less no. Of chairs .
- No Guard in patient waiting area .
- Less awareness of reports available online also through RGCIcare app

- Machine's working gets disrupted
- Delay in dispatch process of hard copy of reports which causes inconvenience to patients .
- Billing / payment made by the patient doesn't show in scheduler (sometimes)
- No Rate Charts :- There is no rate chart , every single time the patient comes inside to know the rates from FDE

EXTRAORDINARY GOOD EVENTS :-

- Organized an International Women's Month Campaign in the month of March .
- Commendable soft skills of Doctors / physicians /consultants / staff /nurses / GDE etc.
- No patient is unattended.

A PROJECT

ON

Assessment of Quality Assurance in Radiology Department Of a 500 Bedded Hospital:

A Cross-Sectional Study

PART- II

PROJECT OUTLINE :-

A cross –sectional study on Assessment of Quality Assurance in Radiology Department of 500 bedded hospital – Rajiv Gandhi Cancer Hospital .

INTRODUCTION :-

- The quality of care given by Hospital Healthcare Systems across the country is receiving more attention. For the benefit of all, hospitals are searching for ways to improve their processes (services). Radiology departments must become more efficient in the face of a changing health-care system and rising competition. Because the healthcare sector is service-oriented, patient happiness is vital in all aspects of the industry. A significant bottleneck in the radiology department is timely report turnaround. It's one of the most important criteria in determining how satisfied patients are with imaging services in general. The radiology process flow is one aspect that needs to be standardised and is receiving a lot of attention in the hospital setting, because non-availability of reports on time can cause delays in diagnosis and even discharge. Delays in report generation and dispatch are caused by slow or unexpected process flow. Producing a final report on time is one way to gauge efficiency. Radiology information systems (RIS) manage work flow and collect enormous volumes of data in many large radiology centres. However, the majority of them lack the necessary analytical skills. CT (Computerized Tomography – CT Scan), MRI (Magnetic Resonance Imaging), and PET-SCAN services in hospital radiology departments generate cash. The reimbursement rates for these services are highly high, and the scan periods (particularly in CT) are relatively short, so increasing

patient capacity for these treatments has the potential to bring in significant cash to the hospital. However, as numerous outpatient diagnostic centres are being developed, patients and clinicians are drawn to its fast, efficient, no-hassle approach to imaging. This adds to the already difficult situation faced by hospitals. Reducing turnaround time for radiology reports with maximum patients satisfaction improves the efficiency , quality of patient care as well as satisfaction . For this an integrated system should be developed that allows continual monitoring of radiology work flow and thus of opportunities to apply interventions ., The deployment of the DMAIC technique can substantially improve the implementation of interventions for a faster report turnaround time. The goal of using six-sigma in healthcare is to improve the predictability of positive outcomes, whether clinical or operational, rather than to undermine the authority of radiologists, physicians, or nurses. It can be a significant aspect of the radiology department's quality management procedure.

LITERATURE REVIEW

- According to Sweety J, a prospective research was undertaken at the radiology department of a 2000-bed tertiary care hospital, where they applied Lean and Six Sigma methods to cut reporting time. A total of 120 patients were tracked for a month to see how long it took them to recover. The possible failure modes identified during the Improve phase were minimised or eliminated as a result of the steps proposed during the Improve phase. This resulted in a 42 percent reduction in scan reporting time.

- A study was carried out, according to Cavagna et al. Six Sigma was used as a methodical way to optimise the process of reporting and uploading radiological examinations, and rigorous statistical analysis was used to examine and improve procedures. In just six months, they were able to reduce turnaround times by 62 percent.

- In a study conducted by S E Seltzer, the goal was to see if total quality management approaches could be utilised to improve the quality of radiology departments by speeding up radiologists' performance on the duty of signing reports. The mean time required to sign reports fell 59 percent from 26.0 +/- 8.4 hr (mean +/- standard error) in the baseline period to 10.6 +/- 2.9 hr (in the enhanced period, p =.05) when interventions were performed and these enhancements were employed in a test system. It also improved the reporting turnaround time.

- • The imaging services cycle turnaround time (TAT) of the Radiology Department of a Tertiary care Hospital in Kolkata was investigated using a DMAIC technique, with Pareto analysis yielding the main reasons of delay in the analysing stage. During the intervention stage, practical techniques were implemented to improve patient orientation and scan readiness, reducing pre-test waiting time and streamlining processes. In the end, the reporting method helped to cut pre-test and post-test wait times.
- Antony et al. (2007) provided a summary of the outcomes and financial savings from ten healthcare businesses with six sigma initiatives. CtQs and process metrics were improved across the board. Six of the 10 companies' employees were able to forecast cost savings and/or revenue growth.

- The Commonwealth Health Corporation (Cherry and Seshadri, 2000) had major issues with long patient wait times, sluggish radiology report turnaround times, and significant downtime for radiology personnel. The CHC team began

implementing the six sigma philosophy by looking at all radiological processes during an 18-month period. The radiology phase yielded important operational outcomes: 1. During phase one, CHC saw a $800,000 reduction in total radiology operating costs. 2. Radiology procedure prices dropped by 21.5 percent, from $68.13 to $49.55 per operation. 3. Annual operating cost savings of more than $1.65 million are predicted, which are cost savings directly linked to six sigma performance improvements.4. The number of errors in the MRI ordering procedure was reduced by 90%. 5. When waiting and exam times were reduced, patient satisfaction improved. 6. The department's total patient volume grew by 25% while staffing was reduced by 14 FTEs.

- According to Taner, Mehmet Tolga, a study was undertaken in a private Turkish hospital with the goal of using Six Sigma methodology to enhance workflow by eliminating the causes of failure in the medical imaging department, using data collected over a four-month period. Six sigma process optimization and workflow modifications have a demonstrable influence on service cost and quality.

- According to Anthony R. Benedetto of M. D. Anderson Cancer Center. They rapidly discovered that each step had not been optimised when they used six sigma approaches to increase our CT throughput. Patient preparation times, for example, have been lowered from 45 minutes to less than 5 minutes in several circumstances. With no extra machines or shifts, the initial boost in throughput was a 45 percent increase in examinations.

RATIONALE :-

- A hospital's radiology department must become more efficient in the face of changing healthcare systems and rising competition. This project will teach us how to use DMAIC to better identify the features of present radiology processes that are limiting the radiology department's capacity to adequately insure the referral base for PET-SCAN, CT, and MRI services.

RESEARCH QUESTION:-

Q. What are the bottlenecks or gaps in existing process flow of radiology department of 500 bedded hospital that are hindering the quality of services and overall patients satisfaction and roadmap for improving the quality of services ?

OBJECTIVES:-

a) To study and document the existing process flow of the department

b) To find the deficiencies or gaps hindering the quality of services

c) To suggest a roadmap for improving the quality of services

Goal Statement **:-** The goal of the project is :-

- To provide a standardized technique for reducing the time it takes to produce a report.
- Increasing patient satisfaction

Project Objectives :- Objectives for this project:-

• Analyze the current process flow

• To collect data in order to determine the scope of the problem.

• Analyze the information and compare it to the typical procedure.

• Provide a project plan to increase the number of procedures offered on a daily basis in

the areas of PET-SCAN, MRI, and CT in order to optimise process flow and develop appropriate solutions.

• Provide a project timeline to improve patient satisfaction.

• Proper monitoring of findings to ensure their long-term viability.

RESEARCH METHODOLOGY:-

- Study design: Cross-sectional study
- Study area: Radiology Department (RGCIRC)
- Study population: Patients (PET SCAN , CT SCAN , MRI)
- Sampling: Convenience Sampling
- Sample size: 420 patients
- Data collection: Both primary and secondary
- **Primary Data** : Structured Questionnaire for patients Perspective
- **Secondary Data** – Systems And Records
- Data Collection Tool :- Microsoft Excel

- Study Tools :- DMAIC

Define Phase	Measure Phase	Analysis Phase	Improvement Phase	Control Phase
1. SIPOC 2. Process Mapping 3. Voice of Customers	1. Critical to quality 2. Data Collection Plan	1. Fishbone Analysis 2. Data Analysis 3. Process Analysis 4. Summary Of Problems	1. Process Redesigning 2. Recommendations 3. Improvement Plan	1. Continuous Monitoring and training of staff

- Study duration :- 30 days

- Study Framework :- DMAIC was used in the study framework. Here DMAIC theory was applied .

- Exclusion Criteria : Sundays and gazette holidays were excluded from the observations

  Patients tested after 6:00 PM were excluded from the observations

- Inclusion Criteria :

a) The variables chosen were the – (For PET-SCAN) -OPD/IPD , In-Time , Injection Time , Scanning Time , Reporting Time , (For CT and MRI)- OPD/IPD , In –time , Scanning Time , Reporting Time , Reports Approval Time and Reports validation time .

b) Scheduled Patients (OPD , IPD) and emergency cases , and in urgent case IPD patient was preferred over the scheduled OPD case .

c) Cases which were performed during 9:00 AM – 6:00 PM .

d) Customers / Patients for feedback

- Study Location: -

(a) This study moves abreast with time, and data was collected from the samples known as cross sectional study done from 18th March to 18th April in Rajiv Gandhi Cancer Institute andResearch Centre.

(b) The Observed Radiology Departments i.e. PET-SCAN and CT-SCAN was on Ground Floor and MRI on 2nd Floor .

Potential Outcomes :-

- During the study, collection of data would be done and further analyzed with the help of DMAIC.
- The gaps found within the process will be further monitored and recommendations will be given

- Interventions will be placed in order to fulfill the final results of decreasing Turnaround time and further increase the patients overall satisfaction.

OSERVATIONS :-

Operational Definitions	
1. Requisition Slip	The HIS records the date and time the OPD patient enters the Radiology department, pays for the test, and receives a requisition number.
2. Prep time/ Waiting time	Time between the end of the requisition and the entrance of the patient into the test room .
3. Patient goes inside scan room	When the patient walks inside the scan room for the first time.
4. Scan starts	The process of scanning starts
5. Scan ends	The process of scanning ends
6. Patient leaves	The patient leaves the scanning room physically.
7. MT receives the report	After the Radiologist has completed the report, MT receives it for typing.
8. Typing commencing and completion	The beginning and end times of MT typing
9. Signoff	The Consultant Radiologist has signed off on a typed, amended report.
10. Post test waiting time	The time it takes for a patient's report to be generated after he or she leaves the scan room.

11. Report generated	When the report has been typed and signed off by the radiologist, it is considered complete.
12. Delivered at reception	The period when the technician finishes assembling the report and sends it to reception.

FINDINGS :-

1. **DEFINE PHASE :-**

• The radiology project began with the creation of a project charter to determine why the project was needed, why it was needed now, and what the costs of doing nothing were. A SIPOC5 (Suppliers, Inputs, Process, Outputs, Customers) diagram was created, and critical to quality (CTQ) components were identified by looking at the Voice of the Customer (VOC). This phase's findings are summarised below.

Problem Statement:

- Lack of an uniform process flow and late results reporting (increased TAT) have a detrimental influence on the hospital referral base, resulting in lower customer satisfaction, fewer revenue opportunities, and patient loss.

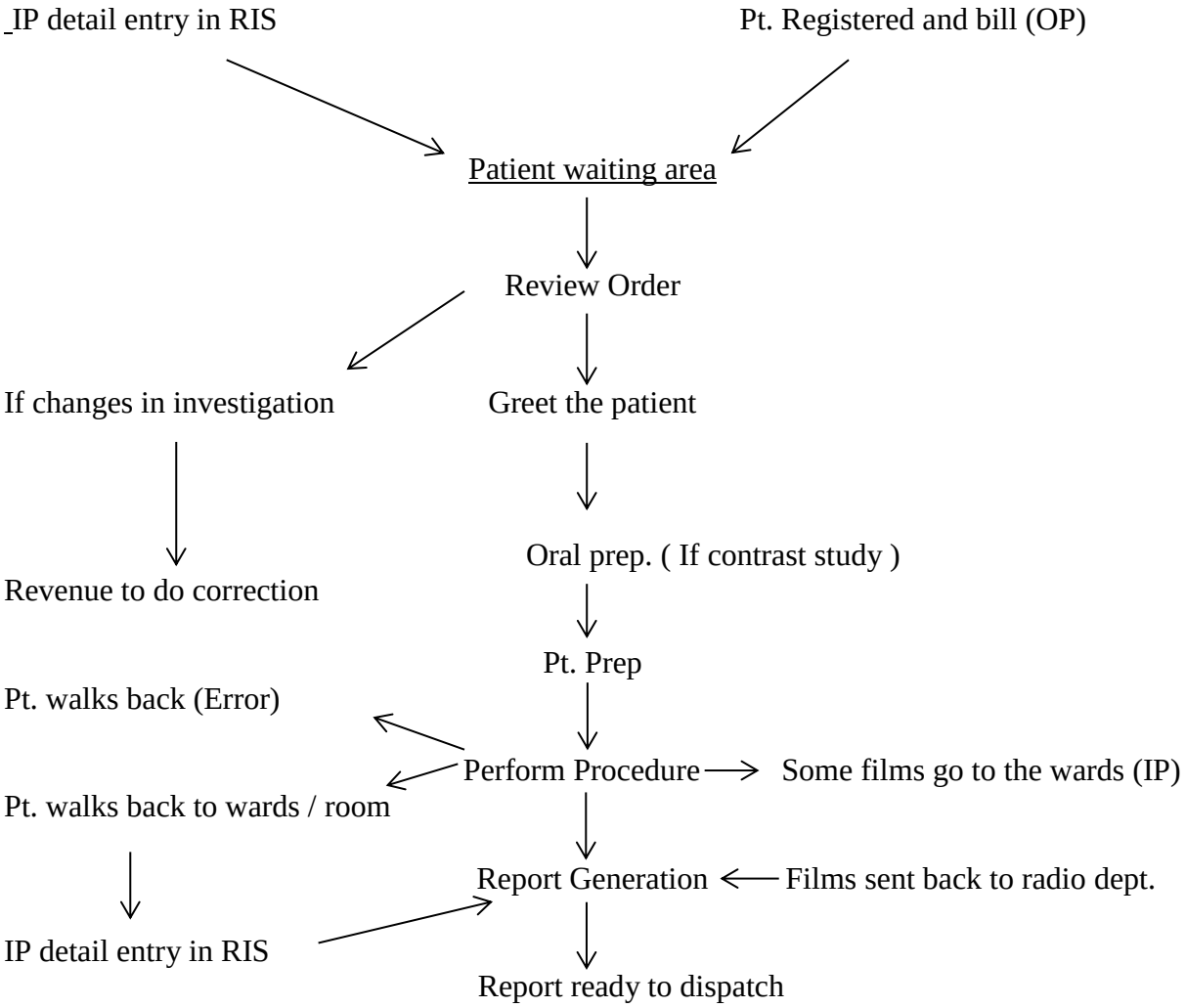
Table No. 1 : SPOC Diagram (Supplier- Input-Process- Output- Customer Diagram)

Supplier	Input	Process	Output	Customer
a) Inpatient Departments b) OPD Counter c) Emergency	2. Inpatient staff (correct information of patient-addressograph),Complete information related to patient (history –current health status , concerned doctor , type of investigation , expected bill) 3. Housekeeping staff (for carrying the patient towards / for investigation of patients , staff for taking the patients report to doctors) 4. Revenue Department (cash counters) – For billing of inpatients . 5. Outpatient staff (billing of inpatients , customer care staff) 6. BME for machine caliberation 7. IT department for maintaining RIS 8. Report Transcriptionist	Test Performed ↓ Report Printed ↓ Report Delivered	Report Delivered on Time	Doctors Nursing Staff Technician Staff

This SIPOC diagram is followed by the process mapping at the radiology department

PROCESS MAPPING :-

Figure No. 1 : Showing Process Mapping of Radiology Department



VOICE OF CUSTOMERS (Patient Feedback)

Voice of customers was obtained in order to identify the major areas of concerns in the department . For this feedback form was used to measure the voice of customers which can be seen in annexure

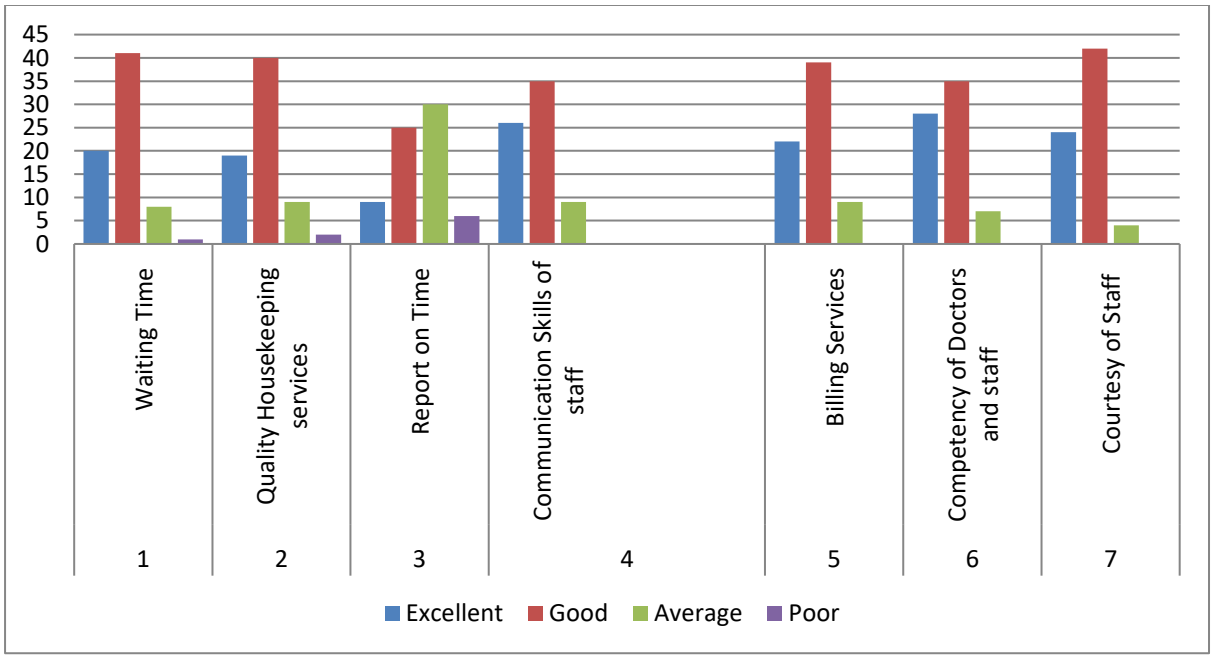
Sample Size : 70 (Average of 210 patients from 3 radiology departments)

Table No. 2 : Voice of customers showing patient feedback

	Quality Indicator	Excellent	Good	Average	Poor
1	Waiting Time	20	41	8	1
2	Quality Housekeeping services	19	40	9	2
3	Report on Time	9	25	30	6
4	Communication Skills of staff	26	35	9	0
5	Billing Services	22	39	9	0
6	Competency of Doctors and staff	28	35	7	0
7	Courtesy of Staff	24	42	4	0

- **Most dissatisfying feedback is for reports on time** .

Graph No.1 : For Voice of Customers showing patients Feedback



From the voice of customers , 5 factors critical to quality were derived on the basis of performance .

Factors Critical to Quality (CTQ) : Total 5 factors were identified

Table No. 3 : Factors Critical to Quality

Sr. No.	Factors
1	Reports on Time
2	Waiting Time
3	Quality of Housekeeping services
4	Communication Skills
5	Billing Services

2. MEASURE PHASE :-

After viewing the process map , voice of customers and CTQ the factor that became primary performance indicator needed to evaluate patient satisfaction was timely reporting of results . A total of 30 days was collected for the three different investigations . Analysis of the current process showed that average turnaround time for various investigations calculated was as follows .

Table No. 4 : Average Turnaround time for PET-SCAN , CT- SCAN and MRI

INVESTIGATION	PET-SCAN (HH:MM:SS)	CT-SCAN (HH:MM:SS)	MRI (HH:MM:SS)
Calculated Average TAT	28:07:31	18:59:18	18:46:16

A data timeline (in HH:MM)=

PET-SCAN	CT-SCAN	MRI
In-Time ↓ 0: 46 min. Injection Time ↓ 1:17 min. Scanning Time ↓ 26:30 min. Reporting	In –Time ↓ 15 Min. Scanning Time ↓ 18: 43 min. Reporting ↓ 7:53 min. Reports Approval ↓ 7:45 min. Reports Validation	**In- Time** ↓ 13min. Scanning Time ↓ 19:29 min. Reporting ↓ 16:45 min. Reports Approval ↓ 1:55 min. Reports Validation

- According to SOP , TAT for PET-SCAN is 30 hours .
- According to SOP , TAT for CT-SCAN is 24 hours
- According to SOP , TAT for MRI is 24 hours .

A) Data Measurement for PET –SCAN :-

Table No. 5 : PET –SCAN showing Average TAT

Avg. TAT (OPD)	28:18:31
Avg. TAT (IPD)	27:23:22
TOTAL Avg. TAT (IPD+ OPD)	28:07:31

Table No. 6 : PET –SCAN showing MeanTAT

Category	Size	Mean TAT (hrs.)
OP	59	27.83
IP	11	27.36
Total (OP+IP)	70	28.11

Table No. 7: Showing TAT Ranges for OP and IP cases of PET-SCAN

Range in hours for average TAT	OP cases	OP Avg TAT (HH:MM:SS)	IP cases	IP Avg. TAT (HH:MM:SS)
0-12 hours	00	28:18:31	00	27:23:22
12- 24 hours	04		02	
24- 30 hours	35		05	
More than 30 hours	20		04	

Table shows the number of OP and IP cases for the range of 6 hrs. Mean TAT for OP cases came in the range of 24- 30 hours and mean TAT for IP cases came in the range of 24-30 hours.

B. Data Measurement for CT-SCAN

Table No. 8 : Showing CT- SCAN Average TAT

Avg. TAT (OPD)	19:43:17
Avg. TAT (IPD)	16:15:04
TOTAL Avg. TAT (IPD+ OPD)	18:59:18

Table No. 9 : CT-SCAN showing Mean TAT

Category	Size	Mean TAT (hrs.)
OP	56	20
IP	15	16.23
Total (OP+IP)	71	19

Table No. 10: showing TAT Ranges for OP and IP cases CT-SCAN

Range in hours for average TAT	OP cases	OP Avg TAT (HH:MM:SS)	IP cases	IP Avg. TAT (HH:MM:SS)
Within 2 hours	2	19:43:17	1	16:15:04
2 hours – 12 hours	17		6	
12 hours – 24 hours	23		2	
1-2 days	9		6	
More than 2 days	4		0	

Table shows the number of OP and IP cases for the range of 12 hours . Mean TAT for OP cases came in the range of 12-24 hours and mean TAT for IP cases came in the range of 12-24 hours .

C. Data Measurement for MRI :-

- **Table No. 11 : MRI showing average TAT**

Avg. TAT (OPD)	19:01:07
Avg. TAT (IPD)	17:05:40
TOTAL Avg. TAT (IPD+ OPD)	18:46:16

- **Table No. 12 : MRI showing mean TAT**

Category	Size	Mean TAT (hrs.)
OP	61	19
IP	9	17
Total (OP+IP)	70	19

Table No. 13: showing TAT Ranges for OP and IP cases MRI

Range in hours for average TAT	**OP cases**	**OP Avg TAT** (HH:MM:SS)	**IP cases**	**IP Avg. TAT** (HH:MM:SS)
Within 2 hours	5	19:01:07	0	17:05:40
2 hours – 12 hours	15		3	
12 hours – 24 hours	20		4	
1-2 days	22		2	
More than 2 days	0		0	

Table shows the number of OP and IP cases for the range of 12 hours and 10 hours respectively . Mean TAT for OP cases came in the range of 12-24 hours and mean TAT for IP cases came in the range of 2-12 hours .

- **ANALYSIS PHASE**

a) Process analysis

b) Fishbone Analysis

c) Data Analysis

A) PROCESS ANALYSIS

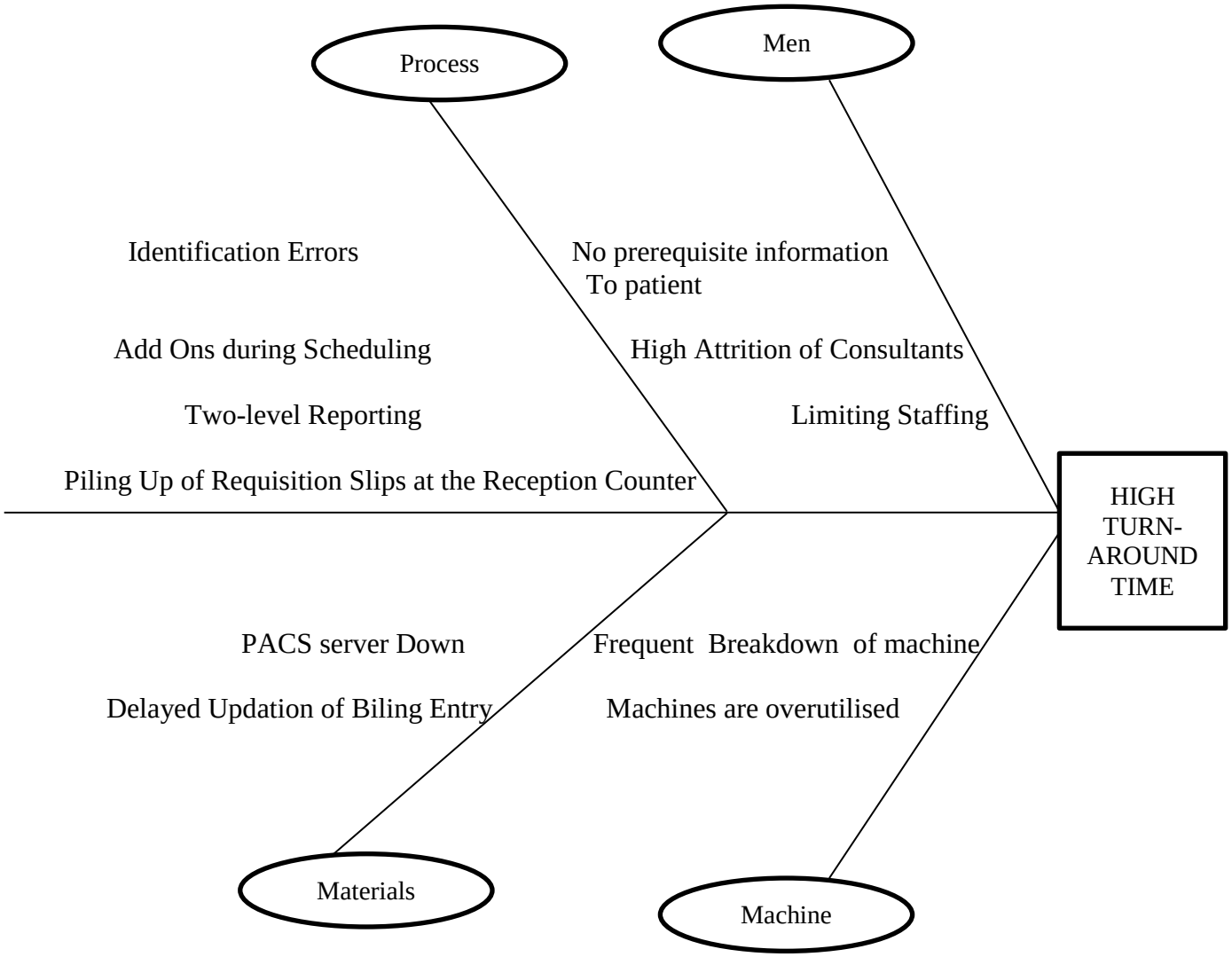
Table No. 14 : Showing Process Aanalysis

STEPS	PROCESS FLOW	ANALYSIS
1	Patient Registration 	(OP) Outpatient gets the registration done . (IP) In patient comes to radiology from ward / room . Sometimes there is no prior information about the IP patient which creates a confusion during patient registration . There is no specific protocol for taking a mid-night census and handover to radiology department for the next day investigations. So radiology staff is unaware about the patient load on daily basis . In some of the cases , investigation requisition details are not entered into HIS before the test and entry is done only after investigation is over . Without the entry , report cannot be prepared . At times this gets delayed and affects TAT. (Critical) patient from emergency may be an outpatient or may be admitted so a confusion always remain regarding the registration (OP/IP) as without registeration investigation can be done in some cases but report cannot be generated . This causes increase in report turnaround time . In some cases , patients billing scheduler was not updated which always created a confusion and process used to get delayed . There used to be chaos during Rush hours so , this was also a reason during delayed or increased TAT during patients registration .
2	Patient walks to waiting room	(OP) Outpatients after getting the registeration done wait for some time till their number comes . (IP) Inpatient prior phone call is done whether the

		staff is free or not . But sometimes it is seen that , IP patient often gets late due to unavailability of housekeeping staff or mismanagement of file which becomes a reason for delayed TAT and outpatients waiting time also increases .
3	Greet the patient with review of order 	In case of inpatients , review order takes more time , as the requisition forms are not fully filled . Due to this the radiologists has to confirm from the sending department regarding all types of investigations . This allows patient to wait more in the department . In some cases , the radiologists demands some different investigations to be done . For this nursing staff sends a investigation mail to revenue . After correction a fresh entry is made in HIS . Delay in entry causes delay in more report preparation .
4	Preparation in case any contrast study 	
5	Patient Preparation 	

6.	Procedure Preparation 	Time take for different investigation varies . Especially in contrast studies , I takes more time for the procedure .
7.	Report preparation with senior consultant signature 	In many investigations like CT-SCAN and MRI , Firstly the junior doctor reviewed the report and then after a gap of 1 or 2 hours the senior doctor signed the report after reviewing it . So , the whole process took a lot of time which resulted in delayed TAT . Less no. of transcriptionist was available for report preparation . This creates a chaos situation esepecially in the morning hours when the patient load is more . In IP / Emergency cases , sometimes films are sent to consultant for review . But there is no specific timeline to send the films back to radiology . Without the film report cannot be generated . It affects the TAT .
8.	Report Dispatch	In IP cases , at times due to shortage of the housekeeping staff , reports are not been sent to wards through they are ready for dispatch . In OP cases , due to glitch in the HIS billing scheduler , the reports are not given to the patient

B. Figure No. 2 : Fishbone Analysis



C. DATA ANALYSIS

1. PET- SCAN

Table No. 15 : Showing percentage of patients who failed to follow the SOP for TAT for PET-SCAN

Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
PET – SCAN (OP)	59	20	33%
PET – SCAN (IP)	11	4	36%
PET –SCAN (OP+IP)	70	24	34%

- 24 cases out of 70 cases in PET- SCAN shows that 34 % patient received the reports after 30 hours .

2. CT-SCAN

Table No. 16: Showing percentage of patients who failed to follow the SOP for TAT for CT-SCAN

Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
CT – SCAN (OP)	56	19	34%
CT – SCAN (IP)	15	6	40%
CT –SCAN (OP+IP)	71	25	35%

- 25 cases out of 71 cases in CT- SCAN shows that 35% patient received the reports after 24 hrs.

3. MRI

Table No. 17: Showing percentage of patients who failed to follow the SOP for TAT for MRI

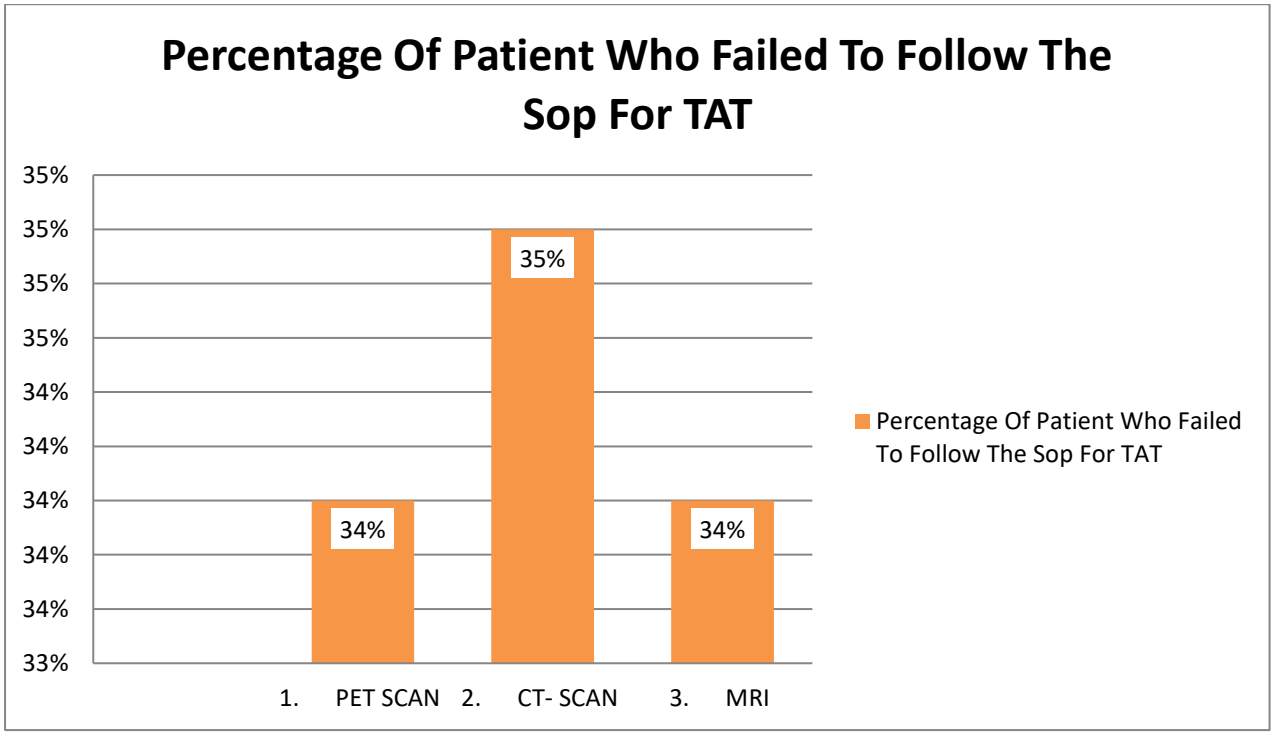
Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
MRI (OP)	61	22	36%
MRI (IP)	9	2	22%
MRI (OP+IP)	70	24	34%

- 24 cases out of 70 cases in MRI shows that 34% patient received the reports after 24 Hrs.

Table No. 18 : Showing Percentage of patients who failed to follow the SOP for TAT

Category	Percentage Of Patient Who Failed To Follow The Sop For TAT
1. PET SCAN	34%
2. CT- SCAN	35%
3. MRI	34%

Graph No. 1 : Showing % of patients who failed to follow the SOP for TAT in Radiology Department



- 34% cases in PET-SCAN, 35% cases in CT-SCAN and 34% cases in MRI do not meet customer's expectation. .

- After doing the process analysis , fishbone analysis and data analysis , the following independent variables were identified determining the CTQ (higher TAT) behavior .

Table No. 19 : Showing Independent Variables determining Higher TAT

S.No.	Variables
1.	Identification Errors
2.	Add On of IP patients during Scheduling
3.	Two-level Reporting (NO DIRECT REPORTING TO SENIOR CONSULTANT)
4.	Piling Up of Requisition Slips at the Reception Counter
5.	High Attrition of Consultants
6.	Limiting Staff
7.	PACS server Down
8.	Frequent Breakdown of machine
9.	Delayed Updation of Billing Entry
10.	Machines are overutilised

4. IMPROVEMENT PHASE

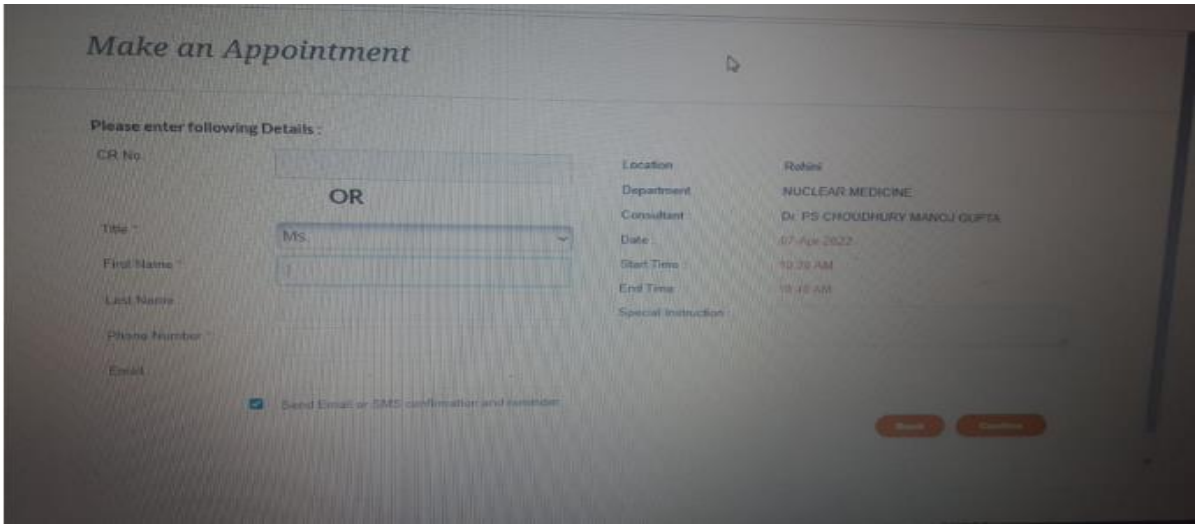
RECOMMENDATIONS :-

- Installations of new machines, as it can directly increase the efficiency of the radiology department and can solve the purpose for frequent breakdown of machines .
- Salaries of the consultants and staff should be revised, to avoid the problem like high attrition rate.

- As it was observed that IP schedule interferes with OP schedule , IP schedule should be sent to radiology department early morning or after the rush hours gets over .

- As it was observed that some patient's didn't know about the pre-requisites like Fasting for 4-6 hours (like for PET-scan and CT- Scan (Contrast studies) so , they had to wait for longer hours to get the procedure done which directly increased the TAT so for this – A small booklet should be there which should include all the pre-requisites for all the radiology departments that should be followed by the patient before coming for the test in both English and Hindi .

OR



If the patient is scheduling an appointment online then after the End Time which is mentioned there should be a box of INSTRUCTIONS for patients coming for a particular procedure with all the pre-requisite information like how much time the procedure will take , waiting time , Fasting hours , Pre- Instructions , Post – Instructions of the procedure .

- **<u>For Two – Level of reporting</u>** i.e. reports gets approval from junior doctor and then after few hours or mints. it gets validated from senior doctor so for this Direct report to senior consultant is recommended so that it decreases the time gap between the Reports approval and reports validation . There should be single level of reporting.

- Continuous flow of requisition slips by the front desk executive through a housekeeping staff should be encouraged so that it can be sent timely to the console room where radiologist sits.

- More no. of consultants , transcriptionists should be hired so that the work load can be divided equally and efficiency would be greater .

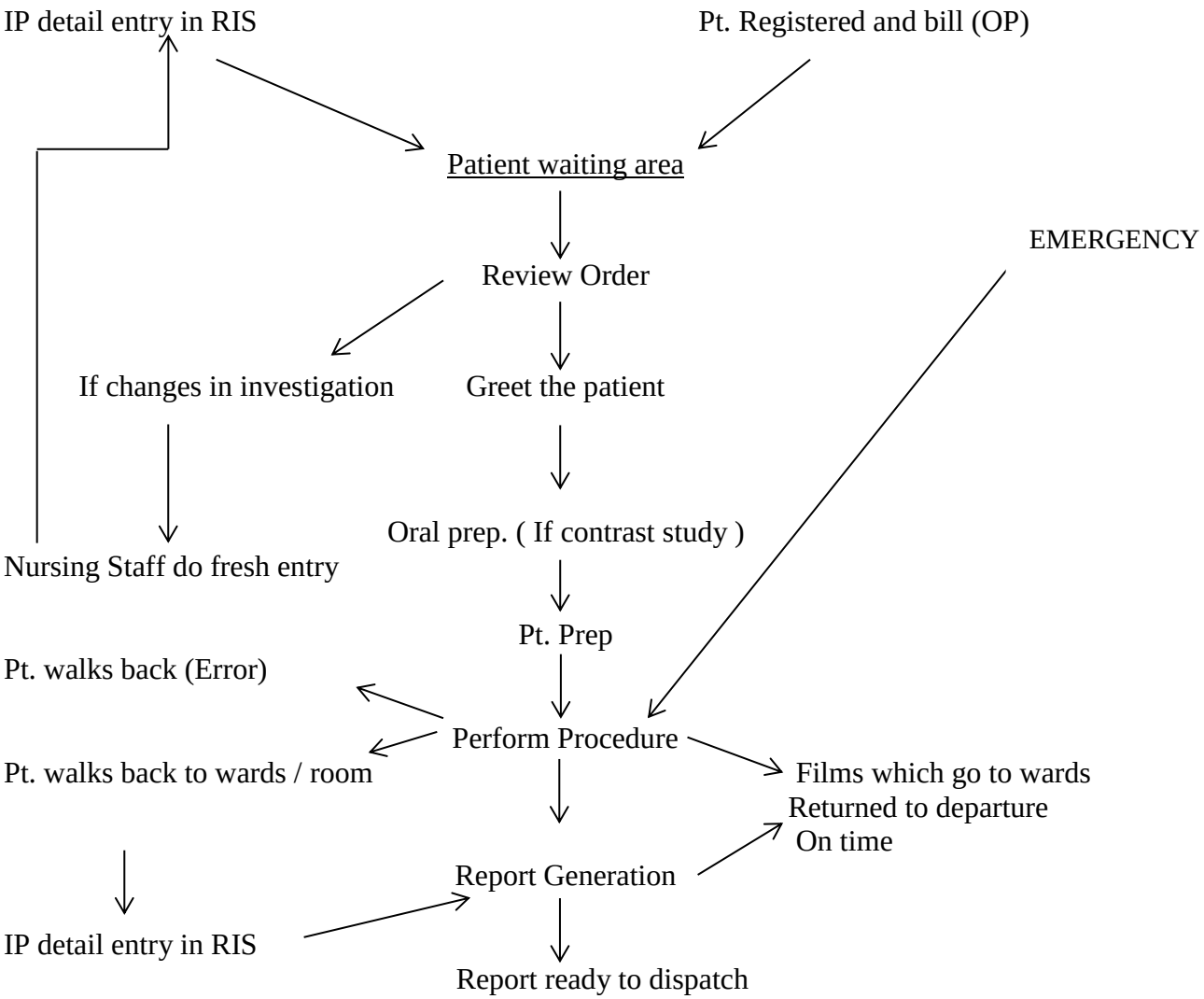
- The IT department should be informed immediately when PACS server is down so the issue cannot delaythe entire reporting cycle.
- Weekly or Monthly Monitoring for smooth / undisrupted working of machine . Overutilization of machines should be avoided , to increase the efficiency of machines .
- The technical glitch that hinders the billing entry or updation of billing should be solved immediately so that the the process of billing is not hindered .
- To change the policy for report dispatch as per the requirement of SOP for TAT .
- Training to be given to nursing and technician staff in radiology department about the guidelines of SOP for TAT , also how to calculate it accurately .

Possible Improvements Done

- Installations of a new CT-SCAN and MRI machine .
- Weekly Monitoring of Machines to avoid the Disruption .
- Technical Glitch that used to be in the HIS which disrupted the updation of billing entry was corrected .
- **Major Improvement done was** :- Single level of reporting was implemented that is senior consultants can directly review the reports and can directly approve it .
- Salaries of the consultants got revised which helped in lowering the attrition rate .

PROCESS REDESIGNING :-

After doing the necessary improvements , a new process map was designed .



Data Measurement after Improvements :

- After implementing some of the possible solutions and redesigning the process flow , a fresh set of data was collected for 20 days for 3 different investigations (PET-SCAN – 70 cases , CT- SCAN – 70 cases and MRI – 70 cases). Analysis of the new process showed that average turnaround time for various investigations calculated was as follows :-

- **Table No.20 : Average Turnaround time for PET-SCAN , CT- SCAN and MRI**

INVESTIGATION	PET-SCAN (HH:MM:SS)	CT-SCAN (HH:MM:SS)	MRI (HH:MM:SS)
Calculated Average TAT	24:02:00	15:45:06	12:30:18

- **Table No. 21 : Showing percentage of patients who failed to follow the SOP for TAT for PET-SCAN (after improvement)**

Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
PET – SCAN (OP)	55	14	26%
PET – SCAN (IP)	15	3	20%
PET –SCAN (OP+IP)	70	20	29%

- 20 cases out of 70 cases in PET- SCAN shows that 29% patient received the reports after 30 hours .

Table No. 22 : Showing percentage of patients who failed to follow the SOP for TAT for CT-SCAN (after improvements)

Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
CT – SCAN (OP)	58	16	28%
CT – SCAN (IP)	12	2	16%
CT –SCAN (OP+IP)	70	18	25%

- 18 cases out of 70 cases in CT- SCAN shows that 25% patient received the reports after 24 hrs.

- **Table No. 23: Showing percentage of patients who failed to follow the SOP for TAT for MRI (after improvements)**

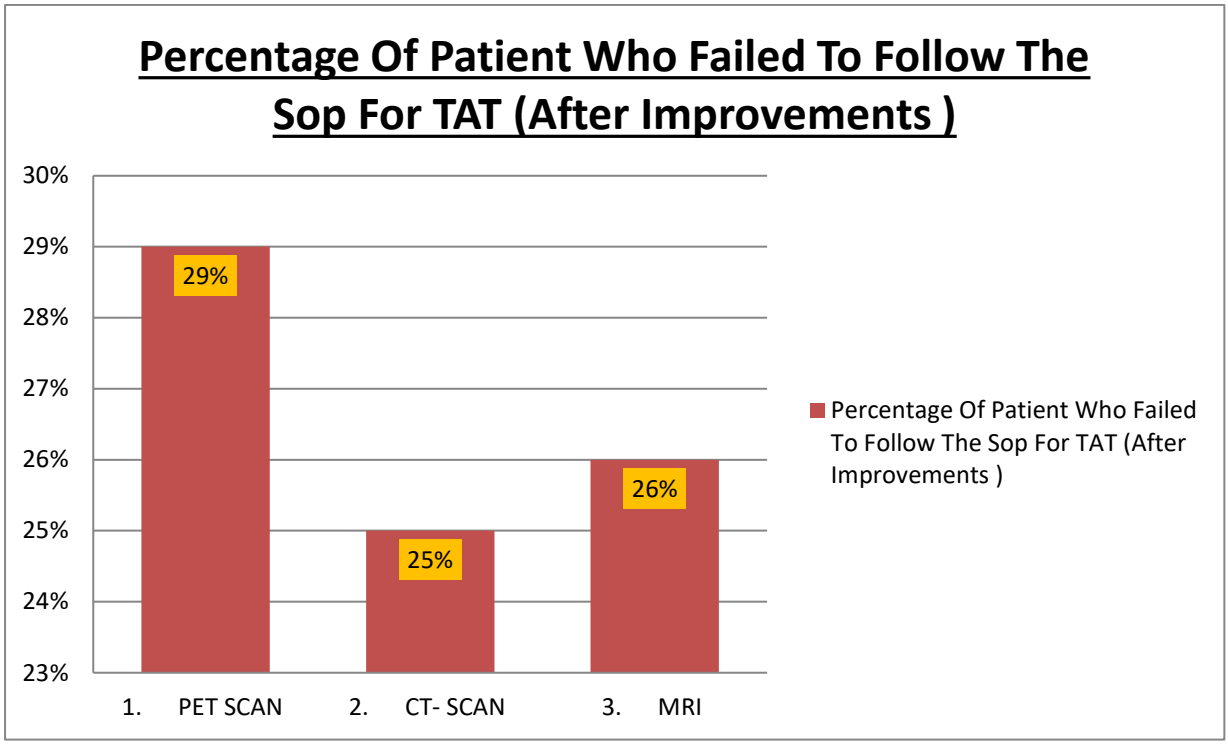
Category	No. of patients observed	No. of patients who failed to follow the SOP for TAT	PERCENTAGE
MRI (OP)	57	16	28%
MRI (IP)	13	3	23%
MRI (OP+IP)	70	18	26%

- 18 cases out of 70 cases in MRI shows that 26% patient received the reports after 24 Hrs.

Table No. 24 : Showing Percentage of patients who failed to follow the SOP for TAT

	Percentage Of Patient Who Failed To Follow The Sop For TAT **(After Improvements)**
5. PET SCAN	29%
6. CT- SCAN	25%
7. MRI	26%

- **Graph No. 2 Showing percentages of patient who failed to follow the SOP for TAT (After improvements)**



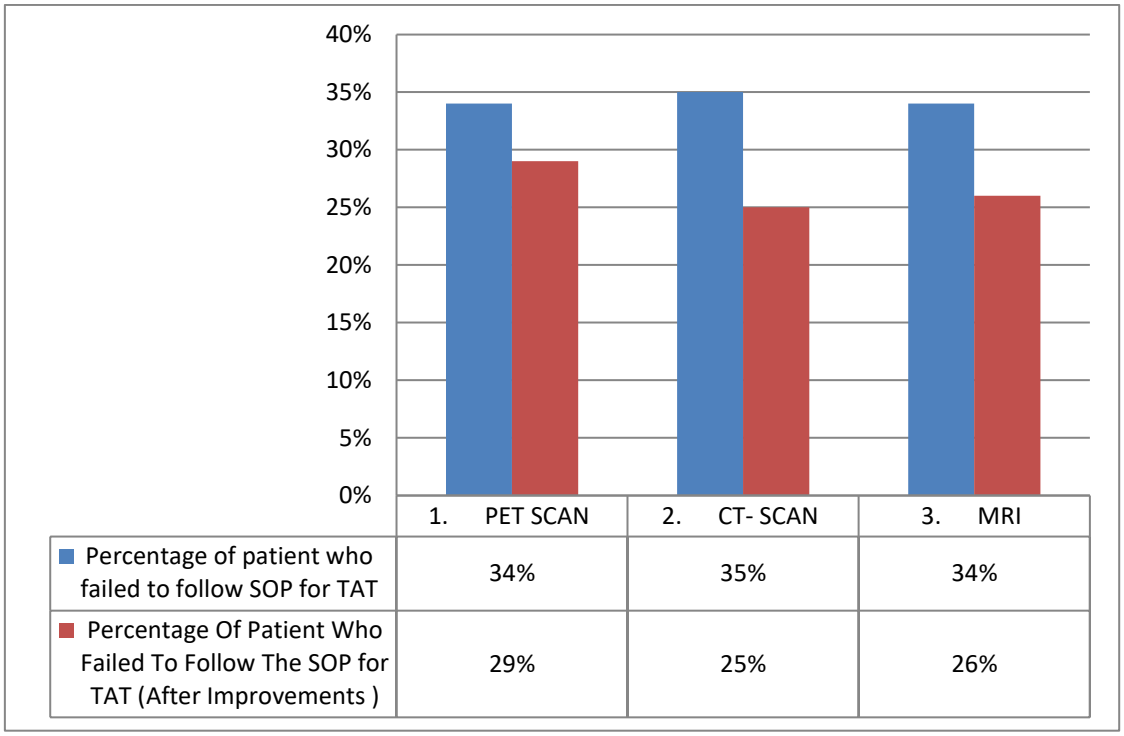
29% cases in PET-SCAN, 25% cases in CT-SCAN and 26% cases in MRI do not meet customer's expectation after improvements were implemented .

Table No. 25 : Showing comparative analysis of performance before and after improvements were implemented

Category	Percentage of patient who failed to follow SOP for TAT	Percentage Of Patient Who Failed To Follow The SOP for TAT (After improvements)
PET –SCAN	34%	29%
CT- SCAN	35%	25%
MRI	34%	26%

- PET –SCAN : showed 5% of improvement
- CT-SCAN : showed 10% of improvement
- MRI : showed 8% of improvement

Graph No.3 : Showing Performance of PET SCAN , CT- SCAN and MRI after Improvements were implemented in terms of %



	1. PET SCAN	2. CT- SCAN	3. MRI
Percentage of patient who failed to follow SOP for TAT	34%	35%	34%
Percentage Of Patient Who Failed To Follow The SOP for TAT (After Improvements)	29%	25%	26%

5. CONTROL PHASE :-

- For ensuring sustainable results , changes were imbedded in departmental processes .
- Continuous Monitoring would be done using control charts and it is expected that radiology turnaround time will continue to decrease as volume goes up .

6. LIMITATIONS :-

- Due to shortage of time , patient satisfaction analysis could not be done after the improvement phase of the project .
- Due to unavailability of a proper radiology information system , there is no proper

maintenance of In and Out timings of patient in RIS which could actually help in measuring the patient waiting time for the investigation .

7. CONCLUSIONS :-

The project " Assessment of Quality Assurance in Radiology Department Of 500 Bedded Hospital: A Cross-Sectional Study " was started around 3 months back . In the initial phase , the main problem statement was defined using Voice of customers and internal department assessment . Later data was collected for 30 days and average TAT (HH:MM:SS) for PET-SCAN (28:07:31) , CT-SCAN (18:59:18) and MRI (18:46:16) . In the analysis phase when we calculated the percentage of patients who failed to follow SOP for TAT ; PET –SCAN (34%) , CT-SCAN (35%) and MRI (34%) . As a result overall process was analysed andwas modified as per the need in the improvement phase . A fresh data was again collected for 20 days which was compared with the data before improvements . The results were great . Average TAT for all the investigations got reduced , PET –SCAN (24:02:00) , CT-SCAN (15:45:06) and MRI (12:30:18) and percentage of patients who failed to follow SOP for TAT also got reduced ; PET –SCAN(29%) , CT-SCAN (25%) and MRI (29%) .In the control phase , continuous monitoring would be there for the various improvements done in order to have sustainability in the results .

8. REFERENCES :-

1. . Cherry, J. and Seshadri, S. (2000), "Six Sigma: using statistics to reduce process variability and costs in radiology", Radiology Management, November-December, pp. 42-5.

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3. "Implementing Lean Six Sigma Methodologies in the Radiology Department of a Hospital Healthcare System". Jamie Workman-Germann, Purdue University, Regenstrief Center for Healthcare Engineering,2007, pp. 5

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9. ANNEXURE :-

- **ANNEXURE -1 :** During Voice of Customers the patients were asked for their consent before taking their feedback

CONSENT FORM

My name is Dr. Angika Tiwari and I'm here to collect data for the purpose of assessing existing process flow and to find the deficiencies or gaps hindering the quality of services in radiology department of Rajiv Gandhi Cancer Institute and Research Centre. The information you provide will help us in identifying the gaps in quality of services which are a cause of concern for patients and improving the same for patients convenience that are being provided in Radiological Department. You will be interviewed on some questions for about 10 minutes. You have the right to participate in, refuse as well and drop out of the study at any time you want. The research has no associated risk and no compensation will be given for the time you spent with us. I hope you will agree to participate since your information is important to successful accomplishment of the study.

May I begin the interview now

1. Agree

2. Not agree

Thank you for your willingness to participate in this study

FEEDBACK FORM

This feedback forms is designed specifically for patients coming to radiology department at Rajiv Gandhi Cancer Institute and Research Centre, Delhi. The purpose of the survey is to analyze the satisfaction level of patients. Your specific answers , in contribution with those of others are extremely important to us . So , please take a few minutes to complete this feedback form .

Patient's Name :-

Phone No. :-

CR No. :-

- Tick the answer you find the most appropriate.

E=Excellent G=Good A=Average P=Poor

	Excellent	Good	Average	Poor
1. Opinion about waiting Time before the procedure to be done .				
2. Opinion about the competence level of Doctors and staff				
3. Opinion about the quality of housekeeping services				
4. How do you grade the report availability on time ?				
5. Opinion about the communication skills of staff members .				
6. Give your opinion about the courtesy of staff members .				
7. Opinion about billing services				

Any Suggestions

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