DISSERTATION REPORT

AT

MAX SMART HOSPITAL SAKET, DELHI

A Descriptive Study to assess the Turnaround Time of Radiology Department and improvement of quality of service in Max Healthcare, Saket

BY

DEEPANSHU

PG/21/028

UNDER THE GUIDANCE OF

DR AYESHA Z SIDDIQUI

DR PUNEET YADAV

PGDM (Hospital & Health Management)

2021-23

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT AND RESEARCH, NEW DELHI

The certificate is awarded to

DEEPANSHU

In recognition of having completed her Dissertation in the Operations Department.

And successfully completed her project on

A Descriptive Study to assess the Turnaround Time of Radiology Department and improvement of quality of service in Max Healthcare, Saket

1ST March 2023- 31st April 2023

AT

Max Healthcare, Saket

Comments:
……
……..……
…….

DR AYESHA Z SIDDIQUI

PRINCIPAL CONSULTANT RADIOLOGY,

MAX SMART HOSPITAL SAKET,

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Deepanshu student of PGDM (Hospital and Health Management) from International Institute of Health Management Research; New Delhi has undergone internship at Max smart Hospital Saket, Delhi 1st March 2023- 31st April 2023.

The candidate has successfully carried out the study designed to her during dissertation and her approach to the study has been sincere and analytical.

The internship is in fulfilment of the course requirements. We wish her all the success in all her future endeavors.

Dr. Sumesh Kumar
Dean Academic and Student Affairs,
IIHMR, DELHI

Dr. Puneet Yadav Dean,
Professor, IIHMR, DELHI.

CERTIFICATE OF APPROVAL

The following dissertation titled **"A DESCRIPTIVE STUDY TO ACCESS THE TURNAROUND TIME OF RADIOLOGY DEPARTMENT AND IMPROVEMENT OF QUALITY OF SERVICE IN MAX HEALTHCARE ,SAKET "** is hereby approved as a certificate study management carried out and presented in manner satisfactorily to warrant is acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only the purpose it is submitted.

Dissertation Examination Committee for evaluation of the dissertation.

o

Names:	**Signature:**
DR. RATIKA	
DR Sumant Sarvai	
Jacob Punyal	

CERTIFICATE FROM DISSERTATION ADVISORY COMMITTEE

This is to certify that Deepanshu, a graduate student of PGDM (Hospital and Health Management) has worked under the guidance and supervision. He is submitting her dissertation titled "**A Descriptive Study to assess the Turnaround Time of Radiology Department and improvement of quality of service in Max Healthcare, Saket** in partial fulfilments of the requirements for the award of the PGDM (Hospital & Health Management). This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Institute Mentor: Dr. Puneet Yadav

Organization: IIHMR, Delhi

Org. Mentor: DR AYESHA Z SIDDIQUI

Designation: Principal Consultant Radiology,

Organization: Max Smart Hospital

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

NEW DELHI

CERTIFICATION BY SCHOLAR

This is to certify that the dissertation titled "**A Descriptive Study to assess the Turnaround Time of Radiology Department and improvement of quality of service in Max Healthcare** at **Max Hospital** submitted by Deepanshu Enrollment No. PG/21/028 under the supervision of Dr Ayesha Z Siddiqui, Dr. Puneet Yadav for award of PGDM (Hospital and Health Management) of the Institute carried out during the period from 1st March 2023 to 31st April 2023 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.

Deepanshu

Annexure F

FEEDBACK FORM

Name of the Student: DEEPANSHU.

Name of the Organisation in Which Dissertation Has Been Completed: MAX SMART HOSPITAL

Area of Dissertation: RADIOLOGY DEPARTMENT.

Attendance: 2 MONTHS.

Objectives achieved: A DESCRIPTIVE STUDY TO ASSESS TURNAROUND TIME OF RADIOLOGY DEPARTMENT & IMPROVEMENT OF QUALITY OF SERVICES IN MAX HEALTHCARE.

Deliverables: Patient and Radiology team co-ordination to improve TAT

Strengths: This is the most important parameter in Radiology department as ~~it is~~ the outcome of all studies depends on it

Suggestions for Improvement: The study is well designed. The areas the need improvement are team work to coordinate the whole process of TAT.

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

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

Date:
Place:

Dr. Ayesha Z Siddiqui
Principal Consultant – Radiology
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DMC Regn. No.-12659

ACKNOWLEDGEMENT

The satisfaction and exhilaration that come with the successful completion of the project would be incomplete without mentioning the people who made it possible, so first and foremost I would want to thank The Almighty GOD whose favour makes all things possible.

I would like to take this opportunity to thank and express my sincere gratitude to my faculty supervisor, Dr. Puneet Yadav (Associate Professor, IIHMR, New Delhi), my hospital guide, Dr Ayesha Z Siddiqui, Principal Consultant Radiology, Max Hospital Greater Noida West, and to all those without the help of whom I could not have written this unique piece of writing. They gave me invaluable advice and time during the study, made helpful ideas, had a positive attitude and was constantly encouraging, for which I am incredibly grateful.

I owe the entire hospital personnel my sincere gratitude and appreciation.

Last but not least, I want to express my sincere gratitude to my parents for their love, support, education, belief in me, and for helping me get ready for the future

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INTRODUCTION

The radiology department is a vital component of modern healthcare systems, serving as a cornerstone for accurate and timely diagnostic imaging services. Prompt access to radiology reports is essential for effective clinical decision-making and optimal patient outcomes. The time it takes from when a healthcare provider orders an imaging study to the delivery of the final radiology report is known as the "turnaround time." The importance of minimizing this turnaround time cannot be overstated, as it directly impacts patient care, resource utilization, and overall healthcare efficiency. In recent years, healthcare organizations have recognized the significance of turnaround time in the radiology department and its correlation with the quality of service provided to patients. Delays in obtaining radiology reports can lead to prolonged diagnostic uncertainty, treatment delays, and potential adverse effects on patient health. On the other hand, expedited turnaround times facilitate early diagnosis, timely interventions, and improved patient experiences. In addition to turnaround time, the quality of service in the radiology department encompasses various crucial aspects, including report accuracy, image interpretation, patient communication, technological advancements, and adherence to safety protocols. A comprehensive approach to improving the quality of service goes beyond mere speed; it also prioritizes precision, safety, patient-centred care, and seamless collaboration among healthcare professionals. This research aims to explore the intricacies of turnaround time in radiology departments and its direct impact on the overall quality of service provided to patients. By understanding the factors influencing turnaround time and identifying challenges, this study seeks to develop a robust improvement strategy that optimizes efficiency without compromising the quality and accuracy of radiology reports. The significance of this research extends beyond individual healthcare institutions. It has implications for the broader healthcare ecosystem, influencing clinical workflows, resource allocation, and patient satisfaction. Healthcare administrators, radiologists, technologists, referring physicians, and patients alike stand to benefit from the insights generated by this study, enabling them to make informed decisions and actively contribute to the enhancement of radiology services. By delving into the complexities of turnaround time and quality of service in radiology departments, this research endeavours to contribute to the growing body of knowledge in healthcare management, informatics, and patient care. As the healthcare landscape evolves, optimizing the radiology department's operations becomes an imperative for delivering patient-centric, efficient, and high-quality healthcare services. Through this study, we aim to pave the way for continuous improvement, innovation, and excellence in radiology practices, ultimately benefiting patients and healthcare providers alike.

Significance

Assessing the turnaround time of a radiology department and continuously striving to improve the quality of service it provides hold immense significance for various stakeholders in the healthcare ecosystem. The following are some key reasons why this assessment is crucial:

1. Enhanced Patient Care and Outcomes: Timely access to radiology reports enables faster and more accurate diagnoses, leading to quicker initiation of appropriate treatments. Reduced turnaround time directly translates to improved patient outcomes, increased chances of successful interventions, and better management of critical medical conditions.

2. Patient Satisfaction: Shorter waiting times for imaging results contribute to higher patient satisfaction. Patients appreciate efficient and reliable services, leading to positive experiences and improved perceptions of the healthcare institution.

3. Efficient Resource Utilization: A well-optimized radiology department with reduced turnaround time can handle a higher volume of cases within the same time frame. This efficiency leads to better resource utilization, increased patient throughput, and potential cost savings.

4. Improved Healthcare Workflows: Streamlined processes and reduced turnaround time foster smoother workflows across the entire healthcare system. This, in turn, positively impacts other medical departments that rely on timely radiology reports for patient care decisions.

5. Faster Decision-Making: For complex or urgent cases, faster turnaround time enables referring physicians to make well-informed and timely decisions about treatment plans. This expedites patient management and may positively impact prognosis.

6. Risk Reduction and Safety: Prompt diagnoses can prevent delays in identifying critical conditions, reducing potential risks associated with undiagnosed or untreated medical issues.

7. Quality and Efficiency of Clinical Trials: In the context of medical research and clinical trials, efficient radiology services with quick turnaround times contribute to the timely collection of data, enabling researchers to make informed decisions during the trial process.

8. Optimal Resource Allocation: Assessing turnaround time and identifying areas for improvement helps healthcare institutions allocate resources strategically. This includes staffing, equipment upgrades, and investments in advanced technologies to enhance performance.

9. Competitive Advantage: Healthcare institutions that prioritize and achieve shorter turnaround times and high-quality radiology services gain a competitive edge. Patients and referring physicians are more likely to choose facilities known for their efficiency and excellence in radiology. 10. Data-Driven Decision Making: Regularly assessing turnaround time and quality of service provides valuable data for evidence-based decision-making. It helps identify trends, patterns, and areas that require attention or intervention.

11. Regulatory Compliance and Accreditation: Many healthcare regulatory bodies and accreditation organizations set standards for turnaround times and quality of radiology services. Regular assessments ensure compliance with these standards and may facilitate accreditation and recognition.

12. Continuous Improvement Culture: The assessment and improvement of turnaround time and quality of service foster a culture of continuous improvement within the radiology department and the wider healthcare institution. This encourages staff engagement, innovation, and a commitment to delivering exceptional patient care.

In conclusion, assessing the turnaround time of a radiology department and continuously striving to improve the quality of service are critical for delivering efficient, patient-centered care, ensuring optimal resource utilization, and maintaining a competitive edge in the healthcare industry. These efforts contribute to better patient outcomes, higher satisfaction

levels, and a culture of excellence and continuous improvement within the healthcare organization.

General Objective

The population for this study includes individual patients undergoing the specified diagnostic scans at the Super Specialty Hospital in Saket. The inclusion criteria involve selecting all consecutive patients undergoing MRI, CT, X-Ray, Ultrasound, or Dexa Scan, while pregnant and lactating women are excluded due to their unique physiological conditions.
Data collection tools and techniques were designed to gather information according to the chosen research method
The general objective of the study is to understand the process flow of the Radiology Department for each modality and calculate the waiting and reporting turnaround times (TAT) for both OPD and IPD patients.

The secondary objective is to study the delay in the process of radiology study and identify reasons for any delays.

LITERATURE REVIEW

Researchers from the Department of Radiology at Cincinnati Children's Hospital, including Alexander J Towbin, Srikant Iyer, James Brown, Kartik Vardarajan, Laurie A Penny, and David B. Larson, conducted a study aimed at reducing the variability in turnaround time (TAT) for radiography studies in the emergency department. The main objective was to assess whether minimizing this variability would lead to improved patient outcomes and experiences in the emergency department.

Their findings indicated that the mean radiology turnaround time was 29.3 minutes, with a median TAT of 15 minutes. The standard deviation for TAT was 22.8 minutes. The improvements in radiology turnaround time had a significant positive impact on the overall patient experience during their emergency visits.

In a separate study conducted in March 2014, Sobechukwu W. I. Onwuzu, Mabel C. Ugwuja, and Thomas Adejoh from the Medical Imaging Unit at the University of Nigeria investigated patient waiting times in the radiology department. They focused on identifying the specific steps in the patient registration process that contributed significantly to increased waiting times. By systematically sampling 131 patient request cards, they recorded the times of arrival at the department, registration, entry into the diagnostic room, and departure from the department. The study revealed that the average time a patient spent from reporting to reception until leaving the department was 2 hours and 40 minutes, with a standard deviation of 1 hour and 16 minutes. Chest cases showed the shortest waiting time of 2 hours and 29 minutes, while extremity cases had the longest waiting time of 3 hours and 36 minutes.

In Kenya, Agolah Denis Odhiambo, Auka Josh, and Luke G. Kanamu investigated the turnaround time for patients undergoing ultrasound examinations at Kenyatta National Hospital. They stressed the importance of timely and accurate diagnosis for ultrasound patients and emphasized the need for reduced patient waiting times through efficient management, including thorough but brief ultrasound examinations. The researchers identified the major causes of longer turnaround times, such as power blackouts, patients jumping queues, and staff burnouts when working alone. A majority of the surveyed patients (96 respondents, with 51 females and 45 males) expressed dissatisfaction with the ultrasound examination waiting times.

In conclusion, these studies underscore the significance of reducing variability and waiting times in radiology departments to improve patient experiences and optimize the delivery of

medical care. Implementing efficient processes and addressing the identified causes of delays can lead to better patient outcomes and increased satisfaction with healthcare services.

METHODOLOGY

Research methodology involves a systematic approach to solving research problems, outlining the steps followed by researchers to study the issue and explaining the rationale behind them.

It comprises various elements such as research design, approach, setting, population, sample, sampling technique, tool selection and description, pilot study, data collection method, and data analysis plan.

Research Approach: In this study, a quantitative approach was chosen to evaluate adherence to antimicrobial usage policies and guidelines for the rational use of restricted antibiotics. Quantitative research enables the collection of numerical data, which allows for statistical analysis and objective conclusions.

Research Design: The research design refers to the overall plan to address the research question and includes strategies to enhance the study's integrity. In this study, a descriptive research design was used. Descriptive research is appropriate for investigating the characteristics and behavior of a specific population, providing a comprehensive snapshot of the subject matter.

Variables: Research variables represent concepts measured, manipulated, and controlled in the study. The dependent variable in this study was "Scan Time for the independent tests," which refers to the time taken for different diagnostic scans. Additionally, demographic variables, such as age and gender, were included to analyze their potential impact on scan time.

Setting of the Study: The study was conducted at the Super Specialty Hospital in Saket. This setting was chosen as it provided access to a diverse group of patients undergoing MRI, CT, X-Ray, Ultrasound, and Dexa Scan, which are relevant to the research question.

Population: The population for this study consisted of individual patients undergoing the specified diagnostic scans (MRI, CT, X-Ray, Ultrasound, and Dexa Scan) at the Super Specialty Hospital in Saket.

Sample: The sample size for this study comprised 186 patients selected from both the Inpatient Department and Outpatient Department. Convenient Sampling Technique was used to select the sample. Convenient sampling was employed to minimize data bias during the selection process, making it easier and more accessible to recruit participants.

Sampling Criteria: The inclusion criteria involved selecting all consecutive patients from both the Inpatient and Outpatient Departments who were undergoing MRI, CT, X-Ray, Ultrasound, or Dexa Scan. However, pregnant and lactating women were excluded from the study due to their unique physiological conditions, which might affect scan times differently.

Data Collection Tools and Techniques: To collect data, specific tools were designed for gathering information according to the chosen research method. The data collection tools could include survey

questionnaires, observation protocols, or existing medical records. The scan time for each independent test was recorded, and demographic information, such as age and gender, was also collected for analysis.

Pilot Study: Prior to the main data collection, a pilot study may have been conducted to test the feasibility and effectiveness of the data collection tools and procedures. The pilot study helps identify any potential issues or limitations in the research design, allowing adjustments and improvements to be made.

Data Analysis Plan: The data collected were analyzed using appropriate statistical methods. Descriptive statistics, such as mean, median, and standard deviation, were used to summarize the scan time data. Inferential statistics, such as t-tests or analysis of variance (ANOVA), may have been employed to identify significant differences in scan times between different demographic groups. The level of significance and confidence intervals were determined to make valid inferences.

The data analysis was conducted following these steps: • The data was organized and arranged in master sheets. • Subject baseline characteristics were presented in terms of frequency and percentage. • Frequency and percentage distributions were used for the analysis. • The analyzed data was presented in tables, graphs, and diagrams to facilitate comprehension and visualization.

TOOLS AND METHODS:

- **Project Implementation Plan:**
- Data collection: The data will be collected from Software RIS and Freedom Dashboard and entered into a Microsoft Excel sheet to create a database file.
- Data entry: Data will be entered into an Excel sheet. After data cleaning is completed, the analysis will be done.
- **Analysis**: The analysis of Turn Around the time of reporting and the waiting time will be done. Further, a detailed analysis of the Delay in waiting time will be done with the staff to attain the benchmark as per the department policy.

RESULTS

The analysis and interpretation of the data in this study rely on the information collected regarding adherence to the policy and guidelines of restricted antimicrobial usage, aligning with the study's objectives. The data was gathered from the software and the computerized patient record system. After collection, the data underwent organization, tabulation, analysis, and interpretation, utilizing descriptive statistics as the analytical method

ORGANIZATION AND PRESENTATION OF DATA

Data and finding of the study have been organized and presented under the following

Tables.

TAT LEGEND - Between Exam Completion and Report Approval
IP: Mon-Sun (8.00 to 18.30 With 240 mins Approval TAT)
OP: Mon-Sat (8.00 to 18.30 With 240 mins Approval TAT)
EMER: 24X7 (With 60 mins Approval TAT)

Reporting TAT

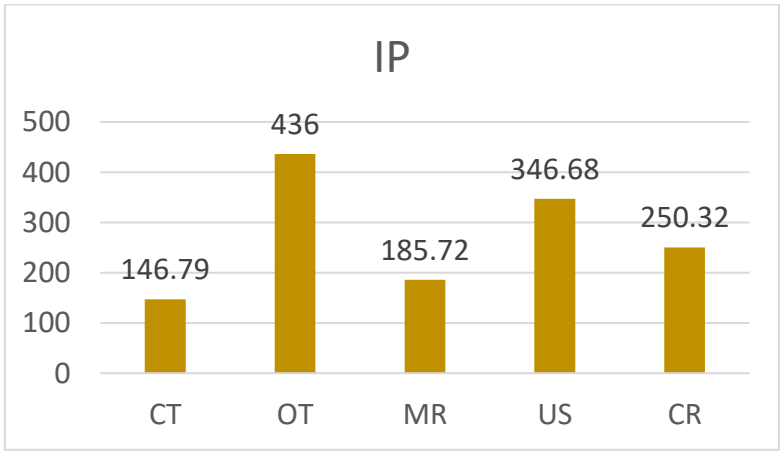

Figure 1: Illustrates a bar diagram displaying the frequency distribution of various radiology modalities for inpatients.

Data represented in Fig 1 shows that the highest Reporting TAT of Inpatients was of Dexa Scan (436) followed by Ultrasound (346.68), X-Ray (250.32), MRI (185.72) and the lowest Reporting TAT was of CT scan (146.79)

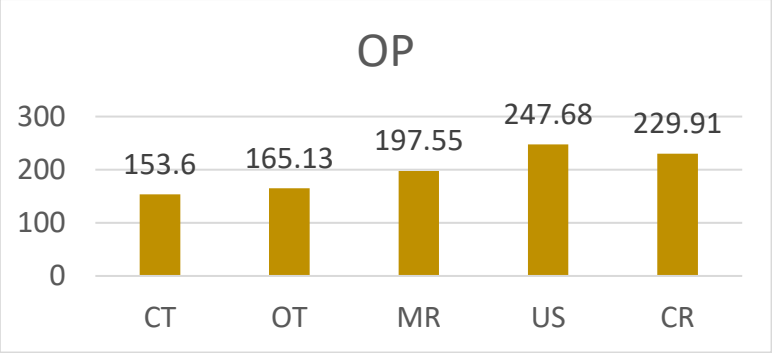

Fig 2: A Bar diagram showing the frequency distribution of different modalities of Radiology outpatients.

Data represented in Fig 2 shows that the highest Reporting TAT of outpatients was of Ultrasound Scan (247.68) followed by X-Ray (229.91), MRI (197.55) and the lowest Reporting TAT was of CT scan (153.6)

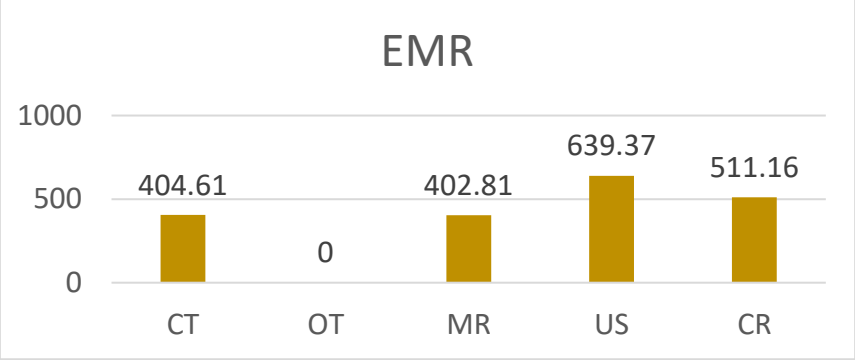

Fig 3: A Bar diagram showing the frequency distribution of different modalities of Radiology emergency patients.

Data represented in Fig 3 shows that the highest Reporting TAT of emergency patients was of Ultrasound Scan (639.37) followed by X-Ray (511.16), MRI (402.81) and the lowest Reporting TAT was of CT scan (404.61)

WAITING TAT

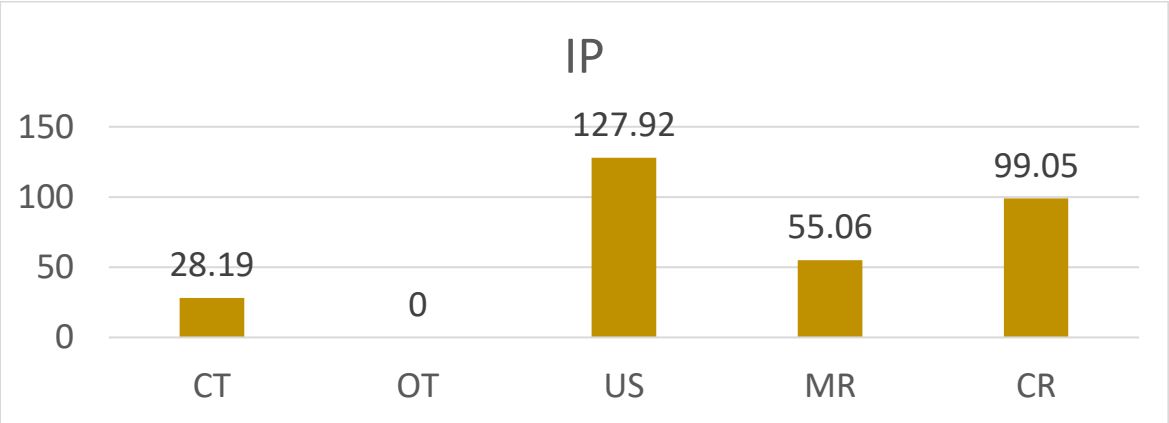

Fig 4: A Bar diagram showing the frequency distribution of different modalities of Radiology inpatients.

Data represented in Fig 4 shows that the highest waiting TAT of emergency patients was of Ultrasound Scan (127.92) followed by X-Ray (99.05), MRI (55.06) and the lowest waiting TAT was of CT scan (28.19)

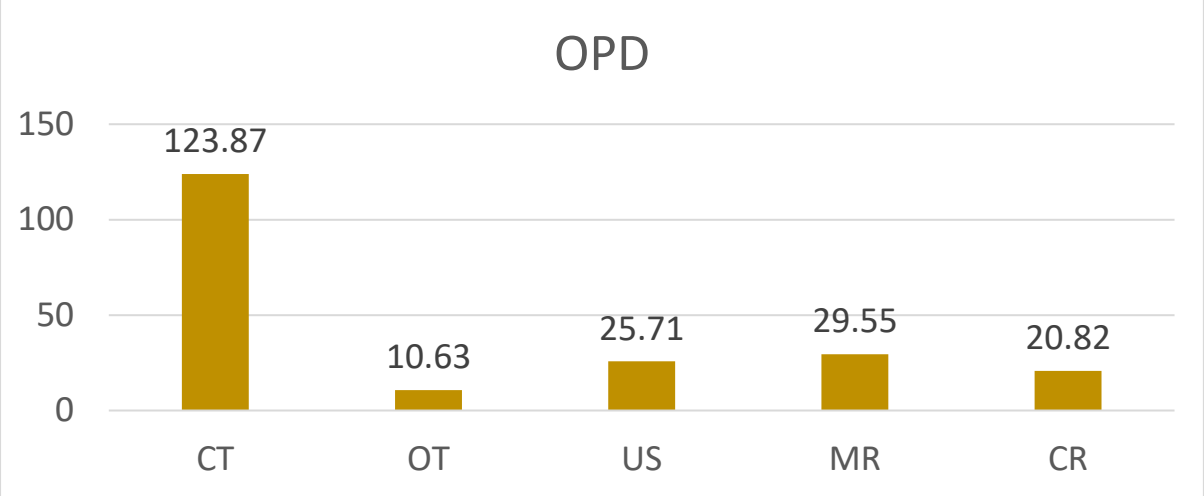

Fig 5: A Bar diagram showing the frequency distribution of Waiting TAT of different modalities of Radiology inpatients.

Data represented in Fig 5 shows that the highest waiting TAT of outpatients was of CT scan (123.87) followed by MRI (29.55), Ultrasound (25.71), X-Ray (20.82) and the lowest waiting TAT was of Dexa scan (10.63)

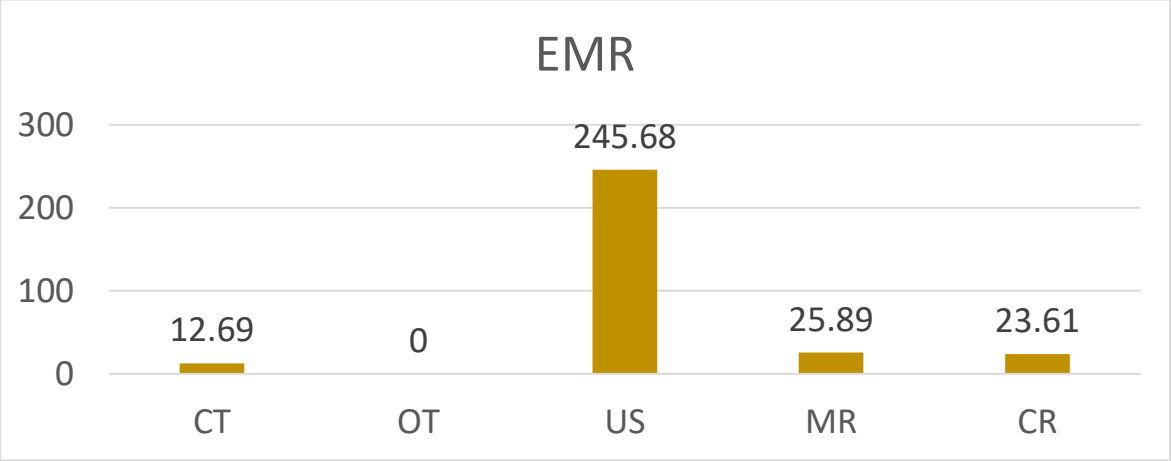

Fig 6: A Bar diagram showing the frequency distribution of Waiting TAT of different modalities of Radiology emergency patients.

Data represented in Fig 6 shows that the highest waiting TAT of outpatients was of ultrasound scan (245.68) followed by MRI (25.89), X-Ray (23.61) and the lowest waiting TAT was of CT scan (12.69)

DISCUSSION

As per turnaround time for the waiting and reporting the desired TAT for USG is 120 mins, X-rays is 60 min, CT is 90 min and MRI is 90 mins, and per the daily analysis, the average reporting TAT for CT is 146.79, MRI is 185.72, USG -346.08 and for X-rays is 250.32. For all the IPD cases whereas for the OPD patients, the reporting TAT is as described CT 151.6, MRI 163.18, USG 247.68, and X-ray is 229.91

The waiting TAT for IPD is as follows for CT is 28.19, MRI 55.06, USG 127.92, and X-rays 99.05 and whereas for the OPD is 128.87 for CT, 25.71 for USG, 29.55 for MRI, and 20.82 for X-rays which is within the desired TAT of waiting as per the expectations

Based on this data, we can see that the reporting TAT for all imaging modalities is higher than the desired TAT, both for IPD and OPD cases. This indicates a delay in reporting the results to the patients, which can impact patient care and overall efficiency.

To improve the reporting TAT, the medical facility needs to identify the bottlenecks and inefficiencies in their imaging and reporting processes. Possible measures to reduce TAT include optimizing the imaging workflow, streamlining reporting procedures, increasing staffing in the imaging and reporting departments, and using advanced technologies to speed up the process without compromising on accuracy.

It's also important to consider that certain cases may require more time for interpretation and analysis, which could contribute to the higher TAT. However, if the average reporting TAT consistently exceeds the desired TAT across the board, there might be underlying systemic issues that need to be addressed.

Regularly monitoring and analyzing the TAT data for each modality can help identify trends and areas for improvement. By implementing targeted strategies, the medical facility can work towards meeting the desired TAT and providing more efficient and timely patient care

CONCLUSION

Reporting in the radiology department plays a crucial role in the healthcare system. It involves the interpretation of medical images, Medical professionals use a variety of imaging techniques, including X-rays, CT scans, MRI scans, ultrasounds, and others, to aid in the diagnosis and monitoring of a wide range of medical conditions... Timely and accurate reporting is essential for providing effective patient care and making well-informed clinical decisions.

1. Importance of Timely Reporting: The Turnaround Time (TAT) for reporting is a critical aspect of radiology services. Timely reporting ensures that patients receive prompt diagnoses, enabling faster initiation of treatment plans. Reduced TAT can lead to improved patient outcomes, especially in cases where urgent medical intervention is required. Efficient reporting also enhances the workflow and overall efficiency of the healthcare facility.
2. Challenges in Meeting TAT: The radiology department may face challenges in meeting reporting TAT due to several reasons. High patient volumes, the complexity of cases, and resource constraints can contribute to delays. Technological issues, such as system downtimes or slow image processing, can also impact TAT. It's essential for the department to identify these challenges and implement measures to address them effectively.
3. Quality vs. Speed: While timely reporting is essential, maintaining the quality of reports is equally important. Radiologists must balance the need for quick turnaround with accuracy and precision. Rapid reporting should never compromise the diagnostic accuracy, as misdiagnoses can lead to severe consequences for patients. Quality assurance processes, peer reviews, and continuous education for radiologists can help ensure both speed and accuracy in reporting.
4. Technology and Automation: Leveraging cutting-edge technology and automation can greatly enhance the efficiency of reporting. Implementation of Picture Archiving and Communication Systems (PACS) and Radiology Information Systems (RIS) optimizes the workflow, granting radiologists easy access to both images and patient information. Moreover, Artificial Intelligence (AI) applications can support radiologists in identifying abnormalities and generating initial reports, leading to a more streamlined and expedited process.
6. Collaboration and Communication: Effective communication and collaboration between radiologists and referring physicians are crucial for optimal patient care. A streamlined communication system ensures that critical findings are promptly communicated to the relevant clinicians. This can reduce delays in initiating treatment and improve patient outcomes.
7. Monitoring and Analytics: Regularly monitoring TAT and analyzing data can provide insights into the department's performance. Key performance indicators (KPIs) can help identify bottlenecks and areas for improvement. By analyzing data, the radiology department can implement strategies to optimize TAT and workflow efficiency continually.

8. Patient Engagement and Satisfaction: Timely reporting not only impacts medical outcomes but also influences patient satisfaction. Waiting for diagnostic results can cause anxiety and stress for patients and their families. Ensuring that patients receive their reports promptly can enhance their overall experience with the healthcare facility. In conclusion, reporting and reporting TAT in the radiology department are critical factors in delivering efficient and effective patient care. It requires a balance between speed and accuracy, which can be achieved through the strategic use of technology, continuous quality assurance, and effective communication and collaboration between all stakeholders involved in the diagnostic process. By prioritizing these aspects, healthcare facilities can optimize their radiology services and improve patient outcomes and satisfaction.

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- **Mayer M, Sebro R. An Important and Often Ignored Turnaround Time in Radiology – Clinician Turnaround Time: Implications for Musculoskeletal Radiology. Journal of the Belgian Society of Radiology. 2019;103(1). Available From:**
- **https://doi.org/10.5334/jbsr.1834**

- **ANNEXURES**

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Deepanshu D report

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