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A STUDY ON TURN AROUND TIME AS A MEASURE TO ENHANCE DIAGNOSTIC EFFICIENCY AT A LEADING HOSPITAL IN BENGALURU

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Abstract- Diagnostics provide information that can aid patients by allowing them to choose the appropriate treatment, enabling caregivers in finding suitable preventative measures, and providing vital prognostic data that can allow care pathways and management be optimised. Timeliness is often represented in turnaround time and is used to evaluate the laboratory's efficiency and effectiveness. According to ISO criteria, each laboratory must set turnaround times for each of its investigations that reflect clinical demands and review whether or not they are being met on a regular basis. Clinicians rely on short TATs to diagnose and treat their patients quickly, as well as to discharge patients from emergency rooms or hospital in-patient services. As a result, shorter TATs allow the management save money on general expenses. The evaluation and improvement of turnaround times is critical for laboratory quality control and patient satisfaction. This paper aims to understand the work flow process for various tests and evaluate whether or not the sample's TAT is under set criteria. It was observed that the TAT could be reduced by implementing certain measures within the sample processing or scans and decreasing the overall TAT of the tests, thereby achieving a more efficient diagnostic system.

Key words: Diagnostics, Turnaround time, Medical Laboratory, Radiology, Quality control, Efficiency

I. INTRODUCTION:

Diagnostics is defined as "Testing and other procedures done to determine the reason of a person's illness, discomfort, or ailment." **Turnaround Time** is defined as, "The period of time between ordering a test and receiving the results."

TAT is measured by clinicians from the time the test is ordered to the time the results are reported, whereas TAT is measured by laboratory professionals from the time the specimen is received to the time the results are reported. TAT is influenced by a number of factors that are beyond the laboratory's control. Non-analytical delays may account for a large segment of total TAT. Therapeutic TAT refers to the period between requesting a test and making a therapeutic decision. TAT is divided into three categories: pre-analytical, analytical, and post-analytical. Each of the phases—pre, analytical, and post-analytical—can be accelerated in different ways to get the best turnaround time. The pneumatic system is a great innovation that has transformed sample transportation. TATs can be significantly reduced by incorporating a pneumatic tubing system. Adoption of optimum phlebotomy methods, bar coding of samples, and computer-generated requisition slips are other ways to reduce **pre-analytical** delays. All of these procedures will cut down on delays caused by unclear slips and defective sample collecting processes. The use of gel vacutainers can help to reduce the time spent in centrifuging.

Complete laboratory automation, use of machines with higher throughputs, use of plasma or whole blood samples, primary tube sampling, ensuring minimal downtime and adequate backup, adoption of efficient quality control procedures, automatic dilutions in case of results exceeding linearity, prompt validation of reports, and so on can all help to speed up the **analytical phase**. It's also critical to ensure that the technicians have a clear division of labour so that sample processing and reporting go smoothly. Staff should be educated to handle urgent samples with extreme caution and speed up their processing. The introduction of laboratory information services can significantly improve the **post-analytical** phase. This will eliminate transcriptional errors and delays in report delivery to the appropriate wards. Every

radiology department has the challenge of producing a final diagnostic imaging report quickly and efficiently. For radiologists, report turnaround time is a significant quality assurance measure. The Joint Commission for the Accreditation of Health Care Organizations considers standards for report turnaround, which promote excellent clinical decision making, to be significant elements of departmental quality management programmes in many managed care contracts. Initially, laboratory performance evaluations were solely focused on the quality of the results, including accuracy and precision. TAT is now widely used as a quality measure for evaluating laboratory performance. TAT is a statistic used to monitor a laboratory's efficiency and production, hence managing it is critical in clinical laboratories.

There are numerous advantages to TAT control:

1) More confidence from patients, referrals, and business partners when reports are delivered faster and more consistently.

2) Shorter reporting times allow clinicians to respond on reports much more quickly. This speeds up patient service.

3) Increased volume of samples processed each day due to enhanced service delivery time

4) Laboratory management can gain insight into the reasons of delays by monitoring TAT variabilities. This can be beneficial in improving several laboratory operations.

5) Reconsidering TAT can assist significantly cut delivery time and expenses.

The objectives of study include:

1. To study the Turnaround time for assigned samples in the Laboratory and Radiology department.
2. To understand and demonstrate the existing workflow process for sample processing and report generation for both Laboratory and Radiology department.

II. LITERATURE REVIEW

According to Stern C, Boehm T, Seifert B, et al. (2018), The study provides information on the External referring clinicians who expect radiological reports to be sent quickly (TAT). The choice of a radiologic facility may be influenced by reporting times. Furthermore, decreasing TAT and boosting productivity in a radiology department benefits to the overall cost effectiveness of the hospital by minimising the length of inpatient stays. It also allows for quicker clinical decisions and treatment execution. As a result, there is a common requirement for inpatient and outpatient radiology report turnaround times.

According to the study conducted by Hawkins, Robert C (2007), TAT is among the most visible indicators of a laboratory's quality, and many clinicians use it to assess the lab's performance. Users complain about TAT delays right away, yet good TAT remains unnoticed. Unsatisfactory TAT is a primary source of poor service complaints to the laboratory, and it takes a lot of time and effort for lab workers to resolve concerns and improve service. Many laboratories have had trouble improving their TATs despite developments in analytical technology, transportation networks, and computerization.

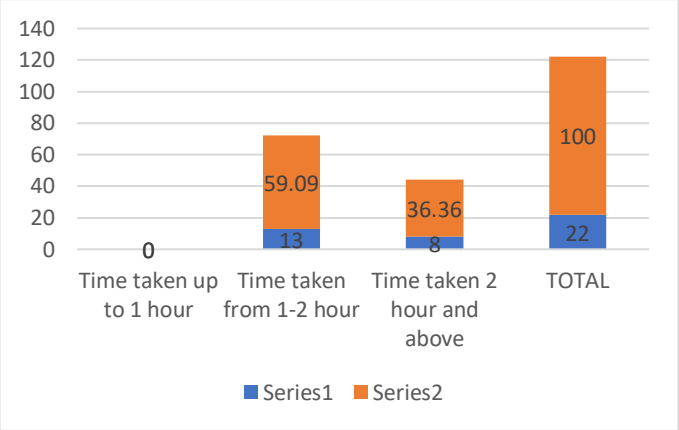
According to study conducted by Jeannette Guarner, MD, et. al (2012), It is critical to have a continuous supply chain of reagents and instruments that are properly maintained in order to improve turnaround time. For this, hospital administrators must understand the value of laboratory services in patient care in order to ensure that resources are allocated and maintained. As a result, both laboratory directors and clinicians must push for a laboratory with adequate supplies, well-maintained tools, and internal and external quality control processes.

III. METHODOLOGY:

This was Observational research that aims to determine the TAT of individual tests and scan of samples considered for the study and knowing whether or not the calculated TAT is within the benchmarked limits. Simple Random sampling technique was used to collect data. The target population were patients for whom scans and tests were ordered by the clinicians in Radiology and Medical Laboratory respectively. The sample size collected were a total of 136 samples due to limited time and convenience, out of which 61 samples were from Medical Laboratory and 75 samples were from Radiology. It was a Time-motion study where the time was being tracked for every step of the sample processing. The samples were tracked right from sample collection or patient registration till the report generation. The analysis tool used was simple percentage analysis.

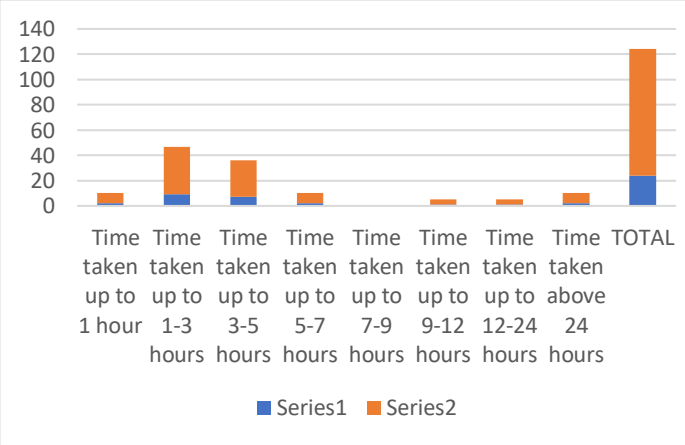
IV. ANALYSIS

Chart-I Chart showing Turn Around Time (TAT) for the samples at Hematology in Medical Laboratory.



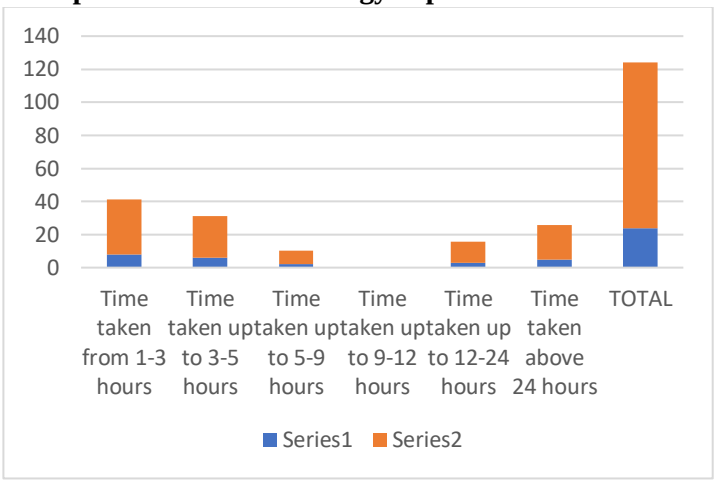
The above chart-I shows that 59.09% of all the sample took 1-2 hours to get processed and report published and 36.36% of the samples took more than 2 hours to get processed and report published.

Chart-II Chart showing Turnaround Time (TAT) for the samples at CT- scan



The above Chart-II shows 37.5% of samples had 1-3 hours, 29.1% of samples had 3-5 hours, 8.3% of samples had 1 hour, up to 5-7 hours, and >24 hours of turnaround time for CT scan at Radiology department.

Chart-III Chart showing turnaround time of each sample for MRI at Radiology department



The above chart-III shows 33.3% of samples took 1-3 hours, 25% of samples took 3-5 hours, 20.8% of samples took >24 hours, 12.5% took 12-24 hours of time, 8.3% took up to 5-9 hours of turnaround time for MRI samples at Radiology department.

V. MAJOR FINDINGS AND RECOMMENDATIONS

The major findings are as follows:

- Chart-I shows that while maximum samples took less than 2 hours to get processed and report published, there were samples that took more than 2 hours of time, which although is within benchmark limits but can be improved.
- Chart-II shows that the samples with maximum percentage took time up to 1-3 hours but a very significant percentage of samples took quiet much of a time as much as taking more than 24 hours of Turnaround time.
- It is evident in Chart-III that it was a significant percentage of 12.55% and 20.8% of samples which took a very high Turnaround time of 12-24 hours and above 24 hours respectively, which is quiet high in terms of Benchmarked criteria and need to be improved.

The Recommendations are as follows:

- Post sample arrival at the laboratory, the time taken to acknowledge and dispatch the samples to relevant section can be decreased by ensuring that a person is always there at the desk and samples are not sitting idle on the desk for a longer time and also increasing manpower in case if there is a huge load of samples to be acknowledged.

- One consultant should always be present at the premises in order to approve the reports as this may help in decreasing the time taken from Test ending to Report approved and generated at the radiology sections. Appropriate arrangements should be done for Holidays or Sundays by dividing the duties of in-house consultants daily and weekly ensuring uninterrupted work flow.
- Quality control measures that are updated on a regular basis and updated standard operating protocols can save time. Computerization of laboratories, with enhanced software to interface devices, examine results, and provide reports to clinicians, may go a long way toward improving TAT productivity.
- Constant trainings should be given to the staff to improve the efficiency of staff, thereby decreasing the instances of high Turnaround time.

VI. CONCLUSION

TAT is interpreted differently by doctors and laboratory workers. Although there are differing views on the clinical benefits of better TAT, the causes of delayed TAT should be investigated. TAT improvement is a continual effort, and we require a holistic strategy to removing roadblocks to optimum TAT. Despite ambiguous data on turnaround time and clinical outcome, a faster TAT has always been requested. Efforts to improve the quality of the complete service supplied, such as laboratory turnaround time, reflect increased attention to the needs of patients. The availability of test results within a certain time frame promotes patient satisfaction while also demonstrating the clinician's efficiency.

VII. REFERENCE

1. Carraro, Paolo and Plebani, Mario. "Process Control Reduces the Laboratory Turnaround Time", vol. 40, no. 4, 2002, pp. 421-422.

2. Kaushik, N., Khangulov, V. S., O'Hara, M., & Arnaout, R. (2018). Reduction in laboratory turnaround time decreases emergency room length of stay. Open access emergency medicine: OAEM, 10, 37–45.

3. David A. Guss, Theodore C. Chan, James P. Killeen, The Impact of a Pneumatic Tube and computerized Physician Order Management on Laboratory Turnaround Time, Annals of Emergency Medicine, Volume 51, Issue 2, 2008, Pages 181-185

4. Hawkins RC. Laboratory turnaround time. Clin Biochem Rev. 2007;28(4):179-194.

5. Dey B, Bharti JN, Chakraborty M. Laboratory turnaround time. Int J Health Sci Res. 2013;3(5):82-84

6. Gupta, S., Kapil, S. and Sharma, M. (2018), "Improvement of laboratory turnaround time using lean methodology", International Journal of Health Care Quality Assurance, Vol. 31 No. 4, pp. 295-308.

7. Verbano, C, Crema, M. Applying lean management to reduce radiology turnaround times for emergency department. Int J Health Plann Mgmt. 2019; 34: e1711–e1722.

8. Krishnaraj, Arun and Lee, Joseph K. T. and Laws, Sandra A. and Crawford, T. Jay, Voice Recognition Software: Effect on Radiology Report Turnaround Time at an Academic Medical Center, American Journal of Roentgenology, 195, 1, 194-197, 2010,

9. Boland, G.W.L., Guimaraes, A.S. & Mueller, P.R. Radiology report turnaround: expectations and solutions. Eur Radiol 18**,** 1326–1328 (2008).

10. Marquis, Bastian et al. “Impact of different SARS-CoV-2 assays on laboratory turnaround time.” Journal of medical microbiology vol. 70,5 (2021): 001280