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A Study on Turn around Time (TAT) As an Indicator to Improve Laboratory Efficiency

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Abstract: *Laboratory Turn Around Time (TAT) is commonly defined as the time from when a test is ordered until the result is reported which includes pre-analytical, analytical, post analytical time. TAT is one of the most noticeable sign of laboratory services and is often used as a Key Performance Indicator. Timely reporting of laboratory tests results increases patient satisfaction and clinicians also depend on fast TAT to achieve early diagnosis and treatment of their patients and hence early patient discharge from the hospital. It has also been shown that out comes in certain situations such as OTs and in emergency departments have been affected by timely reporting of Lab test results. The TAT for all the samples (OPD, IPD, and Emergency) were evaluated for three months and the TAT was calculated from sample reception to report dispatch. The contribution of the analytical time to the total TAT was found to be less than the contribution of pre and post analytical time in both OPD and IPD patients. In this study, variable reasons of delay in TAT and suggestions to achieve fast TAT were described.*

Keywords:*Turn Around Time (TAT), Pre-Analytical, Analytical, Post Analytical, IPD (In-Patient Department), OPD (Out Patient Department)*

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I. Introduction

Turn AroundTime (TAT) is one of the parameter to measure performance of any laboratory Laboratories often give importance on accuracy and precision of the test as their goals for quality service. [(5)]Along with the accuracy and reliability, timely reporting of Laboratory test results is now considered an important aspect of the services provided by the clinical laboratory. [(5)]However, clinicians prefer faster TAT of the tests which may help them to diagnose, treat and discharge patients faster.[(2)]Moreover, a slow TAT can lead to increase in the requestswhich results in duplication of the test. This may again increase the cost burden of Health care.[(1)]TAT can be described in many ways. Clinicians consider TAT as from the time the test is ordered till the reports are received, whereas laboratory professionals usually consider from when the specimen is received togeneration of reports as TAT. [(1)]

The total TAT for laboratory assays includes the entire interval from ordering the test to theclinician's awareness of the results.[(5)] It consists of the intervals from order placement to specimen collection, time taken to transport to the lab, accessioning in the lab, centrifugation, transport time with in laboratory, analysis time, the time after completion of analysis until the result is informed to the clinical team.[(5)] TAT has also been classified as pre-analytical, analytical, post analytical depending on the different phases of sample processing.

The AIM of the present study is to determine the TAT of all the samples of OPD, IPD and emergency patients of Osmania General Hospital to evaluate the contribution of pre and post analytical phases as compared to analytical phase to the total TAT and to see the number of samples being reported outside the defined TAT. Various steps are also described by which total TAT can be reduced.

II. Materials And Methods

The present study has been conducted on samples received in the Departments of Clinical Biochemistry, Microbiology and Pathology of Osmania General Hospital. It is a tertiary care super specialty centre with 1385 bed strength with Super Specialty including Cardiology, Cardio Thoracic Surgery, Nephrology, Urology, Neurology, Neuro Surgery, Endocrinology, Plastic Surgery, Gastroenterology, Surgical Gastroenterology offering services to 6,00,000 Out-Patients (OPD), 45,000 In-Patients (IPD) every year.Turn Around Time for different parameters were observed for three months from 1st April – 2016 to 30th June -2016. It is taken as the time from when samples are received by the lab to the time the reports are dispatched. The Turn Around Time is studied in three phases that is the pre-analytical phase, analytical phase and post analytical

phase. Pre-analytical phase is from when the sample is received by the lab to when the processing starts. Analytical phase is the actual time taken for test to be conducted. Post analytical phase is from completion of the test to dispatch of the report.

During the study period, we have taken 282 samples out of which 32 samples were excluded whereas 60 samples from emergency 90 samples from IPD and 100 samples from OPD patients were included in the study.

Reasons for Exclusion:

1. Rare Tests
2. Cultures
3. Hormonal Assays

Table-1: percentage of samples included and excluded in the study

Samples	Number	Percentage (%)
Included	250	88.6%
Excluded	32	11.3%
Total	282	100%

The samples from OPD patients were collected in the Sample Collection Area by trained phlebotomists whereas samples from In patients and in emergency were drawn by the staff nurses and junior doctors of their respective wards. The samples were taken to the lab by the patient attendants from the wards and emergency areas whereas laboratory support staff transported them from OPD. The samples received in the laboratory were first screened for any pre-analytical errors followed by processing. This is preceded by routine maintenance and quality control evaluation. The sample run is initiated after satisfactory quality control results. The quality control evaluation is run after a batch of every 50 samples to identify any intra assay fluctuations. The samples received in the laboratory were processed in the order in which they were received except for samples received from emergency which were run on stat mode as soon as they were received including ABG samples. After the sample was analysed for all requested parameters and the reports were validated in the software which were then dispatched and manually distributed by the lab staff to the patient attendants.

III. Results

In this study, we have taken 282 samples out of which 32 samples were excluded whereas 60 samples from emergency, 90 samples from IPD and 100 samples from OPD patients were studied.

Table-2: Average Turn Around Time for the samples studied

	Average Pre-Analytical Phase	Average Analytical Phase	Average Post Analytical Phase	Combined (Pre & Post Analytical Phase)	Total TAT
OPD	180 Min	220 Min	980 Min	1160 Min	1380 Min
IPD	120 Min	120 Min	180 Min	300 Min	420 Min
Emergency	15 Min	60 Min	10 Min	25 Min	85 Min

Table-2 shows the average time taken for pre-analytical, analytical and post analytical phases for OPD, IPD and emergency samples. Summing up the average pre-analytical, analytical and post analytical times we get an average Turn Around Time for OPD, IPD and emergency samples.The average TAT for emergency samples was calculated to be 85 minutes from the time the samples were received by the lab to the time the reports were dispatched. The average TAT for OPD samples was one day since the reports are dispatched the next day. Patients receive the reports as and when they turn up for subsequent health check-up. The average TAT for IPD samples was approximately 7 hours asthereports are usually dispatched in the evening. We have not included the samples which will take 2 to 3 days for processing like cultures and hormonal assays in which samples are collected and pooled up for 2 to 3 days and processed in batches. However, the TAT for Prothrombin Time samples is 30 minutes.

Table-3: Percentage Contribution of Pre & Post Analytical Time to the total TAT

	Total TAT	Pre & Post Analytical Time	Analytical Time
OPD	100 %	84 %	15.9%
IPD	100 %	71.4%	28.5%
Emergency	100 %	29.4%	70.5%

Table-3 shows that the pre and post analytical phases contribute to < 30% of TAT in emergency sample as compared to 84% in OPD & 71.4% in IPD samples. This suggests that when pre and post analytical phases are streamlined, then TAT can be reduced as compared to present scenario.

Table-4: TAT Analysis for OPD samples (100 Samples)

	Number of Samples	Percentage %
<60 Min	0	0
60 – 90 Min	2	2%
90 – 120 Min	6	6%
120 – 180 Min	12	12%
>180 Min	80	80%

Table-5: TAT Analysis for IPD samples (90 Samples)

	Number of Samples	Percentage %
<60 Min	2	2.2%
60 – 90 Min	3	3.3%
90 – 120 Min	7	7.7%
120 – 180 Min	8	8.8%
>180 Min	70	77.7%

Table-6: TAT Analysis for Emergency Samples (60 samples)

	Number of Samples	Percentage %
<60 Min	8	13.3%
60 – 90 Min	22	36.6%
90 – 120 Min	23	38.3%
120 – 180 Min	7	11.6%
>180 Min	0	0 %

Table-4,5 and 6 shows that 75% to 80% of samples of OPD, IPD are outside the defined time where as 80% of samples of emergency patients are within defined TAT. It is evident from this study that delays caused in TAT are primarily due to the pre and post analytical phases and contributes 75% of total TAT.The biggest impediment for prompt TAT in our setting is the lack of automated facilities for sample transport and report dispatch and shortage of manpower. We are dependent on manual courier for sample transport as well as for report dispatch.

IV. Discussion

One of the most visible and talked about areas of laboratory services is how fast a test result is return to a care giver. If the results from the laboratory are available in less time it helps the clinician to start the treatment in a single visit thus proving the clinician's efficiency and increase patient satisfaction. Hence, it is our prerogative to ensure timeliness, on the other hand there are many things which are not under the control of laboratory professional which influence TAT and are responsible for many delays. Our study demonstrated that the pre and post analytical phases contribute to < 30% of TAT in emergency sample as compared to 84% in OPD & 71.4% in IPD samples. This suggest that when pre and post analytical phases are streamlined, then TAT can be significantly reduced.

Causes of delay in Turn AroundTime as observed:

1. Shortage of nursing staff, trained technical personnel and other staff at various stages of sample collection transport, processing and dispatch.
2. Increasing work load on personnel.
3. Increased workload on the machines & frequent breakdown of machines.
4. Lack of automated facilities like Lab Information System.
5. Time consumption at sample collection area.

V. Suggestions& Conclusion

Following procedures may be adopted to reduce Turn AroundTime.

Steps to reduce Preanalytical time:

1. Adoption of Ideal phlebotomy practices.[1,2]
2. Barcoding of samples.[1,2]
3. Use of computer generated requisition slips.[1,2]
4. Use of plasma and serum separator tubes will reduce the delays occurring as result of illegible slips and wrong sample collection techniques.[2]
5. Use of gel vacutainers.[1]

6. Pneumatic system is a path breaking innovation that has revolutionized sample transport and many studies have proven the efficiency of this mechanism in reducing the inadvertent delays because of human courier.[1,2]
7. Increase the man power (Nursing Staff, Technical Staff and Other staff) to handle the samples.

Steps to reduce Analytical time

1. Use of fully automated machines with higher throughput.[1,2]
2. Adoption of efficient quality control procedures.[1]
3. Training of technical staff to handle urgent samples with priority.[2]
4. Use of plasma or whole blood samples.[1]
5. Automatic dilutions in case of results exceeding linearity.[1]
6. Prompt validation of report.[2]
7. Adequacy of electrical backup.
8. Regular maintenance contract of all equipment.
9. Recruitment of trained laboratory personnel.

Steps to reduce Post analytical time

1. Adoption of Lab Information system. [1,2]

The manual dispatch of reports to the respective wards should stop, rather the clinicians and staff nurses should be able to see the report on the computer and take their printouts.

VI. Conclusion

The results of our present study show that a lot can be done to improve the Turn AroundTime of our Laboratory. Improving Turn Around Time is a continuous process and we need to have a wholesome approach for reducing the obstacles for optimum Turn Around Time.

References

[1]. Goswami B, Singh B, Chawla R etal. Turnaround time (TAT) as a benchmark of laboratory performance. Indian J ClinBiochem 2010; 25:376-379.
[2]. Vaneetkaur,KamaljitSingh,MinniVerma,Brinder Chopra. Monitoring of Turn around time in Biochemistry Laboratory of a tertiary care hospital in Punjab. e-ISSN :2279-0853,p-ISSN:2279-0861.
[3]. Steindel SJ, Novis DA. Using outlier events to monitor test turnaround time. A college of American pathologist Q-probe study in 496 laboratories. Arch Pathol Lab med. 1999;123:607-14.
[4]. BiswajitDey,JyotsnaNareshBharti. Laboratory Turn aroundTime:ISSN 2249-9571.
[5]. Wankar AD. Study of determination of laboratory turnaround time in tertiary care hospital in India Int J Res Med Sci.2014 Nov;2(4):1396-1401. international journal of Research in Medical in medical sciences.
[6]. Howanitz PJ, Tetrault GA, Steindel SJ. Clinical laboratory quality control: a costly process now out of control. ClinChimActa. 1997 Apr;260:163-74.
[7]. Valnestein P. Laboratory turnaround time. Am J ClinPathol. 1996;105:676-88
[8]. Kilgore ML, Steindel SJ, Smith JA. Evaluating stat testing options in an academic health center: therapeutic turnaround time and staff satisfaction. Clin Chem. 1998;44:1597-603.
[9]. Lundberg GD acting on significant laboratory results. JAMA. 1981:245:1762-1763. Doi:10.1001/jama.245.21.2212. [PubMed] [Cross Ref].
[10]. Hawkins R C Laboratory turnaround time. ClinBiochem Rev 2007; 28:179-194.

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