Analyzing the Turnaround time in the Department of Laboratory Services at a tertiary care hospital, Durgapur

SUBMITTED BY:
Dr. Gayatri Ahlawat

Roll No. - 566
MBA HOSPITAL AND HEALTH MANAGEMENT

GUIDED BY :
Dr. Sandesh Kumar Sharma
ASSSOCIATE PROFESSOR

INTRODUCTION

Lab investigations are essential in patient management and qualities of the tests reports are emphasized. But there is another aspect of quality which is often overlooked and that is timeliness which is expressed as turnaround time (TAT).

Laboratories often give importance on accuracy and precision of the tests as their goals for quality service. However the clinicians prefer a faster TAT of the tests, which may help them to diagnose, treat and discharge their patients faster.

There is no clear definition of TAT, as to which period should be included in determining TAT for a specific test. For laboratory personnel, it would be from the time of receipt of sample in laboratory till report is generated. However, for a clinician, it would be appropriate from the time of his/her requisition of a test till the report reaches him/her.

Research question:

What could be the reasons for delayed turnaround time in the department of laboratory services at a tertiary care hospital, Durgapur?

Objectives:

- To determine the turnaround time of the department of laboratory services
- To identify reasons which lead to delayed TAT and give suggestions

REVIEW OF LITERATURE

- Robert C Hawkins in an article “Laboratory Turnaround Time” stated that TAT continues to be a cause of customer dissatisfaction with the laboratory service. Laboratory staff can feel frustrated when the effects of improvements in intra-laboratory TAT are diluted by pre-analytical and post-analytical factors seemingly outside their control. It was suggested that all common laboratory tests should ideally be reported as fast as possible by methods yielding high quality results, suggesting 60 minutes or less from sample registration to reporting under optimal conditions.
- Pamela G Manor in an article “Turnaround Times in Laboratory: A review of literature” stated that more than 80% of laboratories receive complaints about test TAT. It was found that delayed TAT not only increases dissatisfaction among patients but also increases the length of stay of patients in the hospitals.

CONTINUED

- Joan H. Howanitz et al in his paper “Laboratory Results: Timeliness as a Quality Attribute and Strategy” stated that timeliness in reporting of laboratory results undoubtedly affects clinician and patient satisfaction as well as length of hospital stay.
- Bruce A. Jones et al in an article “Physician satisfaction with clinical laboratory services” stated that most of the physicians show satisfaction about laboratory test results reliability and accuracy whereas the turnaround time is area of dissatisfaction and show an opportunity of improvement.
- *Steven J. Steindel et al* in his study “Using Outlier Events to Monitor Turnaround Time” mentioned that many laboratories analyze multiple time intervals that helps in locating areas where the delay occur and needs improvement. During the study three phases of laboratory work flow were studied which were pre-analytical, analytical and post analytical and outliers were noticed in all phases which can affect the overall TAT of the laboratory.

METHODOLOGY

Study area – The study was carried out in Department of Laboratory Services at a tertiary care hospital, Durgapur.

Study design – Observational cross – sectional study.

Study Duration- The study was conducted for a period of two months (Feb. – April 2019)

Study population- All patients visiting the laboratory for diagnostic services.

Inclusion criteria –All the reports generated from Biochemistry, Hematology and Microbiology and Serology from 8:00am to 6:00pm were included

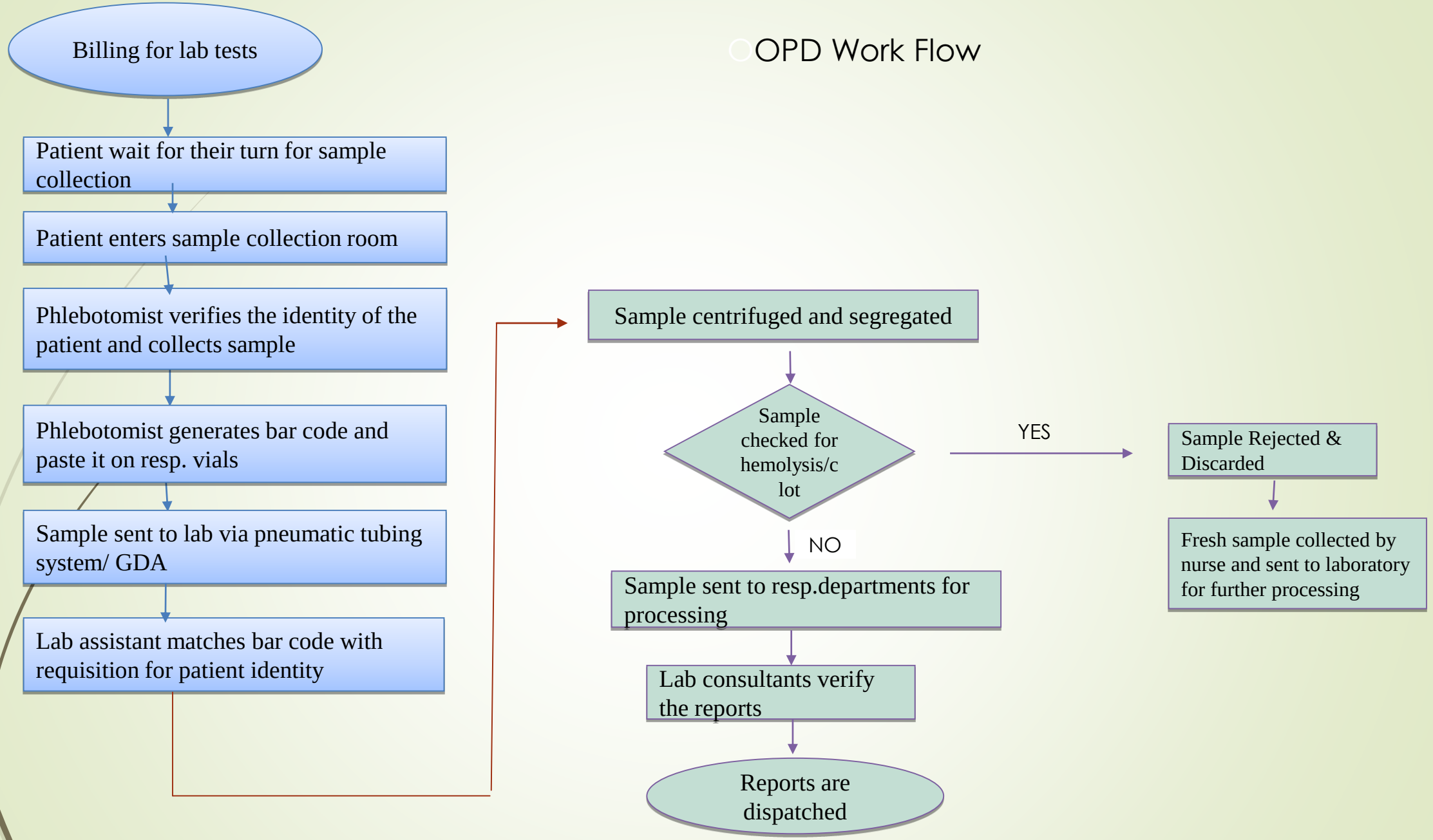
Exclusion criteria – All the reports generated from Clinical Pathology and Histopathology and Cytopathology.

Sample size – 450 In- patients and 450 Out patients (10% of the total population)

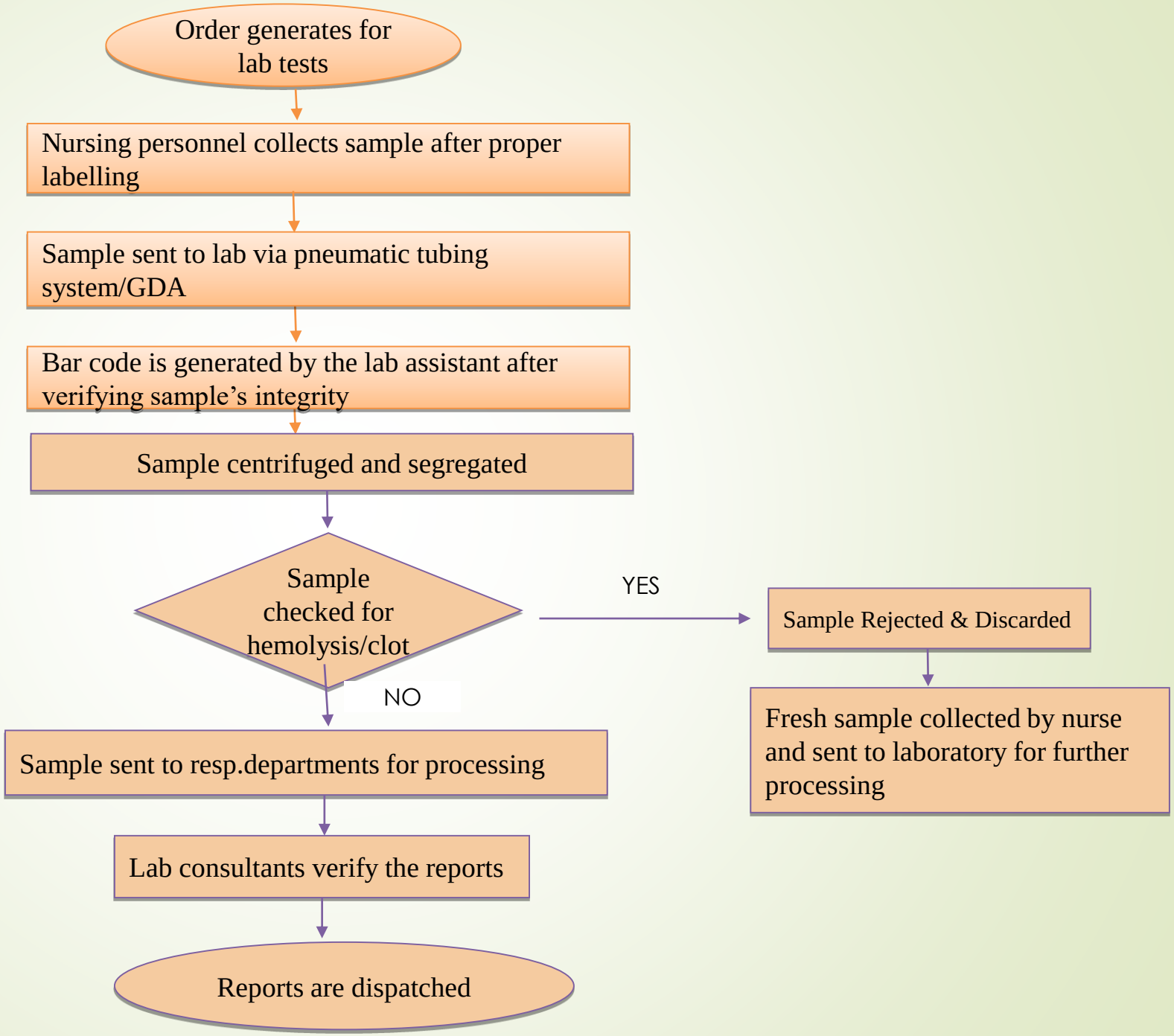
Sampling technique – Convenient sampling technique.

Study Tools -The data for the study was collected through a pre designed checklist

OPD Work Flow



IPD Work Flow

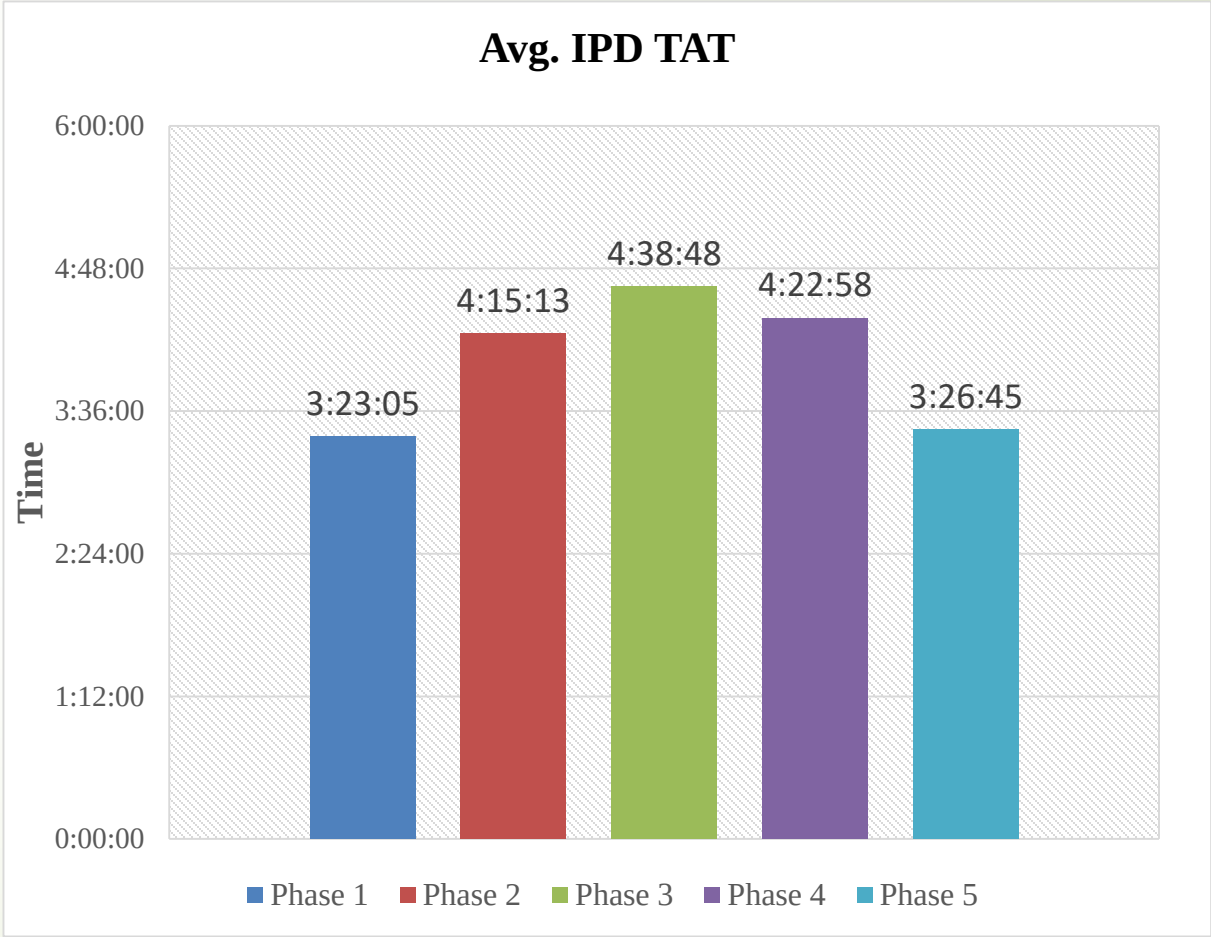


Analysis and Interpretation

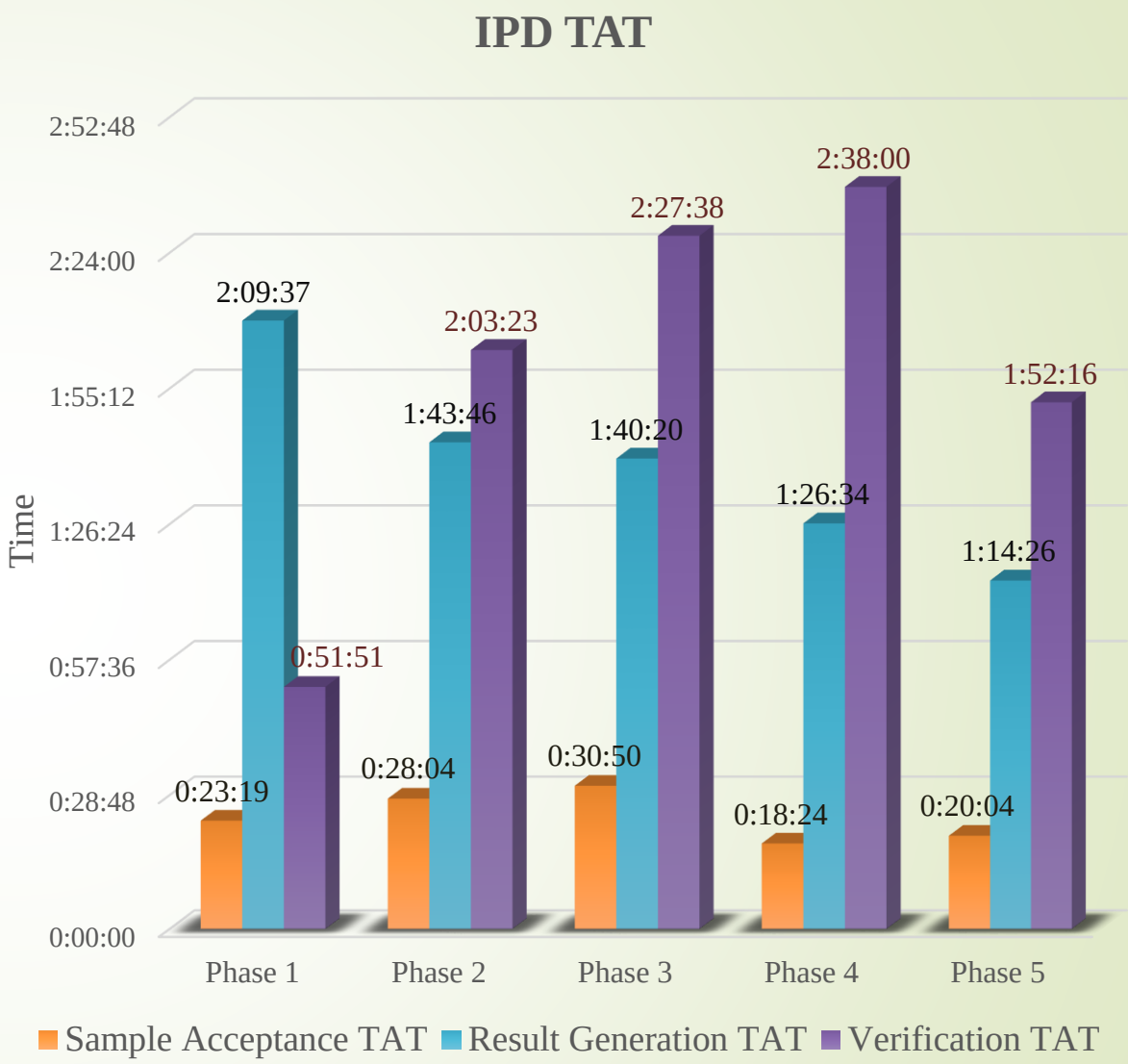
The study included 450 in-patients and 450 out patients.

The study was conducted in five phases which included twelve days in each phase.

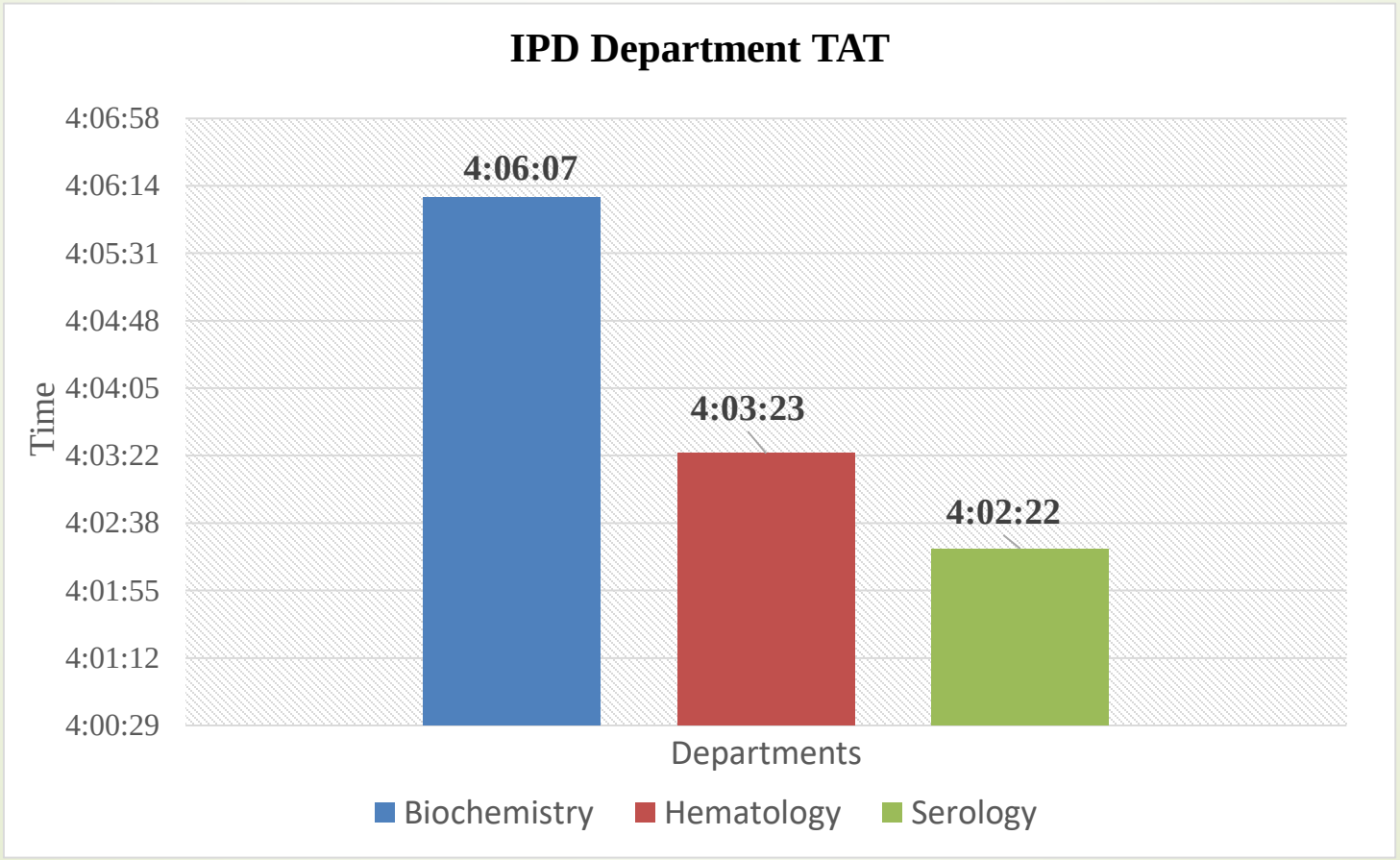
The graph shows the turnaround time of IPD in all phases which was highest during the phase 3 that was 4 hours 38 minutes and the lowest was seen in phase 1 which was 3 hours 23 minutes.



To find out the reasons of increased IPD TAT, various turnaround times were calculated which included-
Sample Acceptance TAT (time difference between sample acceptance and sample collection)
Result Generation TAT (time difference between result generation of tests and the sample acceptance)
Verification TAT (time difference between verification of the test results by the laboratory consultants and the result generation time of the tests)
The graph shows that the transportation time of samples from various places in hospitals till the laboratory receiving area remained almost same during all the five phase and the highest Sample Acceptance TAT was seen in Phase 3 which was approx. 31 minutes.
Result Generation TAT was seen in Phase 1 which was 2 hours 9 minutes and the least was seen in Phase 5 which was 1 hour 14 minutes.
The graph shows that it took the lab consultants approx. 2 hours and 38 minutes to verify the test reports in Phase 4 which was highest among all the Phases and the least time was taken during Phase 1 which was approx. 52 minutes

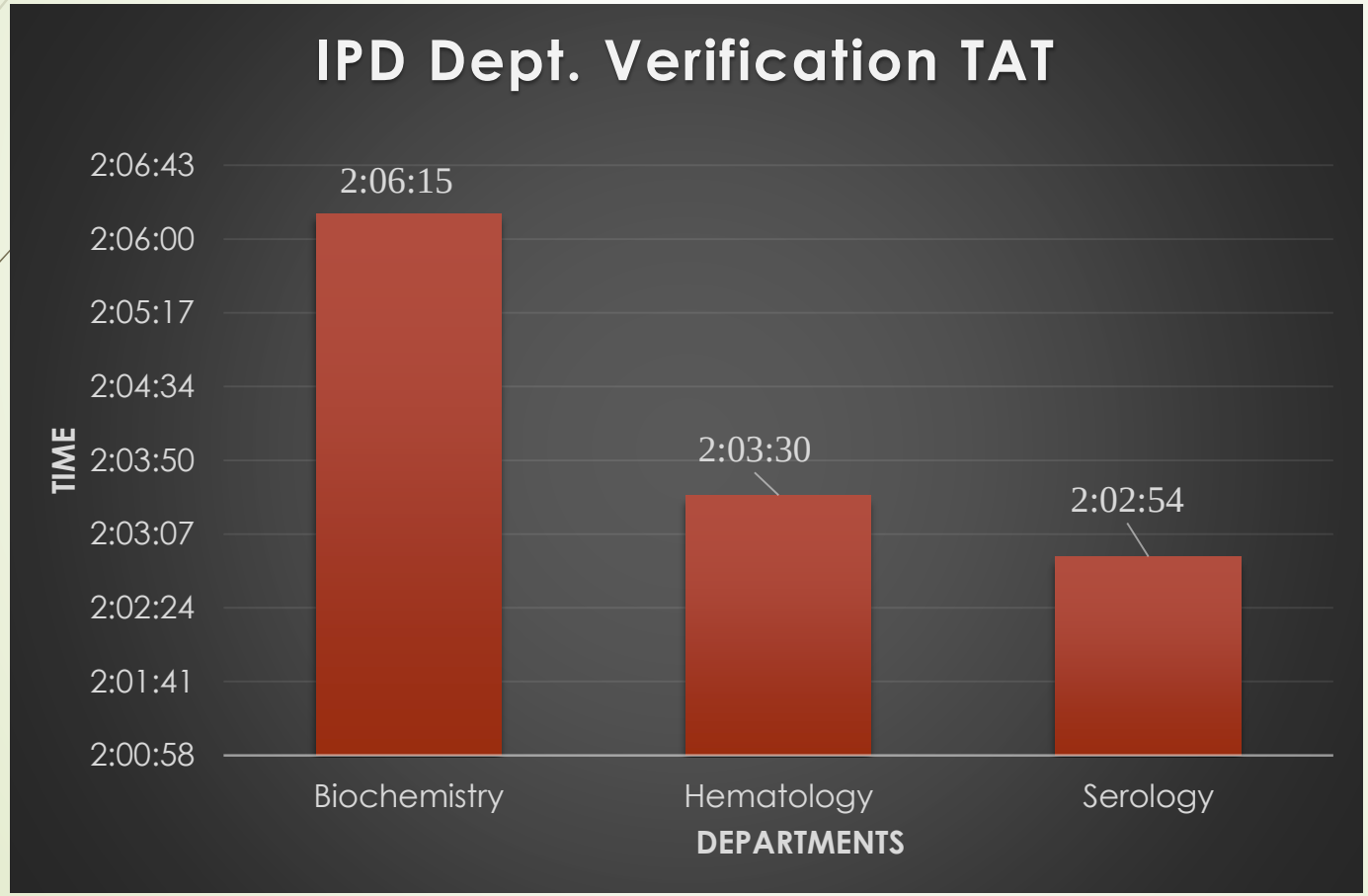


The below graph shows that when the department wise average TAT was calculated for the departments of biochemistry, hematology and serology, the highest turnaround time was noticed in biochemistry department which was followed by hematology and serology.

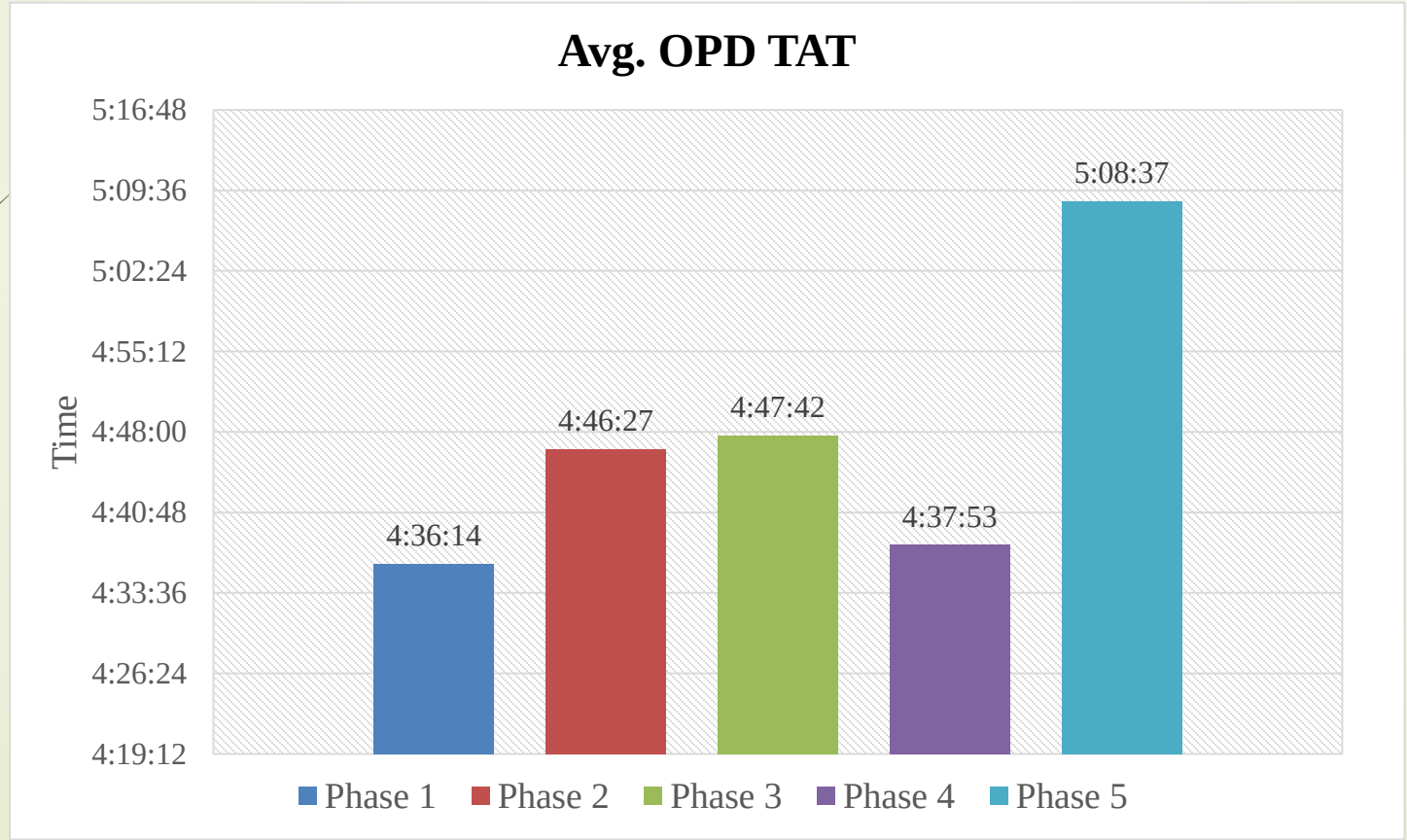


NO. of Reports
Biochemistry= 212
Hematology=93
Serology= 21

The graph below shows the verification turnaround time of various departments, the highest time taken by the lab consultants to verify the test reports was by the biochemistry department which was 2 hours 6 minutes, although the verification time for other departments was also 2 hours.

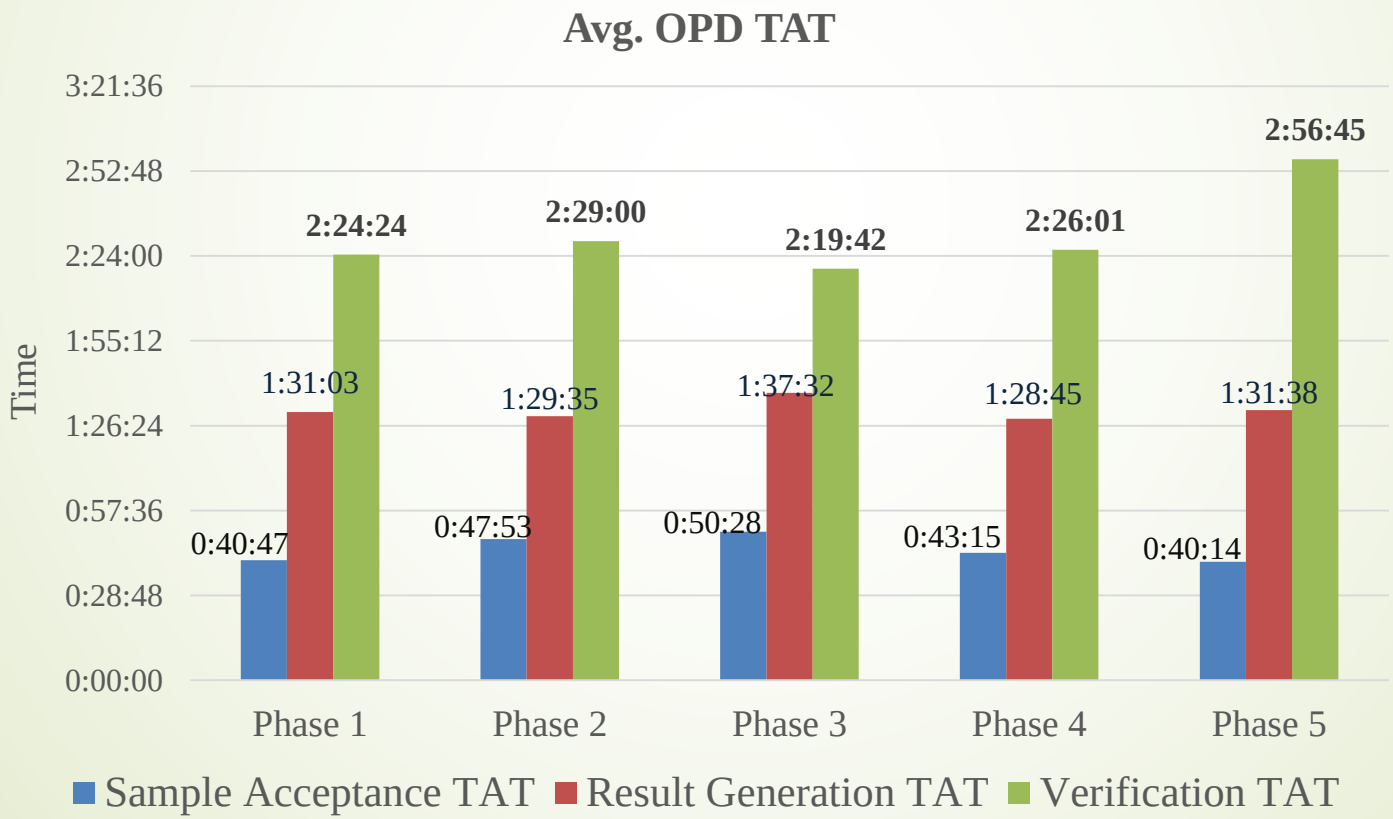


The graph below shows the average turnaround time of OPD in different phases of the study. The highest average OPD TAT was seen in phase 5 which was 5 hours and the least was noticed in phase 1 which was 4 hours 36 minutes.

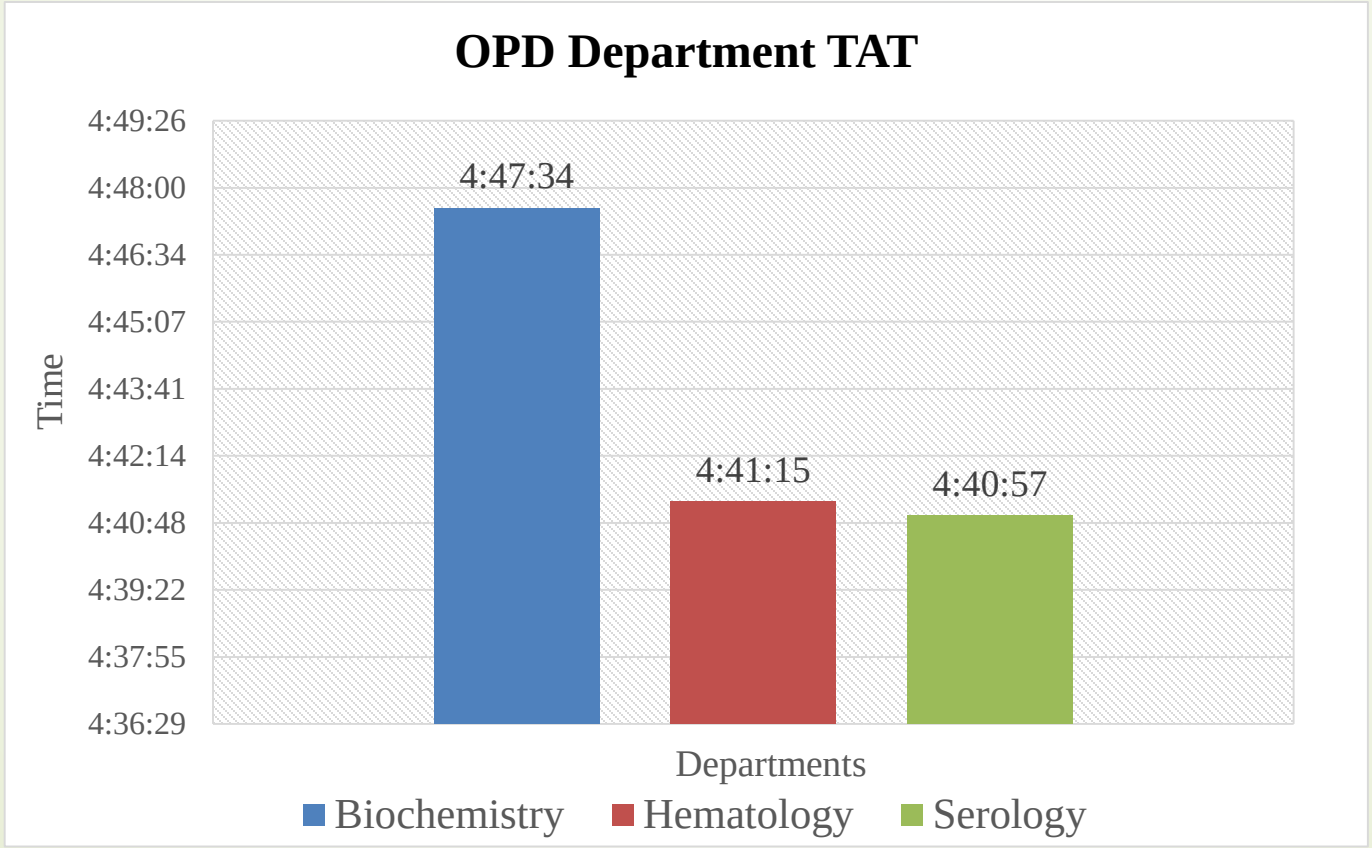


The graph below shows the OPD turnaround times at different steps. The highest verification time was noticed in phase 5 which was 2 hours 56 minutes and the least time taken for verification of test reports was seen in phase 3 which was 2 hours 19 minutes.

It was found out that the sample acceptance TAT and the result generation TAT was almost same for all the phases.

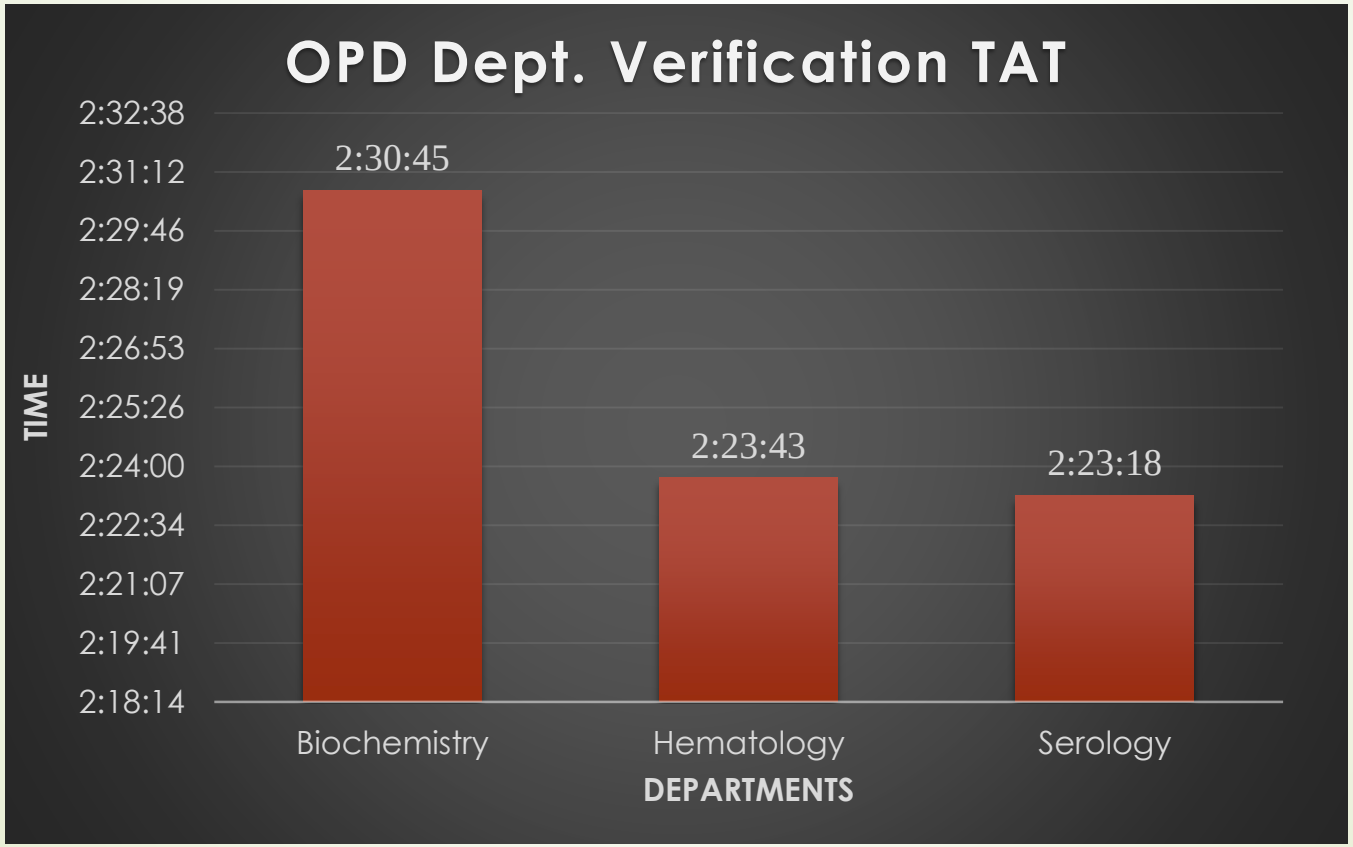


The graph below shows the Department wise OPD TAT of Biochemistry, Hematology and Serology. The highest turnaround time was noticed in Biochemistry Department which was 4 hours 47 minutes. The TAT of Hematology and Serology was almost same that was approx. 4 hours 40 minutes.



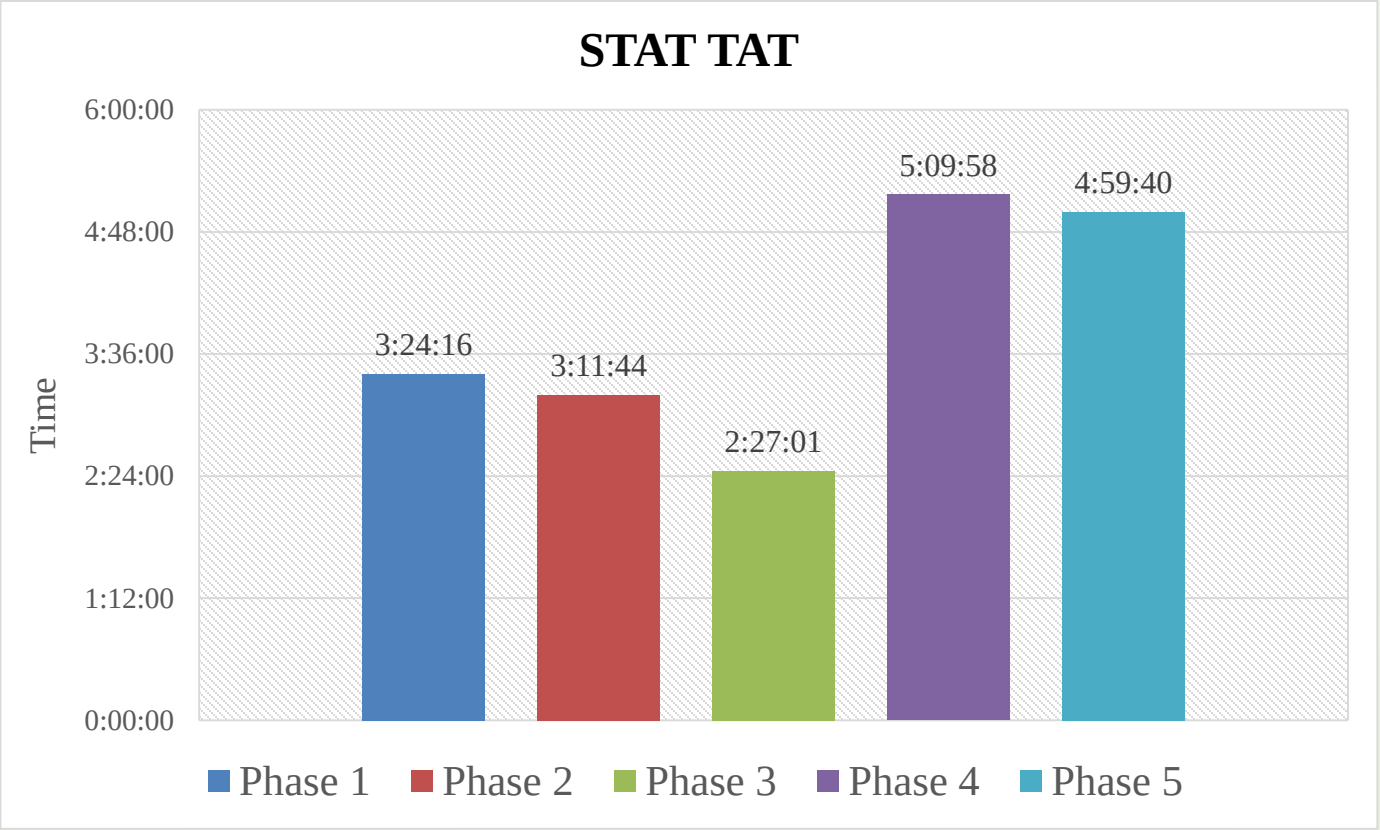
NO. of Reports
Biochemistry= 219
Hematology=176
Serology= 61

The following graph shows that in Biochemistry Department the highest average time was taken by the laboratory consultants to verify the test reports which was 2 hours 30 minutes followed by Hematology and Serology.



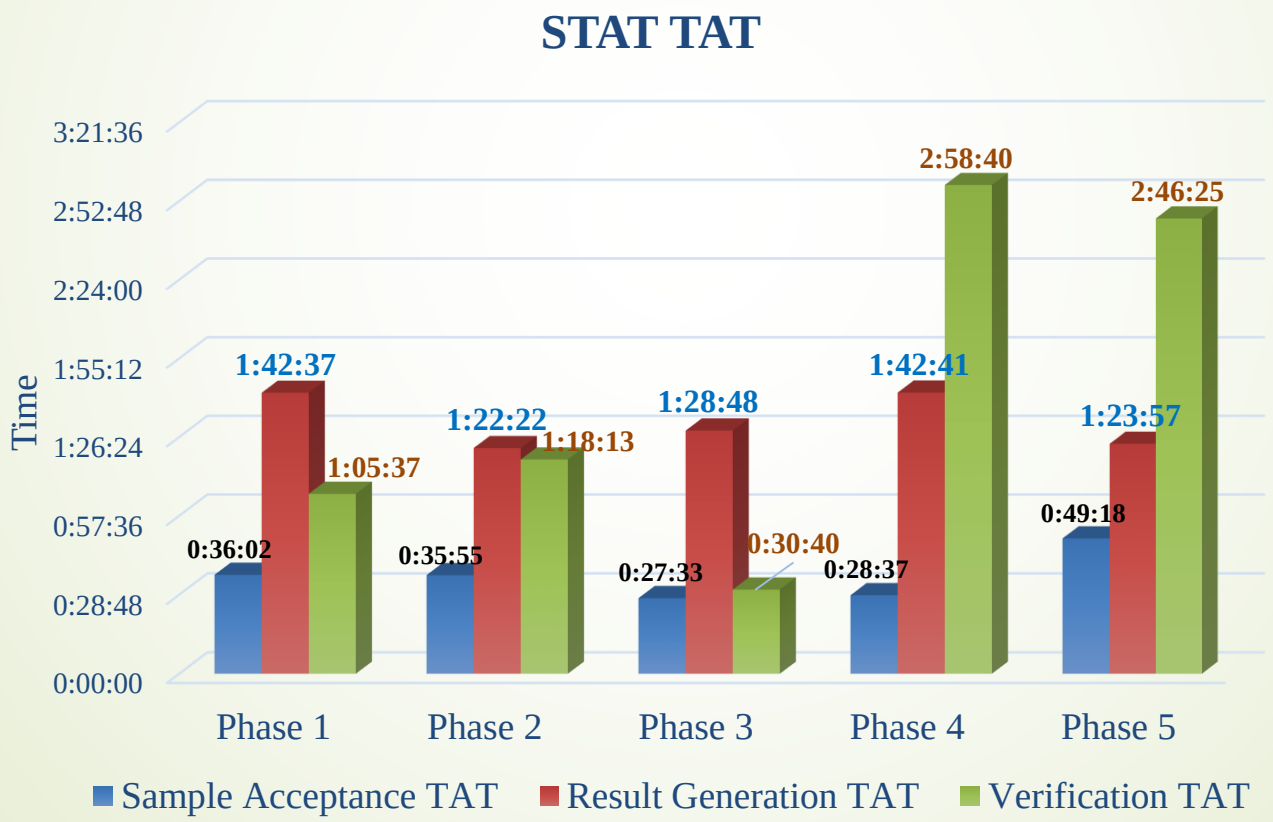
The below graph shows the Average STAT TAT for different phases of study. Phase 4 showed the highest turnaround time for STAT or Emergency samples which was 5 hours 9 minutes and the least was noticed in Phase 3.

The Average STAT TAT which was noticed of all the phases was 3 hours 31 minutes.

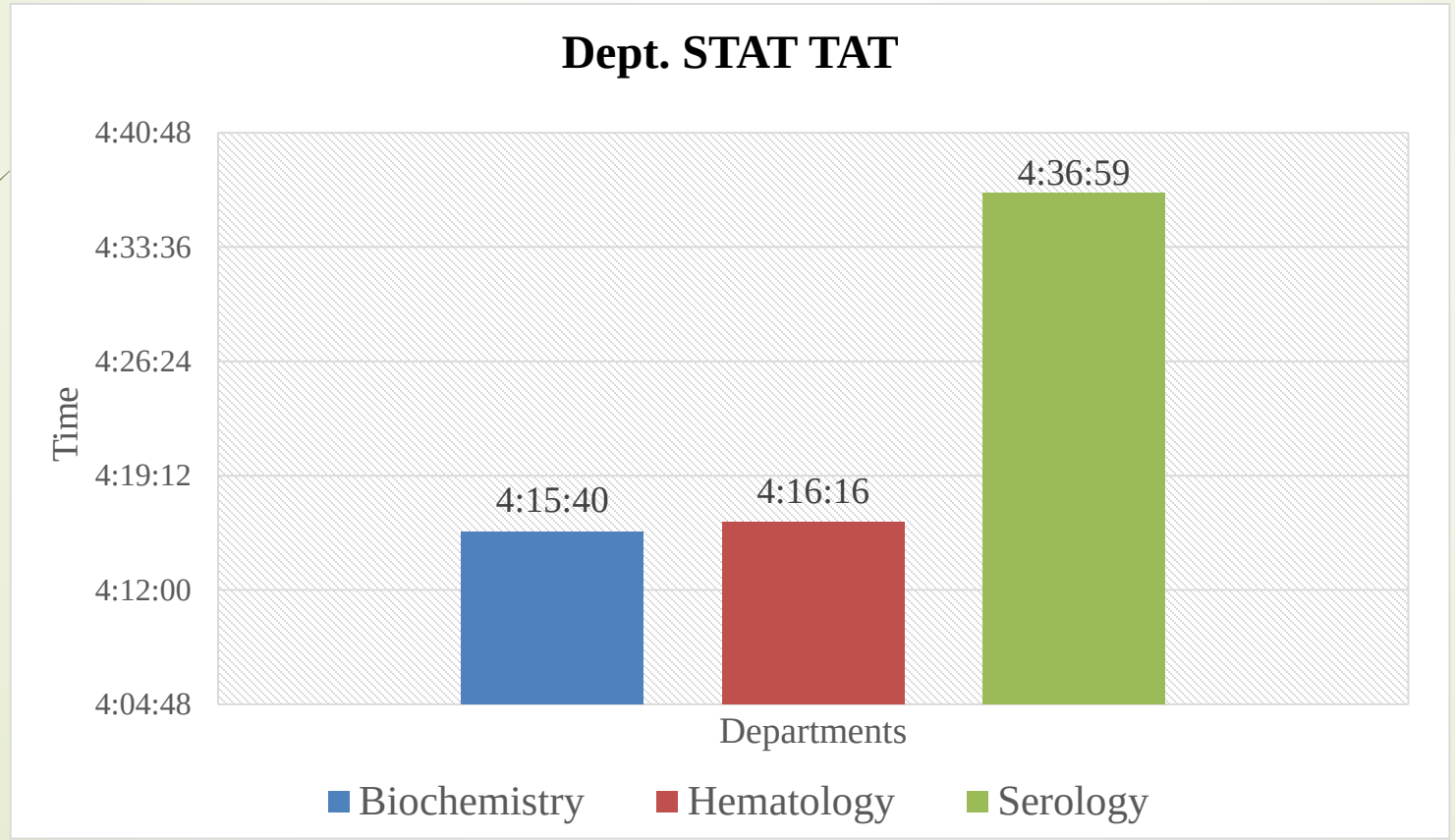


The following graph shows the STAT TAT at various stages the highest verification TAT for STAT test samples was reported in Phase 4 which was 2 hours 58 minutes and the least in Phase 1.

The highest Result generation Turnaround time was seen in Phase 4 which was 1 hour 42 minutes and the highest Sample Acceptance TAT was noticed in Phase 5.

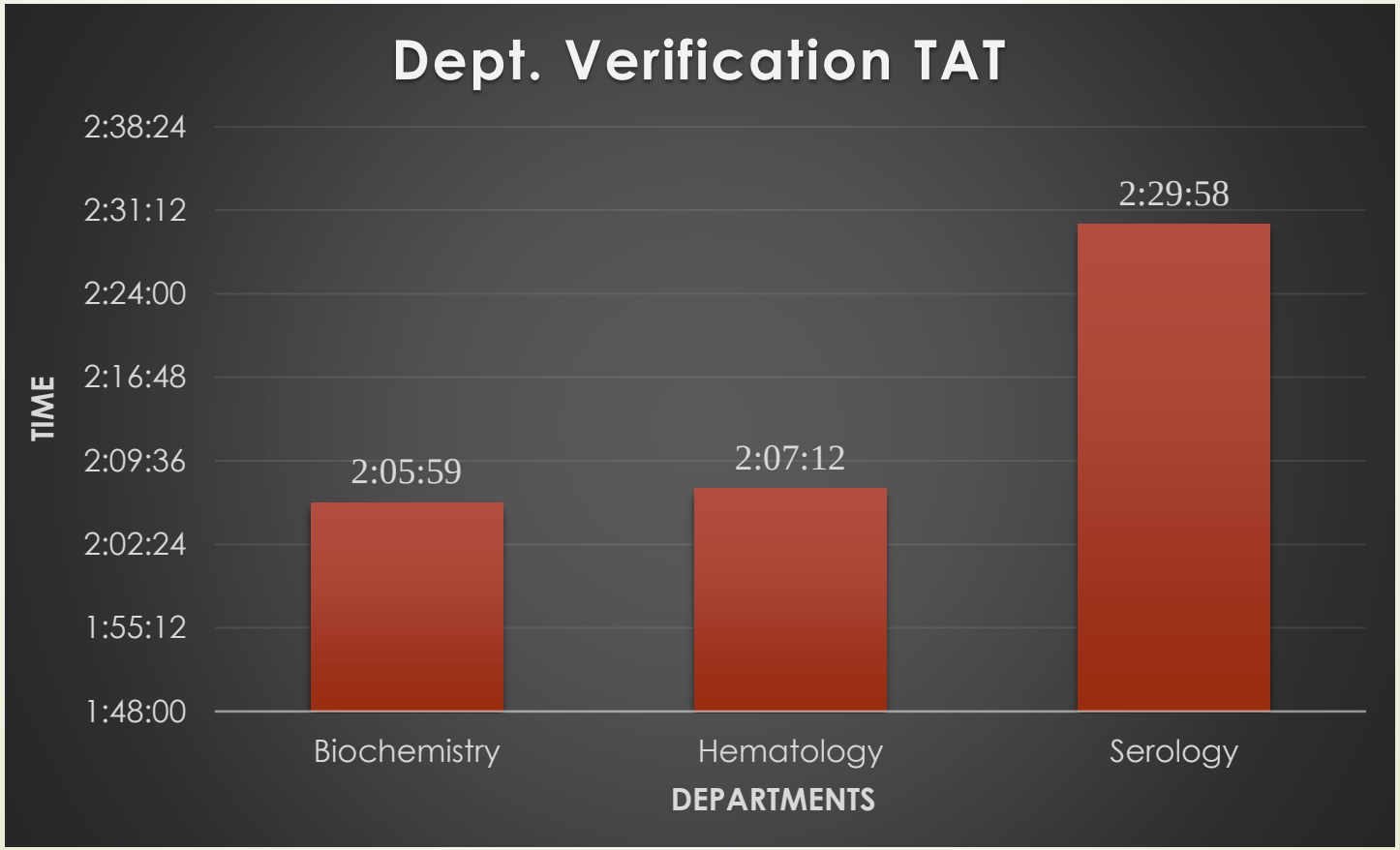


The below graph shows the department wise turnaround time of STAT samples. Serology TAT was the highest followed by Biochemistry and Hematology.

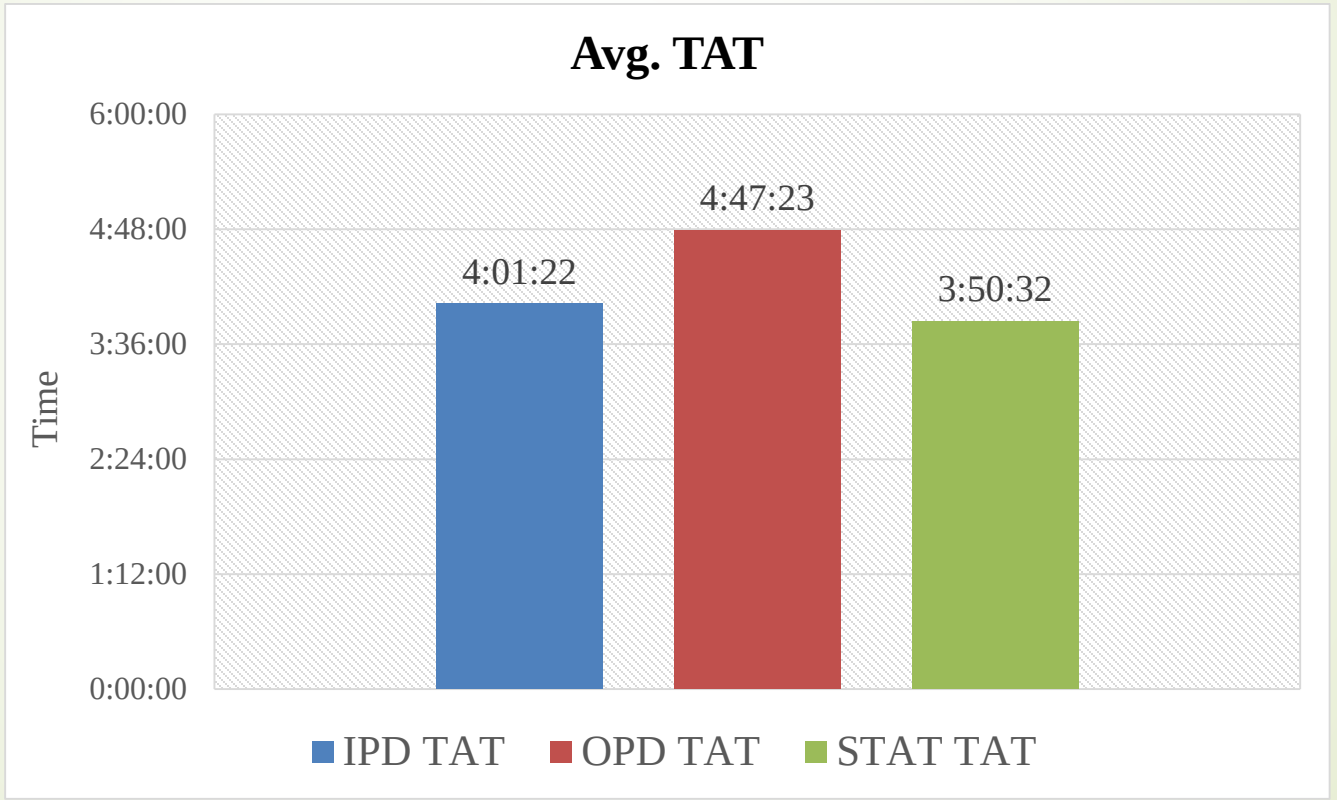


NO. of Reports
Biochemistry= 58
Hematology=42
Serology= 14

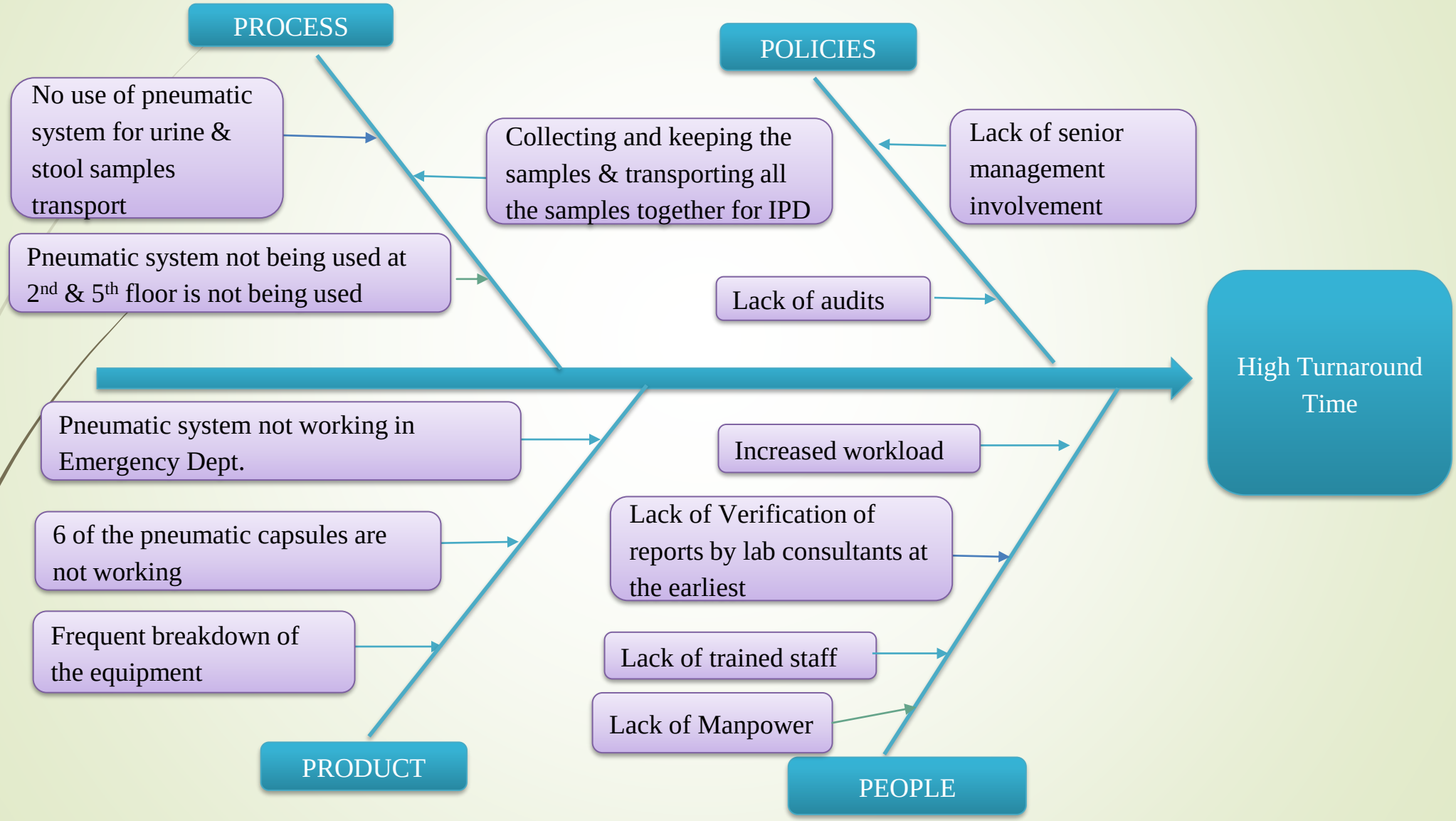
The following graph shows the Department wise Verification Turnaround time. It shows that it took 2 hours 29 minutes for Serology consultants to verify the test reports whereas the Verification TAT for Hematology and Biochemistry was same.



The graph below shows the Average turnaround time of IPD, OPD and for STAT samples. OPD TAT was the highest followed by IPD and STAT.



Root Cause Analysis for Increased TAT



SUGGESTIONS

- To improve TAT the management needs to get the pneumatic tube system rectified in ED.
- The nursing staff should be encouraged to use the pneumatic tube system at 2nd and 5th floor to decrease the transportation time of sample.
- The pneumatic capsules should be rectified to decrease the TAT.
- To improve the TAT equipment should be maintained properly as frequent breakdowns were noticed and preventive maintenance needs to do carried out at frequent intervals.
- Regular audits needs to be conducted for monitoring of TAT.
- Implementation of Dry Chemistry can help in improving the TAT.

CONCLUSION

The study states that there are many outliers which affect the TAT of the laboratory and to reduce the TAT one needs to work on all phases- pre-analytical, analytical and post analytical as these are interrelated and monitoring of these will not only help in improving the overall TAT but will help in ensuring quality control. It was noticed that main delay in TAT was due to delay in verification of test reports by the laboratory consultants followed by frequent equipment breakdown and manpower shortage during analytical phase increased the TAT of the result generation and pneumatic tube system breakdown and inefficient use on some places increased the sample acceptance TAT as the transportation was also taking more than required time.

To improve the TAT policies should be formed and implemented and audits should be conducted at regular intervals of time which will not help in patient satisfaction but will also help in reducing the length of stay of patients and fasten the discharge process as well in the hospital.

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THANK YOU