A Study to Analyse the Turnaround Time of the Department of Biochemistry in Barala Hospital & Research Centre, Chomu, Jaipur.

By

Ms. Bhawna Barala

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2018-2020

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TO WHOMSOEVER MAY CONCERN

This is to certify that Ms. Bhawna Barala, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Barala Hospital & Research Centre from 1st June 2020 to 31st August 2020.

The Candidate has successfully carried out the study designated to him during internship training and his 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 his future endeavours.

Dean, Academics and Student Affairs
The IIHMR University, Jaipur

Professor
The IIHMR University, Jaipur

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **"A Study to Analyse the Turnaround Time of the Department of Biochemistry in Barala Hospital & Research Centre, Chomu, Jaipur"** and submitted by Ms. Bhawna Barala, Enrolment No. IIHMR-U/01/2018-20/0733 under the supervision of Dr. Sandesh Kumar Sharma for award of MBA in Hospital and Health Management in Health and Hospitals of the University carried out during the period from 1st June 2020 to 31st August 2020 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.

Signature

31st August, 2020

SERVICE CERTIFICATE

This to certify that Ms. Bhawna Barala has completed a three-month dissertation study on the **topic "A study to Analyse the Turnaround Time of the Department of Biochemistry in Barala Hospital & Research Centre, Chomu, Jaipur"** from 1st June, 2020 to 31st August, 2020.

During this period of Dissertation, Ms. Bhawna Barala has been found to be sincere, hard working with an attitude to learn.

We wish her successful future and a brilliant professional career ahead.

For **Barala Hospital & Research Centre**

Antima Rawat

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Manager- Human Resources

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ACKNOWLEDGEMENT

It has been my privilege to have had this opportunity to complete my dissertation from a reputed organisation such as Barala Hospital & Research Centre, Chomu, Jaipur. In the entire duration of my association with the organisation, I have gained immense knowledge in various departments of the hospital and has helped garner a better understanding of the on-ground processes that are implemented in a tertiary care institute.

I would like to express my gratitude to Mr Vinita Jain, HOD- Laboratory in providing me with this opportunity to undergo the dissertation process with such an esteemed institute.

I would like to sincerely thank my organisation mentor, Dr. Hanuman Sahai Barala, Medical Superintendent, Barala Hospital & Research Centre for his invaluable inputs, guidance, enthusiasm, and constructive discussion as a mentor. It was his constant counselling and support during the entire phase of the dissertation along with the academic zeal and thorough knowledge of the subject to bring about the best in me for which I shall be grateful to forever even during such uncertain times. He has not only helped me with the dissertation process but also has judiciously provided me with opportunities in other projects undertaken by the organisation.

My special thanks to the entire hospital staff of Barala Hospital & Research Centre, Chomu with a special mention to the Hospital Information Systems team and the Department of Biochemistry team for their cooperation and support throughout my time here in Barala Hospital & Research Centre, Chomu, Jaipur.

I would also like to thank my institutional mentor, Dr. Sandesh Kumar Sharma, Associate Professor, IIHMR University who has truly been a pillar of strength and has been there at every turn for the successful completion of my dissertation. It was through her expertise that helped me to have a better grasp of the entire project as well as the healthcare system in totality.

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ABBREVIATIONS

TAT – Turnaround Time

ER – Emergency Room

OPD – Out-Patient Department

IPD – In-Patient Department

LIS – Laboratory Information Systems

ABSTRACT

Title:

A Study to Analyse the Turnaround Time of the Department of Biochemistry in Barala Hospital & Research Centre, Chomu, Jaipur.

Introduction:

Turnaround time (TAT) is one the parameter among several elements which decide the capability of hospital to furnish the services for patient satisfaction and to fulfil their wants, need and expectations which performs a major function in achieving the standard.

Turnaround time does now no longer have an authorized definition. In consequence, we've the freedom to outline the definition and is as follows:

"The time elapsed among whilst a clinician orders a clinical/diagnostic take a look at, to the time whilst he gets the outcome of the same.''

Time of laboratory is classified to differentiate in 3 stages: Analytical, Pre-Analytical and Post-Analytical.

Above mentioned stages are often to categorise errors and delays and are frequently used for elucidating turnaround time. (1)

To acquire the favoured turnaround time, elements of the lab checking out manner ought to be contemplate.

Objective:

The goal of this research became to examine the general Turnaround time withinside the Biochemistry department at Barala Hospital & Research Centre, Chomu and discover the motive for delays, if any in addition to offer appropriate pointers for the same.

Methodology:

A cross-sectional observational research study was performed in at Barala Hospital & Research Centre, Chomu for a duration of 3 months with criteria of inclusion based on availability of checks crafted from the Emergency room, Inpatient Department and Outpatient Department to the Biochemistry branch among 10 am to 6 pm. 60 samples of Emergency room, 180 samples of Outpatient Department and 900 samples of Inpatient Department are analysed with total number of 1140 samples.

The division of analysis was done in 3 phases relaying on the timespan available for the test. Samples of Phase 1, Phase 2 and Phase 3 were studied among duration of 10:00am to12:30pm, 12:30pm to 3:45pm and 3:45pm to 6:00pm, respectively.

The ordinary turnaround time was divided in three Stages i.e., Analytical Stage, Pre-Analytical Stage and Post-Analytical for every segment to peer the participation made with the aid of using every level in addition to the constraints related to them.

The statistics became amassed thru a predesigned tick list and secondary statistics acquired from the lab information system.

Results:

The median TAT throughout the 3 departments i.e., ER, OPD & IPD, OPD has recorded highest TAT with median of 3:14:22 and ER recorded lowest median TAT of 02:09:43 and IPD recorded median TAT of 2:25:06.

The ordinary contribution among the 3 ranges to the general common TAT became particularly because of the Pre-Analytical and Post-Analytical Stage that became cumulatively 58.92 % for the emergency room, 67.33 % for outpatient department and 59.27 % for inpatient department. Another essential locating became the growth withinside the TAT at some stage in Phase (10 am to 12:30pm) throughout all the 3 phases which became particularly because of the improved workload at some stage in those hours.

Conclusion:

This research study was done to examine the TAT recorded withinside the Department of Biochemistry of Barala Hospital & Research Centre, Chomu. Study was performed throughout the 3 stages i.e., Analytical, Pre-Analytical and Post- Analytical which came up with result of comprehensive TAT of lab test.
During analysis it was found that there was high TAT in phase 1 throughout all the 3 department which resulted in high burden during Phase 1 hours.

A throughout duty roster should be prepared with increased manpower for working during peak hours in the hospital. The purpose of this roster is to serve during the morning hours which are observed to heavy workload hours in the Biochemistry Lab. Arranging the phlebotomist for OPD who can help in reducing TAT which will be easily approachable for the patients regarding to the sample collection.

The outcome of research study shows that there is scope improvement in Lab TAT. Notwithstanding the distinct belief in regard with clinical results of better turnaround time, reasons of increased turnaround time should be known. There must be a beneficial method to reduce the hurdles for standardised TAT. As improvement in Turnaround time is continuous quality process.

INTRODUCTION:

Turnaround time (TAT) is one the parameter among several elements which decide the capability of hospital to furnish the services for patient satisfaction and to fulfil their wants, need and expectations which performs a major function in achieving the standard.

Turnaround time does now no longer have an authorized definition. In consequence, we've the freedom to outline the definition and is as follows:

"The time elapsed among whilst a clinician orders a clinical/diagnostic take a look at, to the time whilst he gets the outcome of the same.''

Time of laboratory is classified to differentiate in 3 stages: Pre-Analytical, Analytical, and Post-Analytical.

Above mentioned stages are often to categorise errors and delays and are frequently used for elucidating turnaround time. (1)

- Duration taken from the time of order given the consultant till the sample arrived at lab for testing is recorded in Pre-Analytical Stage.
- Duration taken from the time of sample accepted by lab to completion of sample process is recorded in Analytical Stage.
- Duration taken from the time of report generation to the report certification by the lab consultant.

To obtain the favoured TAT, all of the above components of the laboratory checking out system should be considered.

This have a look at is targeted on enhancing the workflow of lab through analyses of the work process of the lab and the general turnaround time.

RESEARCH QUESTIONS:

- What is the median turnaround time throughout all 3 levels of laboratory checking out for the inpatient department, outpatient department and Emergency room?
- What are the causes for elevated TAT, if any?
- How can the procedure be progressed a good way to limit delays?

OBJECTIVE:

This research study has been carried out with the intention to enhance the quality of offerings on the Department of Biochemistry at Barala Hospital & Research Centre, Chomu.
To meet this objective, the subsequent steps have been to be taken:

- Evolve an expertise of the workflow on the Department of Biochemistry, throughout the outpatient department, emergency room & inpatient department.
- Calculate the turnaround time in every phase i.e., analytical pre-analytical and post-analytical
- Identification of the causes for delay, if found.
- Recommend measures to enhance the total turnaround time.

LITERATURE REVIEW

1- Spackman in article '*Workstation Technology in Pathology'* (1994) the LIS used in hospital is essential to enhance the efficiency and quality of Lab practice, which also helps in growth of the hospital. Training of lab personnel should be carried out regarding utilization of LIS. (**Error! Reference source not found.**)

2- Manorin in her article *'Turnaround Times in Laboratory: A Review of Literature'* (1999) says there are more than 80% complaints about test TAT in lab. These delayed TAT led to increase in patient dissatisfaction and LOS of the patient in hospital. (**Error! Reference source not found.**)

3- Alain Truchaud et al in their paper titled '*New tools for laboratory design and management'* (1997) focuses on developing the quality goals throughout all the 3 phases i.e., Phase 1, 2 and 3 before selection of advanced technology and self-regulating tools of lab testing. Systematic perspective in simple pattern was given higher significance in the study than following the orthodox disciplines. (**Error! Reference source not found.**)

4- Bruce A. Jones et al in their article *"Physician satisfaction with clinical laboratory services",* says that physician's level of satisfaction is more with accuracy and reliability of lab test and level of dissatisfaction with TAT. (**Error! Reference source not found.**)

5- Wankar in his research article *"Study of determination of laboratory turnaround time in tertiary care hospital in India"* (2014) found that overall TAT involves number of reasons. Monitoring and improvement has to be in all the 3 stages i.e., analytical, pre-analytical and port-analytical to attain the benchmarked standards. (**Error! Reference source not found.**)

6- Dr. Bhagyashree in her article *"Monitoring of Turnaround time (TAT) in Biochemistry Laboratory of a tertiary care hospital in Karwar"* (2017) to understand the individual contribution of all three stages analysis was done individually which represented the overall lab TAT. Opportunity of refinement is shown by post-analytical stage, by introducing an self-regulating process for delivery of post analyzed verified reports. (**Error! Reference source not found.**)

METHODOLOGY

The research study completed withinside the Department of Biochemistry Laboratory Services of at Barala Hospital & Research Centre, Chomu.

Research Design – Observational cross-sectional Study.
Duration – The research study become carried out for a duration of 3 months (1st June 2020 to 31st August 2020).

Study Population –
Criteria of Inclusion - All the records were raised from:

• The Department of Biochemistry obtained from the Emergency room, Inpatient Department and Outpatient Department.

• Examination ordered at Lab among 10:00 AM to 6:00 PM.

• At Barala Hospital & Research Centre, Chomu.

Criteria of Exclusion – All records were raised from:

• The Department of Clinical Pathology, Histopathology, Cytopathology, Haematology, Microbiology and Serology.

• Examination ordered at Lab between 6:00 PM to 10:00 AM.

• At different areas of Barala Hospital & Research Centre.

Tools of study – The statistics for the research study was gathered through:

• Checklist

• Secondary statistics from LIS in use at Barala Hospital & Research Centre, Chomu.

Size of Sample – Overall 1140 samples of test have been analysed from the Department of Biochemistry for this study. These included:

Sample size Distribution:

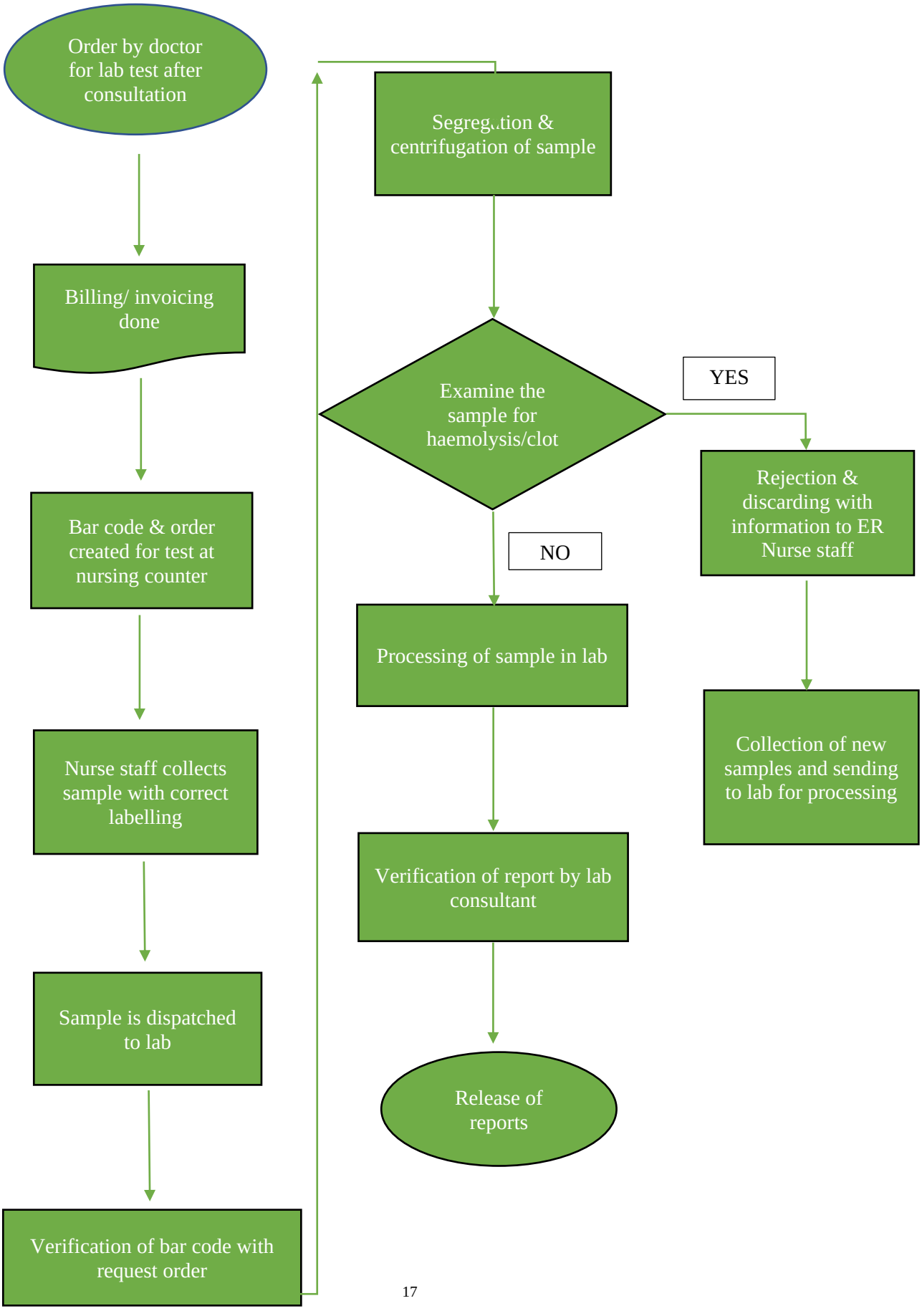
Departments	**Studied Samples**
OPD	180
ER	60
IPD	900
Sum	N = 1140

Workflow of Lab –

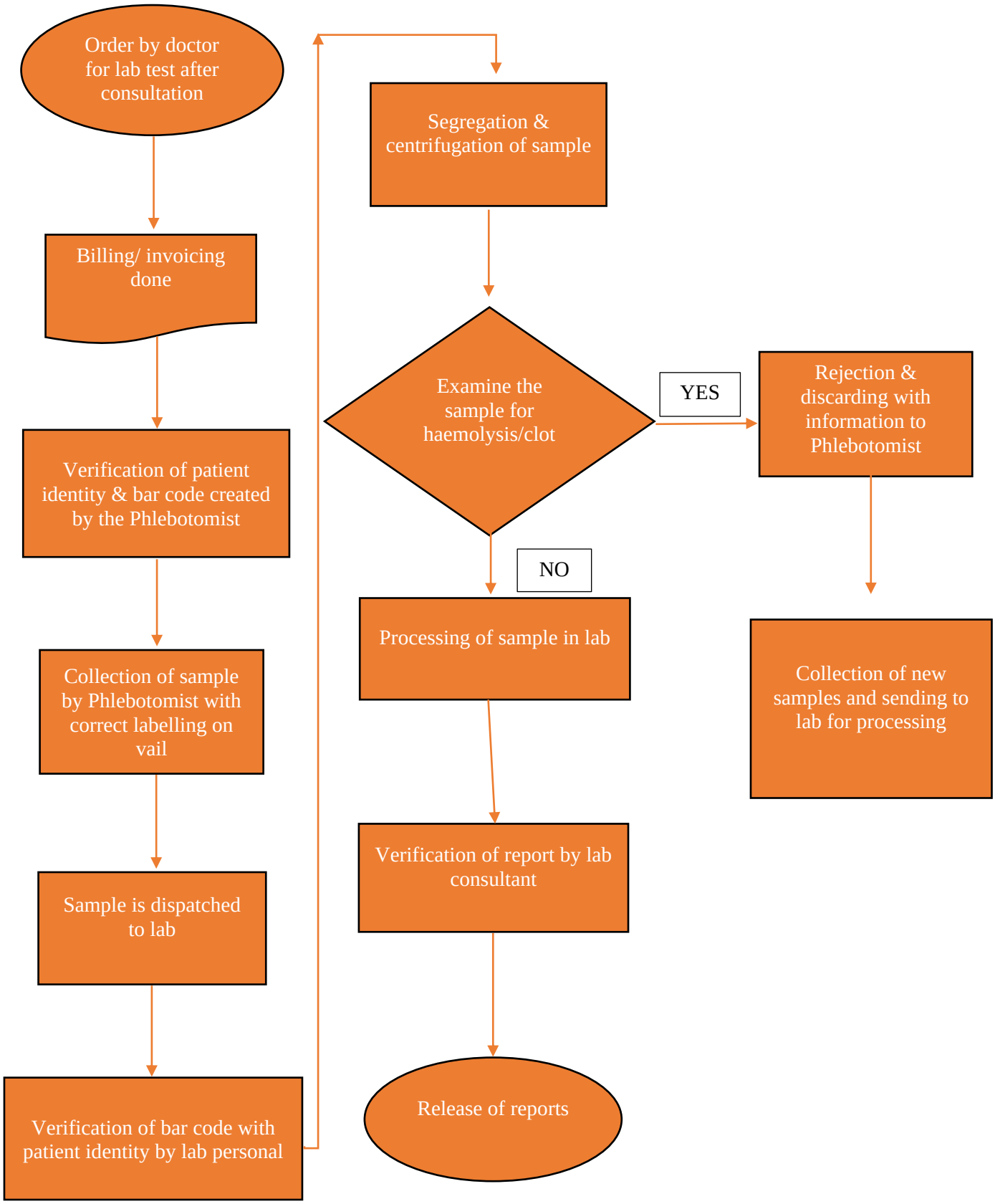
The workflow of the 3 Departments in which the requisitions for the lab checks had been examined. Following are the departments:

1. Workflow of ER –
2. Workflow of IPD –
3. Workflow of OPD –

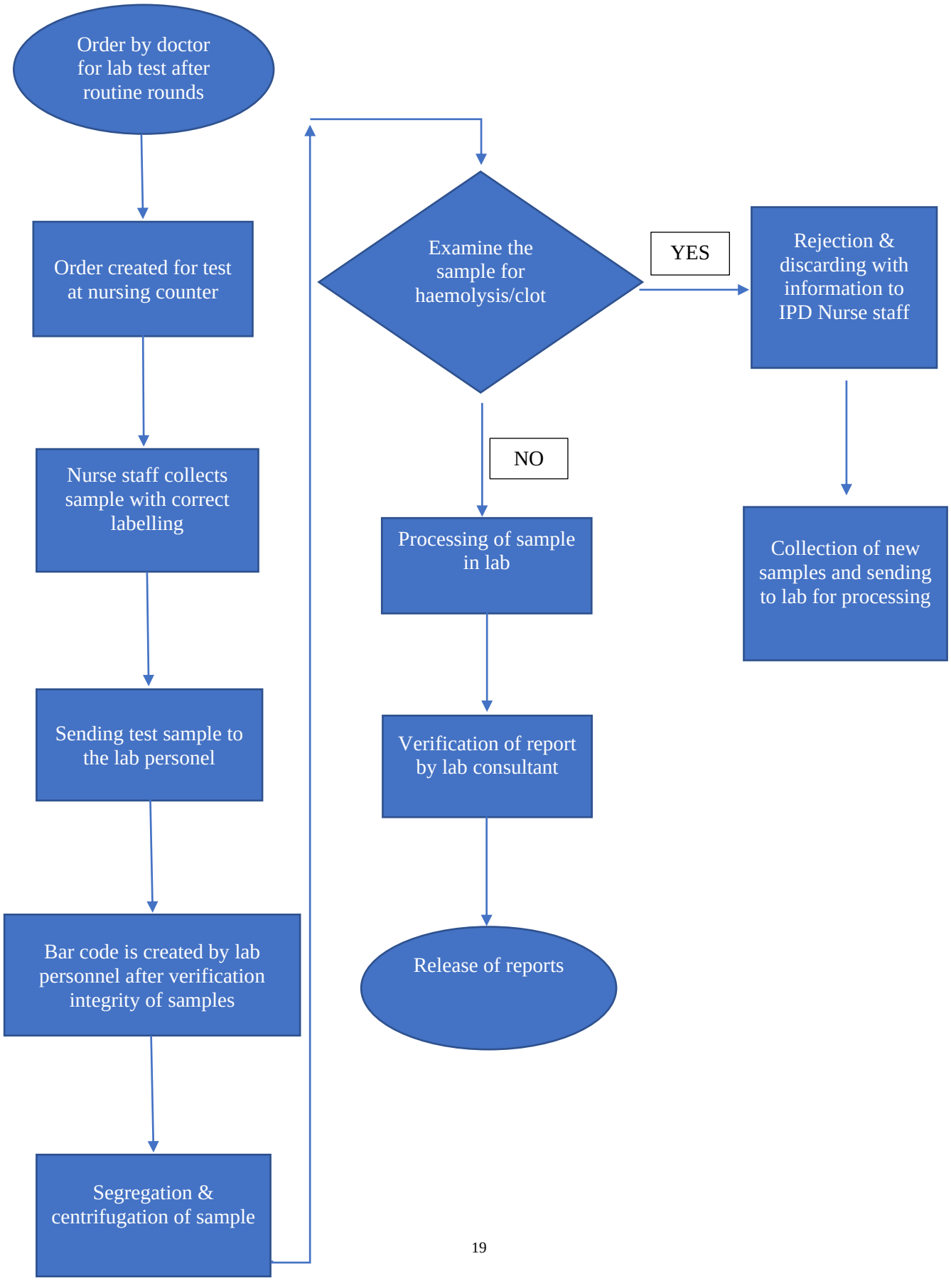
ER Workflow:


Order by doctor for lab test after consultation
Billing/ invoicing done
Bar code & order created for test at nursing counter
Nurse staff collects sample with correct labelling
Sample is dispatched to lab
Verification of bar code with request order
Segregation & centrifugation of sample
Examine the sample for haemolysis/clot
YES
Rejection & discarding with information to ER Nurse staff
Collection of new samples and sending to lab for processing
NO
Processing of sample in lab
Verification of report by lab consultant
Release of reports

OPD Workflow:



IPD Workflow:



DATA ANALYSIS

During this research study 1140 samples has been studied, these samples were collected from 3 areas of the hospital which are as follows: 1. OPD-180 2. IPD-900 3. ER-60.
Division od study was done in 3 phases as per time frame of the test requisition, analysis of samples was done in following 3 phases:

1. Phase 1: 10:00am -12:30pm
2. Phase 2: 12:30 pm-3:45pm
3. Phase 3: 3:45-6:00 pm

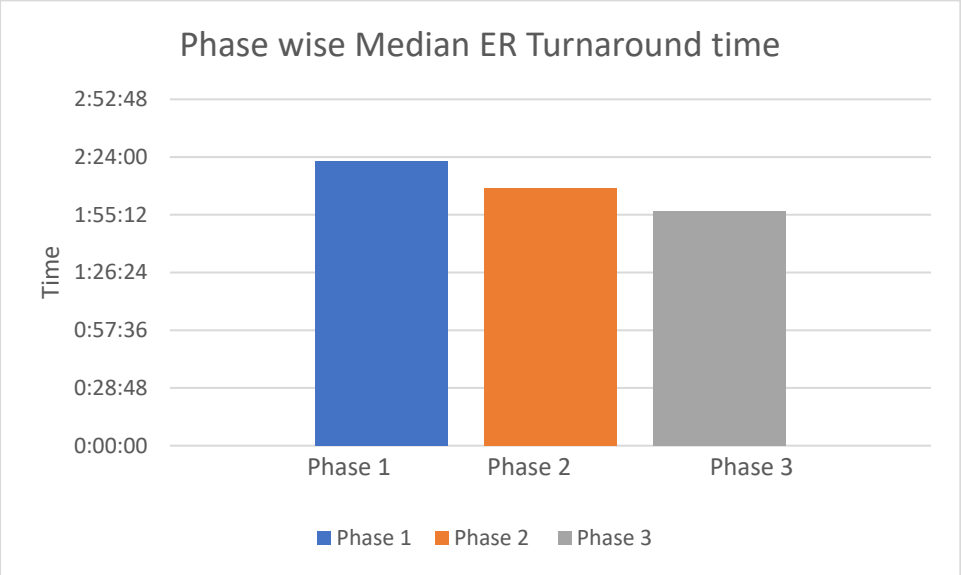
Distribution of samples from different areas were done equally throughout all phases.

Sample Distribution phase wise:

AREA	Phase 1 (10:00 – 12:30PM)	Phase 2 (12:30 – 3:45 PM)	Phase 3 (3:45 – 6:00 PM)
ER	20	20	20
OPD	60	60	60
IPD	300	300	300
SUM	380	380	380

ANALYSIS & INTERPRETATION OF ER

This graphic presentation shows the median TAT throughout the 3 phases for ER. Highest turnaround time recorded was in phase 1 i.e., 2:21:59 and lowest turnaround time recorded was in phase 3 i.e., 1:56:54.



Further analysis shows several distinctions in median TAT in 3 phases, calculation of turnaround time was included in following 3 stages:

1. Pre-Analytical
2. Analytical
3. Post- Analytical

Duration taken from the time of order given the consultant till the sample arrived at lab for testing is recorded in Pre-Analytical Stage.

Duration taken from the time of sample accepted by lab to completion of sample process is recorded in Analytical Stage.

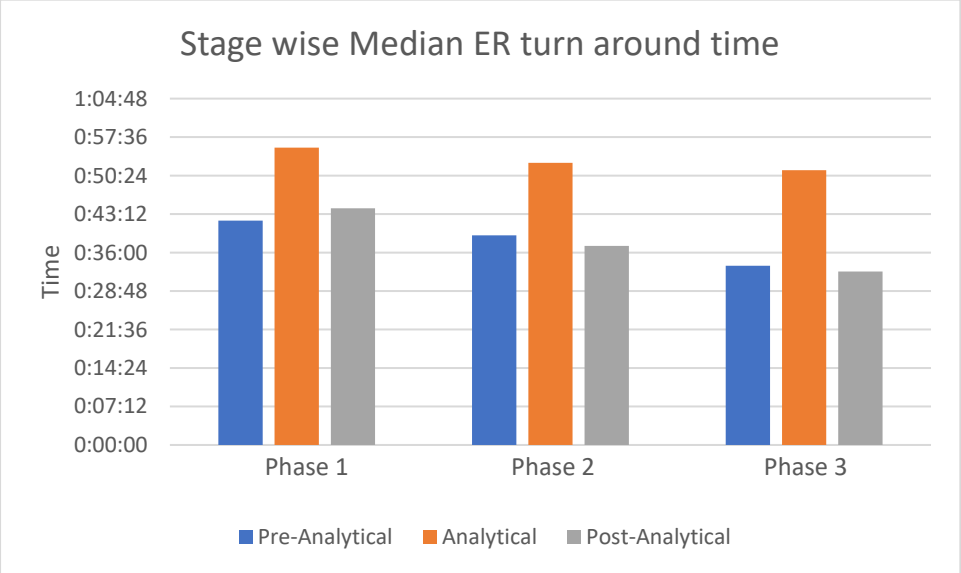
Duration taken from the time of report generation to the report certification by the lab consultant.

This graphic presentation shows the median TAT throughout the 3 Stages for ER.

Observation shows that there is almost same median TAT throughout 3 phases in Analytical Stage, where highest TAT was recorded in phase 1 and lowest in Phase 3 that is 55:38 and 51:25, respectively.

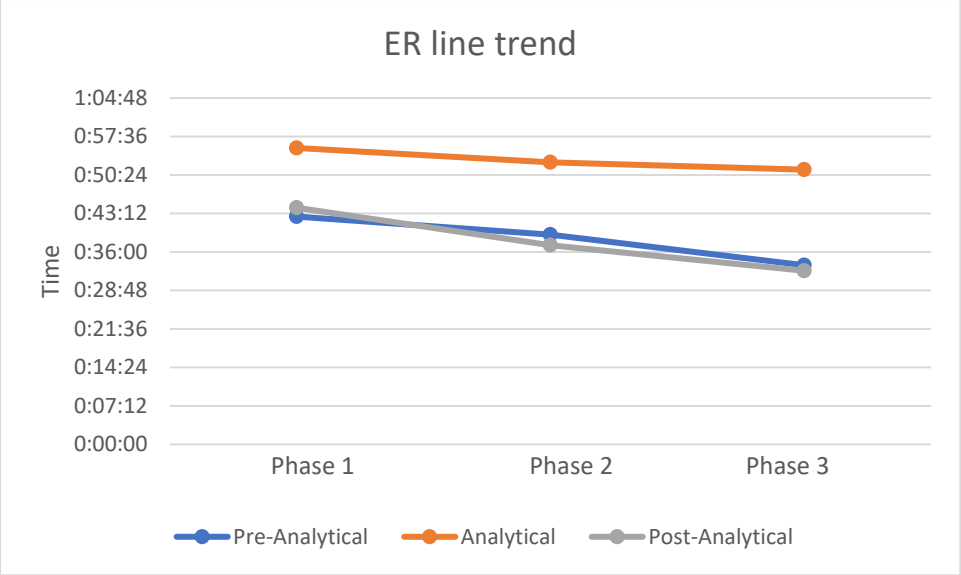
Observation shows the turnaround time in pre-Analytical stage, where is phase 1 recorded highest median TAT and Phase 3 recorded Lowest median TAT that is 41:59 and 33:31, respectively.

Observation shows the turnaround time in post-Analytical stage, where is phase 1 recorded highest median TAT and Phase 3 recorded Lowest median TAT that is 44:16 and 32:28, respectively.



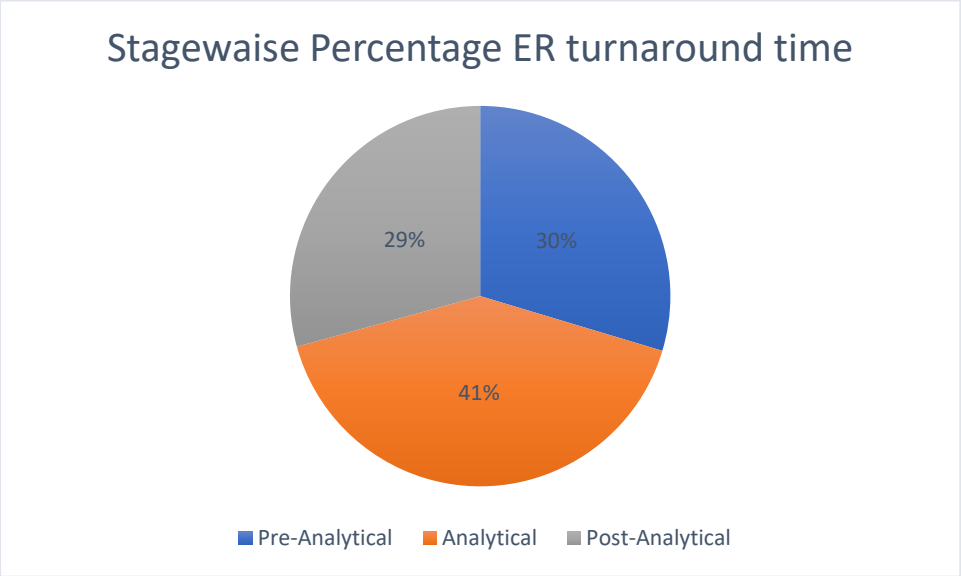
The line trend shows the decrease in median TAT throughout all 3stages when it was observed with time.

Decrease recorded in TAT for stage Analytical, Pre-Analytical and Post-Analytical is 02:07, 04:33 and 5:54 respectively.



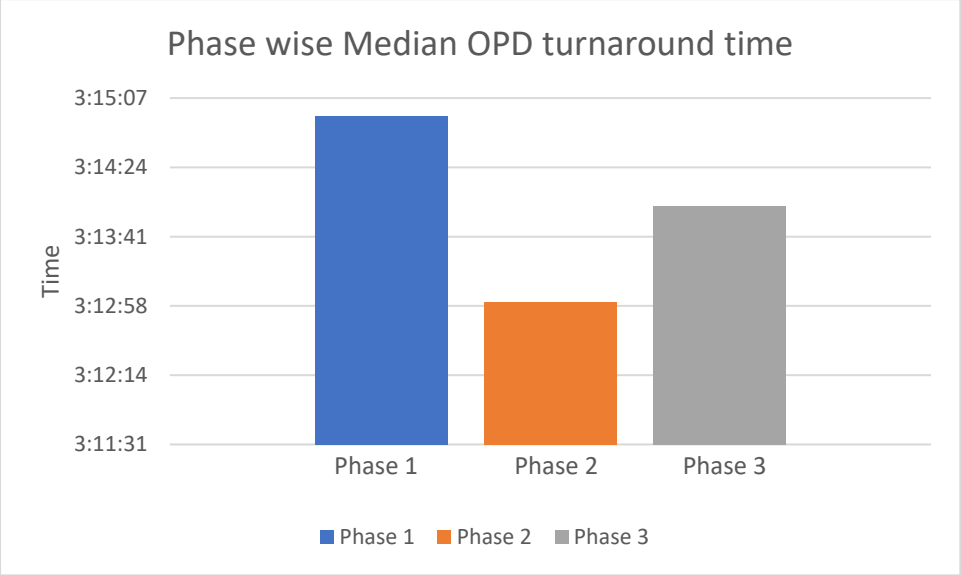
The representation of Pie-Chart shows the percentage that consider the comprehensive median turnaround time created for ER.

Total contribution of TAT in percentage by ER is 58.92% which is combination of 3 phases i.e., Analytical stage with 41.07%, pre-Analytical stage with 29.28% and post-Analytical stage with 29.63%.



ANALYSIS & INTERPRETATION OF OPD

This graphic presentation shows the median TAT throughout the 3 phases for OPD. The median turnaround time for OPD in phase 1 was 3:14:56, Phase 2 was 3:13:00 and Phase 3 as 3:14:00.

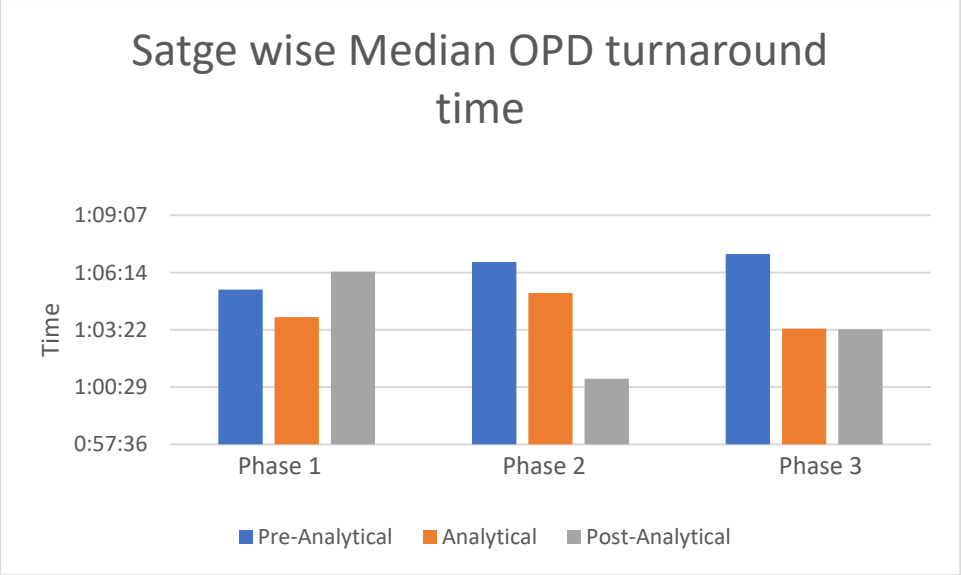


This graphic presentation shows the median TAT throughout the 3 Stages for OPD.

Observation shows the turnaround time in pre-Analytical stage, where is phase 1 recorded lowest median TAT and Phase 3 recorded highest median TAT that is 01:05:23 and 01:07:10, respectively.

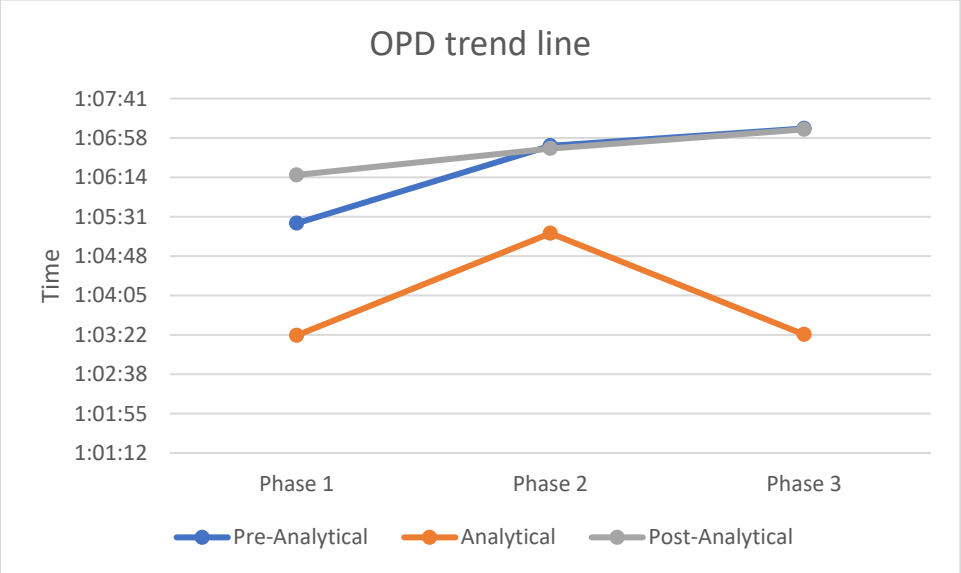
Observation shows that median TAT throughout 3 phases in Analytical Stage, recorded in phase1, phase 2 & phase 3 was 01:04:00, 01:05:13 & 01:03:25, respectively.

Observation shows the turnaround time in post-Analytical stage, where is phase 1 recorded highest median TAT and Phase 2 recorded Lowest median TAT that is 01:06:17 and 01:03:23, respectively.



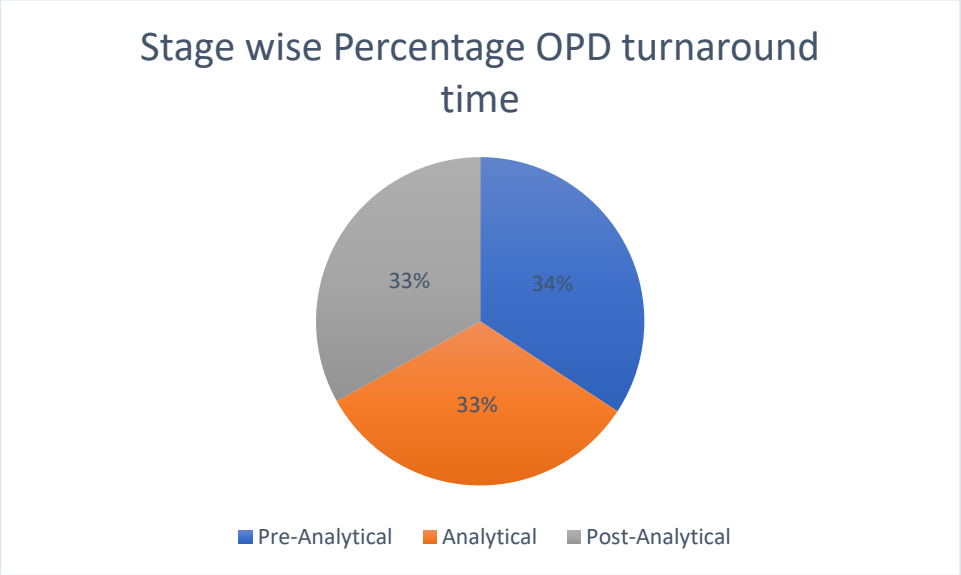
The line trend shows the decrease in median TAT throughout all 3stages when it was observed with time.

Increase was recorded in TAT for stage pre-Analytical with median increase of 53 seconds throughout all 3 phases.



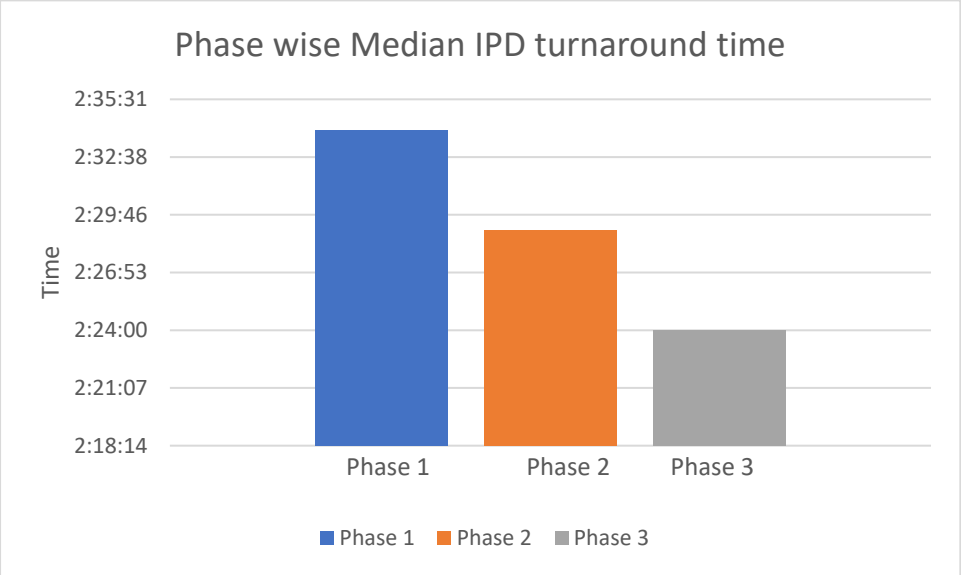
The representation of Pie-Chart shows the percentage that consider the comprehensive median turnaround time created for OPD.

Total contribution of TAT in percentage by OPD is 67.33% which is combination of 3 phases i.e., Analytical stage with 32.67%, pre-Analytical stage with 34.23% and post-Analytical stage with 33.09%.



ANALYSIS & INTERPRETATION OF IPD

This graphic presentation shows the median TAT throughout the 3 phases for IPD. The median turnaround time for OPD in phase 1 was 02:33:59, Phase 2 was 02:29:00 and Phase 3 as 02:24:00. Highest was recorded in phase 1 and least in phase 3.

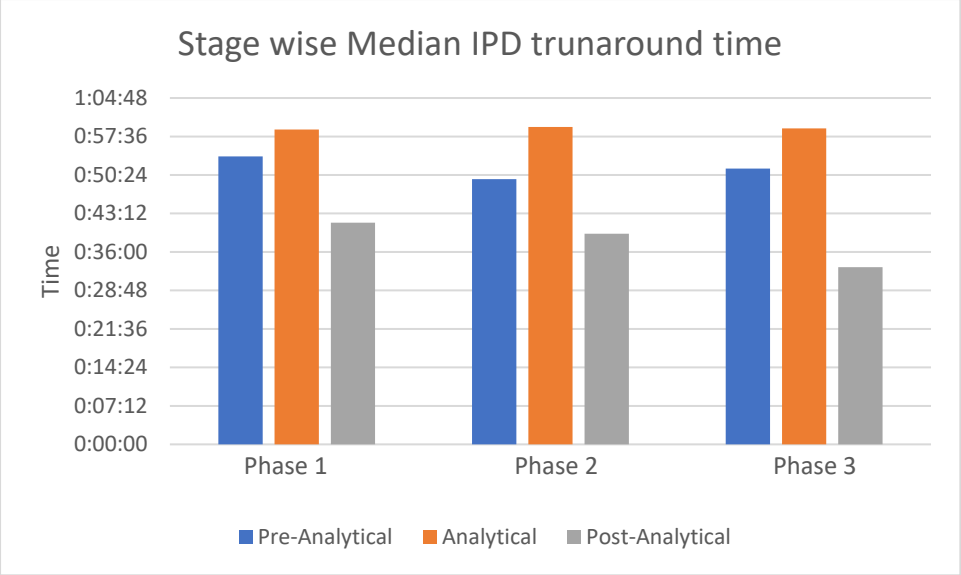


This graphic presentation shows the median TAT throughout the 3 Stages for IPD.

Observation shows the turnaround time in pre-Analytical stage, where is phase 1 recorded highest median TAT and Phase 2 recorded lowest median TAT that is 00:53:53 and 00:49:37, respectively.

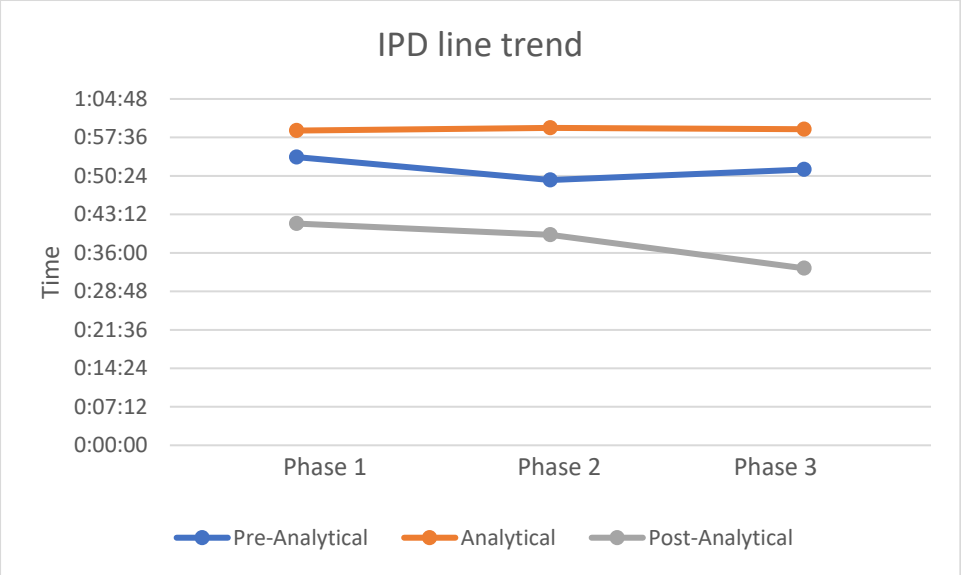
Observation shows the turnaround time in Analytical stage, where is phase 2 recorded highest median TAT and Phase 1 recorded lowest median TAT that is 00:59:23 and 00:58:54, respectively.

Observation shows the turnaround time in post-Analytical stage, where is phase 1 recorded highest median TAT and Phase 3 recorded Lowest median TAT that is 00:41:29 and 00:33:09, respectively.



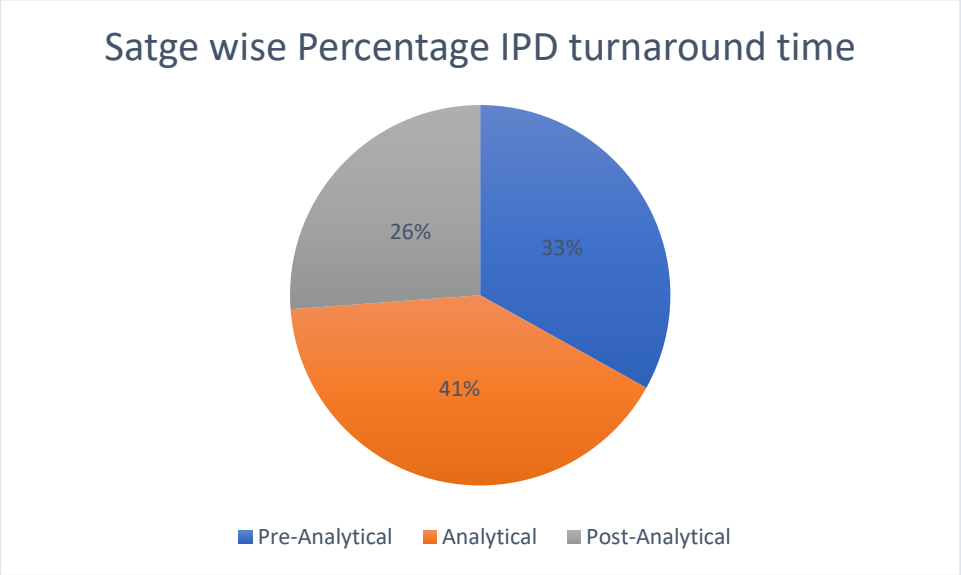
The line trend shows the decrease in median TAT throughout all 3 stages when it was observed with time.

Decrease was recorded in TAT for stage post-Analytical whereas increase in Analytical stage throughout all 3 phases.



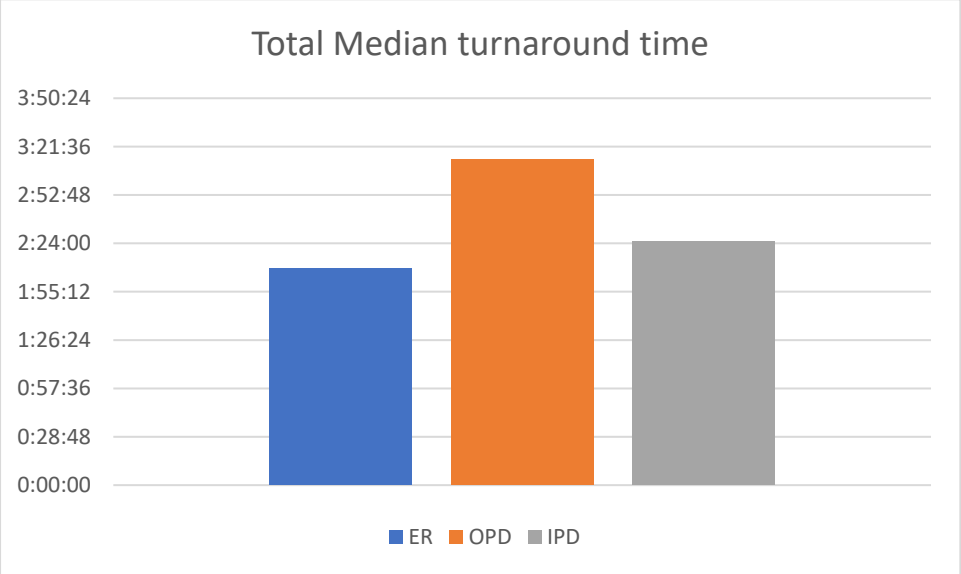
The representation of Pie-Chart shows the percentage that consider the comprehensive median turnaround time created for IPD.

Total contribution of TAT in percentage by IPD is 59.27% which is combination of 3 phases i.e., Analytical stage with 40.73%, pre-Analytical stage with 33.09% and post-Analytical stage with 26.17%.



The median TAT for all departments, ER, OPD, IPD in Biochemistry Lab department.

OPD has recorded highest TAT with median of 3:13:57 and ER recorded lowest median TAT of 02:08:56.



SUGGESTIONS

- A throughout duty roster should be prepared with increased manpower for working during peak hours in the hospital. The purpose of this roster is to serve during the morning hours which are observed to heavy workload hours in the Biochemistry Lab.
- Arranging the phlebotomist for OPD who can help in reducing TAT which will be easily approachable for the patients regarding to the sample collection.
- Pneumatic system for sample transportation should be under monthly preventable maintenance to warrant the increased performance and reduction of breakdown.
- Equipment management instruction should be given to technical manpower.
- Generating a month-to-month remarks mechanism to serve to the technical issues, if found.
- For Lab TAT standard techniques should be evolved.
- There must be scheduled inspection on every 3 months throughout all 3 phases to identify the outcomes as according to set standards

CONCLUSION

This research study was done to examine the TAT recorded withinside the Department of Biochemistry of Barala Hospital & Research Centre, Chomu. Study was performed throughout the 3 stages i.e., Pre-Analytical, Analytical and Post- Analytical which came up with result of comprehensive TAT of lab test.

Data collected from 3 departments i.e., ER, OPD and IPD were divided into 3 phases constituted span or duration of time for test ordered by the Consultant. The time span was as follows: Phase 1-10:00 am to 12:45pm, Phase 2-12:45pm to 3:45pm & Phase3-3:45 pm to 6:00pm.

The median TAT throughout the 3 departments i.e., Emergency room, Inpatient Department & Outpatient Department was found to be duration of 02:09:43, 02:25:06 and 03:14:22 respectively.

There was comprehensively high median TAT in the results due to restrain throughout all 3 stages. Consequently, action on all stages i.e., Pre-Analytical, Analytical and Post- Analytical would result to remarkable improvements.

During analysis it was found that there was high TAT in phase 1 throughout all the 3 department which resulted in high burden during Phase 1 hours.

A throughout duty roster should be prepared with increased manpower for working during peak hours in the hospital. The purpose of this roster is to serve during the morning hours which are observed to heavy workload hours in the Biochemistry Lab. Arranging the phlebotomist for OPD who can help in reducing TAT which will be easily approachable for the patients regarding to the sample collection.

The outcome of research study shows that there is scope improvement in Lab TAT. Notwithstanding the distinct belief in regard with clinical results of better turnaround time, reasons of increased turnaround time should be known. There must be a beneficial method to reduce the hurdles for standardised TAT. As improvement in Turnaround time is continuous quality process.

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