PART I

INTERNSHIP REPORT

HOSPITAL PROFILE

ROCKLAND GROUP

The "Rockland Group" has established itself in diverse business fields namely Budget Hotels and Multi-specialty Hospitals within a short span of time. The Group is promoted by three brothers who are first generation entrepreneurs led by Mr. Rajesh Srivastava who has learnt his entrepreneurial skills in the "University of Life". His brothers Mr. Prabhat Srivastava and Mr. Rishi Srivastava are the two other wheels of his cart who equally invest their time and efforts to carry the group on heights of success.

ROCKLAND HOSPITAL

- Rockland hospital was incorporated in 2004 and has redefined healthcare delivery systems for its community.

- A 110 bedded multi-specialty hospital, is NABH accredited & ISO 9001:2008 certified is located at a prime locality of South Delhi, at Qutab Institutional Area in New-Delhi. The Rockland Hospital is run by the Foundation for Applied Research in Cancer (FARC) of which Shri. Rajesh Srivastava is the Chairman.

- It has more than 700 employees and treats about more than 30,000 patients a year. Its Advisory Board is led by eminent orthopedic surgeon Dr (Prof) P.K Dave; former director of All India Institute of Medical Sciences (AIIMS) New Delhi. The company's goal is to become a premier health care brand in India, and a leader in health education and geriatric care.

- Rockland "Where caring is a way of life", is an ambitious project flourishing with an urge to give further impetus to the community in the field of Health care. Rockland is a niche medical service provider which is fully equipped with 24 hour services for all emergencies. The strength of the hospital is in its internationally reputed team of

doctors who specialize in various medical fields. Within the last seven years of its existence, Rockland hospital has been accepted as a brand standing for transparent & ethical practice at affordable price.

Vision

- To use multidisciplinary approach with ethical practices by a team of highly responsive, caring and efficient professionals with a constant focus on excellence in delivering medical services in patient care, continuing medical education, scientific knowledge and deliver benchmarked quality medical care.

Rockland Philosophy

- Every Organization, Every Society, Every Nation, Every Group Strives for Success and Recognition.
- Each Individual Member of the Group Endeavors to be held in Universal Respect and Esteem; To Gain Prosperity, Wealth, Personal Fulfillment and Dignity.

The Rockland Logo

- **Blue: symbolizes security and trust**
- **Red: epitomizes energy and dynamism**

The Rockland logo symbolizes our commitment to provide world-class services while maintaining the highest standards of excellence.

The logo is dynamic and poly-symbolically imbued with emotive and conceptual values such as life and hope.

The arrow circling round to the point of origin is a symbol of continuity and integrity, as well as a personalized and holistic approach to individual care.

The Rockland Hospital has created a niche for itself in a short span of time both within the medical fraternity and patients. The group has started expanding by coming up with two of its establishments in Manesar and Dwarka. And they will be coming with another in Greater Noida, U.P.

The Hospital in Dwarka is located in Sector-12 which is very much accessible to the community and nearby area like Gurgaon, Janakpuri, Uttam Nagar. It started off its operation from December, 2011 and is doing quite well though much of the area is under construction.

It is an 80 bedded Hospital, with 2 OT's, 8 bedded ICU, and 3 bedded NICU. It has 24 hours Emergency and Diagnostics Services. The hospital is been tied up with Star Imaging, Tilak Nagar for Radio diagnostics like MRI, CT – Scan and other studies.

As part of support services, the hospital provides F&B services, 24 hours Ambulance services, Pharmacy Store that currently caters to Inpatients only and is proposed to be outsourced in near future that will then cater to Outpatients. The Blood bank services are provided by the Hospital through tie up with Bhagat Chandra Hospital, Dwarka and through support from its own Sister, Rockland Hospital, Qutub Institutional Area.

The Housekeeping, Security, Linen and Laundry services, biomedical waste management services are completely outsourced. The hospital will have its own CSSD in near future.

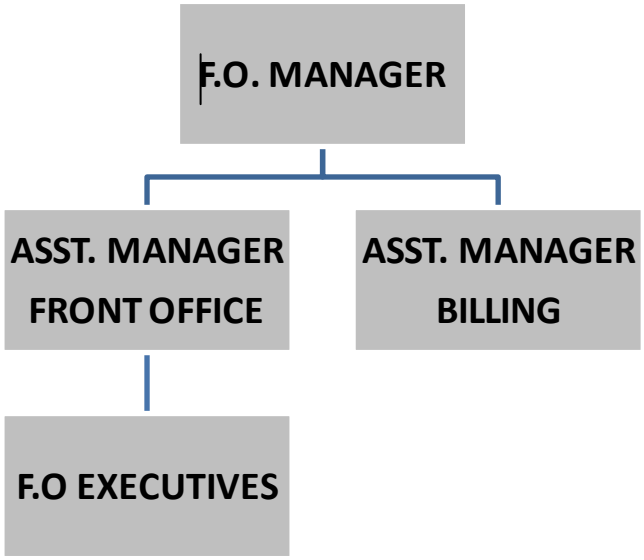
The hospital is a multi specialty establishment that provides 8.00 am – 8.00 pm OPD services and 24 hours Inpatient services, though only Second Floor of the Hospital is only ready to serve the Inpatients which consists of 8 sharing rooms that is, 16 beds.

Specialties includes: Anaesthesia, Cardiology, Dental, ENT, Gastroenterology, General and Laparoscopic Surgery, Internal Medicine, Nephrology, Neuro Sciences, Obstetrics and Gynecology, Oncology & Onco Surgery, ophthalmology, Orthopaedics & Joint Replacement Surgery, Paediatrics, Physiotherapy (outsourced), Psychiatry, Urology.

DEPARTMENT

The period of internship was carried out at the Front Office Department of Rockland Hospital, Dwarka. The department is at the forefront of the hospital, displaying the skills and abilities for serving the patients.

FRONT OFFICE STRUCTURE



There were in all 3 F.O. Executives and one Senior Executives who handle the OPD and IPD billing, Patient queries in person and on EPABX, scheduling the appointments, coordinating the patients and Interdepartmental coordination.

Asst. Manager Billing used to handle all the billing issues related to OPD, IPD, TPA, Corporates and Govt. Panels. He used to coordinate and synchronized the process.

Asst. Manager manned and coordinates the patients, help them in their queries (if not by the F.O. Executives), and coordinate daily with accounts section along with Interdepartmental issues.

F.O. Manager Overviews and keep the department and its process smooth going.
The staff works on the basis of shifts from 8.00 am – 4.30 pm (Morning shift), 9.00 am – 5.30 pm (General shift), 11.30 am – 8.00 pm (Evening shift) and 8.00 pm – 8.00 am (Night shift)

TASK

Observed and participated in all levels of duties at the department:

- Handling console
- Patient coordinating
- OPD billing
- IPD billing
- Admission process
- TPA process
- Discharge process
- Corporate and Panels

REFLECTIVE LEARNING

The Front Office Department is the control center of the organization, providing 24-hours attention towards the handing and serving of all guests' requirements and needs.
From directing the patient on right path to answering every small query, from empathically listening to the patient to settling of bills, from rendering information to coordinating with other departments; Front office demonstrates skills of Patience, Good listener, Proactive, Consciousness and Cheerfulness.

Today's healthcare environment has sprung up as costlier, demanding and competitive. With every passing time, the organization is trying to develop strategies and its goals how to beat its competitors and be the number one in the market.

Cultural competence starts at Front desk of the Hospital. A great deal of training and effort is directed to provide culturally and linguistically competent services and supports. For most patients and visitors, however, many interactions precede the actual encounter with the health care provider.

These actual encounters are with the supporting staff like that of front office.
The abilities and proficiency of handling and receiving the patient to final settlement of bills requires managerial skills in its own way apart from human skills of reception and warmth.

Billing for OPD, IPD requires different procedures altogether for these two types. Another success factor for front office is handling the insurance patients appropriately. Given the multitude of policies insurers have made available to the public, it has become increasingly difficult for front office personnel to know if plan will pay for the services and rendered. And the level of coverage patient will get form the provider. Training in such areas can effectively improve the bottom lines.

Training in the use of advanced HIS software is must for carrying the processes much faster than before when everything was on paper. Now everything seems impossible without such software and is paperless.

For OPD services, the Front Office should be able to mange OPD rush in an efficient manner by appropriate scheduling, getting the patient registered, proper billing, dispatching of reports and cutting the queue for Emergency cases.

The staff should be thoroughly knowledgeable about the services and facilities being provided by the hospital, aware about each and every employee of its organization apart from carrying its routine duties. After all it starts from the Front Office.

PART II

DISSERTATION REPORT

CHAPTER I - INTRODUCTION

The last few decades have seen a spectacular growth in the Health and Hospital Industry of India. Healthcare has come a long way since Florence Nightingale tended the wounded soldiers in the Crimean war. Back then, it was only tender loving care which has now been replaced with huge of technologically advanced surgical procedures. There wasn't enough of treatment and health care and now it's too much.

The idea of healthcare was considered to be "a social service", helping the sick was a merciful act in Florence Nightingale's time; today at $28 trillion, healthcare is the world's largest industry. The institution that we know today as hospitals, were functioned by temples or almshouse or simple shelters for the poor and sick in ancient times. But today they are aesthetically designed modern buildings that provide leisure services to their customers. Hospitals at that time were run by religion orders providing largely religious solace rather than the treatment of physical ills. Screams of pain used to come from the cut of the surgeon's scalpel because there was no anesthetic in those days. They now probably come from the bottom line of hospital bills in many of our private hospitals [1].

Establishing a successful hospital requires triad of good planning, good design and good construction but now it is quadruple with addition of good administration of services by the hospital. Today's patient is better informed and knowledgeable about the health services; thanks to advancement in the world of internet. As a matter of fact at no time in history have people known so much about healthcare and medicine as they do today. They blindly follow what priest and religion followers told them to do in the name of respect. But in this era of corporatization, they shop and select the best hospital; they choose their doctor and change him or her if they don't like them [1].

And they are legible to do so because the healthcare costs are shooting at its never ending pace. Patient demands quality services because they are heavily paying for it.

Setting up a high ended building with advanced medical equipments does not end the race unless and until the patient gets services effectively and efficiently done.
As a result of such increased awareness and knowledge of general public, hospitals are not leaving a single stone unturned. They are assuring Quality at its best in each and every measure to satisfy its privilege customer.

One of the fundamental objectives of quality assurance is to provide accurate, precise, timely and appropriate Laboratory Reports to its patient for timely treatment of their diseases.

Medical laboratory work is composed of the technical activities that produce laboratory results for patient care and the management activities that support the technical work. It is the job of the laboratory technical staff to perform preanalytic activities (blood sample collection, receiving, accessioning); analytic activities (testing, examinations, interpretation); and postanalytic activities (reporting results, archiving samples, charge capture) that transform a clinician's order for a laboratory test or examination into the results used by the clinician to diagnose and treat patients.

Likewise, it is the job of the laboratory supervisory and managerial staff to design and implement the supportive infrastructure that is necessary for the technical work to proceed unimpeded. An integrated coordination between technical and managerial activities is essential for the continuous, unimpeded realization of high-quality, error-free, efficient, and effective laboratory operations [2].
Collation of all these activities has a direct impact on the time taken to provide reports to the patient which is termed as Turnaround time (TAT).
The Turnaround time has been identified as an indicator for laboratory quality by the quality assurance experts [3].

Laboratory Turnaround time (TAT) is commonly defined as the time from when a test is ordered until the result is reported [4].

Clinicians consider TAT from the time the test is ordered to results reporting, whereas laboratory professionals usually use specimen receipt to reporting of results as the TAT [5].

Laboratories have traditionally restricted the discussion of technical or analytical quality; instead they have always focused on imprecision and accuracy goals. But today's patient demands quality covering accuracy as well as timeliness.
Laboratorians may disagree with such a priority, arguing that unless analytical quality can be achieved, none of the other characteristics matter [6].
Nevertheless TAT is one of the most noticeable signs of a laboratory service and is used by many clinicians to judge the quality of the laboratory [7]

It has its own importance, as Clinicians depend on fast TATs to achieve early diagnosis and treatment of their patients and to achieve early patient discharge from emergency departments or hospital in-patient services. Hence faster TATs have a role in curtailing general expenditure incurred by the exchequer.

Delayed TATs also increases the frequency of duplicate samples sent to the laboratory. This further increases the workload on the laboratory. Assessment and improvement of turnaround times is essential for laboratory quality management as well as ensuring patient satisfaction [8].

Apart from this major concern of providing reports timely for patients benefits, allocation of the facility, human resource, equipments and materials are equally necessary for ensuring adequate capabilities to satisfy customer needs.

Management should culminate in the laboratory's prioritization of opportunities for improvement, allocation of resources to carry out the improvements, and monitoring of improvement activities to ensure their effectiveness.

CHAPTER II - LITERATURE REVIEW

Clinical laboratory testing plays a crucial role in the detection, diagnosis and treatment of disease in patients. Across the world, laboratory tests help determine the presence, extent, or absence of disease and monitor the effectiveness of treatment.
An estimated 60-70 percent of all decisions regarding a patient's diagnosis and treatment, hospital admission and discharge are based on laboratory test results. As such, labs need to sustain a commitment to quality and demonstrate a certifiable level of Compliance.

Established and emerging labs are equally faced by other key industry, quality and safety challenges including:

- Meeting or squeezing timelines and driving down costs
- Ensuring the quality, accuracy, and integrity of test results and other laboratory data
- Continuous training of laboratory workers
- Establishing and maintaining effectiveness metrics

As a result, an increasing number of clinical and medical laboratory organizations are seeking solutions that enable them to sustain compliance and ensure ongoing viability and performance [9] .

Accuracy, precision, timeliness, and authenticity are the four pillars of efficient laboratory services. We often overlook timeliness as an important attribute and instead concentrate on improving the analytical intricacies of sample processing.

It is considered as a reliable quality indicator for laboratory effectiveness and efficiency. Quality can be defined as the ability of a product or service to satisfy the needs and expectations of the customer [10].

A College of American Pathologists (CAP) Q-Probes survey of ED TAT in 1998 showed low satisfaction rates concerning the laboratory's sensitivity to urgent testing needs (39%) and meeting physician need (48%). Laboratory TAT was felt to cause delayed ED treatment more than 50% of the time (43%) and also increased ED length of stay (LOS) over half the time (61%). With the increasing interest in the extra-laboratory phases of the testing process, more laboratories are including TAT as a key performance indicator of their service but often have problems meeting their internal goals [11-12].

DEFINITION OF TURNAROUND TIME

Review of literature reveals that there are various approaches to define TAT. TAT can be classified by test (e.g. potassium), priority (e.g. urgent or routine), population served (e.g. inpatient, outpatient, ED) and the activities included [4].

The steps in performing a laboratory test were outlined by Lundberg, who described the brain to brain TAT or "total testing cycle" as a series of nine steps: ordering, collection, identification, transportation, preparation, analysis, reporting, interpretation and action [13].

The term "therapeutic TAT" is sometimes used to describe the interval between when a test is requested to the time a treatment decision is made [14-15].

Although the laboratory can and perhaps should be involved in all these steps, many laboratories restrict their definition of TAT to intra-laboratory activities, arguing that other factors are outside their direct control and that timing data for extra-laboratory activities are not readily available.

Such an approach will necessarily underestimate TAT since non-analytical delays may be responsible for up to 96% of total TAT [16].

Another classification of time periods separates the steps into the pre-analytical (order to preparation), analytical (analysis) and post-analytical (reporting to action) phases. These divisions have often been used when classifying errors and delays and are sometimes used for description of TAT [17-18].

There are differences between clinicians and laboratories in their definitions of TAT. In the 1998 CAP Q-Probes program, 41% of laboratories defined ED TAT as time of receipt in the laboratory until time of report, 27% as ordering of test to result reporting and 18% as specimen collection to reporting [19].

Unfortunately the variety of different approaches in the literature creates difficulties when searching for benchmarking or state-of-art data. Howanitz, who has published widely on the CAP survey results, has suggested that TAT be defined from the time the test is ordered to the time that results are available to the caregiver and that TAT goals be expressed as a percentage of all results completed within the time interval (e.g. 90% or 95% of results completed within the time interval). However laboratories without electronic order entry systems may have difficulty collecting accurate ordering times and may find intra-laboratory TAT a more feasible option at present.

TURNAROUND TIME AND CLINICAL OUTCOMES

Faster TAT is universally seen as desirable. Statements such as "the more timely and rapidly testing is performed the more efficient and effective will be the treatment" and "it is almost axiomatic that providing a more rapid result saves time and therefore money" are common in the literature [20].

However, faster TAT does not necessarily improve patient outcome. Steindel et al. examined the timeliness of early morning routine clinical laboratory tests for inpatients in 653 institutions and found little evidence that longer routine test turnaround times affect patient length of stay [21].

Shortening the TAT of microbiological procedures was associated with an improved clinical outcome in two studies performed in the USA but not in Europe.

The hope of prompt medical decision making guided by quick convenient testing has led many hospitals to consider decentralized testing (by POCT or satellite laboratories) despite little evidence of decreased LOS or cost savings[4].

Proponents argue that total cost should theoretically decrease if TAT is faster through use of decentralized testing as episodes of care will be shorter and transport costs reduced. However, on a direct charging basis, decentralized testing is more expensive. POCT glucose measurement, for example, is 3–4 times the cost of central laboratory measurement. And these increased costs reflect duplication of staff and equipment [4].

The relationship between laboratory TAT and patient LOS in the ED is unclear, but it is now generally accepted that POCT is not a panacea for LOS problems in the ED.
Use of laboratory tests is associated with longer LOS. Heckerling described a higher percentage of patients discharged from the ED within two hours if no laboratory or radiology investigations were requested (80% no investigations vs. 42% with laboratory tests and 57% with radiology tests) [19]

Saunders et al. described a computerized model of ED operations, showing that the time taken to see the initial care giver is the key factor in LOS and that testing (laboratory or radiology) only has a potential impact when the stay exceeds 1 hour. Delays in ED TAT are most commonly pre-analytical and post-analytical.

Steindel and Howanitz describe a study of ED TAT in hospitals in Washington DC which found that the most common reasons for test delays were linked to sample collecting and transport, the practice of interrupting routine testing for urgent analyses, and communicating results to clinicians [19].

Other studies have demonstrated advantages of POCT in the ED. Singer et al. examined the effect of cardiac troponin I POCT on ED LOS in chest pain patients. This was a before and after design with two weeks of central laboratory testing of troponin followed by two weeks in which nurses performed POCT for troponin I. ED LOS reduced from 7.1 to 5.2 hours with POCT availability[22].

TAT has its own reasons for improving lab efficiency but there is little evidence of the benefit of faster TAT on LOS or patient care despite the intuition that faster results must be better.

The clinical laboratory is the predominant source of information physicians rely on for important diagnosis and treatment decisions, so it is crucial that labs minimize errors in results and results reporting. Most lab errors result from manual steps performed by technologists and other lab professionals. There are several reasons for this. Humans are fallible under the best of circumstances, and work stress can exacerbate that fallibility. Human variability is another source of potential errors. Variability is a much bigger problem when performance differences between individuals and groups of individuals (for example, work shifts, or permanent staff vs. temporary staff) are considered.
Some errors can be eliminated by redesigning processes to reduce the number of human-performed steps and create a more efficient workflow. Once processes have been optimized, however, further error reductions can only by achieved by "reassigning" tasks to automated instruments, which are known to perform these tests more reliably than humans and do not fatigue. In addition, automated instruments perform without variability, which is also the key to the efficiency gains they produce [23].

Each laboratory should design, develop, document, validate, implement, monitor, and improve both the work processes and the infrastructure elements in such a way to meet the defined customer's needs. Thus management of laboratory systems requires integration of organization, its manpower and essential facilities.

CHAPTER III - OBJECTIVES OF THE STUDY

General Objective

To streamline the laboratory workflow through identification of problem areas

Specific objectives

1. To identify the problem areas in the workflow of laboratory processes
2. To suggest the corrective actions for streamlining the processes.

CHAPTER IV - METHODOLOGY

The study is Cross Sectional in nature carried out in the Laboratory department of Rockland Hospital from 1st March to 11th April, 2012. Rockland Hospital is an 80 bedded hospital located in sector-12, Dwarka well accessible to its community and nearby area. The laboratory of the hospital is located on its 5th floor and the sample collection room is adjacent to the laboratory department. The department is proposed to be shifted in the Basement of the Hospital in near future.

The hospital laboratory caters to Outpatient as well as Inpatient Department. The outpatient sample was collected either in the emergency department if the patient cannot travel to 5th floor and as in the case of Emergency or the patient is sent to 5th floor to the sample collection room by the Laboratory personnel.

The laboratory workflow was extensively observed during the study period and through discussion with laboratory staff, the problem areas were identified which defines the lacunae in the laboratory services of Rockland, Dwarka.

One of the major problem areas is the complaints from the patients that they were not getting their reports on time that in turn delays the process of diagnosis and treatment. The other are Manpower deployed, Infrastructure, Equipments and materials provided, time constraints which had an impact on the workflow of laboratory services. For these reasons the turnaround time of the laboratory reports was calculated. The following methodology was used for calculating TAT for various common tests during the study period.

Sample Size

A Total of 303 different laboratory tests were done in the month of March, 2012 and a total of 81 tests were done in the month of April, 2012 for the outpatients.
Out of which a sample of 219 drawn from the total of March and 71 from the total of April months excluding all the missing reports and tests which were done for the Hospital staff.

However the analysis was drawn for most of the common tests in various categories since there number was high as compared to other investigations whose number were 1 or 2 in a month like that of HBsAg test or Vitamin B12 or CRP and many more. Sample is exclusive of the counts of tests for the Hospital Staff and missing reports and data not fed in LIS.

Sampling Technique

Random sampling technique was adopted for selection of the samples.

Data Collection Plan

- **Technique**

Data was collected through the laboratory Information System called WIPRO LIS installed in the laboratory.

- **Inclusion and Exclusion Criteria**

Inclusion Criteria:

Patients who came to lab for specimen and collected and tests reported to their physicians

Patients who came from other institutes, outpatient clinic, nursing homes, referrals

Exclusion Criteria:

Specimen of the patient who got registered with Emergency before ordering of tests

Specimen of Inpatients.

Specimen collected for Hospital staff

- **Analysis**

  Definition

  Laboratory Turnaround time was defined for the study as "the time at which the order is placed for the test by the patient at billing counter or requisition made in the LIS to the Reporting of the values of the tests in the LIS by the laboratory personnel".

  Formula

  The formula used for calculating the TAT for a particular test:

  Time taken to complete the TEST = Time of order of test (starting point) – Time of reporting of values in LIS (end point)

$$TAT = \frac{\text{Sum of Time taken}}{\text{No. of Tests done in particular month}}$$

The total number of counts of tests done in the particular month and the time of order of the tests and reporting time of the values of the tests were all taken from the LIS systems of the hospital.

The results were evaluated using MS Excel 2007. The pictorial representation of the results is done through using pie charts, bars and columns to make comparisons and making the results more understandable.

Duration of study

15th March 2012 – 11th April 2012

CHAPTER V - RESULTS AND FINDINGS

MAJOR PROBLEM AREA: LABORATORY TAT

A Total of 303 different laboratory tests were done in the month of March, 2012 and a total of 81 tests were done in the month of April, 2012.

Out of which a sample of 219 drawn from the total of March and 71 from the total of April months excluding all the missing reports and tests which were done for the Hospital staff.

The laboratory investigations are divided majorly into categories of:

- Biochemistry
- Clinical pathology
- Haematology
- Microbiology
- Serology

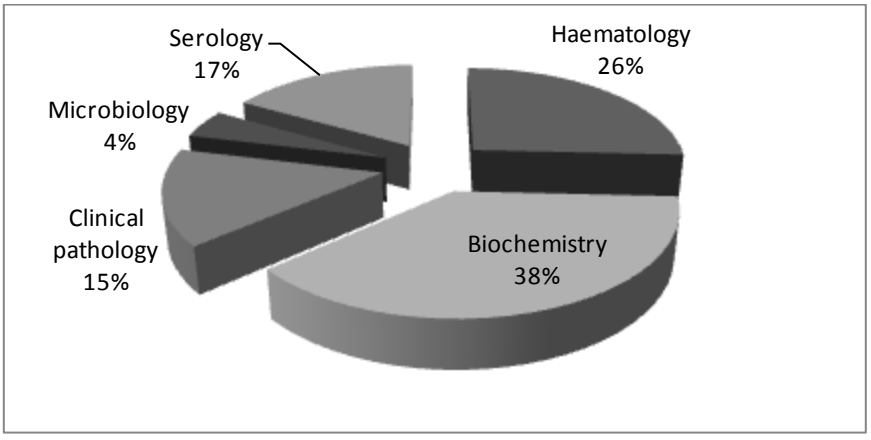


Fig 1: Counts of tests done for the month of March

The percentage of Tests done in the category of Biochemistry was highest being 38% for the month of March followed by Hematology Tests at 30%.

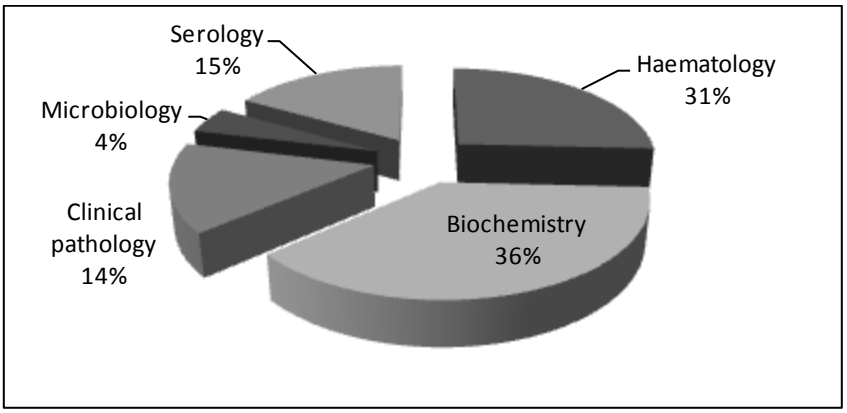


Fig 2: Count of tests done for the month of April

The percentage remained higher for Biochemistry category at 38% in the month of April followed by Hematology at 26% and then Serology at 17% and Clinical Pathology at 15%.

The most common tests under various categorizations of the Laboratory Investigations were collated, counted and were taken for the analysis of TAT of respective tests.

The common tests under **Category of Biochemistry** were Blood sugar random, Fasting & PP, Blood Urea, Lipid Profile, Liver Function Test (LFT), and Renal Function Test (RFT).

Those under **Category of Clinical Pathology** were Urine Routine/Microscopic and Stool for routine. Under **Category of Hematology** were Complete Haemogram, Complete Blood Count (CBC), Hemoglobin, ESR, Platelet Count and PT WITH INR.

Under **Category of Microbiology**, the common tests were Culture & Sensitivity Urine and Pus. For **Category of Serology Tests**, the common were Thyroid profile, TSH and Typhidot.

Each of the individual tests was analyzed for their respective TAT using the Formula:

Time taken to complete the TEST = Time of order of test (starting point) – Time of reporting of values in LIS (end point)

$$TAT = \frac{\text{Sum of Time taken}}{\text{No. of Tests done in particular month}}$$

The order time and the reporting time for each of the individual test taken for analysis, was noted down from the LIS software.

ANALYSIS FOR THE MONTH OF MARCH

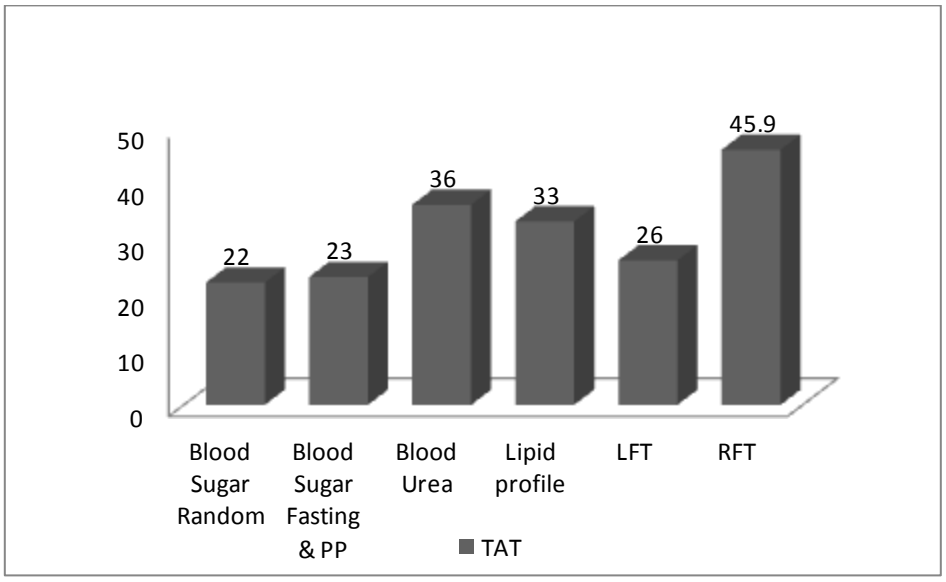


Fig 3: TAT for common Biochemistry reports for month of March

Under Category of Biochemistry, TAT for RFT came to be the highest of about 45.9 hours or 1-2 days as compared to others. Lipid profile and Blood Urea takes about 33 hours and 36 hours respectively for completion of reporting. Blood Sugar random and Blood sugar Fasting & PP takes near about 24 hours for its completion according to Hospital Data. The process for LFT also takes about 1 day to get its analysis done.

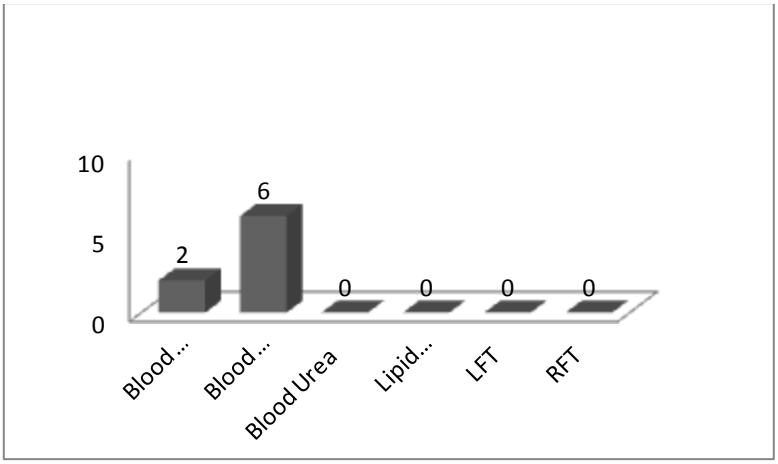


Fig 4: Missing Biochemistry reports for the month of March

There were also Missing reports for some of the tests like that Blood Sugar Random (2) and Blood Sugar Fasting & PP (6).

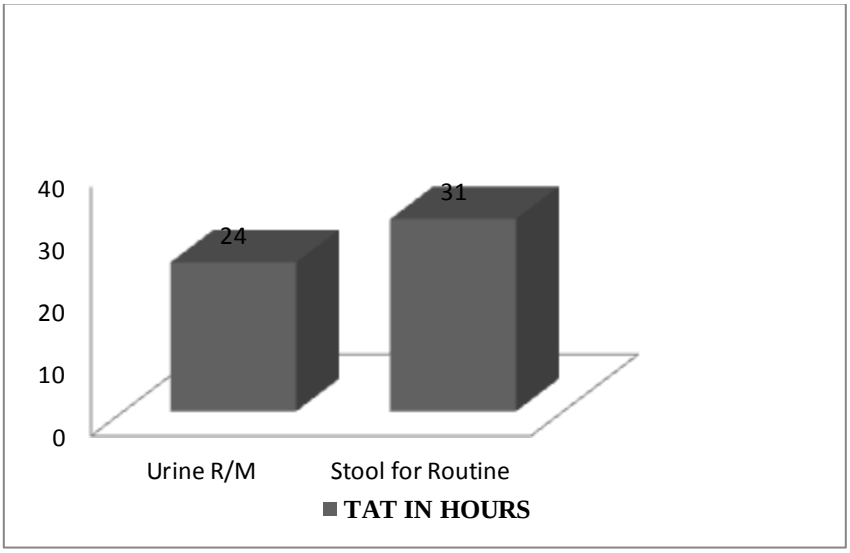


Fig 5: TAT of Clinical Pathology reports for the month of March

Under the Category of Clinical pathology Tests, Stool for Routine demonstrated the TAT of 31 Hours (1-1.5 days) and Urine Routine/Microscopic demonstrated TAT of 24 Hours or about 1 day.

Missing reports were 1 in case of Urine R/M and 2 in case of Stool for Routine.

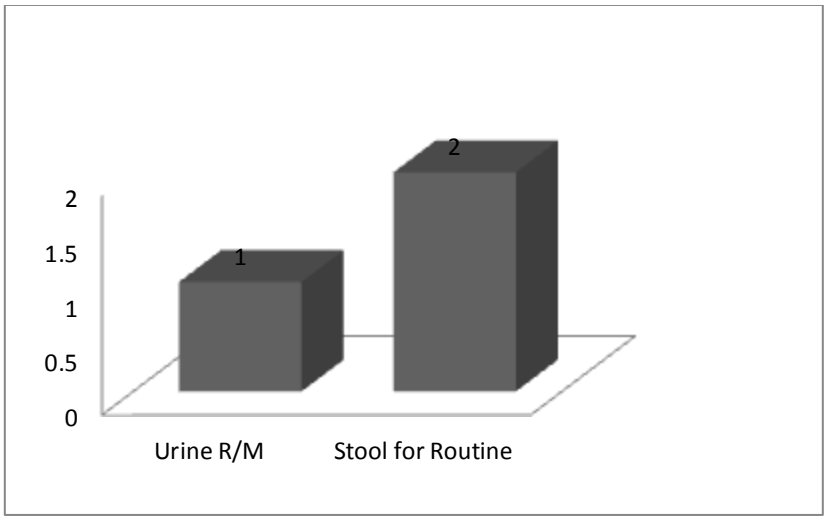


Fig 6: Missing Clincal pathology reports for the month of March

For Category of Haematology, Complete Haemogram and CBC took about 27-19 hours for their complete reporting. TAT for Platelet count, Haemoglobin, ESR was 20, 19, 12 hours respectively. PT WITH INR demonstrated high TAT of 29 hours (> 2 days)

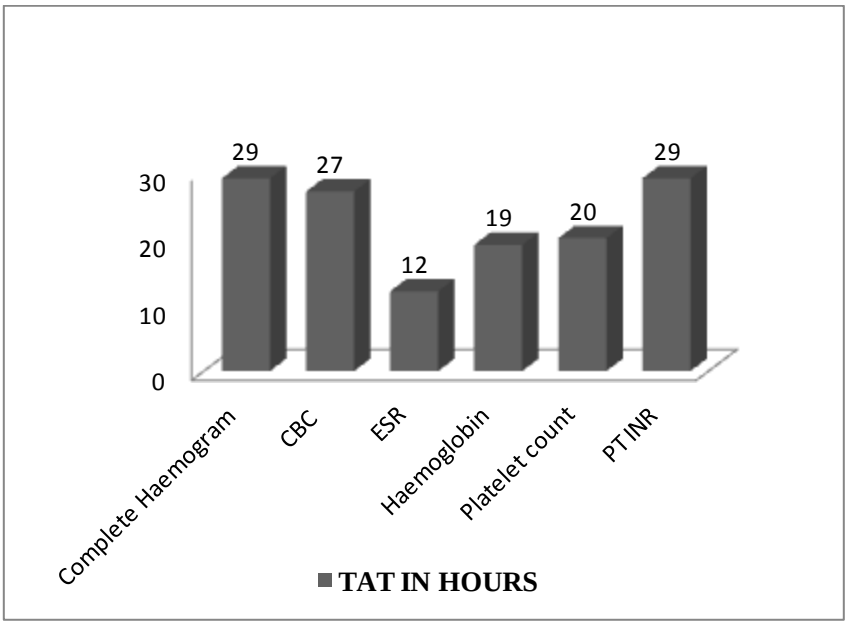


Fig 7: TAT of common Haematological reports for the month of March

A total of 10 reports were missing, out of which 5 was of Complete Haemogram, 2 was of CBC and 1 each of Hemoglobin, Platelet count and PT WITH INR.

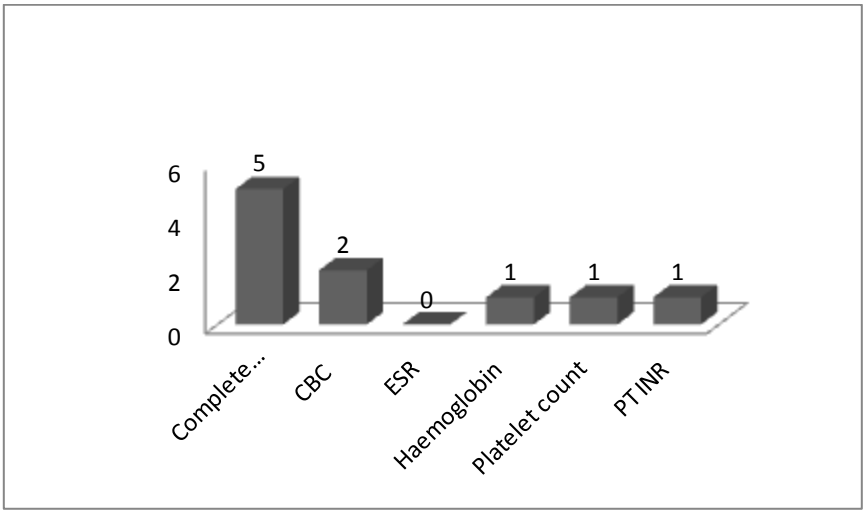


Fig 8: Missing Haematology reports for the month of March

Microbiology investigations namely Culture & Sensitivity (urine) and Culture & Sensitivity Pus demonstrated TAT of about 5 and 4 days respectively after analyzing the hospital data. There were none of the reports missing for these tests.

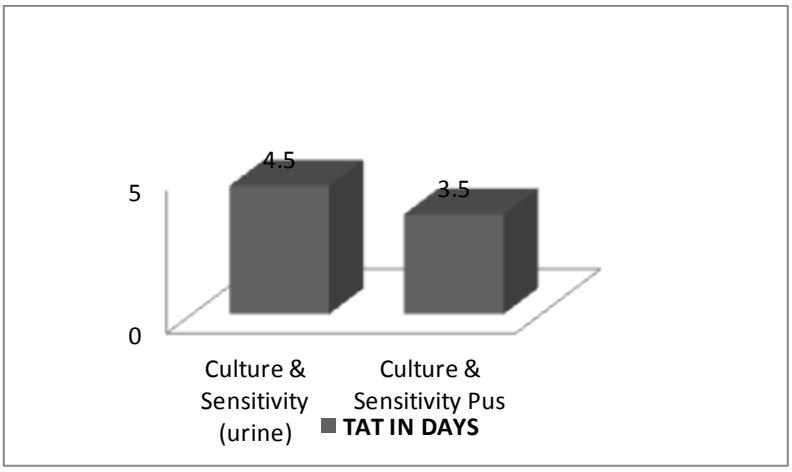


Fig 9: TAT of Microbiology reports for the month of March

TAT of Thyroid Profile for the month of March was found to be 41 hours, that is, the patients get his/her report in one to two days. TAT of TSH was 27 hours (> 1 day) and for Typhidot, it was 21 hours (< 1 day).

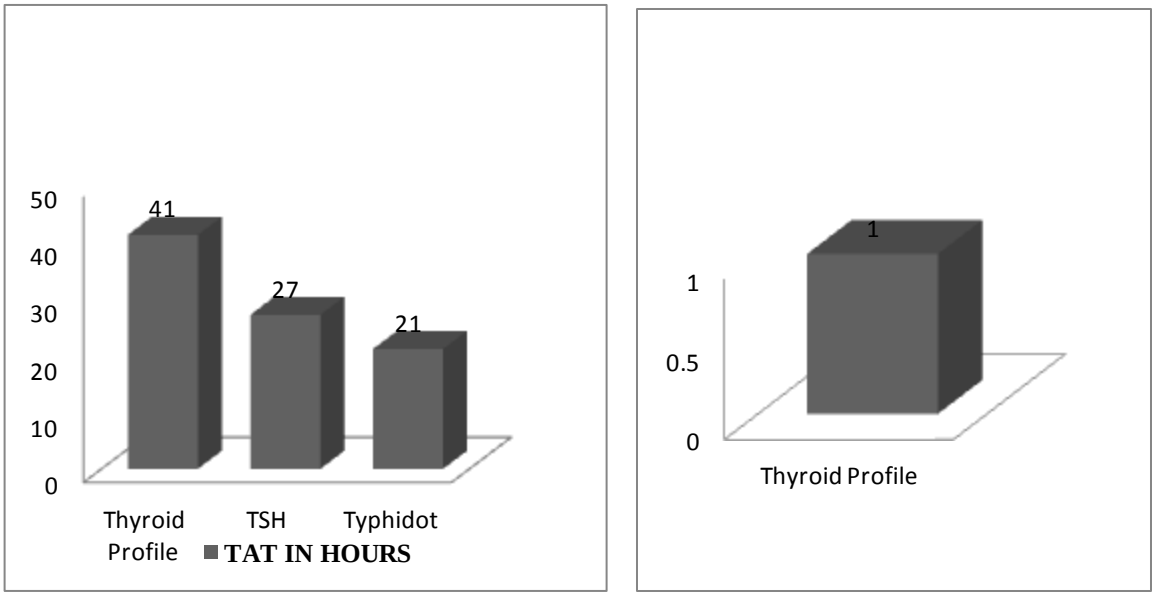


Fig 10: TAT and Missing Serology reports for the month of March

ANALYSIS FOR MONTH APRIL, 2012

Decreased TAT was demonstrated for various tests under Category of Biochemistry as compared to month of March. Lipid profile showed higher TAT of 17 hours among others and Blood Sugar fasting & PP had TAT of 16 hours. While LFT had a TAT of 4-5 hours and Blood Urea TAT was 8 hours.

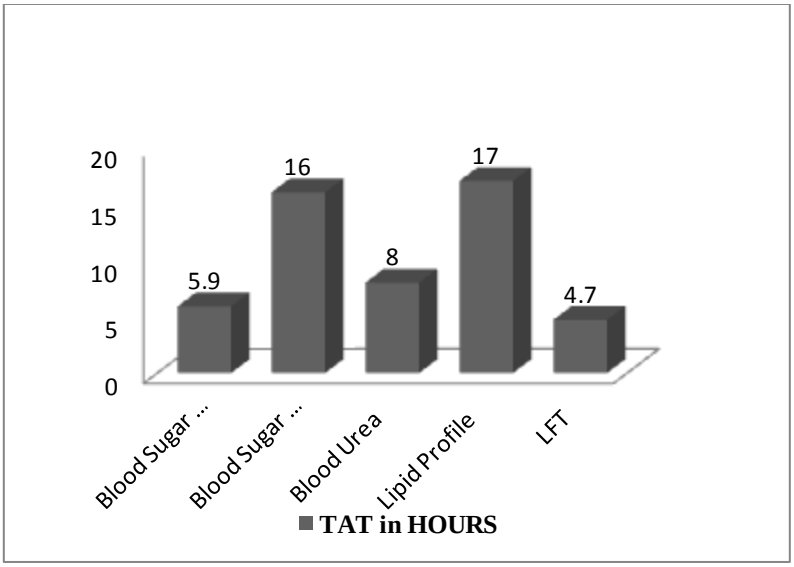


Fig 11: TAT of Biochemistry reports for the month of April

Only Urine R/M tests were seen to be ordered for the stipulated period of study and were analyzed to produce a TAT of 12 hours. There were certain reports missing or which were not fed into the LIS systems and found to be 6 in number.

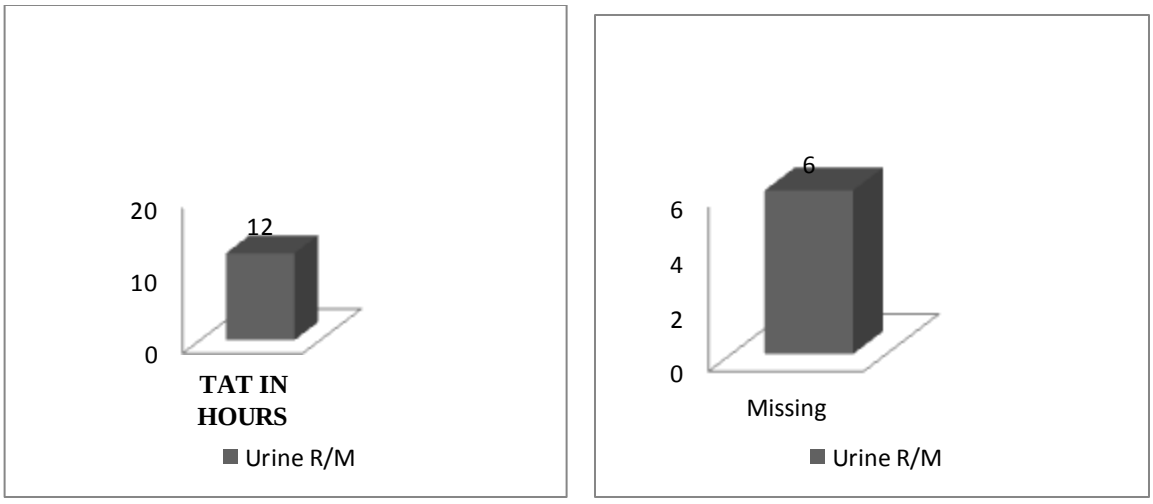


Fig 12: TAT and Missing Clinical Pathology reports for the month of April

TAT for common hematological tests also showed reduction as compared to month of March. None of the ESR, Platelet counts, Complete Haemogram was being ordered in this month. So they were out of analysis.

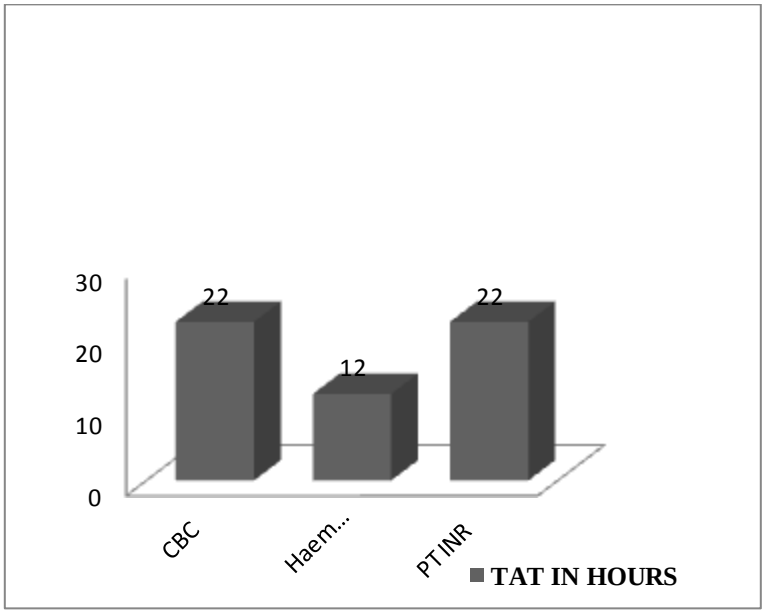


Fig 13: TAT of Haematological reports for the month of April

Month of April showed only a single count of test for Culture & Sensitivity, and whose TAT was 5-6 days.

The samples for such tests were sent to Rockland, Qutub for analysis since the Laboratory do not have the essential Equipments for the same.

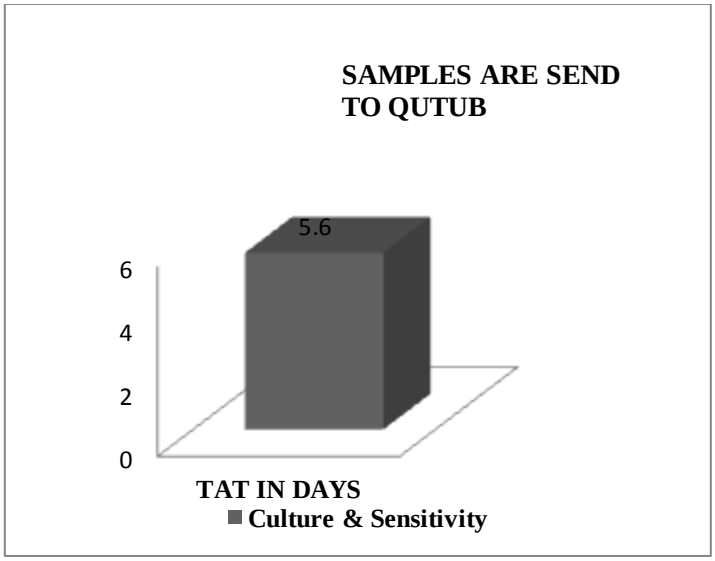


Fig 14: TAT of Microbiology reports for the month of April

TAT for Thyriod profile and Typhidot did not show much changes. It took about 1-2 days for providing the reports to its patients.

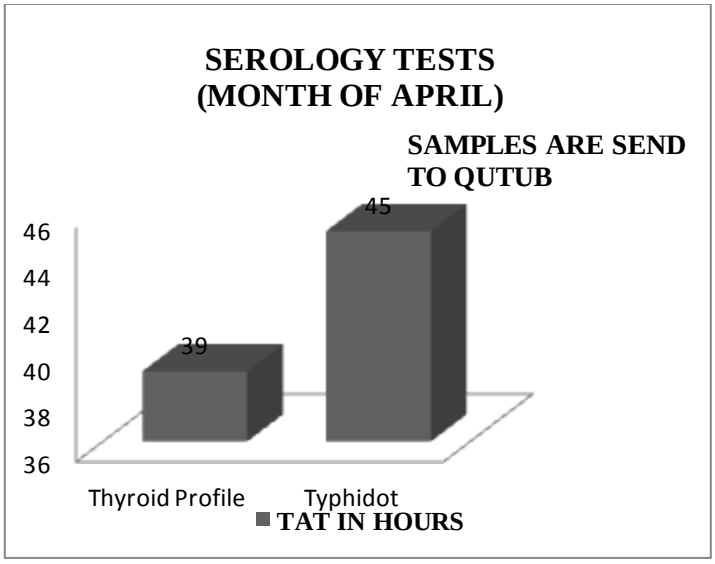


Fig 15: TAT of Serology reports for the month of April

MINOR PROBLEM AREAS:

1. INFRASTRUCTURE

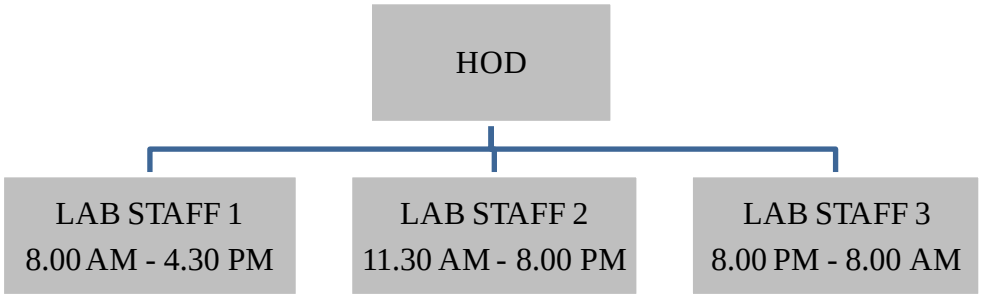
   The laboratory of the Rockland Hospital, Dwarka was located on the 5th floor of the hospital with only one single room and no demarcation of area for analysis of various categories of investigations. The sample collection room was situated beside the laboratory area on 5th floor itself instead of on the ground floor near the OPD which is the usual practice in all the hospitals.

   For collection of sample, the lab personnel either have to come down for specimen collection in case the patient cannot travel up or else the patient need to escalate to 5th floor.

   Moreover, the separate counters, basins, shelves which are required for analysis area are not provided currently which hinders the work processes somehow.

2. MANPOWER

   The staff deployed for laboratory work is through Shift basis. There are 4 shifts incorporated for the services: Morning 8.00 am – 4.00 pm, Evening 11.30 am – 8.00 pm, and Night 8.00 pm – 8.00 am with HOD in General shift 9.00 am – 5.30 pm.



Now most of the time there was single personnel in peak hours of morning and evening. Thus, from collection of sample, its analysis and its reporting in the LIS is mostly done by one person. And in the meanwhile, if another requisition for sample collection arises, the same person has to go leaving behind the work he was doing.

3. EQUIPMENTS/MACHINES

The machines in the laboratory here in the hospital, all were Semi-automated that requires preparations of the specimen by the lab personnel and then need to be set in the machines. All this process takes time instead if the machines were automated that makes the procedure easy and fast.

The machines that are currently being used in laboratory are:

- Easylyte Plus (for Na,K,Ca)
- ERBA Biochem
- Swelab

4. TIME CONSTRAINTS

The major problem area seen in the laboratory workflow of Dwarka branch was that the samples for major tests were being sent to Qutub for their analysis and reports were then delivered from there to Rockland, dwarka .

The samples that were taken were being sent to Qutub only two times a day: around 12.00 pm in the afternoon and the other at around 5.30 in the evening.

Due to this constraint of sending the samples only two times a day in turn increases the time of getting back reports and hence, dissatisfaction of patients.

CHAPTER VI - DISCUSSION

For years, clinical laboratories have judged overall quality of services using mean TATs measured in minutes/hours. However, TAT means vary greatly based on individual hospitals and the type of test under consideration.

As is the case with Rockland Hospital, Dwarka all of the samples were sent to sister branch that is, Rockland, Qutub for their analysis which took quite a long time in all.

As per the Analysis drawn for the month of March, it is been observed that TAT for almost all of the tests was more than one day (> 24 hours) while according to studies 90% completion time of <60 minutes for common laboratory tests has been set as an acceptable goal [21].

Basic tests like Blood sugar, hemoglobin, ESR, and others were taking >60 minutes, in fact much higher than what actually takes is a point of concern. But then the issue does not lie with the laboratory staff, as they are not provided with essential equipments and materials to perform the analysis.

The next month analysis, that is, April first week showed a remarkable reduction in the TAT as compared to month of March, as the investigations were started here itself in the Rockland Hospital, Dwarka but still it did not show upto mark performance.

Since the Hospital at Dwarka does not have set any of the standard time for reporting of any of the investigations, Rockalnd Hospital, Qutub's laboratory was contacted to know whether they have set any such policy for their lab reports.

According to their stated policy, the routine tests like that of Blood Sugar, CBC, Complete Haemogram, Lipid profile, LFT, RFT, Urine R/M, etc should be completed in range of 3-5 hours (from order to reporting time). While Culture tests take <1 or 1week and Serology tests takes about 1-2 days.

In that case, Dwarka Laboratory demonstrated high TAT in the month of April for most of the investigations.

Like for instance, Study of TAT for order to reporting of hemoglobin was found to be 12 hours in the month of April (first week) still higher as per Rockland Qutub which states report in 2-3 hours. According to 1998 CAP Q-Probes TAT for 90% of the hemoglobin results should be 55 minutes or less [3].

Likewise glucose test took about 6 hours in month of April which quite high as per 1989 Q-Probes study of glucose which says max. outlier of 34 minutes [3]. In 1993, Howanitz reported that the fastest Intra-laboratory TAT technically possible for serum glucose was 24 minutes.

Microbiology and Serology samples continued to be sent to Qutub for their analysis, so they continue to demonstrate high TAT, but the other Categories of Routine tests of Biochemistry, haematology, clinical Pathology still were on higher side.

The major factors that correspond to higher TAT in the month of April was because of Semi-automated machines, Insufficient number of staff in various shifts, the location of the laboratory at 5th floor and no sample collection room in the OPD area and certain samples for tests like cultures and serology were not conducted in premises.

Interestingly, the other minor problems that were identified on in the flow process of laboratory were found to have directly or indirectly impact on TAT of various tests conducted during study period.

In that respect, a fishbone diagram is drawn in order to make things clear:

FISH BONE DIAGRAM/ROOT CAUSE ANALYSIS

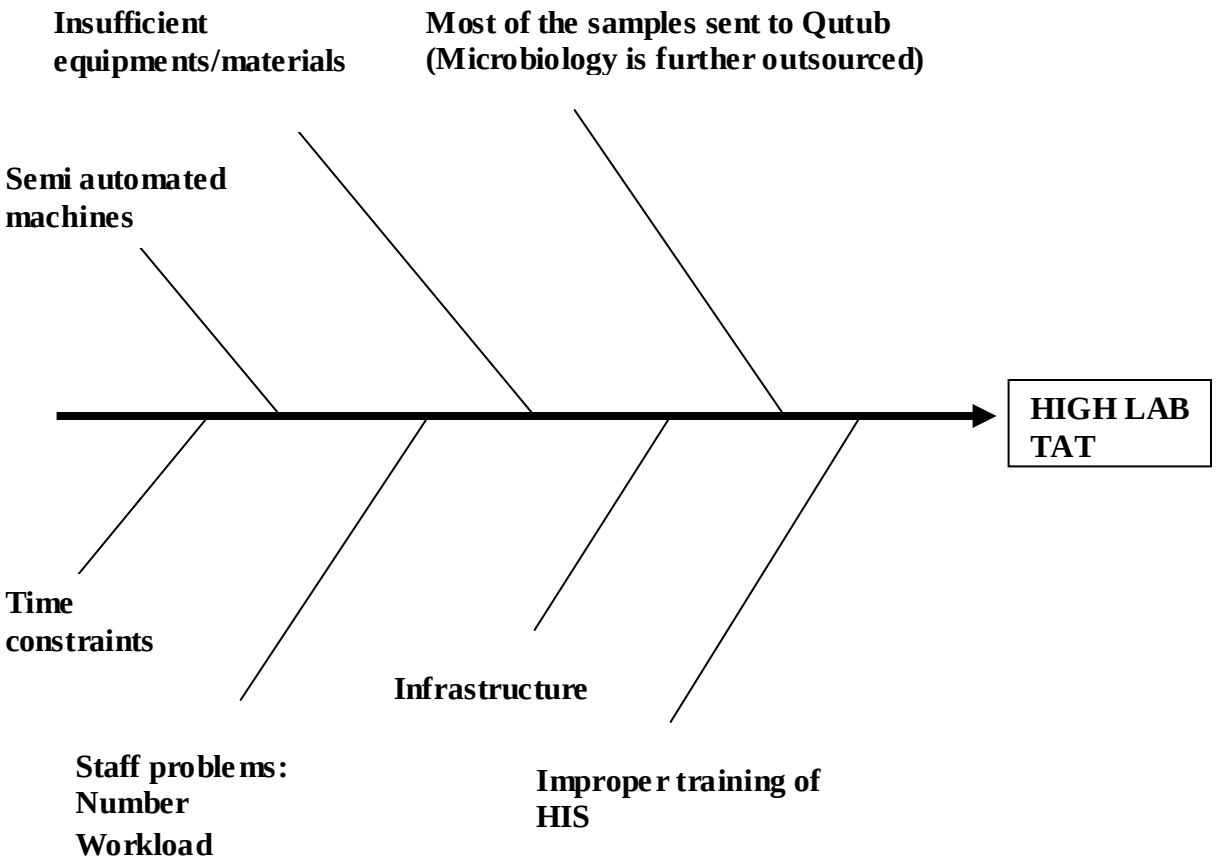


Fig 16: Fishbone diagram for identifying causes of high laboratory TAT

A fishbone diagram is constructed in order to study the causes for high TAT for various carried out in the laboratory of Rockland Hospital, Dwarka for the month of March and April (Study period was 15th March, 2012 – 11th April, 2012).

The major and foremost cause was that almost all of the sample were sent Rockland hospital, Qutub for their analysis and thereby, takes much higher time for getting the completed reports back to Dwarka branch.

Further TAT of microbiology shoot up because the Laboratory for the concerned tests was outsourced there in Qutub branch, thereby, causing a high shift in TAT.

The Hospital started analyzing the routine tests in its own Lab in last few days of March. The second major concern was the machines at lab of Rockland, Dwarka were Semi-automated which in turn increases The TAT, as compared to results drawn from automated machines.

Another factor that indirectly may have an effect on TAT was comfort ability in using of LIS software. It was observed that proper training was not deployed to the staff of Laboratory and that create problem for them to feed values of analysis into the system.

All the illustrated minor problems do not necessarily be termed as minor because they majorly affect the workflow of laboratory services. Process needs the contribution of all the factors collectively to make the systems efficient and effective. Whether it being the manpower, equipments, materials, environment of working etc. These factors were said as minor because in future these will undergo changes as the building is under construction and definitely work towards improvement of its operations.

CHAPTER VII - RECOMMENDATIONS

1. Test Order: The Rockland hospital is installed with LIS system and is connected to Front Office module. So there should be system of POP Ups in the system that as soon as the billing for investigations is done that an Alert POP up shoots out in the LIS system and Lab Personnel is ready to collect specimen.

2. Appropriate and Efficient Staff. Although the Laboratory staff is trying to effectively do the things but because of lack of resources the process is not efficient. Most of the time, only one personnel is present who collects labels or prepares the specimen and then analyze it. So need of at least 2 personnel at a time with HOD.

3. Consider total laboratory automation.

4. Use of pneumatic chutes in future to reduce the time in delivering of sample. Especially form Emergency department and Wards.

5. Reporting through Computerization. It has been observed that TAT is high for many of the investigations and the major reason behind is that the samples are being sent to sister concern, Rockland Qutub. So Post analytical time can be reduced by either sending reports to Rockland Dwarka by mails in Standard format or sending through Fax.

6. Weekly training of the Laboratory Staff in using LIS.

7. Maintenance of Records properly especially for missing reports.

8. Lab TAT can be categorized into 3 phases – Pre-analytical, Analytical and Post-analytical. For Pre-analytical Phase, documentation should be done by the lab personnel. As when he collects the sample, should document that time. So that it makes easy to study TAT in future and to identify where the things are going wrong.

CHAPTER VIII - LIMITATIONS OF STUDY

1. The time calculated could not be categorized into pre-analytical time, analytical time and post-analytical time due to insufficient maintenance of records.

2. The hospital did not have set its benchmark/standard for respective investigations as all of the equipments used to analyze the samples were semi-automated. So this will take little higher time as compared to automated machines.

3. Data was collected from the LIS software in the Lab. Sometimes, the values of the tests were entered later than the actual result time. So it brought shift in the TAT.

4. There are less number of researches and studies being carried out on impact of high TAT on the process of treatment and LOS of patient in the hospital.

5. There are also little studies being carried out on importance of Manpower and there efficiency on smooth functioning of Laboratory workflow.

CHAPTER IX – CONCLUSION

Despite technical advancement in recent decades, 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 the factors which are uncontrollable by them.

Multifactorial analysis shows TAT to be affected by a variety of factors that can be placed in two categories. The first are uncontrollable institutional factors, such as institution type, bed size, location, which are probably surrogate markers for staffing levels, governance, case mix and geography. The second are controllable process factors, which should be the focus of quality improvement activities. These include the nature of the phlebotomy staff, extent of computerization and method of specimen transport [10].

The review of the literature illustrates the difficulty in recommending any universal evidence-based goals for laboratory TAT for two reasons. Firstly, the wide range of work practices (clinical and laboratory) and timing data availability hinders common agreement on TAT definitions. There has been progress in this area in recent years, with more explicit descriptions of TAT data in the literature and increasing availability of timing data through laboratory computerization and electronic medical record development. Secondly, there is little indication that decreased TAT improves patient care or hospital LOS [4]. There is a need for well-designed studies of the effect of laboratory TAT on patient outcomes. However the outlook in this area is less optimistic. It is difficult to design and perform studies in stable operating environments that can separate the effect of the laboratory service from other confounding variables and that can produce generalized results applicable to other sites.

Given this lack of evidence, should one dismiss TAT as an important quality measure? Howanitz and Howanitz argued that if laboratory results provide essential data for patient

Management, it follows that more timely results will improve patient care and that, despite the lack of evidence, it is reasonable to assume that timeliness of laboratory results affects physician efficiency and hospital LOS [4]. They felt 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.

Laboratory services bring in the heavy turnover in monetary terms and one should provide the facility with best of our efforts if we are charging heavily for the same. The organization should itself set its benchmark and provide the accurate and timely services in order to keep its patients happy and satisfied. Focus on streamlining the procedures with collaboration of whole of the department will bring the things into sync.

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