

Monitoring process flow and reducing turnaround time
(TAT) at Primary Health Checkup (PHC) station and
Radiology Department of Eternal Hospital

By

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*Dissertation submitted for the partial fulfillment of the
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The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



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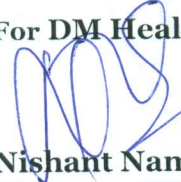
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She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning

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List of Acronyms/Abbreviations

S. No	Acronym/ Abbreviation	Meaning
1	PHC	Primary Health Check Up Station
2	TAT	Turn Around Time
3	EHCC	Eternal Hospital
4	FMEA	Failure Mode Effect Analysis
5	GDA	General Duty Assistant
6	OPD	Outpatient Department
7	IPD	Inpatient Department
8	NABH	National Accreditation Board for Hospitals

1. INTRODUCTION

Turn Around Time for elective care have been considered a serious problem in many health care systems since it acts as a barriers to efficient patient flows. It is an important indicator of quality of services offered by hospitals. It is a tangible aspect of practice that patients will use to judge health personnel, even more than their knowledge and skill.

As with many tertiary healthcare centre Eternal Hospital encounters an expanding patient load, greater patient expectations and increasingly complicated patients who require services from a multitude of health providers. Such rising demands amidst limited resources cause inefficiencies and long waiting times for consultation. This results in low patient satisfaction and an unpleasant experience.

OPD is considered the shop window of the hospital and patient's impression of the hospital generally begins here.

At EHCC a team of highly qualified and experienced medical personnel has developed the Health Check Program. The packages included in this program are designed to give a complete Check-up and, within their limitations, detect any latent health problems. For ease of patients a separate station is established in OPD known as Preventive Health Check-up (PHC) station.

Due to increasing patient loads, higher patient expectations, evolving new subspecialty services, and on-going research activities, clinic operations became complicated and inefficient. There were increasingly negative sentiments from patients, with many encountering long periods of waiting, often spending nearly a day at the centre when they came for appointments. Confusion and disorder arose when patients had multiple same day appointments, as there was a lack of coordinated workflows between care providers. Doctors, nurses, allied health, and service staff felt stressed with the increased load.

Clinicians often pride themselves in delivering the best patient care but fail to acknowledge the need to improve systems and operations surrounding this administration of care. In large hospitals

patients are often left waiting for long periods when they come in for the tests and consultations. The perception of inactivity whilst waiting is largely due to the multiplicity of providers that have varying methods, training, and habits of seeing patients without recognising how such uncoordinated variability contributes to the patient experience. There is often poor handover from one provider to another with no overall coordination. Patient experience often does not take priority. Such phenomena are not uncommon and multiple improvement projects using various methods have been reported to improve patient satisfaction both in the inpatient and ambulatory setting.

Patients' waiting time has been defined as "the length of time from when the patient entered the outpatient clinic to the time the patient actually leaves the OPD". Whether it's a time used for registration of patient, routine doctor's appointment, emergency room treatment, laboratory/diagnostic test, procedures, receiving the results of various tests, waiting happens to just about everyone seeking medical care.

Waiting times for elective care have been considered a serious problem in many health care systems since it acts as a barriers to efficient patient flows. It is an important indicator of quality of services offered by hospitals keeping patients waiting unnecessarily can be a cause of stress for both patient and doctor. Waiting time is a tangible aspect of practice that patients will use to judge health personnel, even more than their knowledge and skill.

1.1 Justification

The Eternal Hospital, Jaipur is a multidisciplinary tertiary care hospital which aims to provide an integrated one-stop service for all health care. As with many tertiary healthcare centre, Eternal Hospital encounters an expanding patient load, greater patient expectations and increasingly complicated patients who require services from a multitude of health providers. Such rising demands amidst limited resources cause inefficiencies and long waiting times to consultation. This result in low patient satisfaction and an unpleasant clinic experience.

A project was thus initiated by a multidisciplinary team from Eternal Hospital to improve the TAT of patients at PHC station in OPD, engage better communication and workflow between the various healthcare providers, and improve the overall hospital experience for both patient and staff.

By systematically breaking down processes and identifying problem areas, targeted changes were implemented.

The primary aim of this project was to improve the patient turn-around time at PHC in OPD.

1.2 PROBLEM STATEMENT

A key aspect of the patient's encounter at the hospital is how long he or she has to wait. As waiting time increases patient satisfaction drops. Eternal Hospital needed visibility on the challenges faced by the patient and the staff to improve the efficiency of the hospital. One key challenge was to find out responsible factors resulting in waiting during and after investigation at PHC station and Radiology department of Eternal Hospital.

1.3 RESEARCH QUESTIONS

- What are the leading factors resulting in the waiting time of patients during and after investigations?
- What is the turnaround time of patients from registration to dispatching the investigation reports?

1.4 AIM

To identify the responsible factors along the patient pathway to improve patient waiting time during and after investigations at PHC of Eternal Hospital, Jaipur

1.5 OBJECTIVES

- To observe the investigation process in OPD 1.
- To understand the process flow at PHC.
- To calculate Turn Around Time of patients after investigation at PHC
- To calculate the Turn Around Time of OPD & IPD patients after investigations in

Radiology Department.

- To propose alternatives to make the patient flow process of investigations efficient with reduced waiting time.

2. LITERATURE REVIEW

1. The Institute of Medicine (IOM) recommends that, at least 90% of patients should be seen within 30 min of their scheduled appointment time (6). This is, however, not the case in most developing countries, as several studies have shown that patients spend 2-4 h in the outpatient departments before seeing the doctor.(7,8,9) A source of dissatisfaction with health care reported by patients is having to wait a long period of time in the clinic and several studies have documented the negative association between increased waiting time and patient satisfaction with primary care.
2. The duration of waiting time varies from country to country, and even within country it varies from city to city. Long waiting times have been reported in both developed and developing countries.
3. In the USA, an average waiting time of about 60 min was found in Atlanta, (10) and an average of 188 min in Michigan .(11). In Nigeria, an average waiting time of about 173 min was found in Benin, (12) while in University College Hospital Ibadan, a mean waiting time of 1 h 13 min was observed. (13)
4. AkilanArunkumar.A. Delays and waiting – a challenge for the hospital. Analysis of Out-Patient Service using Queuing Theory, Research Scholar, Tata Institute Of Social Science, Mumbai (14). The study was designed to know the arrival pattern of the patients, the time taken to utilise the services (service rate) and utilisation of ophthalmologist and other staff involved in OPD. 1413 samples were studied through this study. Response time was calculated from finding the difference between the entry and exit time. The bottleneck analysis revealed where the system fails in providing quick service. If more than 300

patients arrived at the OPD, queue starts building up at the reception centres. Reception centres were the primary bottlenecks.

5. Dr Jawahar S.K. India, A study on patient satisfaction in a super speciality hospital in India. International Journal of Medical Update 2007 (July-Dec); 2(2):13.7(15). In the study it was found that most of the patients waited for less than one hour. The enquiry time and time at Medical Record Department was less than 30 min for about 70% patients. However the time for consultation was very high; in some cases it extended even more than three hours leading to patient dissatisfaction.
6. Improving Turn around Time for OPD. P.D. Hinduja National Hospital & Medical Research Centre [internet] 2011 [cited 2012 Apr 13]. Available from: http://www.quimpro.com/nabh/project_hinduja.php (16). In order to track waiting a study was conducted to capture end to end process for all services. It was found that the idle waiting time constituted for around 40 to 50 minutes. The appointment patient on an average was ready to wait for 30 minutes after giving the voucher.

This study aimed at improving the patients' waiting time in the OPD of Eternal Hospital.

3. RESEARCH METHODOLOGY

3.1 Type of study- Descriptive study

It is an Applied type of study as it aims at finding immediate solution to the problem. The study deals with data hence it is an Empirical study.

3.2 Study design-

- Observational study was carried to understand the process which a patient undergoes after entering the OPD till he leaves the department. The bottlenecks and possible solutions were noted down.
- Time motion study was carried out to note time taken for each activity.

3.3 Duration of study-10th February till 30th April

3.4 Sampling method- Simple Random Sampling technique was used where every individual had equal chance of getting selected.

3.5 Study area- PHC Station in OPD 1 and Radiology Department of Eternal Hospital, Jaipur

3.6 Study method- The observational study was conducted at the PHC Station in the OPD and Radiology department, the TAT was measured and discussions were held with the respective department head.

3.7 Study tools used:

- (a) Turnaround time checklist for PHC Station and Radiology Department was used to collect data.
- (b) Observational study was used to understand processes in OPD and Radiology and was documented.
- (c) Time motion study was used to collect data on time taken for each activity in the process.
- (d) Fish Bone diagram was used to analyse the causes of delay.
- (e) Brainstorming session were undertaken to work out possible solutions.
- (f) MS Excel was used for statistical analysis.

3.8 Analysis tool- Microsoft Excel

3.9 Project team

A multidisciplinary team was constituted by the hospital to undertake this study. The team consisted of following:

- | | | |
|------------------------|---|-------------------------------|
| 1. Dr Vrajesh Shah | - | Medical Superintendent |
| 2. Mrs Monika Saxena | - | Deputy Medical Superintendent |
| 3. Mr Subratha Das | - | General Manager, HR |
| 4. Miss Kirti Hemkar | - | Quality Head |
| 5. Mr Shailender Singh | - | PHC Head |
| 6. Mahak | - | Author |

3.10 ETHICAL CONSIDERATIONS

- Privacy of patients was maintained.
- Project was executed with proper permission to authorities.
- Privacy and confidentiality of data obtained was ensured.
- Scientific honesty was maintained.

3.11 Time frame

Table 3.1: Time frame of the study (in weeks)

Activity	Feb			Mar				Apr			
	2	3	4	1	2	3	4	1	2	3	4
Understanding the working of hospital, getting acquainted with various departments, discuss project with the MS and noting the process flow in OPD											
Time motion study and collecting data											
Transfer of data to MS Excel, creating tables and charts, analysing bottlenecks											

Brainstorming for possible measures to reduce TAT and giving suggestions accordingly											
Implementation and impact of interventions											

4. RESULTS AND DISCUSSION

This is the first step that refers to defining the goals of the project. The hospital had been receiving constant feedback about the long waiting time during their OPD visits. However there was data available on this issue. During this stage, the team first developed a high-level process map to help understand the larger process and to gain consensus for the overall scope of the project (Fig). To understand the actual processes and problems faced on the ground, an actual state analysis was performed.

The process starts when the patient enters the OPD and ends when the patient collects the reports from the counter. On entry in OPD every patient is expected to take a token for his turn gets them registered. Package counselling is provided to the patients and billing is done by the billing officer covers time after billing for investigations till the patient receives the report.

As the hospital earlier was a single specialty hospital and got upgraded to multispecialty hospital just about 2 months ago, the team decided to undertake the project on turn around time for this study. The average time decided by the management for waiting was 3 hours in case of investigation report for packages.

To identify high level process map and the stakeholders the SIPOC (Table 4.1) has been done focussing on the third step.

Table 4.1 : SIPOC

Supplier	Input	Process	Output	Customer
Patient	Patient information	Patient registration	UHID No	Billing staff
Billing staff	UHID No & cash	Billing	File& Receipt	Attendant
CSE at PHC station	View File for Investigation	Guiding the patient for investigations	Getting the reports	Patient
Doctor	File & wait list No	Consultation	Prescription	Patient

Figure 4.1 process flow for OPD

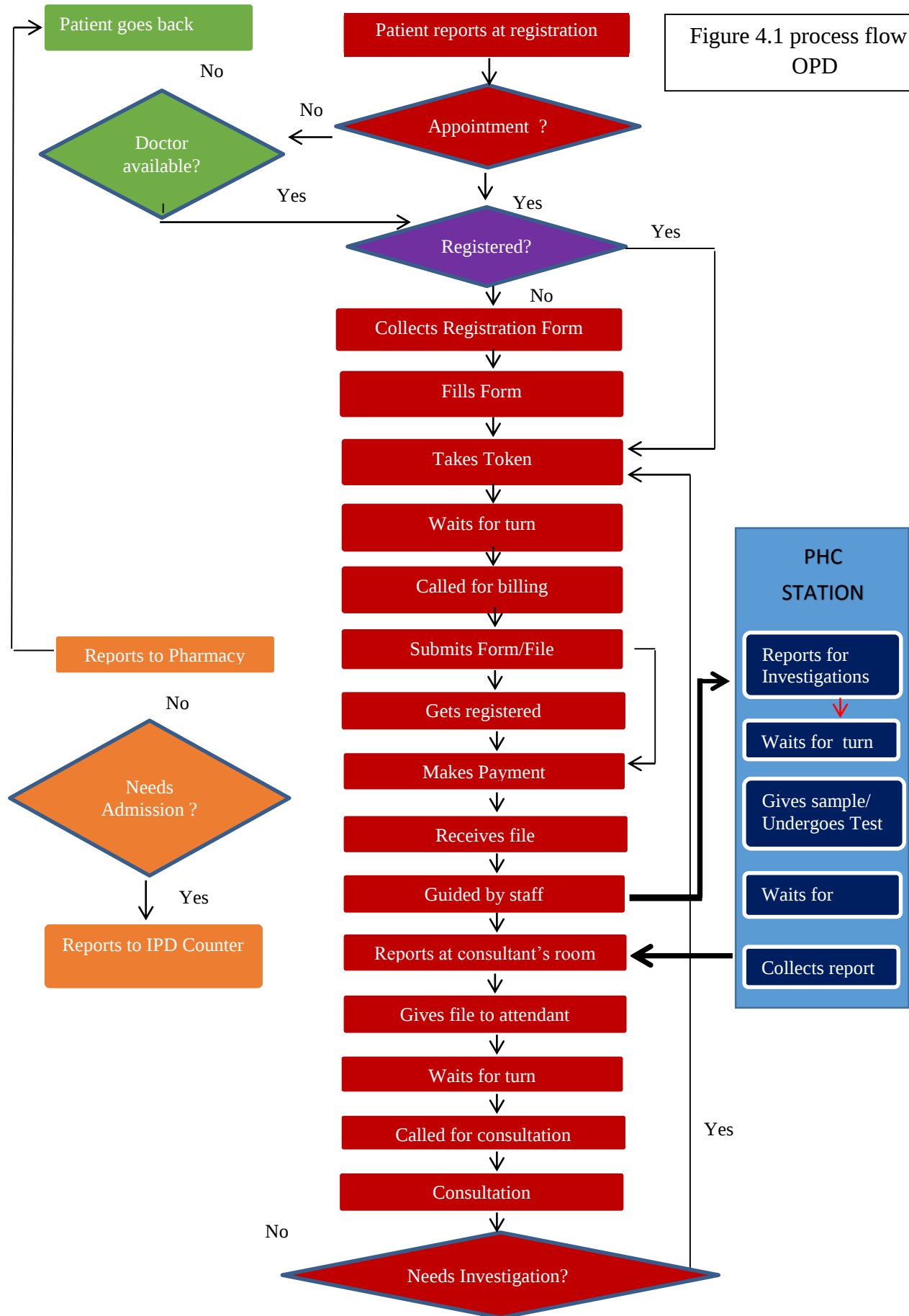
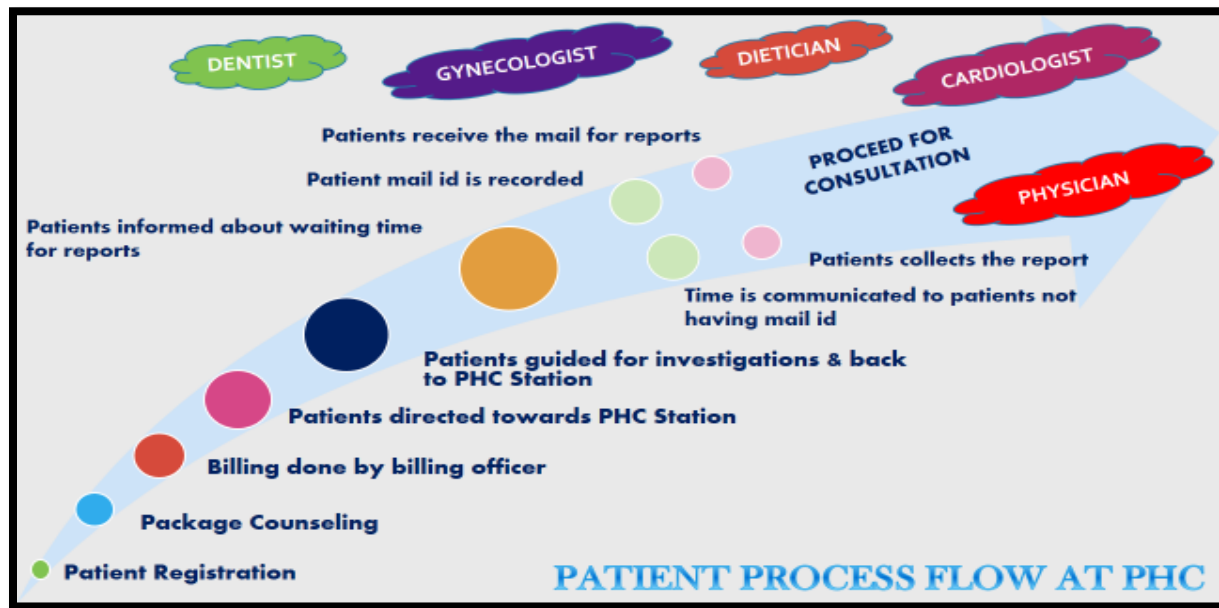
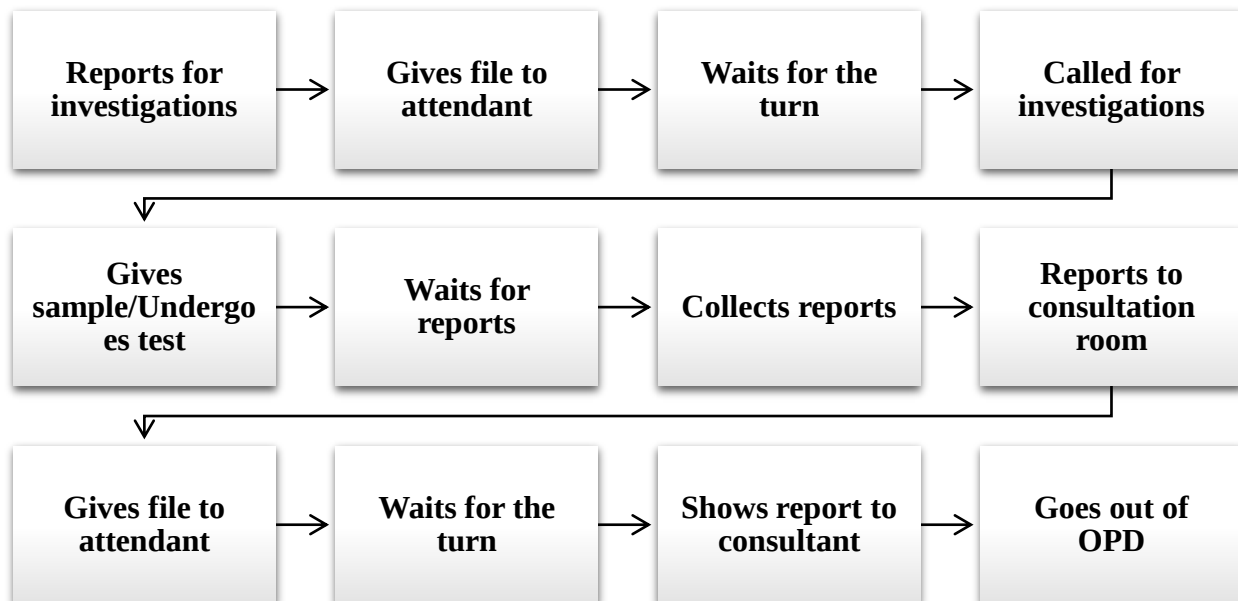


Figure 4.2 Process flow for PHC Station



To determine a baseline metric of the identified overall (TAT) from start to finish. The process map was used to identify each step, and a data collection tool was created to capture a metric for the designated incremental steps within the hospital. The team decided to measure the time required to complete the process of patient coming to the PHC Station ,giving samples for investigations, waiting for report and proceeding for the consultation.

Figure 4.3 Process flow from PHC station till Consultation



A Turn Around Time Checklist was designed and data was collected by carrying out a time motion study. The checklists for the study are given as Appendix A, B, C, D and E respectively for investigation reports at PHC station ,OPD X-rays, OPD MRI/USG/CT,IPD X-rays and IPD MRI/USG/CT.

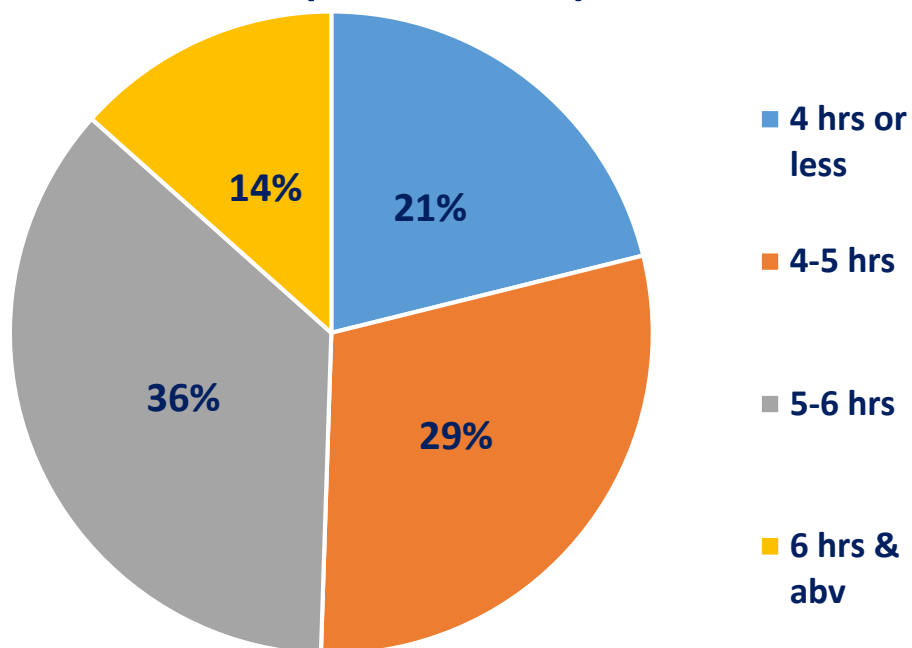
FINDINGS

IN OUT TURN AROUND TIME FOR PATIENTS

IN= Patient billing time

OUT= Patient collects the report or receives the report

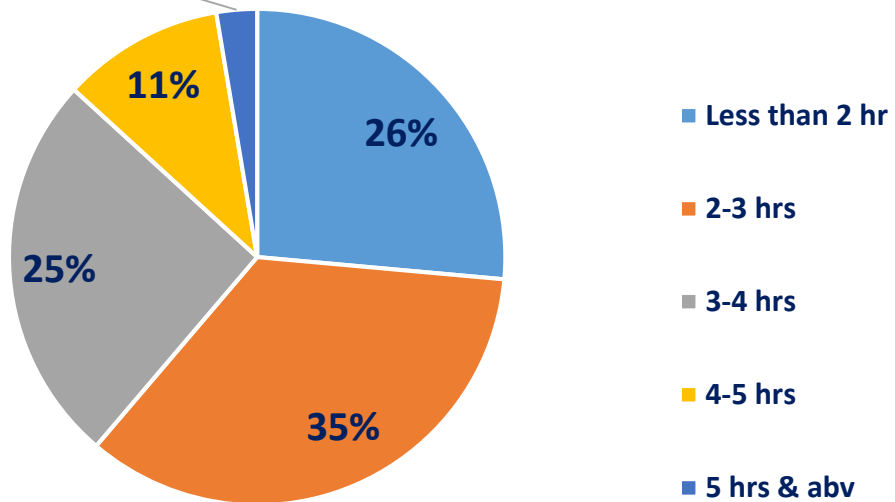
**Fig.4.4 Percentage TAT of patients
(In-Out time)**



This figure depicts the time when the patient is doing the billing till the patient receives or collects the report .It was seen that only 21 % patients get the reports before 4 hrs, whereas 79% people take more than 4 hours to get the investigation reports.

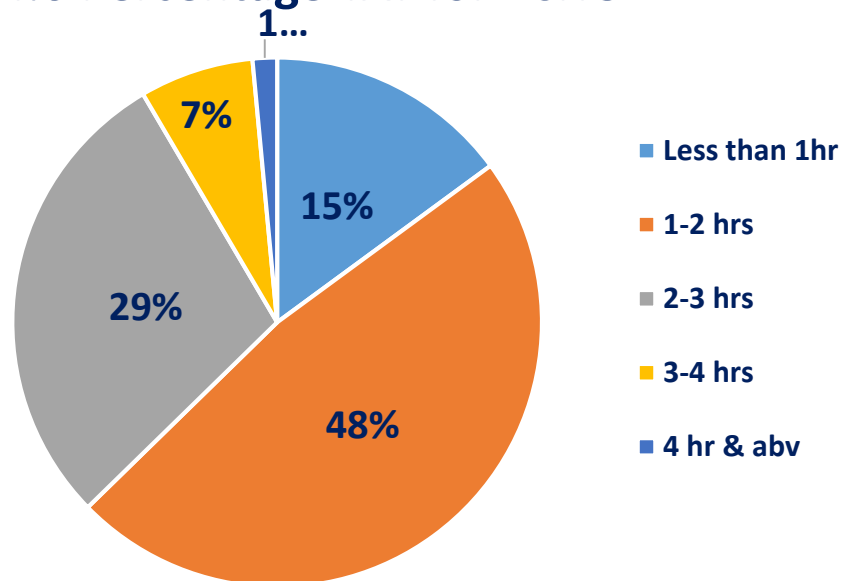
In this part of the process it was observed that for ECHO 92% of patients get reports before 3 hours. About 50% of the patients get the ECHO reports within 1 to 2 hrs. Echo investigation room was located nearest to the PHC Station

Fig 4.5 Percentage TAT for X Rays



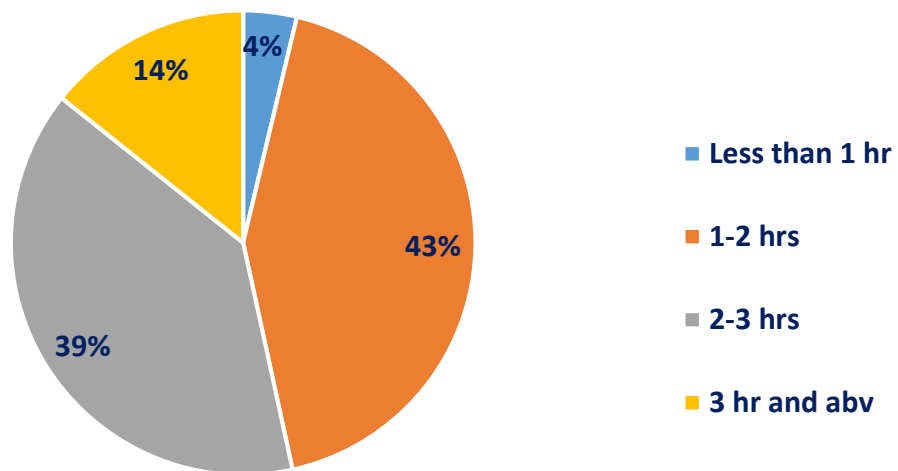
As seen in **the figure** it was observed that 61% patients were getting the X-Ray reports within 3 hrs, whereas 39% are getting the reports after 3 hrs.

Fig 4.6 Percentage TAT for ECHO



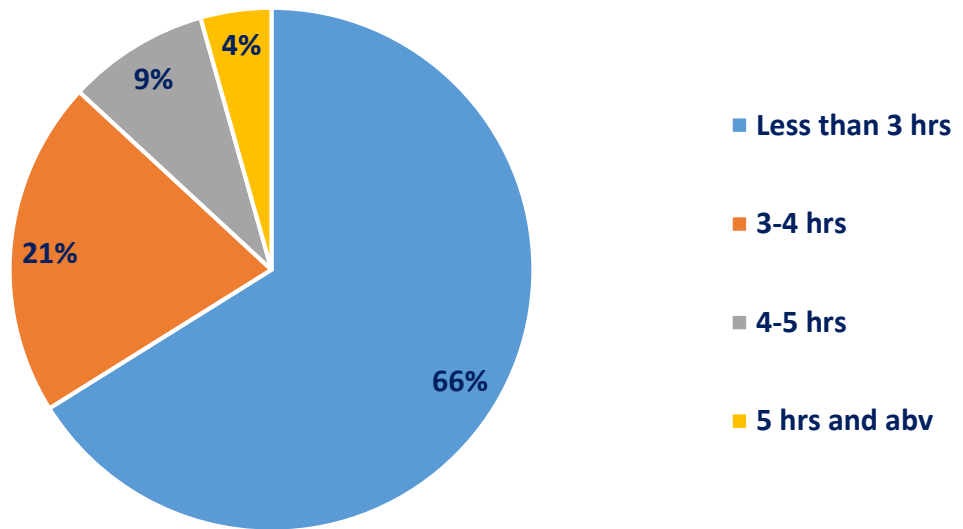
It was seen that 86% of patients are getting the Treadmill Test reports before 3 hrs whereas 14% are getting it after 3 hours.

Fig 4.7 Percentage TAT for TMT



It was seen that 66% patients get the blood reports within 3 hrs whereas 34% of patients get the reports after 3 hrs.

Fig 4.8 Percentage TAT for Hematology



Only 33 % patients get the pathology reports within 3 hours ,else 67% patients get it after 3 hrs.

Fig 4.9 Percentage TAT for Pathology

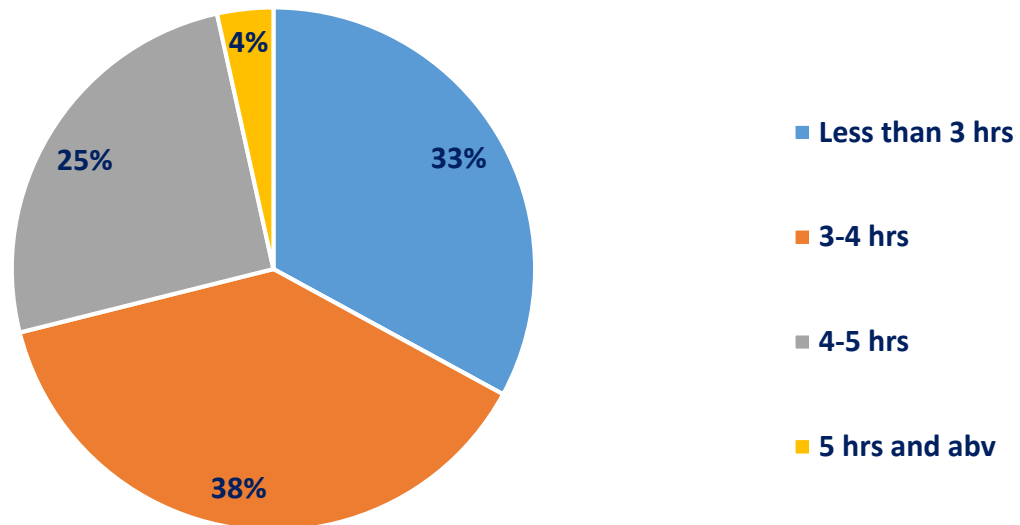


Fig 4.10

Average waiting time for reports at PHC station



It was seen in figure 4.10 that average waiting time was maximum for pathology reports that is three hours fifteen minutes and lowest for ECHO reports that is one hour forty five minutes

Fig 4.11 WAITING TIME AFTER LAST TEST DONE

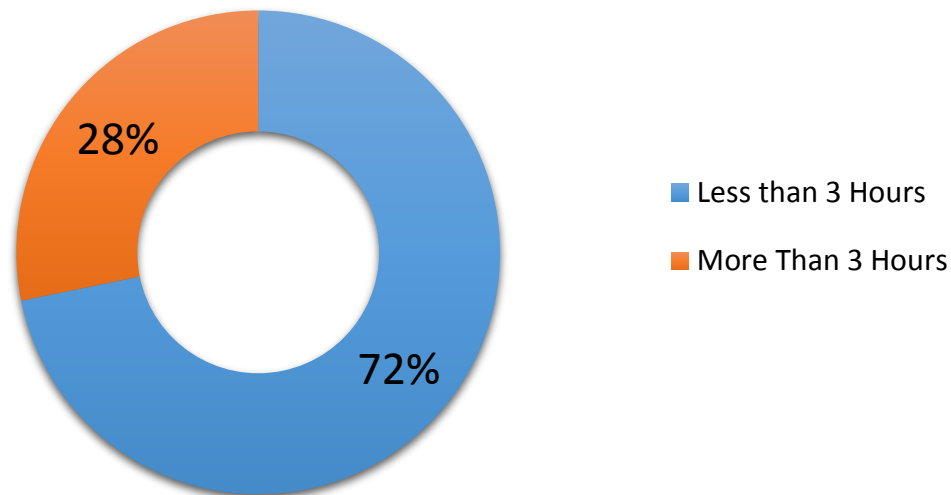
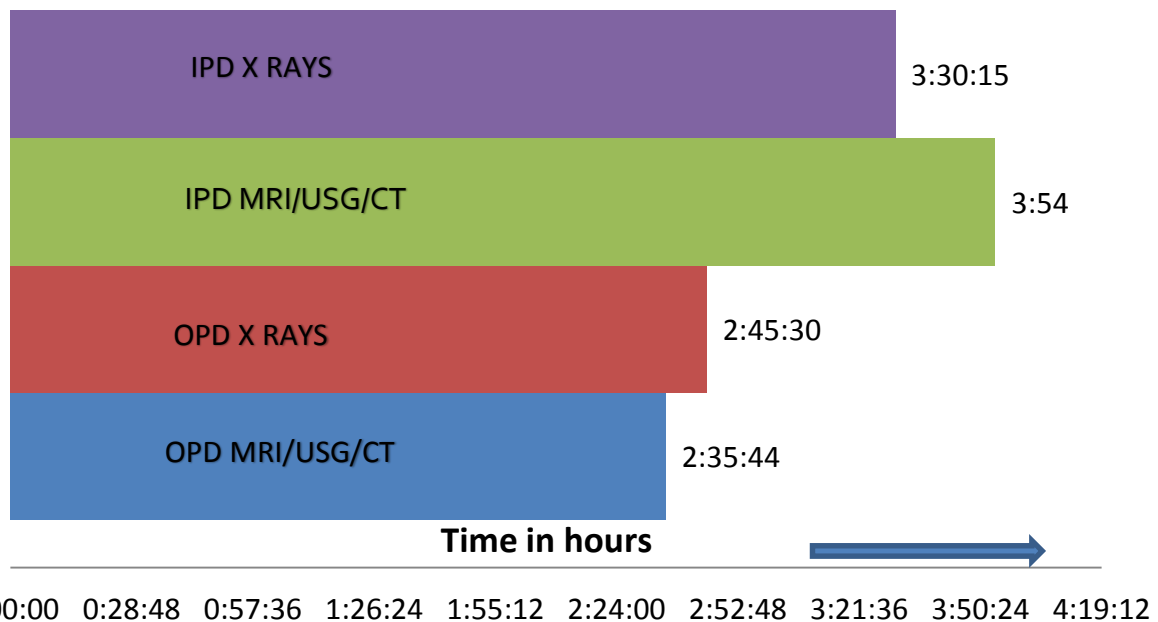


Figure 4.11 depicts that even after the last test was done 28% people had to wait more than 3 hours whereas 72% got the result within 3 hours after the last investigation was done.

Fig 4.12 Average waiting time in Radiology



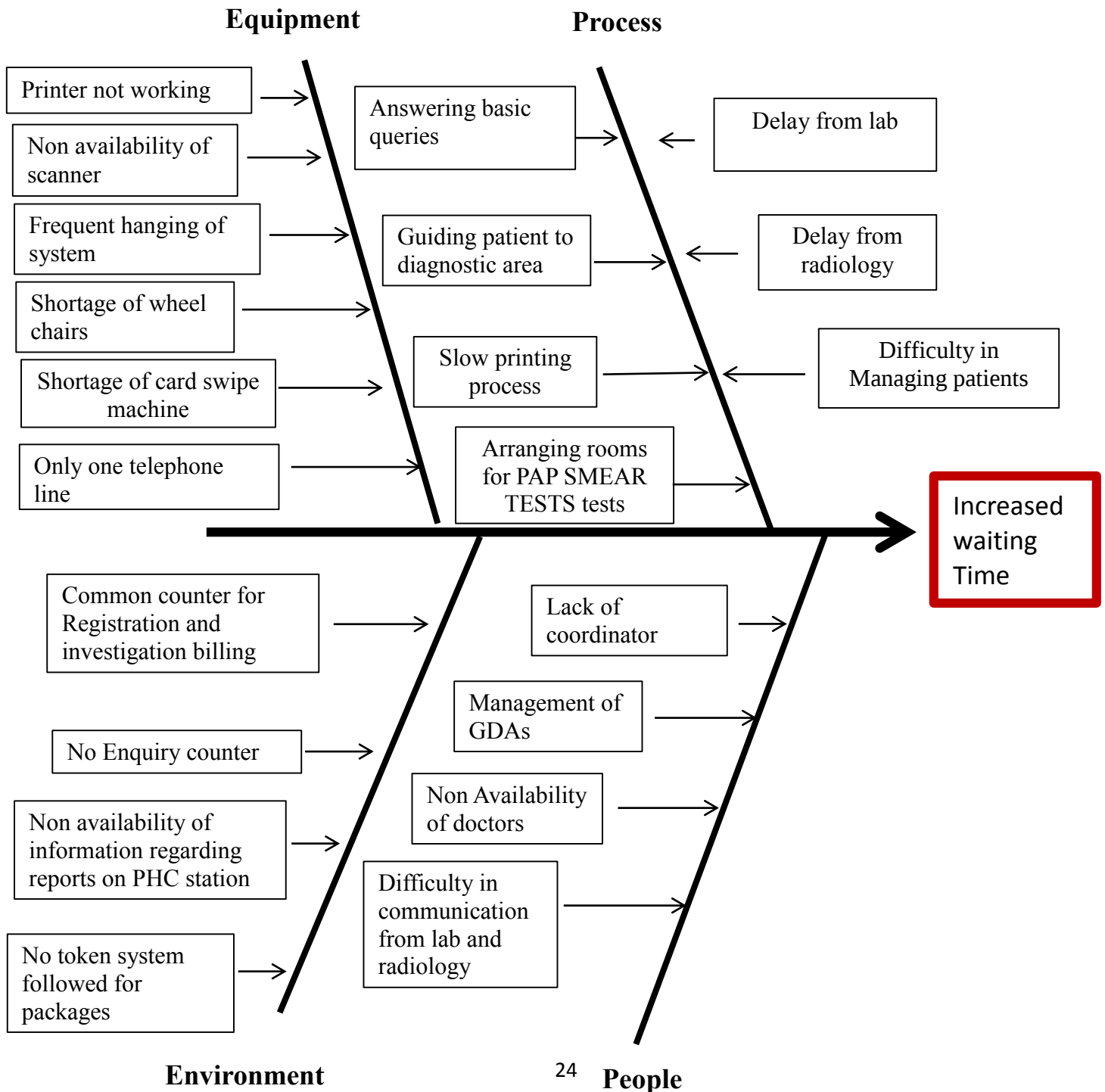
It was observed that on an average OPD reports are generated faster than the IPD reports .OPD Xrays are taking more time than IPD Xrays.

Analysis

The goal was to identify causes of delays in patient TAT and to determine any disparity that may exist in the goals set and the current performance levels achieved. The understanding of the relationship between cause and effect was necessary to bring about any improvements, if needed.

The Fish Bone Diagram of all the perceived causes was prepared (Figure 4.13)

Figure 4.13 Fish Bone diagram for causes of delay



A modified Failure Mode and Effect Analysis (FMEA) was carried out where the causes were ranked on the basis of occurrence and severity of their impact on waiting time (Table 4.8) as per criteria given in Table 4.2.

Table 4.2: Rank weightage

Occurrence	Rank	Severity	Rank
Once a Month	1	Mild	1
Once a Week	5	Moderate	5
Every day	9	Severe	9

Table 4.3: FMEA of causes of delay

Cause	Occurrence	Severity
Answering basic queries	5	5
Delay from laboratory and radiology	9	9
Delay of reports	9	1
Lack of coordinator	9	1
Management of GDAs	5	1
Common counter for Registration and investigation billing	9	9
No Enquiry counter	9	1
Non availability of information on scope of services and charges	9	5
Problem in communication	5	1
Printer not working	5	1
Non availability of scanner	9	5
Frequent hanging of system	9	1
Shortage of wheel chairs	5	5

Improvements in existing systems are necessary to bring the organization towards achievement of the organization goals. Creative development of processes and tools brings about a new lease on life for the organization's processes and takes them nearer to organizational objectives.

The team performed another brainstorming session with representatives from each area where inefficiencies occurred to find solutions that could have a positive impact on patient flow. The causes along with possible solutions are given in Table 4.4.

Table 4.4: Causes & Possible solutions

Cause	Possible solutions
Common counter for registration and investigation billing	• Dedicated counter for investigation billing. • Additional counters specially on high foot fall days.
Unavailability of Cashier tray at PHC station cause delay in the system	• In lieu of managing lose money cashier trays should be provided so as to reduce the wasted time.
Return of balance money(lose money not available)	• Bulk provision of lose money in denominations of Rs 1, 2 ,5,10 and 50 every morning. • Availability of in lieu items like candies.
Frequent hanging of the system	• Upgrade the system
Sharing of card swipe machine with other counters	• Provide additional machine
Frequent enquiry by patients about OPD days, OPD charges and other tests charges.	• Setting up of separate MAY I HELP YOU desk. • Static display of OPD Schedule and the package Charges
Unavailability of separate room for tests like PAP SMEAR and Mammography	• Separate area should be allocated for the tests in order to reduce the waiting of the patient for procedure room

Improper communication among the staff regarding the timings of report.	One statement should be followed while communicating with the patient, sensitizing staff for the same.
Lack of changing area inside XRAY and TMT chambers for females.	Separate areas inside XRAY and TMT should be made so that the time female patients invest in going to the changing room and coming back to diagnostic area can be eliminated and also to reduce embarrassment for the female patients as they have to travel the whole OPD for coming to the scanning area for X ray.
Wheel Chair Management: The GDA is sent to get wheel from other departments hampering functioning of PHC station.	Wheel chairs earmarked for OPD could be placed at waiting area. Movement of these can be easily tracked.
No authorized person for delivery of x rays from scan room to radiology department and back to the PHC counter.	Time slot with duty rota's must be formed for GDA'S for collection of XRay Report on time.
No reliever at the radiology counter when front staff is on leave or unavailable during lunch time delaying process of report dispatching	For the duration of unavailability handover should be given to the next person sitting on the counter.
Answering basic queries of outside customers on telephone like types of facilities available, names and schedule of doctors etc.	Basic details could be available with the operator who can satisfy the caller. Availability of doctors can be checked from the OPD.

THE DATA ANALYSIS SHOWS THAT PROBLEMS IN THE PROCESS WAS AT FOLLOWING MAJOR STEPS:

- Waiting time for investigation.
- Time taken for investigation.
- Long waiting time for investigation results.

5. CONCLUSION

As a result of the study a separate registration counter was started for investigation billing and reports dispatching, the person authorised to dispatch reports was trained properly, dedicated wheel chairs were placed for PHC STATION, the billing staff was provided with loose money every morning, separate cabins for changing in Xray and TMT areas for females was made and GDAs were given duty on collection of the Xray reports on time.

Eternal Hospital is encountering an expanding patient load, greater patient expectations and increasingly complicated patients who require services from a multitude of health providers.

Such rising demands amidst limited resources can cause inefficiencies and long waiting times to consultation. This would result in low patient satisfaction and an unpleasant hospital experience.

As this is still one of the preliminary quality improvement project, efforts to continually track, examine, and further improve turn-around times will go a long way in improving patient's experience at Eternal Hospital.

Future initiatives could be directed at more time-efficient appointment scheduling, a real-time patient tracking system which can facilitate hand over of patients with same day multiple appointment system and reinforcing the PHC station to provide a more seamless patient flow.

Appendices

Appendix A – Sample Turn Around Time checklist for Investigations

IN TIME	UHID	ECHO			TAT - ECHO (C-A)	XRAY			TAT XRAY (C-A)	TMT			TAT TMT (C-A)	HEMATOLOGY			TAT TOLO GY (C-A)	CLINICAL PATHOLOGY			TAT (C-A)	OUT TIME	TAT
		SAMP LE TIME (A)	REPO RT TIME (B)	ACTU AL TIME ⊙		SAMP LE TIME (A)	REPO RT TIME (B)	ACTU AL TIME ⊙		SAMP LE TIME (A)	REPO RT TIME (B)	ACTU AL TIME ⊙		SAMP LE TIME (A)	REPO RT TIME (B)	ACTU AL TIME ⊙		HEMAS AMP TIME (A)	REPO RT TIME (B)	ACTU AL TIME ⊙			
8:29	10043	8:29	11:10	11:40	3:11	8:32	9:50	12:30	3:58	8:29	10:50	12:10	3:41	8:29	10:02	13:20	4:51	8:29	11:42	13:20	4:51	16:55	8:26
8:32	10045	8:32	10:59	11:40	3:08	8:46	9:51	12:30	3:44	8:32	11:13	11:45	3:13	8:32	10:00	13:15	4:43	8:32	11:44	13:15	4:43	11:55	3:23
8:27	33239	8:27	10:02	10:35	2:08	8:27	11:18	12:40	4:13	8:27	10:31	11:05	2:38	8:45	11:09	13:10	4:25	8:27	10:46	13:10	4:43	13:15	4:48
8:35	33180	8:35	9:40	10:35	2:00	8:35	11:16	12:40	4:05	8:20	9:56	10:35	2:15	8:35	11:12	13:05	4:30	8:35	10:47	13:00	4:25	13:10	4:30
8:46	33250	8:46	9:45	10:35	1:49	8:46	11:17	12:40	3:54	8:46	11:08	11:35	2:49	8:46	11:01	13:36	4:50	8:46	10:46	13:42	4:56	13:45	4:59

APPENDIX B

Sample turn around time checklist for OPD XRAYs

UHID	OPD		
	X Rays		TAT XRAY
	In	Out	
19216	9:20	12:03	2:43
27170	9:34	12:03	2:29
35432	9:28	12:03	2:35
36705	9:57	12:03	2:06
36734	8:14	12:03	3:49

APPENDIX C

Sample turn around time checklist for OPD CT/USG/MRI

UHID	OPD		
	CT/MRI/USG		TAT
	In	Out	
36833	8:20	9:19	0:59
36834	8:19	9:18	0:59
36950	8:32	10:52	2:20
36399	8:33	11:20	2:47
35965	9:56	12:07	2:11

APPENDIX D

Sample turn around time checklist for IPD XRAYs

UHID	IPD		
	X Rays		TAT XRAY
	In	Out	
36377	8:46	14:14	5:28
11787	9:46	11:00	1:14
36559	2:59	12:43	9:44
36947	8:09	11:00	2:51
36932	9:41	12:07	2:26

APPENDIX E

Sample turn around time checklist for IPD CT/MRI USG

UHID	OPD		
	CT/MRI/USG		TAT
	In	Out	
36833	8:20	9:19	0:59
36834	8:19	9:18	0:59
36950	8:32	10:52	2:20
36399	8:33	11:20	2:47
35965	9:56	12:07	2:11

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