

Value Stream Mapping of Emergency Department in Eternal Heart Care Centre, Jaipur

By

Rimjhim Jain

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Rimjhim Jain**, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Eternal Heart Care Centre, Jaipur** from **February 4, 2019 to May 2, 2019**.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfilment of the course requirements.

I wish her all success in all his future endeavours.



Dr. (Col.) Ashok Kaushik

Dean, Academics and Student Affairs

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Professor

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17 May 19

The certificate is awarded to

Rimjhim Jain

In recognition of having successfully completed her
Internship in the department of

Quality

and has successfully completed her Project on

**Value Stream Mapping of Emergency Department in
Eternal Heart Care Centre, Jaipur**

13th May 2019

Eternal Heart Care Centre and Research Institute, Jaipur

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

We wish him/her all the best for future endeavors


Medical Superintendent


Sr. Manager-Human Resources

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **“Value Stream Mapping of Emergency Department in Eternal Heart Care Centre, Jaipur”** and submitted by **Rimjhim Jain** Enrollment Number **IIHMR-U/01/2017-19/0649** under the supervision of **Dr. P.R. Sodani** for award of MBA in Hospital and Health Management in Indian Institute of Health and Hospital University carried out during the period from **4th Feb 2019 to 2nd May 2019** 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.

Rimjhim Jain
Signature

ABSTRACT

VALUE STREAM MAPPING OF EMERGENCY DEPARTMENT IN ETERNAL HEART CARE CENTRE, JAIPUR

Name: Rimjhim Jain

Keywords: Value Stream Mapping, Emergency department

Background: The Emergency department can be considered as the face of the hospital as it is the first contact point between a patient and the hospital when the former is in distress. Value Stream Mapping of the ER process helps in identifying waste steps in the patient care process in order to eliminate them, thereby reducing unnecessary patient waiting times.

Objectives: To understand the process flow of the Emergency department; To calculate the Length of Stay (LOS) and the initial assessment time of patients in ER; To calculate the time in which consultant responds to calls from ER; To identify the reasons for delay in shifting the patient; To suggest the measures to improve the process cycle of ER.

Method: Being the face of a hospital, the emergency department should ensure that the entire process of patient care is smooth without any reasons for delay. A two-month long study of the emergency department (ER) of Eternal Heart Care Centre, Jaipur uncovered many problems in the process which led to unnecessary delay in transfer of patients to In-Patient Department (IPD) or Discharge. Value Stream Mapping (VSM) of the care process was done to eliminate non-value adding steps and an ideal state is mapped with suggestions to improve, which, if implemented, can greatly reduce the length of stay of patients in ER. A time motion study was conducted to determine the time it took to complete every step of the patient care process, from his/her arrival to his/her departure from ER.

Result: The average time of initial assessment of the patient comes out to be 6.78 minutes much below the benchmark of 15 minutes. On an average, a consultant took 28 minutes to respond to the emergency patient. 28% of the patients remained in the ER for more than 4 hours, some extending to even 15 hours.

Conclusion: At the end of the study, it was concluded that, unavailability of beds due to high occupancy rate in the hospital was the major reason behind the increased length of stay of patients in ER. Smoothening of the discharge process in order to maintain the TAT of 4 hours for cash patients and 6 hours for TPA patients was suggested to ensure that beds are available when needed. The study was a cross sectional one which included patients for immediate care, nursing staff, ER doctors and consultants. A number of other problems were identified and suitable suggestions have been made to enhance patient experience in ER.

ACKNOWLEDGEMENT

The dissertation/internship project, was a sort of experiential learning for me which gave me insights into the daily managerial level issues of this renowned hospital. I consider myself fortunate enough to interact with the highest authorities and staff of the hospital, who have encouraged and guided me with their support and patience.

First of all, I would like to thank **Mr. Subrata Das**, Director HR and training and **Dr. Vrajesh Shah**, Medical Superintendent, for providing me an opportunity to carry out my internship at **Eternal Heart Care Centre, Jaipur**

I want to express my gratitude and sincere thanks to **Mr. Saurabh Chauhan**, Manager, Clinical Operations & Quality Department, and **Dr. Kalpana Bindal**, Senior Quality Executive, for their constant support and invaluable time-to-time guidance and help in completion of this project.

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I would also like to thank all those who have directly or indirectly supported me towards the completion of this Internship.

Sincerely,
Rimjhim Jain
MBA-HM (2017-2019)
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LIST OF ABBREVIATIONS

ABBREVIATIONS	EXPANSION
CT	Computed Tomography
EHCC	Eternal Heart Care Centre
GDA	General Duty Assistant
IPD	In- Patient Department
MRI	Magnetic Resonance Imaging
OPD	Out- Patient Department
ER	Emergency Room
ALOS	Average Length of Stay
VSM	Value Stream Mapping
TAT	Turnaround time
TPA	Third Party Administration
UHID	Unique Hospital Identification Number

VALUE STREAM MAPPING OF EMERGENCY DEPARTMENT IN ETERNAL HEART CARE CENTRE, JAIPUR

An overview of the emergency department

The Emergency Department at EHCC provides round the clock emergency services to patients arriving at the facility without prior appointment; either on their own or by an ambulance.

It is easily accessible to patients owing to its strategic location on the ground floor closer to the main entry of the hospital.

The Emergency department or the ER here has a total of seven beds color coded according to the severity of the patient's condition.

- Three beds- yellow
- Two beds- red
- Two beds- green

A part of the emergency department is dedicated for day care patients who come for minor procedures like catheter removal and inpatients waiting for beds for surgeries. It has a total of four beds besides the seven beds for emergency patients. When the flow of patients increases, the day care area is converted to ER to provide emergency aid.

Location: Ground floor

Manpower:

- 3 doctors
- 19 nursing staff (required 28)
Morning: 5+1
Evening: 6
Night: 5
- General duty assistants (outsourced)
Morning: 6
Evening: 4
Night: 2
One GDA is dedicated to ambulance
- One ER coordinator
- One Emergency In charge
- One ER manager

Total equipment in ER

1. Patient Bed: 8
2. Patient stretcher: 5
3. Cardiac table: 9
4. Patient monitor: 9
5. Defibrillator: 3
6. Oxygen Cylinder trolley: 1
7. Oxygen cylinder: 8 (2 ER+ 4 ambulance+ 2 portables in ambulance)
8. Nebulization machine: 3
9. Syringe pump: 10
10. Weighing machine: 1
11. Portable IV stand: 3
12. Ventilator: 3
13. ECG machine: 1
14. Echo machine: 1
15. Stethoscope: 2
16. IV-line box: 9
17. Scale: 2
18. BP Cuff (paediatric): 3
19. BP instrument manual: 3
20. Battery cell: 8
21. Kidney tray steel: 4
22. Kidney tray plastic: 6
23. Crash cart: 1
24. Paediatric spo2 probe: 1
25. Trop-T machine: 2
26. Cervical collar adult: 3
27. Cervical collar paedia: 3
28. Electrical board: 1
29. Stapler: 2
30. Glucometer: 2
31. Hot water bag: 1
32. Keto strip: 1
33. Ambu bag: 7
34. Bain circuit: 7
35. Bipap mask M/V: 2
36. Bipap mask medium N/V: 2
37. Toomey syringe: 3
38. Asepto syringe: 3

39. Laryngoscope: 4
40. BP instrument electric: 1
41. Wheelchairs: 8

Total Files in Emergency

1. Ambulance cleaning checklist files of both ambulance (7660, 7458)
2. Ambulance patient monitoring form file
3. Clinical pathway order sheet of PTCA package
4. OPD triage file
5. Post sedation forms file
6. Intra department training file
7. List of approved abbreviations file
8. ER quality indicator file
9. Central line procedure checklist file
10. NSI forms file
11. CAUTI checklist file
12. ER primary consent file
13. ER handover and takeover forms
14. HIV consent forms file
15. IQC of glucometer file
16. MRI consent file
17. CT consent file
18. ER PTCA package consumable checklist
19. Nursing handover file
20. Ambulance inventory checklist of both ambulance (7660, 7458) file
21. PCPNDT form F file
22. Ambulance transfer consent form for both ambulance file
23. Dressing trolley checklist file
24. ER refrigerator temperature checklist file
25. Hygrometer checklist file
26. Ambulance medicine trolley checklist of both ambulance (7660, 7458) file
27. Housekeeping department cleaning checklist file
28. Emergency consent form for DSA file
29. Oxygen cylinders checklist file
30. Crash cart checklist file
31. Intubation trolley checklist file
32. Paediatrics Intubation Trolley checklist file
33. Ambulances oxygen cylinder checklist file
34. Medicine trolley I checklist file
35. Medicine trolley II checklist file
36. Performance tracking form file
37. Consent for TPI file
38. Consent for CAG file

- 39. Consent for EPS + RFA file
- 40. Consent for TAVI file

Total registers in emergency

- 1. Vaccination registers
 - (a) TT, Hepatitis (Housekeeping GDA+ Nursing GDA)
 - (b) Hepatitis (Doctors, Nursing & non-medical)
 - (c) TT (Doctors, Nursing & non-medical)
 - (d) H1N1 (common for all)
- 2. CSSD Register
- 3. Daily checklist register
- 4. Death register
- 5. Oxygen cylinders register
- 6. Bio-medical equipment complaint register
- 7. ER ETO & CSSD item register
- 8. Ambulance movement register
- 9. ER MRD register
- 10. ER Lab register
- 11. Trop-T register
- 12. ER critical value register
- 13. Master register
- 14. ER Transfer out register
- 15. ER indent register
- 16. ER radiology register

ER Process flow

- Patient comes to the ER department either by himself or by ambulance.
- The GDA and the nursing staff go outside to receive the patient and take him/her in, shifting him/her on the appropriate bed.
- Primary assessment is performed by the nursing staff (vitals are taken and nursing triage assessment form is filled).
- ER doctor does the assessment and the patient is immediately given treatment as per his/her need.
- Assessment done by the ER team, which includes nurses and doctors, together constitutes the initial assessment.
- Non-emergency patients who come to the ER and require consultation only are referred to the OPD.
- Emergency patients are then registered as per the registration process and investigations are ordered, if necessary, and the patient is kept under observation.
- For registration, the patient or his/her attendant has to go to the central reception.

- Based on the assessment, doctor decides as to which diagnostic tests are to be conducted for screening.
- Based on the results of the investigations, ER doctor decides whether referrals are needed to be made to specialities for further course of treatment or the patient can be discharged/ transferred out.
- The ER doctor, as per his provisional diagnosis, informs the concerned consultant chosen by the patient. If the patient does not come with a choice of consultant, then the ER doctor gets the ER module started under EHCC consultant and informs the concerned consultant according to his/her own judgement of the patient's condition.
- Patient coming to ER with a specific doctor's name shall be admitted under that doctor irrespective of his presenting complaint.
- Patient with an apparent cardiac problem, after evaluation, shall be directly admitted under Cardiologist of that particular day through cardiac helpline.
- Walk-in patient without having any reference of a particular consultant or with a non-cardiac complaint shall be examined by the ER resident, who will first consult the physician of the day and accordingly will admit the patient.
- The doctor after examining the patient either advises Admission or Discharge.
- If the patient agrees for admission then admission is given if bed is available but if bed is not available then patient is made to wait in ER.
- The admission form is filled and the required information is forwarded to the central reception. The personnel at the reception shall complete the admission process on priority basis and the patient shall be transported from the ER to the assigned bed.
- Patient privacy and confidentiality has to be respected at all times.
- A patient can be kept under observation in ER for not more than four hours within which a decision has to be taken for admission or discharge based on the patient's condition.
- If the patient disagrees for admission then he/she, after being given primary treatment, is asked to fill the LAMA (Leave Against Medical Advice) form and the patient goes away.

General observations:

- The staff of ER is polite and responsive in dealing with the sick patients and is always ready to help the patients.
- Efforts were consistently made to improve the process with a dedicated ER coordinator to get the patients shifted out of ER (either IPD or Discharge) within the stipulated time.
- Regular audits are conducted by quality department to maintain the standards of services being provided by the ER department.
- The pneumatic chute, though in place, is not used to transfer samples to the laboratory.
- The length of stay of many patients is more than the benchmark of 4 hours due to unavailability of beds.
- Files are maintained properly and registers are devoid of any incomplete information.
- Insufficient waiting area outside the department.
- Improper signage for OPD outside the hospital leading to unnecessary chaos in the ER.

- Insufficient number of guards during a single shift to cater to the flow of patients and their attendants.
- Communication gaps both inter-departmental and intra-departmental.
- No separate admission & billing counter in ER even though there is space for it. The attendant has to go to the central reception for admission and billing increasing chaos and time taken for patient treatment.
- More than often GDAs are not available when needed.
- ER doctors are hesitant in filling lengthy triage forms.
- No fall risk signage used or used very rarely.
- Bed managers are mostly unaware about the status of availability of beds. The ER coordinator has to directly call the authorized person in the patient destination to find out if bed is available.
- The F&B department does not come to collect used dishes on time. Frequent calls have to be made. Same is the case with the laundry & linen department.
- Even OPD patients come to ER as consultant sends them to start the necessary tests to be done before a surgery. The reason again is unavailability of beds due to high occupancy.
- Many times, it is observed that the nursing staff doesn't receive the patients and only GDAs are sent.
- Training should be rigorous to improve the soft skills of the ER staff. It is also observed that they do not listen to patients who constantly ask for something.
- Female nursing staff seen with long nails.
- No single person authorized to receive phone calls. This leads to confusion and miscommunication.
- Beds are not available due to high occupancy and slow discharges.
- Some consultants come very late to see the patient.

Introduction to the Project:

- Value Stream Mapping is a very powerful lean tool, if used properly.
- Value is something that the customer is willing to pay for and is determined by time, price and quality.
- A stream is developed by the flow of material and information from origin to consumption. This flow of information and material creates value for the customer.
- Mapping this stream of value is called Value Stream Mapping colloquially known as VSM. It helps figure out waste, reduce process time and put into use other process enhancement activities.
- The entire VSM activity is divided into two phases.
 - 1) **Current state:** the 'as is' process.
 - 2) **Future state:** the 'ideal' process.
- The Emergency department can be considered as the face of the hospital as it is the first contact point between a patient and the hospital when the former is in distress.
- A smooth process from receiving the patient to transferring him/her out of ER is crucial to instill a sense of trust in the patients regarding the quality of services provided by the hospital organization.

- Value Stream Mapping of the ER process helps in identifying waste steps in the patient care process in an attempt to eliminate them, thereby reducing unnecessary patient waiting times.
- Eternal hospital has a heavy footfall of patients both in OPD as well as Emergency. So, it becomes all the more difficult to manage patients in ER where patients come for immediate attention. In such a situation, every second counts and any delay on the part of care providers can be detrimental to the health of the patients.
- Value Stream Mapping appears as an essential tool to decrease waiting times and increase patient satisfaction with the quality of services being offered to them. Mapping the 'as is' state helps in identifying non-value creating processes which can then be removed to reach an 'ideal state' of functioning of the Emergency department.

Quality indicators for ER

1. Time for initial assessment of emergency patients

- **Definition:** Initial assessment is the evaluation of the health condition of a patient by undertaking a physical examination following a health history. The time shall begin from the time the patient has arrived till the time that the initial assessment has been completed.
- **Benchmark:** 15 min

2. Length of stay in emergency

- **Definition:** Duration for which a patient stays in ER during a particular time period.
- **Benchmark:** 4hrs

Aim & Objectives:

The study aims at removing non-value adding processes from the cycle of patient care in ER with the following objectives.

- To understand the process cycle of the Emergency department
- To calculate the Average Length of Stay (LOS) and the initial assessment time of patients in ER.
- To calculate the time in which consultant responds to calls from ER.
- To figure out the reasons for delay in shifting the patient.
- To provide some suggestions to enhance the process cycle of ER.

Literature Review:

Hospitals worldwide are giving a growing emphasis to the application of lean concepts in the healthcare sector, commonly known as 'lean healthcare'. A fundamental tool that allows such implementations is the value stream mapping (VSM). The problem is that VSM models used in implementations of lean healthcare are simple adaptations of the original VSM model, which was initially directed towards manufacturing and may not always represent important support activities for the patient flow that directly impact treatment time. (1)

With increasing financial pressures, high service demand and target pressures, Lean offers a potential approach to maintaining a high-quality efficient clinical service for patients and staff. Using Value Stream mapping, a tool originally developed for manufacturing, we identified over 300 instances of waste and potential improvements in processes within the major area of our department. This work allowed us to reduce the time to initial assessment and has highlighted a number of projects that are now being taken forward with directorate backing. With the support of healthcare leaders and managers who embrace the Lean philosophy, Lean Thinking offers huge potential for identifying waste and Value Streams leading to improvements in quality of care in the emergency department. (2)

To understand where wastes (non-value activity when patients were mainly waiting) were occurring, wastes were attributed to key time frames in the patient pathway. The key time points chosen were:

- waits after the patient arrived but before being assessed by a doctor
- waits after assessment by a doctor but before a final admission decision
- waits after a final admission decision but before the patient left the department or was admitted to a ward.

Long waits for beds could have reflected high bed occupancy, slower turnaround or poor communication. Waits for tests or their results could have reflected differences in staffing, ability to move patients between different areas, proximity of X-ray departments, laboratory staffing and speed of diagnostic tests, or the information technology systems used to communicate results. The prominence of staff availability as a factor at one site suggests that waste time may have increased with workload, indicating reduced efficiency.

It is also possible that differences in waiting times may result from deliberate planned decisions about resource allocation. One explanation is that this could indicate a lack of sharing of best practice and innovations that could reduce waits. Sharing insights and best practice could reduce waits in different areas for all patients, thereby reducing waiting times and journey times overall, in all hospitals. For example, hospitals with longer waits for assessment or for discharge might benefit from adopting specific practices associated

with shorter waits. Sharing of ideas and practice, promoting a best-practice model of care, could reduce waiting and journey times and enhance patient experience.

There were no substantial differences between the sites in the ratio of waste to value, and patients were waiting in the ED for nearly half of the time. Although value-adding activities could have been occurring behind the scenes, during waiting periods, this value ratio may give some indication of patient experience. However, there were significant differences in types of waits at the four sites. The project's PPI group felt that some waits were more acceptable than others: waiting for triage and assessment could be experienced as less acceptable than subsequent waiting for test results. Waiting for first assessments was more adverse because the patient was not yet in the system and treatment could not commence. In contrast, waiting for test results could be more understandable, and patients were more amenable to waiting at this stage.

The majority of patient admissions or discharges occurred close to the 4-hour target, suggesting that this target strongly influenced decision-making at all four sites. However, the 4-hour target may also have hastened some admissions that were avoidable.

Earlier senior involvement in decision-making had a weak but significant association with reduced patient journey time

Waste and value were very similar at each site, but the sites contrasted in the stages where waste occurred. Sites where single-entry points predominated tended to have longer pre-assessment waits. Time spent awaiting test results or hospital beds also signified important sources of waste at some sites. Patients who were admitted had greater waste time than those discharged. Time waiting to leave the department after a decision to discharge also varied considerably between the four sites. These differences may also be associated with significant differences in staffing costs. The VSM study insights indicate several areas where performance could potentially be improved and ways to improve patient experience at these sites. (3)

Rationale:

- The given study aims to design a value stream mapping of the department of emergency to map the 'as is' state and the 'ideal state' of the processes. A detailed comparison will help in determining the non-value adding processes which can then be eliminated. The study will help in removing or minimizing deficiencies and further improve the way the department functions.

Research Questions:

- What is the averagetime taken to shift a patient from the emergency department to IPD/Discharge at EHCC Jaipur?

- What is the average time taken within which the initial assessment of a patient is completed?
- How much average time do consultants take to examine patients after receiving a call from ER.
- What could be the reasons for delays?

Methodology:

- The study is a Cross-sectional one.
- Emergency department of EHCC was the location for the conducted study.
- The study was undertaken during 12th February 2019 – 15th April 2019.
- The participants of the study were-
 - ✓ Patients
 - ✓ Nursing staff
 - ✓ ER doctors
 - ✓ Consultants

Study tools:

A checklist was developed to observe the patient time spent in the Emergency Room. The components of the checklist were as follows:

- Name of the patient
 - Unique Hospital Identification Number
 - Arrival Time (t1)
 - Nursing assessment time
 - ER doctor assessment time
 - Initial assessment time
 - Time at which ER doctor calls the concerned consultant/senior doctor
 - Time of arrival of the consultant/senior doctor
 - Name of the consultant/senior doctor
 - Consultant response time
 - Time of shifting out of the patient (t2)
 - Location where the patient is shifted to
 - Length of stay
 - Remarks
- The checklist was used to monitor patient time for two months which was then analysed at the end of the said period to find out the LOS, initial assessment time and the reasons for the delay in both.

Sampling and sample size:

- Purposive Sampling
- Sample size: 349 patients

Exclusion and Inclusion Criteria:

- Only the patients coming between 9:00 a.m. till 3:00 p.m. were considered for the study. Patients coming before and after the given time were not considered as part of the study.
- Both Emergency as well as emergency patients in Day Care were included as part of the study.
- Patients in day care waiting for beds were not included.
- Patients for minor procedures like catheter removal, drip or injection were not a part of the study.
- Patients found dead on arrival were not included.
- Code Blue patients who died after arrival were included.

Data collection methods:**Primary data:**

- Time motion study
- Direct Observation

Secondary data:

- HIS- Panacea
- Patient Files & ER Registers
- MRD
- Conversation with the ER department staff
- Conversation with the patients

Data collection tools:

- A flow diagram with the aim of achieving clarity of understanding of how a process works will be drawn. The start and the stop points of the process with listing of the activities in between will be done which will give a clear idea of all the activities undertaken.
- Time motion study will be done to calculate the ALOS of patients in the ER, average initial assessment time of patients; time gap between informing the consultant and his arrival will be calculated.
- Live observation for understanding the daily activities of the department and flow of the patients and information.

Data analysis:

- Data will be taken using a checklist and length of stay of patients, initial assessment time of patients; time gap between informing the consultant and his arrival will be calculated.
- Charts and graphs will be used for documentation and dissemination of the data, to gain a clear and better understanding.

Operational definitions:

- **Length of Stay:** Duration for which a patient stays in ER during a particular time period.
- **Initial assessment:** Initial assessment is the evaluation of the health status of a patient by performing a physical examination after taking a health history. The time shall begin from the time the patient has arrived till the time that the initial assessment has been completed.
- **Time of arrival (t1):** Time when the patient comes to the ER for immediate care.
- **Time of report (t2):** Time when the patient is shifted out of the ER either as an IPD patient for further course of treatment or is discharged after primary treatment.
- **Length of stay:** $t_2 - t_1$

RESULTS:

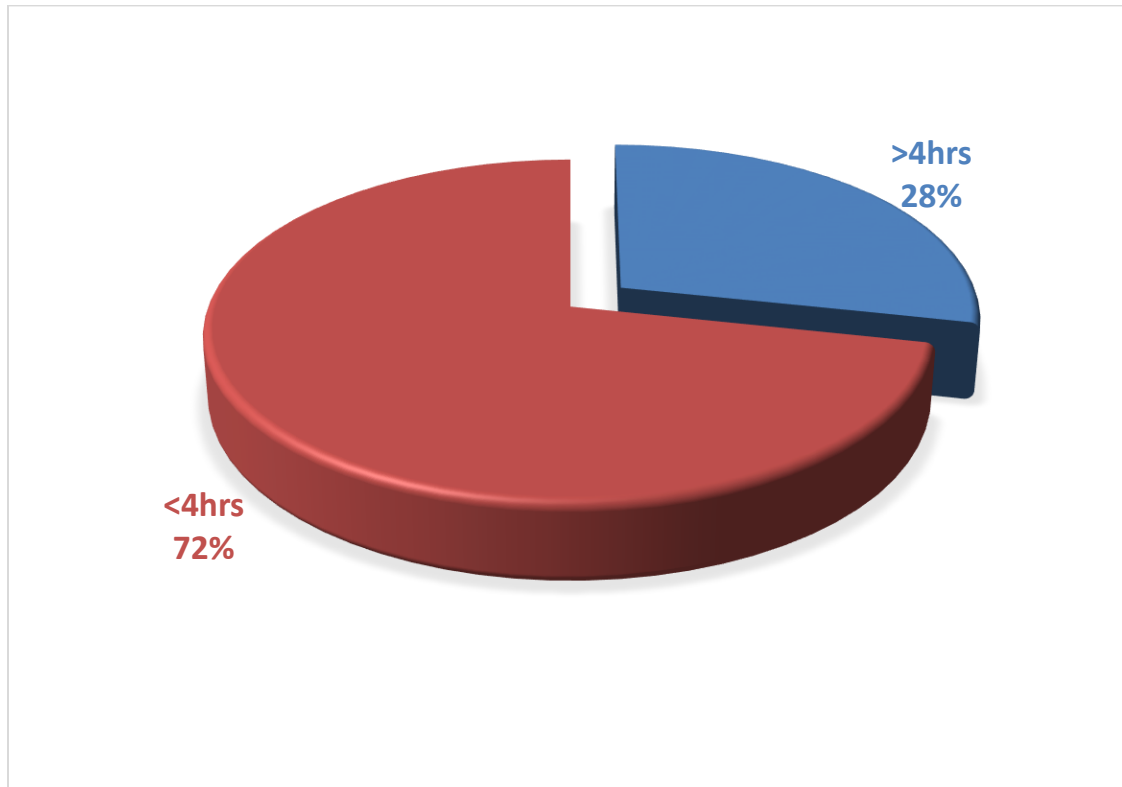


Fig 1: Percentage of patients staying for more than 4 hours & less than 4 hours in ER

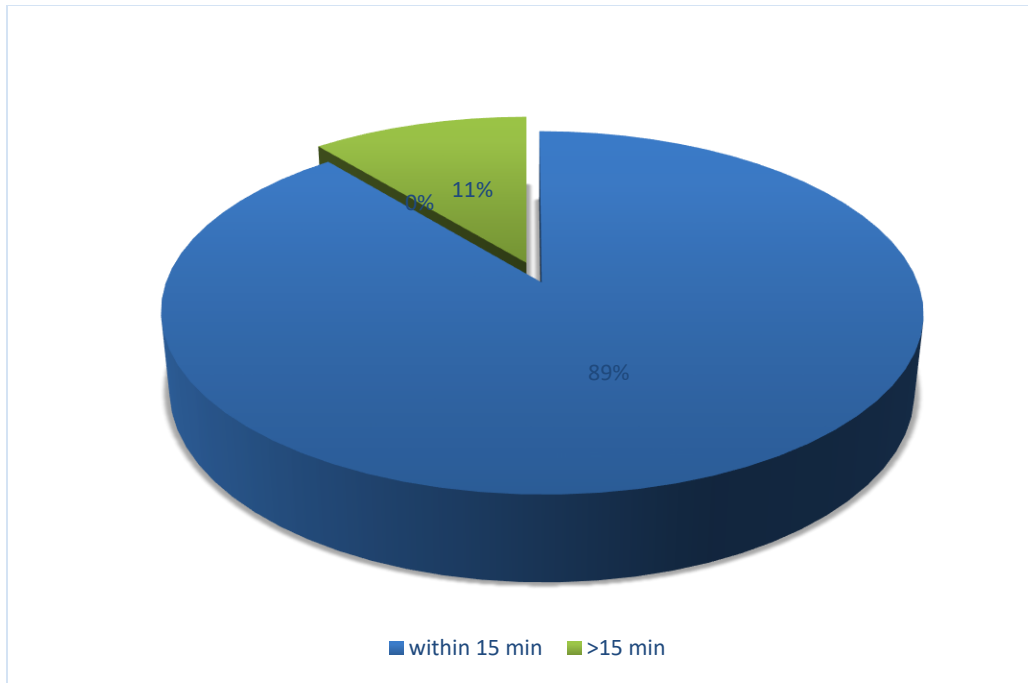


Fig 2: Percentage of patients getting initial assessment within first 15 minutes of arrival

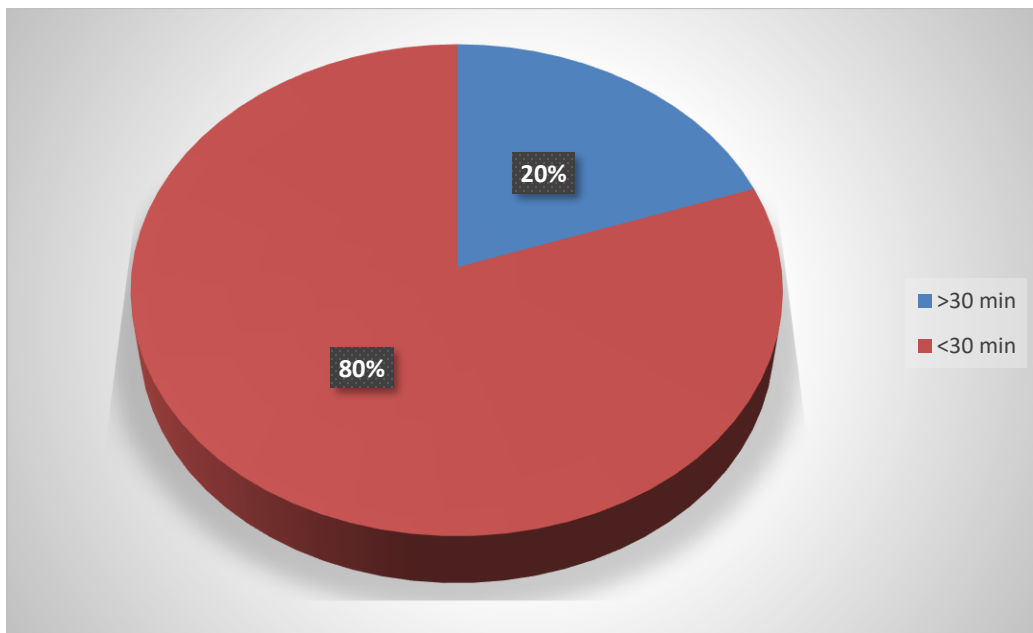
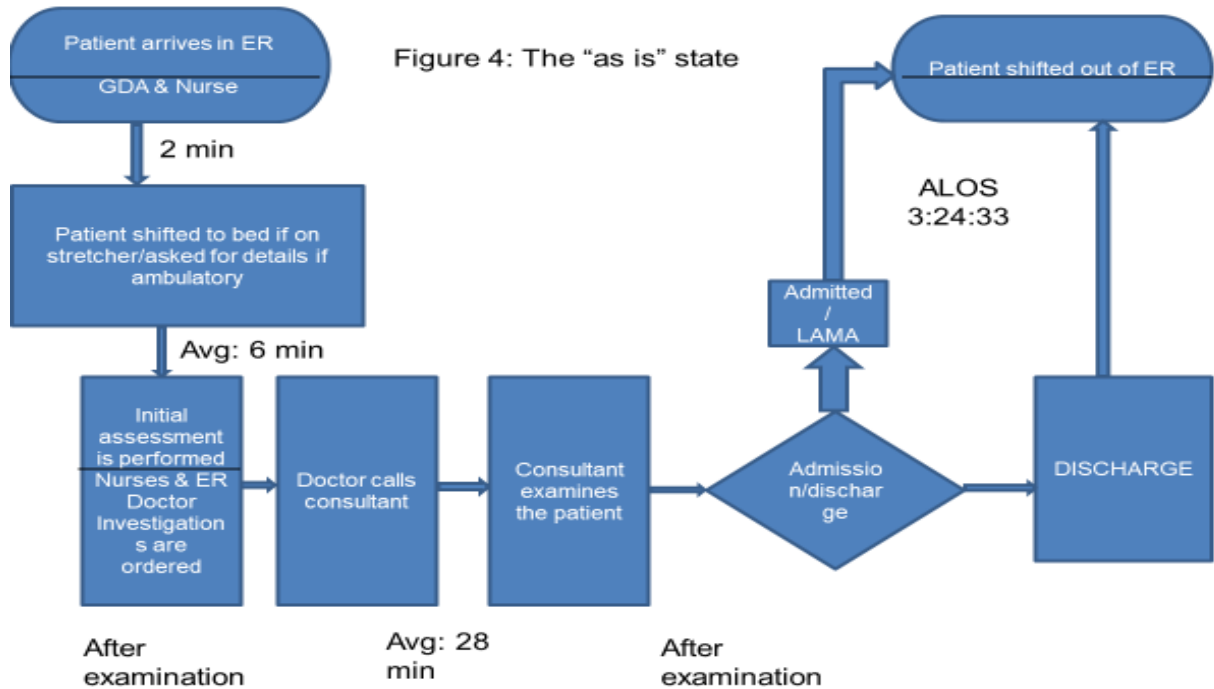


Fig 3: Percentage of patients who got examined by consultant 30 minutes after being called by ER doctor



Value stream map of the "As is" state

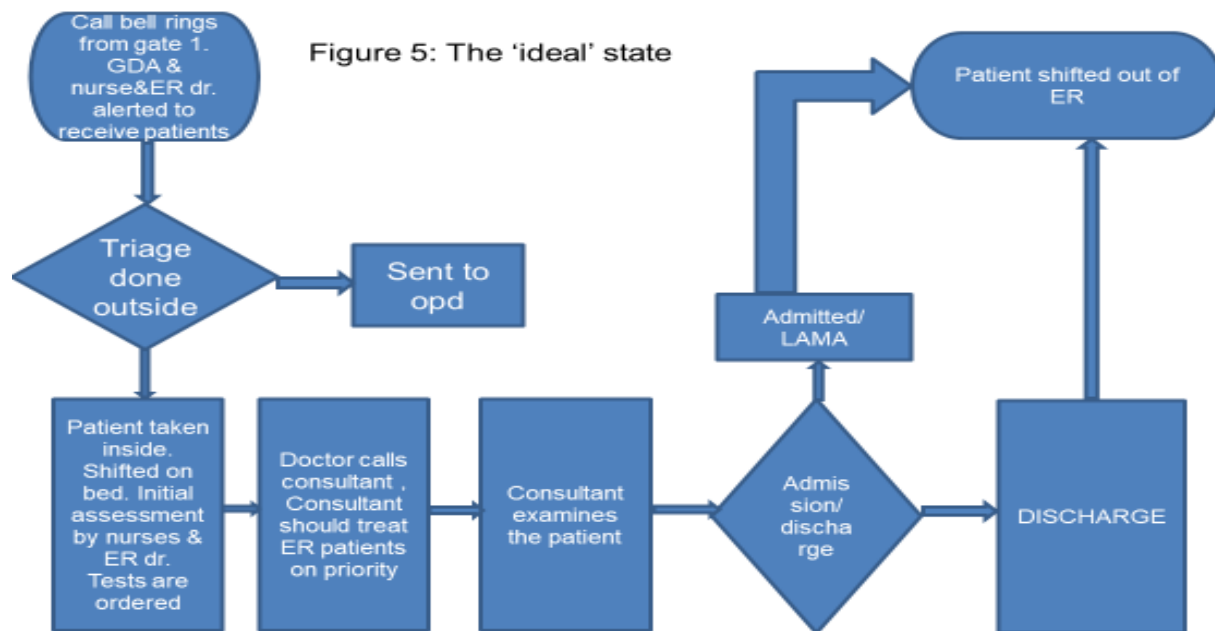
The activities that cause delay are:

- GDA's not available to receive the patients. Nurses shift responsibility of receiving patients.
- Many times, it happens that patients are shifted on the bed and after initial assessment ER doctor finds out that it is an OPD patient.
- Consultant takes time to come down to the ER.
- For admission & billing attendant has to go to the central reception.
- Radiology results are delayed.
- Time is consumed in sending samples manually.
- Beds not available to shift the patient.

Interpretation:

1. The average time consumed in initial assessment of the patient comes out to be 6.78 minutes which is well below the benchmark of 15 minutes specified by Eternal Hospital.
2. 89% of the patients received initial assessment within first 15 minutes of arrival. The reason for 11% patients not receiving it within 15 minutes could be due to ER doctors being busy with a more serious patient.
3. Some consultants have to be called again and again before they finally come.
4. On an average, a consultant took 28 minutes to respond to the emergency patient after a call has been made to them by the ER doctor.
5. Out of a sample of 349 patients, 28% of the patients remained in the ER for more than 4 hours, some extending to even 15 hours.
6. Though the % is small, efforts should be made to reduce it to zero so that ER staff is able to intake more patients and the process of patient care continues without any delays.

Value Stream Map:



Value stream map of the “ideal” state

The activities that can minimize delays are:

- A call bell at gate no. 1. The guard can use it to alert the staff inside ER about the arrival of an ER patient.
- ER reception should be there for billing & admission.
- Triage should be done outside so that OPD patients are sent to OPD from outside only.
- Radiology department should treat ER patients on priority.
- Blood samples can be sent via pneumatic chute.
- TAT should be there for consultants too except for when they are in OT. (or they can send their doctors if they are busy)
- Discharge process should be hastened. This causes major delays in patient shifting.

Discussion:

- Of total 349 patients, 72% did not stay for more than 4 hours in ER while the stay was delayed for 28% of them. The major reason for delay is non-availability of beds in IPD.
- Some doctors took a long time to visit the patient in ER due to other preoccupations.
- The initial assessment time for ER doctors in some cases was found to be more than 15 minutes. This can be because the doctor was busy with a more serious patient.
- Other reason for delay were:
 - ✓ The pneumatic chute, though in place, is not used to transfer samples.
 - ✓ Shortage of waiting area outside the department creates chaos inside ER as attendants tend to barge in.
 - ✓ No proper signage for OPD outside the hospital leading to unnecessary chaos in the ER.
 - ✓ Insufficient number of guards during a single shift to cater to the flow of patients and their attendants.
 - ✓ Shortage of ER doctors.
 - ✓ Communication gaps inter-departmental and intra-departmental.
 - ✓ No separate admission & billing counter in ER even though there is space for it. The attendant has to go to the central reception for admission and billing increasing chaos and time taken for patient treatment.
 - ✓ More than often GDAs are not available when needed.
 - ✓ ER doctors are hesitant in filling lengthy triage forms.
 - ✓ No fall risk signage used or used very rarely.
 - ✓ Bed managers are mostly unaware about the status of availability of beds. The ER coordinator has to directly call the authorized person in the patient destination to find out if bed is available.

- ✓ The F&B department does not come to deliver patient food or to collect used dishes on time. Frequent calls have to be made. Same is the case with the laundry & linen department.
- ✓ Even OPD patients come to ER as consultant sends them to start the necessary tests to be done before a surgery. The reason again is unavailability of beds. This creates shortage of beds in ER for actual patients.
- ✓ Many times, it is observed that the nursing staff doesn't receive the patients and only GDAs are sent who are unaware of the medical needs of a patient.
- ✓ Patients come to ER and get treatment but after getting financial counselling they refuse to get admitted. Financial constraint is a major reason behind patients taking LAMA.
- ✓ Waiting for diagnostic test results delays the decision-making process of ER doctors.
- ✓ Too many files and registers have to be maintained. A number of forms have to be filled.
- ✓ Due to unavailability of proper waiting area for attendants, they have to find a place to sit somewhere else but when they are needed for shifting the patient, it is difficult to find them.

Conclusion:

- The staff of ER is responsive and courteous in dealing with the patients and is always ready to lend a helping hand.
- Efforts are constantly made to improve the cycle with a dedicated ER coordinator to get the patients shifted out of ER (either IPD or Discharge) within the stipulated time.
- Regular audits are conducted by quality department to maintain the standards of services being provided by the ER department.
- Files are maintained properly and registers are devoid of any incomplete information.
- Further changes in patient care can improve the process and can reduce the delay in the ER process cycle.
- This will improve the overall patient experience coming to the department and will smoothen up the process as well.

Suggestions:

- Training should be rigorous to improve the soft skills of the ER staff. It is observed that they do not listen to patients who constantly ask for something.
- All female staff should not be allowed to grow their nails to maintain hygiene during patient care.
- Only one person should be authorized to receive calls at the first instance to avoid miscommunication.
- The availability of beds is heavily dependent upon the smoothening of the discharge process. Turn Around Time of 4 hours for cash patients and 6 hours for TPA patients should be maintained.
- Manpower should be increased according to the footfall of patients.
- Frequent audits should be conducted to check for delays and find the areas that need improvement.

- ER patients should be given priority in imaging services.
- Pneumatic chute must be used to transfer samples.
- GDAs do not come on time and leave early. Signatures should be made compulsory and should be allowed to sign only when the next GDAs arrive.
- A separate admissions & billing counter should be made inside the ER.
- A call bell should be installed at gate number 1. The guard can press the bell in case of an emergency patient so that the staff is alerted and comes outside immediately to receive the patient. Relatives will be satisfied.
- Demarcation for car parking should be there so that there is enough space for the patient to get down.
- A guide or guard should stand outside to guide the cars coming with emergency patients.
- Other vehicles should not be allowed to use the path leading to ER.
- Triage should be done at the entrance gate that whether the patient is an emergency patient or an OPD patient.
- One oxygen cylinder should be present outside.
- One small oxygen cylinder should be there on one wheelchair too.
- Nursing & doctor triage form should always be present on every cardiac table so that they don't look for it when the patient arrives.
- Waiting area should be there for attendants so that they do not go far away to find a place and can be easily called when needed.
- Financial counselling should be done while the patient is being given primary treatment. Validity of TPA card or Bhamashah card should be clarified in the beginning itself.
- Proper signage for OPD should be there at gate no. 1, as most people enter the hospital through this gate only.
- Doctor duty room and store in ER should be interchanged to avoid delays.
- The hospital should consider opening up satellite centers to cater to far away areas.
- ER department should prepare itself for the newly launched Certification Standards for Emergency Department in Hospitals

APPENDIX

Checklist for time-motion study in emergency department

Part 1: Patient Information

1. Name of the patient
2. Unique Hospital Identification Number

Part 2: Patient assessment process time

- Arrival Time (t1)
- Nursing assessment time
- ER doctor assessment time
- Initial assessment time
- Time at which ER doctor calls the concerned consultant/senior doctor
- Time of arrival of the consultant/senior doctor
- Name of the consultant/senior doctor
- Consultant response time

Part 3: Efficiency information

- Time of shifting out of the patient (t2)
- Location where the patient is shifted to
- Length of stay

Part 4: Remarks, if any.

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