

Study on Compliance to Quality Indicators in Accident and Emergency Department at a Multispecialty Hospital

By

Harpreet Saini

*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 MAY CONCERN

This is to certify that Dr. Harpreet Saini, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone dissertation at The Mission Hospital, Durgapur from February 6, 2019 to April 30, 2019.

The candidate has successfully carried out the study designated to her during dissertation and her approach to the study has been sincere, scientific and analytical.

The dissertation is in fulfilment of the course requirements.

I wish her all the success in her future endeavours.

A handwritten signature in blue ink, appearing to read 'Ashok Kaushik'.

Col. (Dr) Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

15 May 2019

A handwritten signature in blue ink, appearing to read 'Neetu Purohit'.

Dr. Neetu Purohit
Associate Professor
The IIHMR University, Jaipur



Ref: TMH/HRD/OG/April/19/86

Date: 01/05/19

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Harpreet Saini** has done three months dissertation on **A Study on Compliance to Quality Indicators in Accident & Emergency Department at Multispecialty Hospital at The Mission Hospital, Durgapur, West Bengal** from 04/02/2019 to 30/04/2019.

During the period of dissertation **Dr. Harpreet Saini** has been found sincere, hard working having an attitude to learn.

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

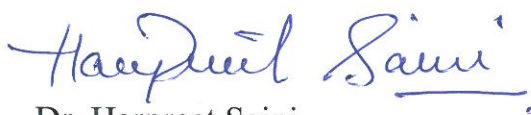
For The Mission Hospital, Durgapur

Ramesh Lall
Sr. General Manager - HR

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "**A study on Compliance to Quality Indicators in Accident and Emergency Department at a Multispecialty Hospital**" and submitted by **Dr. Harpreet Saini** , Enrolment No. - 0570 under the supervision of Dr. Neetu Purohit for award of MBA in Hospital and Health Management of the University carried out during the period from February 6,2019 to April 30,2019 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.



Dr. Harpreet Saini

THE IIMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify all ethical issues have been considered while collecting data for my dissertation titled **A study on Compliance to Quality Indicators in Accident and Emergency Department at a Multispecialty Hospital.**

A handwritten signature in blue ink, reading "Harpreet Sami". The signature is fluid and cursive, with a horizontal line underlining the name "Sami".

Signature of student

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The opportunity provided to do dissertation at The Mission Hospital, Durgapur was an enriching and valuable experience. I am highly obliged to have met so many experienced professionals who led me throughout my study period. I am sincerely grateful to them for sharing their truthful and illuminating views on several issues related to the project.

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I recognize this opportunity as a big milestone in the development of my career. I will strive to use the knowledge and skills gained in the best possible way.

Lastly, I want to express my respects and love to my parents, my siblings and my friend Dr. Manikbir Singh for constant encouragement and motivation in my higher studies.

Sincerely,

Dr. Harpreet Saini

TABLE OF CONTENT

A study on Compliance to Quality Indicators in Accident and Emergency Department at a Multispecialty Hospital

CHAPTERS	PAGE No.
1. INTRODUCTION	7
2. REVIEW OF LITERATURE	9
3. RESEARCH QUESTION	12
4. OBJECTIVES	12
5. RESEARCH METHODOLOGY	12
6. DATA ANALYSIS AND INTERPRETATION	14
7. RESEARCH FINDINGS	22
8. RECOMMENDATIONS	27
9. CONCLUSION	27
10. ANNEXURES	28
11. BIBLIOGRAPHY	30

ABBREVIATIONS

ED	Emergency Department
ADCC	Admission Disposition to Critical Care
ADW	Admission Disposition to Ward
CTVS	Cardio Thoracic Vascular Surgery
DEA	Death Disposition
DIS	Discharge Disposition
ED	Emergency Department
ED LOS	Emergency Department Length of Stay
GDA	Group-D Assistant
ICU	Intensive Care Unit
ICCU	Intensive Coronary Care Unit
LAMA	Left against Medical Advice
LWBS	Left Without Being Seen
LOS	Length of Stay
MRD	Medical Records Department
NABH	National Accreditation Board for Hospital & Healthcare Providers
OPD	Out-Patient Department
PDCA	Plan-Do-Check-Act
RTA	Road Traffic Accident
TAT	Turn around Time
TQM	Total Quality Management
TMH	The Mission Hospital
WHO	World Health Organization

LIST OF FIGURES

Fig. 1 - Overview of The Mission Hospital, Durgapur

Fig. 2 - Layout of Accident & Emergency Department, The Mission Hospital, Durgapur.

Fig. 3 - Organogram of Emergency Department, The Mission Hospital, Durgapur.

Fig. 4 - Graph of Average Length of Stay in ED

Fig. 5 - Graph of Length of Stay in ED

Fig. 6 - Graph of Time taken for initial assessment

Fig. 7 - Graph of average time taken for initial assessment

Fig. 8 - Graph of ED Conversion

Fig. 9 - Graph of ED LAMAs

Fig. 10 - Graph of ED Death

Fig. 11 - Graph of average call response Time

Fig. 12 - Graph of Ambulance Response Time

Fig. 13 - Graph of GAP Analysis in ED Process Flow

LIST OF TABLES

Table no. 1 – ED conversion

Table no. 2 – Length of stay in ED

Table no. 3 – Time taken to start initial assessment

Table no. 4 – Ambulance Call Response Time

Table no. 5 – Gap Analysis in ED Process Flow

Table no. 6 – Turnaround time sheet

Table no. 7 – Quality indicators sheet

Table no. 8 – Gap analysis form

Table no. 9 – Ambulance call response sheet

1. INTRODUCTION

According to WHO “hospitals complement and amplify the effectiveness of many other parts of the health system, providing continuous availability of services for acute and complex conditions. Hospitals concentrate scarce resources within well planned referral networks to respond efficiently to population health needs. They are an essential element of universal health coverage and will be critical to meeting the Sustainable Development Goals.” [1]

Multispecialty hospital (multi = many) means the hospital which provides different services of varied number of medical specialties; like General Medicine, ENT, Ophthalmology, Cardiology, Pulmonology, Nephrology, etc. A hospital provides various services starting from medical care of patients in outpatient and inpatient services, prevention, diagnostic service, therapeutic, accident and emergency services, Rehabilitation services, education and research service. [2-4]

Emergency department (ED) plays an important role in hospital and health care system. ED serves as a primary diagnostic centre in the hospital and is responsible for more than half of the admissions in the hospital. Quality improvement and maintaining the standard is now of outmost importance in Emergency Department (ED) and emergency team to provide patient-centric care and improved patient satisfaction. In every segment of the society people always want early treatment for their disease. They don't want to wait. People are always impatient. Even after the name “patient” defines itself “persons who are in patience” has little patience in themselves.

Problems faced by ED include overcrowding, exit block which leads to increased length of stay of the patient and thereby resulting in dissatisfaction of the patient. For efficient working of the emergency department and patient satisfaction the key quality indicators which should be taken care of are as follow: -

- Time taken for initial assessment of emergency patient and outliers (1 min as per organization's standard)
- Length of stay in ED (less than 1 hour)
- Patients returning to emergency within 72 hours with similar complaints
- Incidence of medication errors, adverse drug reactions
- Patients receiving high risk medicines and developing adverse drug reaction
- Transfusion reaction
- Near miss events
- Incidence of patient falls
- Non-compliance observed related to infection control practices
- Procedure complication rate
- Documentation completeness rate
- ED conversion
- Number of ED LAMA cases

- Number of ED deaths
- Ambulance response time (less than 10 min)

Non-compliance of quality and clinical indicators in emergency department causes problems for patients and staff, including increased waiting times, increased ambulance diversion, increased length of stay, increased medical errors, increased patient mortality, and increased harm to hospitals due to financial losses.

To see the efficiency and preparedness of the emergency department compliance of selected indicators will be assessed. Only those key performance indicators will be taken whose data will be complete and will be able to collect on the daily basis under direct observation.

- Time taken for initial assessment of emergency patient and outliers (1 min as per organization's standard)
- Length of stay in ED (less than 1 hour as per organization's target)
- Patients returning to emergency within 72 hours with similar complaints
- Incidents in ED
- Patient left ED without being seen.
- ED conversion
- Number of ED LAMA cases
- Number of ED deaths
- Ambulance response time (less than 10 min)

This study will help in finding the gaps and correct the gaps leading to the increased turnaround time which is more than 1 hour in ED as per hospital protocol and non-compliance of the quality indicators so that the corrective and preventive measures can be taken to smoothen and re-engineer the process flow in the emergency department. The study will also help in decreasing length of stay in the ED to less than 4 hours. So that the hospital can provide patient centric care and follow the standards set according to the NABH guidelines.

2. REVIEW OF LITERATURE

Defining good quality ED care has vexed clinicians, academics, managers and regulators for many years. In the UK, ED care has been measured using time-based metrics, including the 4-hour access standard. While these are easy to measure, they only represent one facet of quality. The US Institute of Medicine defines quality as having six domains; safe, effective, timely, efficient, equitable and people centered. [5]

Emergency leaders are increasingly faced with challenges that go beyond the scope of traditional clinical medicine and department staffing. A thorough understanding of quality improvement principles and benchmarking is now necessary for Emergency Department (ED) leaders to be successful in providing patient centered care, improving customer satisfaction and evaluating service initiatives. Correctly treating emergent complaints is no longer the only focus, and emergency physicians are now being asked to also provide safe, timely, efficient and cost-effective care. [6]

Key performance indicators cover all clinical as well as quality indicators and they are as follow:

- Patients seen and discharged within X hours (hospital to determine their standard)
- Patients admitted from ED
- Time to treatment
- Patient satisfaction
- Standard of care treatment
- Correct diagnosis
- ED occupancy/crowding
- Time to treatment
- ED LOS (length of stay)/wait
- ED returns
- Left without Being Seen
- Time to diagnosis
- Effectiveness
- Mortality
- Time to pain management
- Rate of complaints
- Provider satisfaction
- Waiting time
- Time diagnostics to treatment
- Time to diagnosis
- Patient participation in own care
- Satisfaction: pain control Satisfaction: hygiene
- Triage vs. time to see provider
- Staff safety [6-7]

It is crucial to develop key performance indicators that are measurable and in the same time beneficial to performance management and improvement. These must be comprehensive; covering all phases and components of ER; from arrival till discharge or admission, including other supportive services. Hospitals and ER departments might be able to measure many indicators, but they might not be able to realize their strategic and/or operational value or even to utilize them to the maximum. It is recommended that further research and studies investigate how such KPIs can control and reflect the improvement of performance along different dimensions, such as safety, effectiveness, efficiency, patient centeredness, timeliness, and equity, which are the six main domains of healthcare and performance quality identified by the institute of medicine. [7]

Emergency department (ED) mean length of stay (LOS) per patient measured from the patient's arrival to departure has been promoted as a surrogate indicator of crowding in the absence of a standard or universal definition. It is also frequently considered a key process indicator for performance improvement and clinical and operational efficiency. From the patient's perspective, total LOS and long wait times to see a physician or for test results create the sense that the ED is busy and crowded [9]

EDs with respect to length of stay targets of 4 hours for patients discharged to home, transferred to another hospital, or admitted to observation and 8 hours for those admitted to an inpatient bed. [10]

According to NABH chapter no 1 (patient centric Access), Assessment and Information (AAI) Standard no.6, Emergency patients cared for by the organization undergo an established initial assessment. Objective Elements are as follows:

- a. The organization defines and documents the content of the initial assessment for emergency patients.
- b. The organization determines who can perform the initial assessment.
- c. The organization defines the time frame within which the initial assessment is completed based on the patient's needs.
- d. The initial assessment for emergency patients is documented as per the patient's condition and as defined in the triage policy.
- e. Initial assessment also includes nursing assessment which is done at the time of admission and this is documented.
- f. The initial assessment results in a documented care plan which is signed by the attending doctor. [11]

Working towards a consensus of performance measures that reflect the general performance of an ED and whether certain quality improvement initiatives prove efficient is clearly warranted. A shared understanding of performance measures will enable continuous quality improvements and benchmarking opportunities both internally and externally over time. [12] Few performance measures have the advantage of quick overview and thus lack the ability to take multiple aspects of performance into account. [12]

Engagement of hospital executive sponsors, including the chief of staff, chief quality officer, chief nursing office, chief medical officer, and chief executive officer, via daily data-driven huddles, weekly planning sessions, and quarterly workshops helped accelerate ED improvement efforts.

Through these interactions, the executive teams developed a clearer understanding of ED improvement needs and were able to facilitate integration of Ed issues into hospital-wide strategic objectives, such as reducing ED boarding and ambulance diversion. This executive-level involvement also facilitated qualitative improvements in ED patient and staff experience. For example, observing the burden of non-clinical work asked of ED staff to manage after-hours visitors for the entire hospital resulted in increasing the main hospital building's security hours and the addition of a patient navigator available to the ED. [8]

A smooth workflow in the ED sets the tone for the rest of the patient experience as more than two-thirds of inpatients arrive via the ED. With tracking of ED patient satisfaction by CMS expected in early 2016, hospitals and health systems that build strong support from administration, physicians, and ancillary staff for efficient and patient friendly EDs are likely to experience strong patient loyalty and a positive impact on the bottom line [13]

3. RESEARCH QUESTION: What is the status of compliance of the quality indicators and process gaps of accident and emergency department of the Mission hospital?

4. OBJECTIVES:

1. To assess the compliance of selected quality indicators in the emergency department.
2. To identify the gaps in process flow of the emergency department.

5. RESEARCH METHODOLOGY:

STUDY DESIGN: Observational descriptive study

SETTING: Accident and Emergency Department, The Mission Hospital, Durgapur, West Bengal

STUDY POPULATION: patients coming in the emergency department

- **Inclusion criteria:** All patients visiting emergency department.
- **Exclusion criteria:** Patients not admitted in emergency department (i.e. Patients who visited ED for injection, vaccination, suture removal etc.) and patients with incomplete data.

DURATION OF STUDY: 6th February 2019 to 30th April 2019 (3 months)

METHODOLOGICAL APPROACH:

Firstly, to find out the compliance of quality indicators few quality indicators were selected after going through some literature and some were taken as per organizations protocol to find out the efficiency of the ED.

Quality indicators included in study are as follow:

1. Length of stay of the patient in ED (less than 1 hour)
 2. Time taken to start initial assessment (1 min)
 3. Patients who left ED without being seen
 4. ED return within 72 hours
 5. ED conversion
 6. Number of ED LAMA cases
 7. Number of ED deaths
 8. Ambulance Response Time (10 min)
 9. Incident occurred in ED
- To find compliance of length of stay in ED data 10 patients daily were taken through convenience sampling during the working hours i.e. 9 AM to 6 P.M
 - To find out the compliance of ED conversion, ED LAMA, ED deaths, ED incidents, ED return, ambulance response time and patient left ED without being seen, secondary data of total no of patients who visited the ED were considered.
 - For ambulance response time total no of ambulance calls during the study period were considered.

Secondly, for the gap analysis data was collected daily through convenience sampling. Patients were followed throughout the process from patient entering the emergency department and leaving the emergency department and time taken for each step was noted down. Informal discussion done with the ED staff regarding delays and gaps in the process flow and reasons behind the delay. Compliance of time take to start initial assessment also taken from this data. Because it is also a part of the process flow.

SAMPLE SIZE:

- For ED conversion, ED LAMA, ED deaths, ED incidents, ED return, patient left ED without being seen total no of patients (2624) who visited Accident and Emergency dept. during the study period (6th February -30th April) was taken. For ambulance response time total no of calls 163 during the study period were considered.
- For length of stay of patient in ED total sample of 772 patients were taken through convenience sampling 10 patients daily during the study period through direct observation.
- For Gap analysis of the ED process flow sample of 433 patients were taken and that patients were followed throughout the process to find out the gaps.

SAMPLING TECHNIQUE: Convenience sampling

DATA COLLECTION PROCEDURE:

- Primary data – Collected through TAT form, gap analysis form by direct observation. For length of stay of the patients in ED, time taken for initial assessment and for gap analysis
- Secondary data – Collected from the Master register of emergency department, Procedure register and Ambulance register. For ED return within 72 hours, ED conversion, ED LAMA, Ed deaths, Ambulance response time, incident occurred in ED.

DATA ANALYSIS: Data is analyzed with the help of advanced Microsoft Excel function.

ETHICAL CONSIDERATION: Appropriate measures were taken to ensure data security, privacy, confidentiality of the patients and the organization.

LIMITATIONS:

- Time constraint need more time to continue this study to find out the compliance of all the quality indicators related to emergency department to find out the efficiency of ED and to do gap analysis further in depth.
- Selection bias.

6. DATA ANALYSIS AND RESULTS

Quality indicators:

1. Length of stay of the patient in ED: for this indicator total sample of 772 patients were taken for February (224), March (436) and April (112) were taken to find out the turnaround time of ED. It was calculated from the patient's arrival time in the department and to the patient leaving the department (ED discharge, shift out to other departments, LAMA) only potential footfall was considered for this indicator. Standard time as per organizations protocol is 1 hour. In the month of February average length of stay was 3 hours 2 mins, March was 2 hours 35 mins and in April it was 2 hours 36 mins. Data was recorded in TAT sheet (see annexure no. 1).

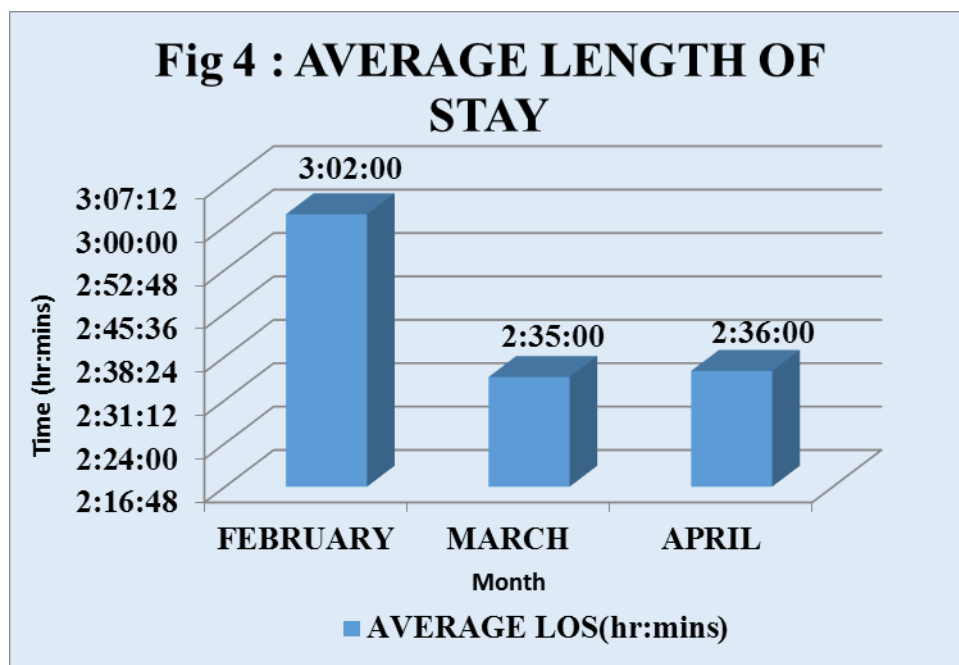


Figure 4: Average LOS in ED in the month of February, March, April. Avg. LOS is more than 1-hour standards set per organization in the month of February, March, April. N=772

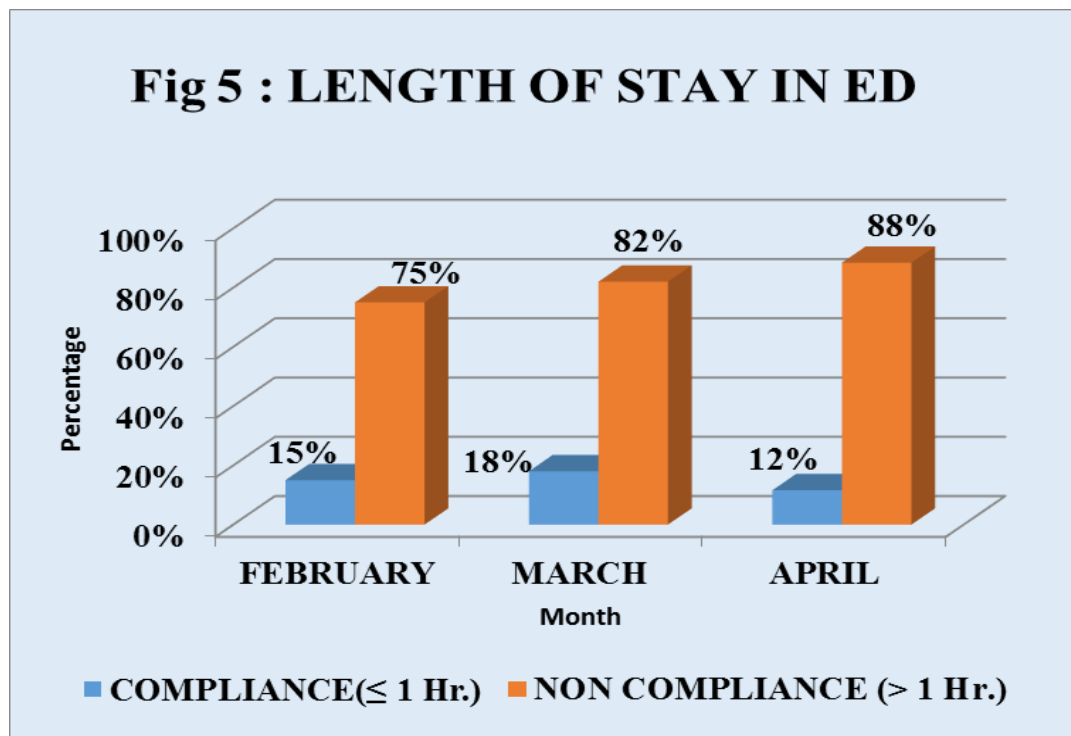


Figure 5: compliance rate of the length of stay in ED, in the month of February, March and April. N=772

2. Time taken for initial assessment: data for this indicator was taken from the gap analysis indicator itself from the sample of 433 patients. Time taken to start initial assessment and primary survey by the doctor, standard time as per organizations protocol is within 1 min to start the initial assessment. Only 15.94% of the total patient's assessment was started within standard time i.e. 1 min.

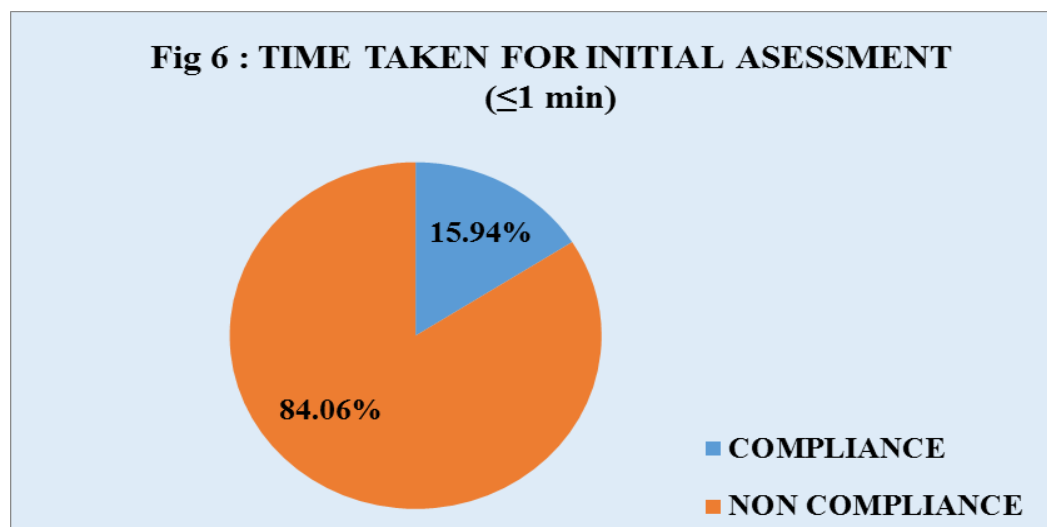


Figure 6: compliance rate of the time taken to start the initial assessment in ED. N=433 in 84% of the cases there is non-compliance.

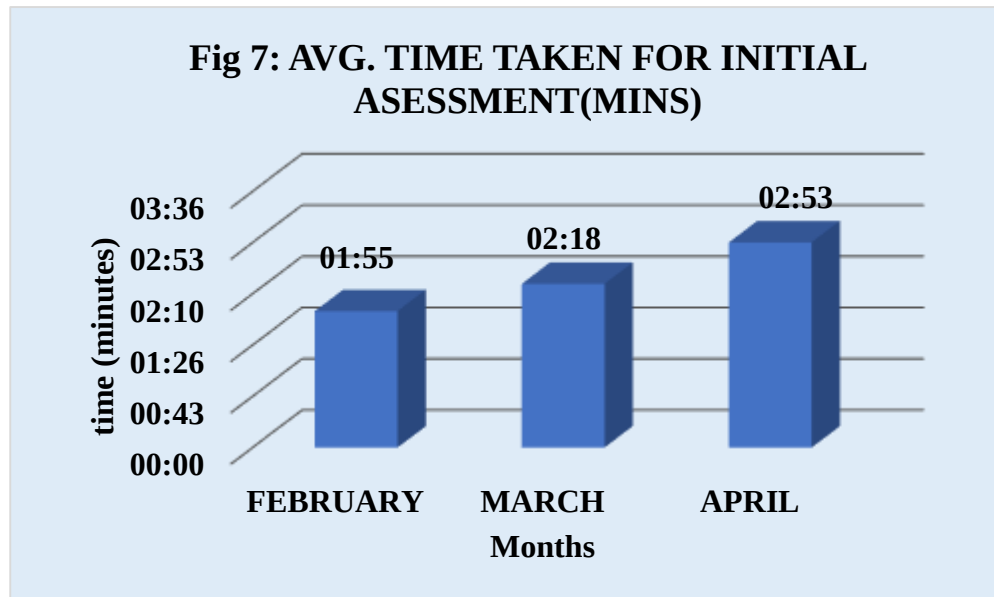


Figure 7: average time taken for initial assessment in ED in the month of February, March and April. It's more than 1 min standards set by the organization in the month of February, March and April.

3. Patients who left ED without being seen: during study period no such case was noticed or observed who left Emergency department without any kind of assessment. Because most of the patients coming to the hospital Ed was referred from other corporate hospitals. Major limitation in this indicator was that it was not possible to observe all the cases like patients coming after working hours, they were not directly observed.

4. ED return within 72 hours: during study period there were only 4 such cases those who return to ED within 72 hours with the same symptoms after being treated for the same. One in the month of February 3 in the month of March and in month of April there was no such cases recorded and observed.

5. ED conversion: Total footfall during the study period was 2624 out of which 1875 were potential footfall, patients who got admitted to the hospital. 513 were OPD discharges through the emergency, 227 were LAMA, 1 brought dead, 6 deaths in emergency and 2 were other cases (DORB). Data was recorded in quality indicators sheet (See annexure no. 2)

MONTHS	TOTAL FOOTFALL	TOTAL ADMISSIONS	TOTAL GENERAL WARD TRANSFER	TOTAL CRITICAL CARE TRANSFER
FEBRUARY	914	669	279	390
MARCH	980	701	280	421
APRIL	730	503	232	273
TOTAL	2624	1875	791	1084

Table 1: ED conversion in the month of February, March and April.

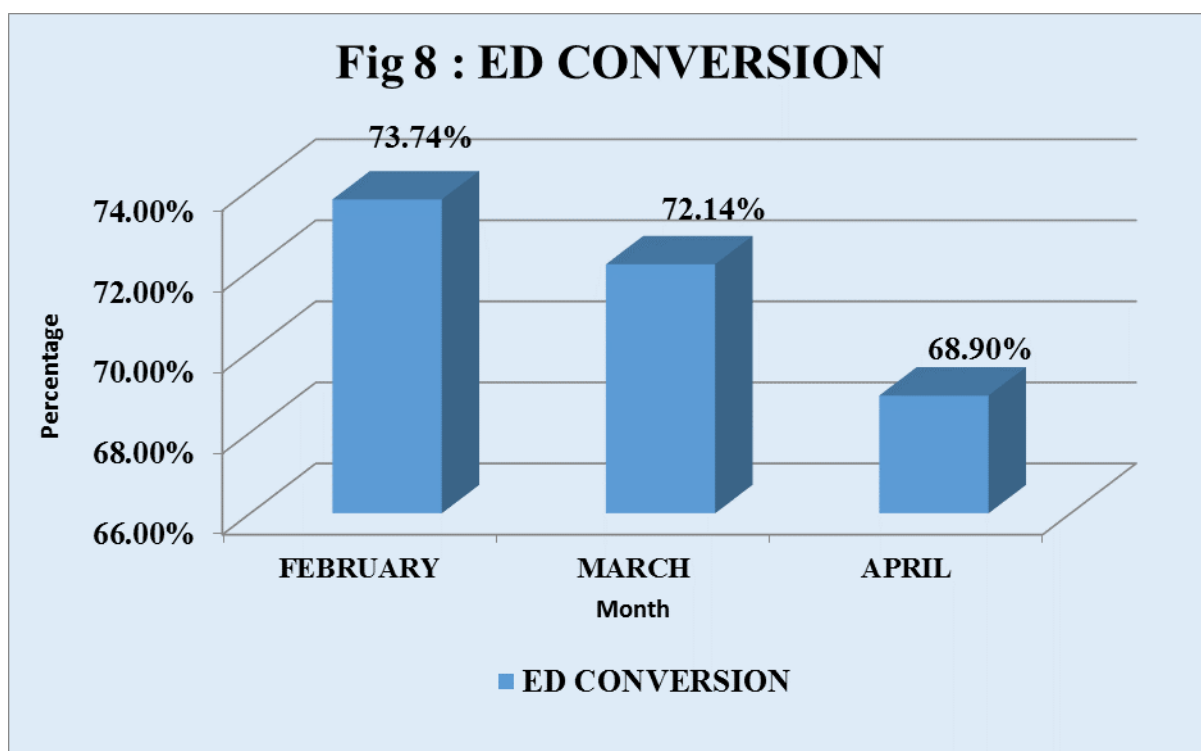


Figure 8: ED conversion in the month February, March and April. Highest in the month of February and lowest in the month April. N= 2624.

6. Number of ED LAMA cases: there were 227 LAMA cases out of 2624 total footfall of the emergency department in the month of February, March and April.

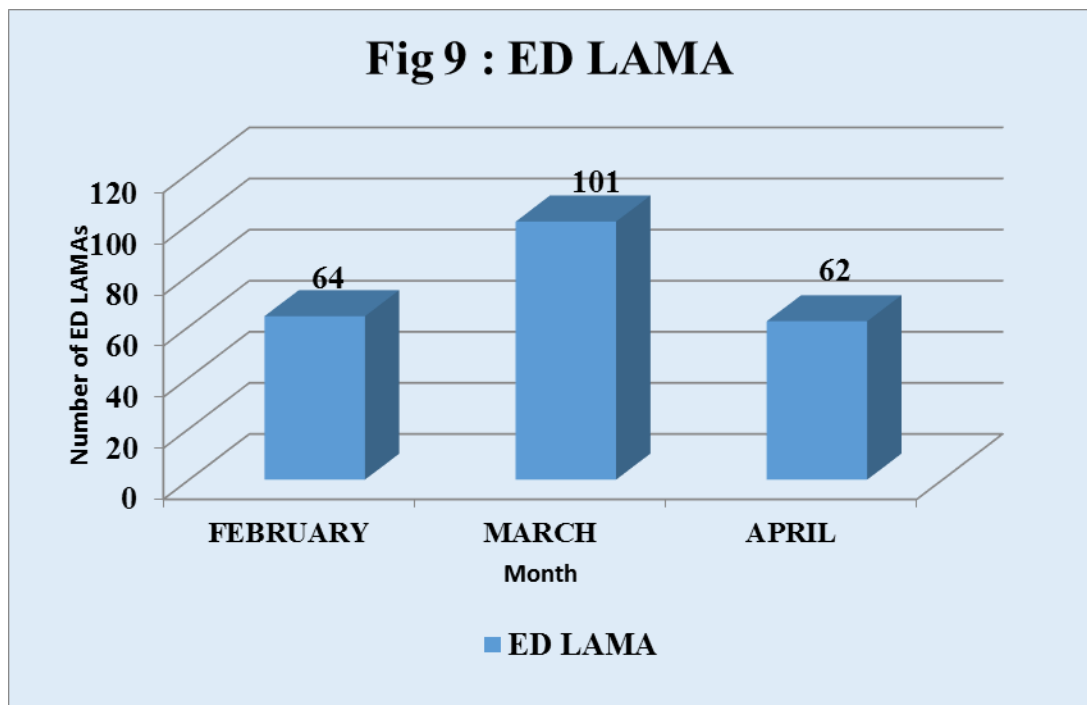


Figure 9: ED LAMA in the month of February, March and April. n=2624 out of this there were 227 LAMA cases.

7. Number of ED deaths: There were 6 deaths in ED in the month of February, March, and April. Out of 2624 total footfall

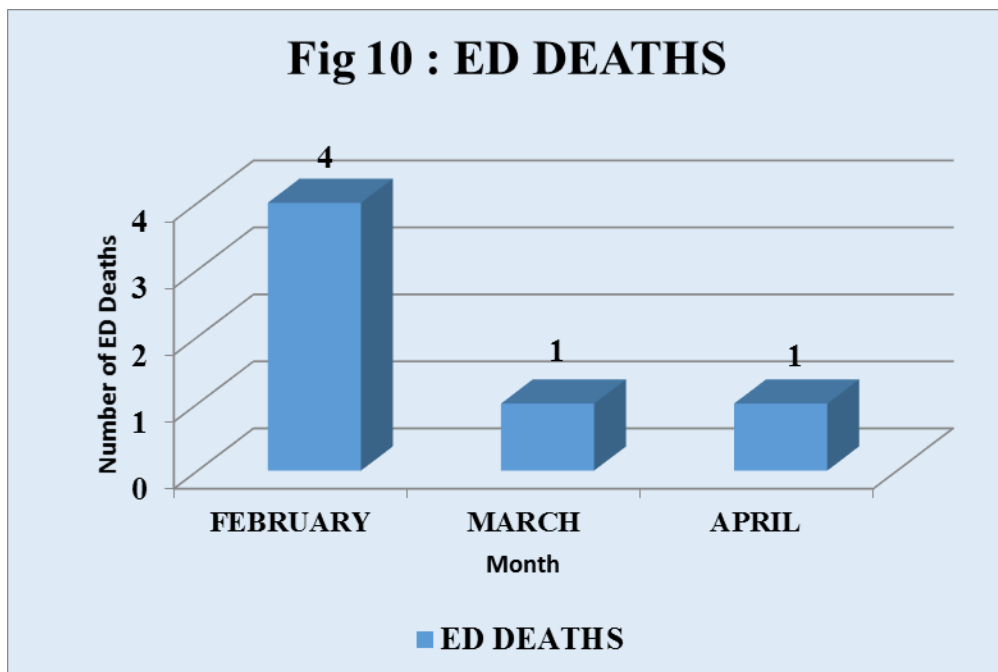


Figure 10: total no of deaths in ED department in the month of February, March and April. Total no of 6 deaths out of total patient footfall. N= 2624

8. Ambulance Response Time: there were 163 ambulance calls during the study period. In 60.74% calls ambulance response time was less than 10 mins as per standard set by organization. Data was collected in the ambulance response time sheet (see annexure no. 4)

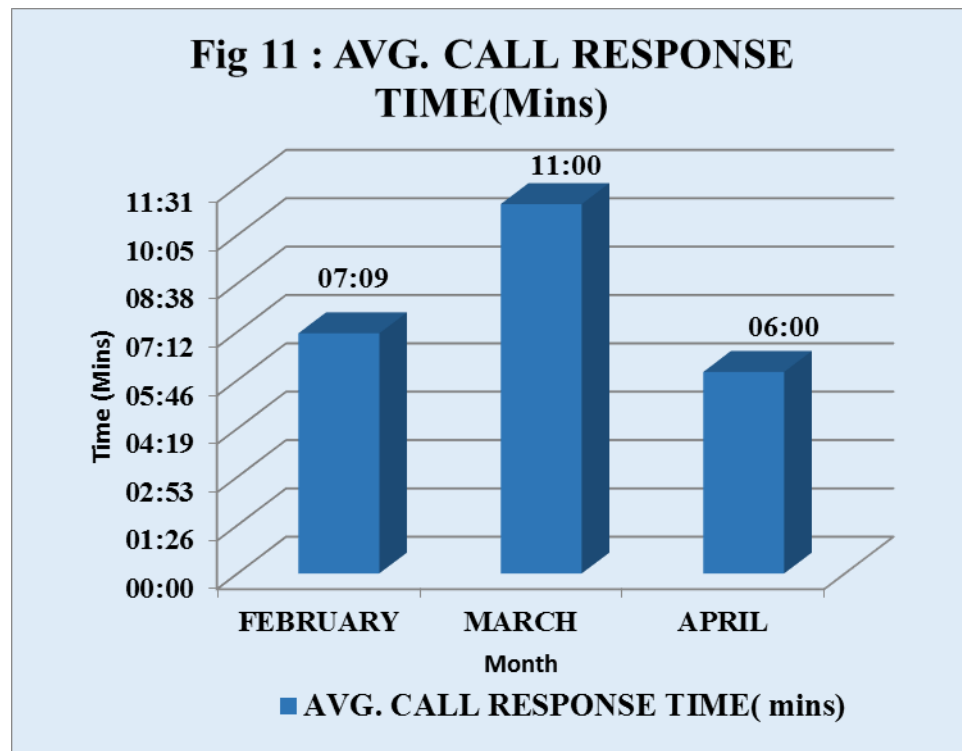


Figure 11: average ambulance calls response time in the month of February, March and April. In the month of February and April, it is within the standard set by the organization i.e. within 10 mins. In March its more than standard time.

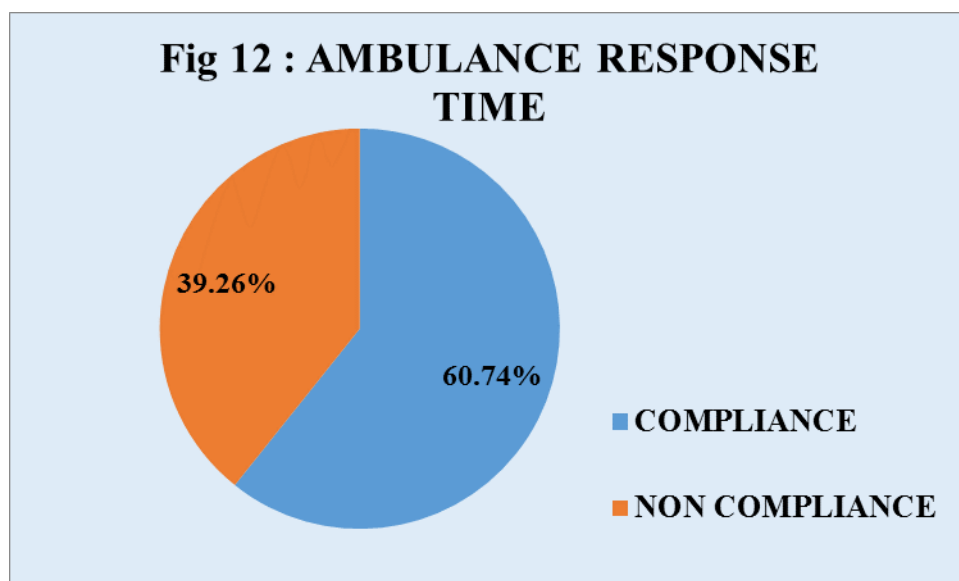
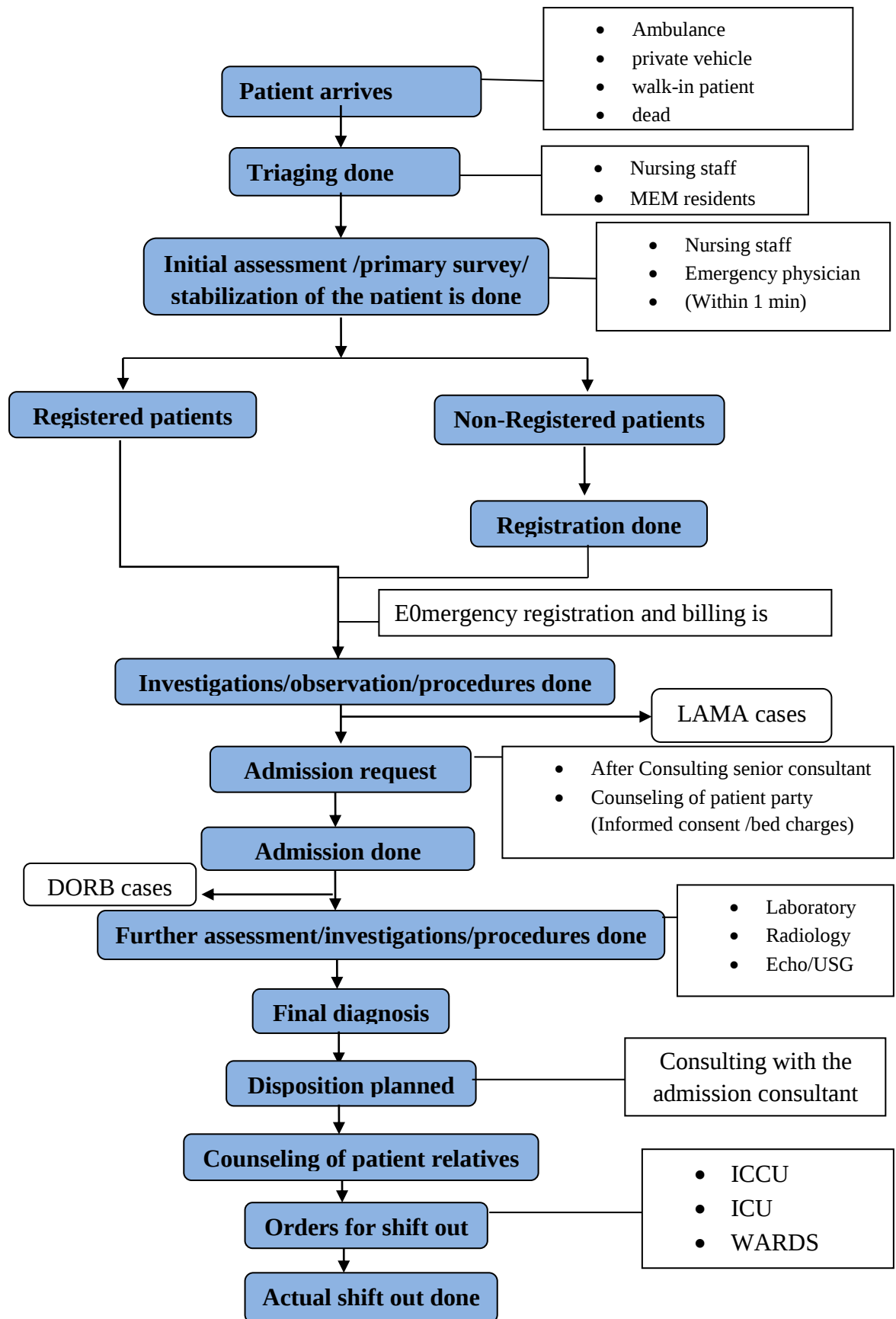


Figure 12: compliance rate of the ambulance calls response time. N = 163 calls

9.Incident occurred in ED: there were only two cases of incidents recorded in the study period. None of it was directly related to the patients. One was near miss event equipment related; Oxygen cylinder while being halted for transferring patient from ED to ICU fell from the oxygen cylinder carrying trolley, Leakage of Oxygen Occur. It happened on 13th of March 2019.And another was adverse event equipment related in which Patient blood sample sent by Pneumatic chute to lab at 3:00am in 4/04/2019 was jammed and which lead to delay of laboratory diagnosis and reports.

Gap analysis:

PROCESS FLOW: Once the patient enters the Accident & Emergency Department, he/she is assessed by the emergency personnel of Accident & Emergency Department and triaging is done on bed side itself because of the space constraint. Initial assessment starts within 1 min of the patient's arrival. If resuscitation is required the patient is taken directly to the resuscitation bay before starting the triaging process, to stabilize the patient life threatening condition. After triaging and resuscitation, the patient is primarily surveyed and assessed by Emergency Doctor. If any stabilization of patient and point of care test (like Acid-Base Gas analysis, Random Blood Sugar, USG, ECG) needed then it is done at this very point. After assessing the patient doctors request for admission or further assess and keep the patient for observation. If any investigation is needed then they sent request for investigation, and asked patient relative for investigation billing. Those patients who are not registered previously (the patient who first time visit the hospital) are sent for Registration first followed which OP registration is done and admission request is sent. Further assessment is done after patient's admission. Required management is provided and major investigations like Laboratory investigations, Radiology investigations, and Echocardiogram are sent. After gaining the patient's report, the Emergency doctors comes into the diagnosis of the case and disposition of patient to ICCU/ICU/Ward after consulting with the senior consultant is done. Patient's relative is counseled and patient's present condition is discussed with them by the attending Emergency Doctor. After all the pre-requisite steps patient is now ready for shift to ICCU/ICU/Ward.



For gap analysis of process flow in the accident and emergency department total sample of 433 patients were taken during the study period. Direct observation was done daily the patients coming directly to the ED and gap analysis sheet (see annexure no. 3). was filled and then the analysis was done to find out at which step the time wastage is more. In it the time of patient arrival, time taken for initial assessment, time taken for admission, time for laboratory orders, time for radiology orders, time taken for order of shift, time taken for actual shift out of the patient and time taken for imaging process were recorded. For analysis time taken for each step was calculated from the time of patient's arrival in ED and their average was calculated. It is seen that there is time wastage in every step starting from the initial assessment to the shift out of the patients. As per organization's standard LOS in ED should be less than an hour. Time taken for every step leads to delay.

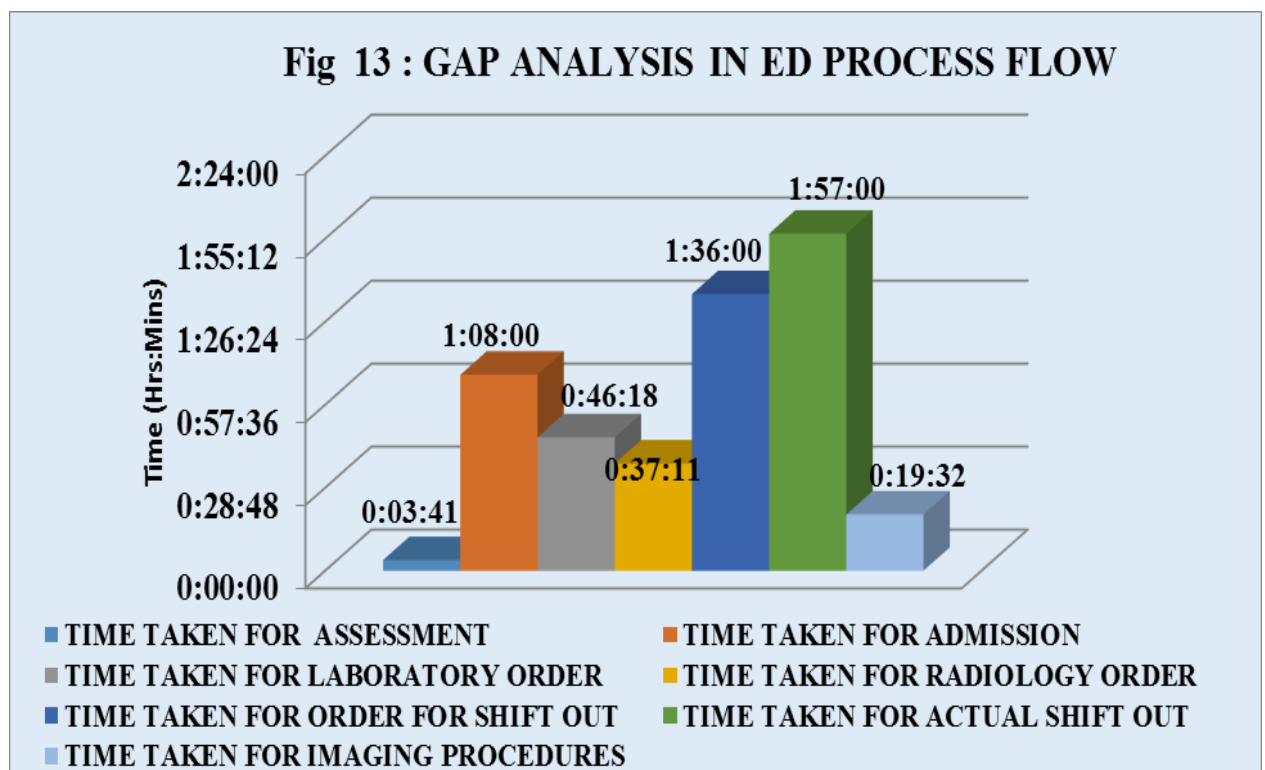


Figure 13: average time taken for the steps in the process flow of the emergency department. N=433

7. RESEARCH FINDINGS:

Quality indicators:

1. Length of stay in ED: total sample size of 772 patients were taken to find out the compliance of the LOS in ED. it was seen that compliance rate was less than 20% and non-compliance is average 82%. Further investigations needed to be done to find the reason behind the non-compliance of this indicator.

MONTHS	COMPLIANCE (≤ 1 Hr.)	NON-COMPLIANCE (> 1 Hr.)
FEBRUARY	15%	75%
MARCH	18%	82%
APRIL	12%	88%

Table 2: ED Length of stay compliance status in the month of February, March and April

2. Time taken to start initial assessment: total sample size of 433 patients were taken to find out the time taken for initial assessment to find out the compliance. Only 15.94% of the cases were within the time other 84.06 % were non-compliant.

MONTH	COMPLIANCE	NON-COMPLIANCE
FEBRUARY	46.15%	53.85%
MARCH	13.11%	86.89%
APRIL	15.71%	84.3%

Table 3: Compliance status of time taken for initial assessment in ED

3. Patients who left ED without being seen: during study period no such case was noticed or observed who left Emergency department without any kind of assessment. Because most of the patients coming to the hospital Ed was referred from other corporate hospitals. Major limitation in this indicator was that it was not possible to observe all the cases like patients coming after working hours, they were not directly observed.

4. ED return within 72 hours: during study period there were only 4 such cases those who return to ED within 72 hours with the same symptoms after being treated for the same. One in the month of February 3 in the month of March and in month of April there was no such cases recorded and observed.

5. ED conversion: Total footfall during the study period was 2624 out of which 1875 were potential footfall, patients who got admitted to the hospital. 513 were OPD discharges through the emergency, 227 were LAMA, 1 brought dead, 6 deaths in emergency and 2 were other cases (DORB). Compliance rate for ED conversion is 71.45%

6. Number of ED LAMA cases: there were 227 LAMA cases out of 2624 total footfall of the emergency department in the month of February, March and April.

7. Number of ED deaths: There were 6 deaths in ED in the month of February, March, and April. Out of 2624 total footfall

8. Ambulance Response Time: there were 163 ambulance calls during the study period. In 60.74% calls ambulance response time was less than 10 mins as per standard set by organization. Non- compliance is mostly due to multiple point of contacts for the ambulance.

	AMBULANCE RESPONSE TIME
COMPLIANCE	60.74%
NON-COMPLIANCE	39.26%

Table 4: Compliance status of ambulance response time.

9. Incident occurred in ED: there were only two cases of incidents recorded in the study period. None of it was directly related to the patients. One was near miss event equipment related; Oxygen cylinder while being halted for transferring patient from ED to ICU fell from the oxygen cylinder carrying trolley, Leakage of Oxygen Occur. It happened on 13th of March 2019. And another was adverse event equipment related in which Patient blood sample sent by Pneumatic chute to lab at 3:00am in 4/04/2019 was jammed and which lead to delay of laboratory diagnosis and reports.

Gap analysis:

N= 433	Average time taken	Minimum time taken	Maximum time taken
Time taken for assessment	00:03:41	00:01:00	00:10:00
Time taken for admission	01:08:00	00:08:00	02:37:00
Time taken for laboratory order	00:46:18	00:10:00	01:15:00
Time taken for radiology order	00:37:11	00:06:00	00:53:00
Time taken for order for shift out	01:36:00	00:09:00	04:25:00
Time taken for actual shift out	01:57:00	00:25:00	06:10:00
Time taken for imaging procedures	00:19:32	00:07:00	01:05:00

Table 5: average time taken in each steps of the process flow of ED along with minimum and maximum time taken.

For analysis time taken for each step was calculated from the time of patient's arrival in ED and their average was calculated. It is seen that there is time wastage in every step starting from the initial assessment to the shift out of the patients, here are many gaps which lead to the time wastage and increased turnaround time in the emergency department. The major gaps which directly or indirectly affect the quality and performance of the emergency department which were observed are as follow:

Assessment & Stabilization: average time taken for assessment to start is more than one minute. Emergency Doctors need time to assess & stabilize the patients. Patient many a time comes with multiple complaints/ symptoms even sometimes comes with vague symptoms. Doctors often found difficulty to come into diagnosis in a short period of time. Most of them are residents which need senior consultant's advice or guidance in procedures and treatment. Though it leads to delay in the process, but it is must to diagnose the patient properly to avoid any risks.

Delay due to admission process: Delay by the Patient party in decision making, delay in signing and filling of the consents, waiting for admission consultant, Absence of relevant documents needed for admission (especially in insurance & corporate patient cases), Absence of relevant signatory authority from the end of patient relatives required during admission and delay due to TPA patients results in delay in admission process which lead to increased turnaround time of emergency department.

Delay due to laboratory investigation: delay in taking the sample, delay in sending the sample to the lab and receiving the reports directly lead to the increased TAT in this step various other factors like non-availability of GDA also results in delay.

Delay due to radiology investigations: delay in changing the clothes of the patient, delay in shifting the patient from ED to the radiology department, delay in imaging procedures, delay in generating, multiple imaging procedures and interpretation of the reports are the main causes of radiology delay. This therefore results in increased TAT.

Delay due to GDA Non-Availability: delay in sending the samples to the laboratory, delay in changing the clothes of the patient, delay in the process of transfer of patients from Accident & Emergency Department (A&ED) to disposed inpatient departments are because of GDA non-availability. There are only 2 male GDA and 1 female GDA present per shift. GDA non-availability is because of the shortage of staff and present staff is sent for other works like collecting and disposing linen, getting food for the patient and staff, sent to stores for collecting the material required in emergency.

Delay due to staff scheduling for the shifts: increase in patient's length of stay in Accident & Emergency Department of the hospital due to change in shift of medical and paramedical personnel during a small period of time every day. There are three shifts for nursing, GDA and housekeeping staff.

Delay by the senior consultant: on call doctors are called for advice regarding admission of the patient and diagnosis. But most of the time senior consultants are not available or come late. Due to which delay is there for shifting out of the patient.

Exit Block: The exit block is defined as the condition/s arise in the indoor facility which causes blockage of shift of patient from emergency department to different indoor facilities like ICCU/ICU/Ward/Semi-private room/ suits, even after the patient is ready to shift leading to increase in length of stay of patients at Accident & Emergency department. This is the major cause of patient delay which therefore results in increased length of stay.

Delay due to procedures: Often multiple critical procedures are required to perform on the patient which may takes lots of time to stabilize the patient. Some of the doctors are residents in the department they take time for procedures. And there is delay due to academic activities in the process.

Further in-depth studies required to find out the reasons for gaps in the process flow and to what extent they are affecting the process flow which results in increase of length of stay and non- compliance of other other quality indicators.

8. RECOMMENDATIONS

Further investigations or in depth should be done to find out the rate of reasons resulting in delays.

QUALITY INDICATOR:

- Separate space to perform minor procedures such as injections, suturing, vaccinations etc. along with separate small X-ray and Radio-diagnosis Unit in the ED to reduce the time taken for non-potential patients and investigation procedures
- Designated space with requisite manpower and waiting area for fast track cases.
- Separate counter for ER registration and ER generated lab orders to reduce time wastage in the step of admission.
- A computerized Ambulance monitoring system should be implemented.
- Single point of contact for Ambulance.

GAP ANALYSIS:

- To fasten the discharge process in the IPD to reduce the exit block from the emergency.
- Training of the ED employees regarding the protocols of the emergency department should be done.

9. CONCLUSION:

For the efficient working of the emergency department at multispecialty hospital it is extremely important to take care of all the key performance indicators which are both quality and clinical indicators. Gaps such as investigation delay, exit block, communication delay, radiology delay, admission delay, assessment & stabilization delay, GDA non-availability, shifting delay and Sr. Consultant delay & procedure delay are the main reasons for the delay and inefficiency of the emergency department. Gaps leading to the increased length of stay should be scientifically investigated and further improved. Continuous detailed in-depth studies should be done to analyze the performance of different departments which are found to have greater proportion of delayed cases affecting quality indicators. By doing this we can smoothen the process flow of the emergency department which will not only help in reducing the overcrowding of the department, but it will ultimately lead to enhance patient and employee satisfaction. By reengineering the process flow of the emergency department, we can achieve the aim of providing patient centric care.

10. ANNEXURES:

1. Turnaround time format:

S. No	Name of the patient	Age/sex	Time of arrival in ED	Time of shift out/ left ED department	Length of stay in ED	Remarks

Table 6: Turnaround time form

2. Quality indicators format:

Indicators	February	March	April
Total no. Of admissions			
Admission in ICU			
Admission in general ward			
Lama			
No. Of deaths			
ED return within 72 hours			
Pt. Left ED without being seen			
ED Conversion			

Table 7: Quality indicators form

3. GAP analysis format:

Date	Patient name	IP NO	PATIENT arrival time	Initial assessment time	Admission time	Laboratory orders time	Laboratory report time	Imaging order time	Imaging report time	Shift out order time	Actual shift out

Table 8: Gap analysis form

***To be filled on daily basis**

4. Ambulance response time:

S.NO	Date	IP/ MR no.	Patient name	Ambulance confirmation call time	Ambulance in time	Ambulance out time	Purpose

Table 9: Ambulance response sheet form

11. BIBLIOGRAPHY

1. <https://www.who.int/hospitals/en/>
2. Pitrou I, Lecourt AC, Bailly L, Brousse B, Dauchet L, Ladner J. Waiting time and assessment of patient satisfaction in a large reference emergency department: a prospective cohort study, France. *European Journal of Emergency Medicine*. 2009 Aug 1;16(4):177-82. https://journals.lww.com/euro-emergencymed/Abstract/2009/08000/Waiting_time_and_assessment_of_patient.4.aspx (Accessed 3rd April, 2019)
3. Anderson RT, Camacho FT, Balkrishnan R. Willing to wait?: the influence of patient wait time on satisfaction with primary care. *BMC health services research*. 2007 Dec;7(1):31. <https://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-7-31> (Accessed 3rd April, 2019)
4. Magid DJ, Asplin BR, Wears RL. The quality gap: searching for the consequences of emergency department crowding. *Annals of emergency medicine*. 2004 Dec 1;44(6):586-8. [https://www.annemergmed.com/article/S0196-0644\(04\)01208-9/abstract](https://www.annemergmed.com/article/S0196-0644(04)01208-9/abstract)
<https://doi.org/10.1016/j.annemergmed.2004.07.449>
5. Boyle AA. Quality: more than just timeliness. *Emerg Med J*. 2019 Mar 15;emermed-2019. <https://emj.bmj.com/content/early/2019/03/14/emermed-2019-208419>
6. Wiler JL, Welch S, Pines J, Schuur J, Jouriles N, Stone-Griffith S. Emergency department performance measures updates: proceedings of the 2014 emergency department benchmarking alliance consensus summit. *Academic Emergency Medicine*. 2015 May;22(5):542-53. <https://onlinelibrary.wiley.com/doi/full/10.1111/acem.12654>
7. Khalifa, Mohamed & Zabani, Ibrahim. (2016). Developing Emergency Room Key Performance Indicators: What to Measure and Why Should We Measure It?. *Studies in health technology and informatics*. 226. 179-182. 10.3233/978-1-61499-664-4-179. <https://www.researchgate.net/publication/305388176>
8. Mercer MP, Singh MK, Kanzaria HK. Reducing Emergency Department Length of Stay. *JAMA*. 2019 Mar 19. <https://jamanetwork.com/journals/jama/article-abstract/2729032>
9. Rathlev NK, Obendorfer D, White LF, Rebholz C, Magauran B, Baker W, Ulrich A, Fisher L, Olshaker J. Time series analysis of emergency department length of stay per 8-hour shift. *Western Journal of Emergency Medicine*. 2012 May;13(2):163. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415804/>
10. Fee C, Burstin H, Maselli JH, Hsia RY. Association of emergency department length of stay with safety-net status. *Jama*. 2012 Feb 1;307(5):476-82. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3641855/>

11. Proposed Draft Standards of Emergency Medical Services Certification Program in Hospital First Edition - August 2015 National Accreditation Board For Hospitals And Healthcare Providers.
https://www.nabh.co/Announcement/Draft_Emergency_Medical_Services.pdf
12. Sørup CM, Jacobsen P, Forberg JL. Evaluation of emergency department performance—a systematic review on recommended performance and quality-in-care measures. *Scandinavian journal of trauma, resuscitation and emergency medicine*. 2013 Dec;21(1):62.
<https://sjtrem.biomedcentral.com/articles/10.1186/1757-7241-21-62>
13. Angie Esbenshade, Stephanie O’Byron, and Wenzel Tirheimer Oct 19, 2015 7
Tips for Improving Emergency Department Patient Flow
<https://www.hfma.org/leadership/immediatebedding/>
14. *Megan McHugh et al* Improving Patient Flow and Reducing Emergency Department Crowding: A Guide for Hospitals. Content last reviewed July 2018. Agency for Healthcare Research and Quality, Rockville, MD.
<http://www.ahrq.gov/research/findings/final-reports/ptflow/index.html>
15. https://www.healthcatalyst.com/success_stories/ed-patient-flow-mission-health