A STUDY OF WAITING TIMES AND PATIENT SATISFACTION IN EMERGENCY DEPARTMENT AT A SELECT HOSPITAL

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ABSTRACT

The present study is to determine the average waiting time of patients reporting in the Emergency Department and to assess the factors responsible for the waiting period of patients. Along with this study; a survey was done among patients to assess their satisfaction with the services in the ED. The study is done in two parts, the first encompassing "Study of Waiting times in Emergency Department" and the second covering "Patient Satisfaction with Emergency Department Services". The study in the ED was conducted by collecting samples of 100 critical patients who required immediate quality care. The study also included determining the patient satisfaction regarding the waiting times. A Questionnaire was developed and used direct questioning method to collect the data from 55 patients and their attendants.

The major findings of the study are that the mean waiting time in ED was 5 hours 6 minutes (306 minutes) and also there is a high correlation between the "waiting time for Admission" (patient "boarding") and "Consultant review waiting time" with total ED waiting time. With respect to patient satisfaction, factors such as ED identifiable and approachable, speed of bed allotment, doctors and nurses - time taken to attend, explain treatment and services, ambience of ED and overall stay were rated highly. Delays in billing were identified with high ED waiting specifically attributed to non-availability of beds to transfer out patients. The study recommendations include building an Acute Critical Care Unit, increasing nurse patient and doctor patient ratios.

Key words: Emergency Department, HIS, LOS, Patient satisfaction, TAT, Waiting time

INTRODUCTION

A hospital is an integral part of a social and medical organization, the function of which is to provide the population complete healthcare, both curative and preventive. Hospital is also a center for training of health workers and biosocial research. An emergency department (**ED**), also known as an accident and emergency department **(A&E)**, emergency room **(ER)** or casualty department, is a medical treatment facility specializing in emergency medicine, the acute care of patients who present without prior appointment; either by their own means or by that of an ambulance.

In some countries, emergency departments have become important entry points for those without other means of access to medical care. The emergency departments of most hospitals operate 24 hours a day, although staffing levels may be varied in an attempt to reflect patient volume. In 2021, emergency department (ED) visitors waited on average 35.7 minutes to see a physician, advanced practice registered nurse (APRN), or physician assistant in the United States. In 2021, 140 million emergency department (ED) visits occurred in the United States. The overall emergency department (ED) visit rate was 43 visits per 100 people in 2021.

RESEARCH PROBLEM STATEMENT

Patients who check into a hospital's emergency department (ED) often experience long wait times in the emergency waiting area. These wait times are due to the triage process that is a requisite for hospital admission, patient "boarding" (waiting for a bed), a shortage of on-call consultants and the pile up of patients due to local accidents and disasters. As ED wait times can lead to delayed treatment of patients who require immediate medical care, the hospitals must focus on efforts in reducing the amount of time patients must spend in the emergency department.

NEED FOR THE STUDY

The Emergency Department (ED) is known to be one of the most congested units in any hospital that faces greater pressure in terms of patient load and health care resources as compared to other departments of the health care system. ED is one of the most heavy service specialties as they see a wide variety of cases that arrive on a daily basis. Due to the unplanned nature of patient attendance, the department must provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be life-threatening and require immediate attention. Hence, the present study is needed to understand the waiting times and patient satisfaction in ED.

OBJECTIVES

• To determine the average waiting time of patients reporting in the Emergency Department
• To identify the factors responsible for the waiting period of patients
• To assess the patient satisfaction with the services in the ED.

METHODOLOGY

Primary data was collected by direct questioning method with the patients and patient bystanders. 55 patient feedbacks were taken with good and satisfactory responses for patient satisfaction survey. ED physicians, EMS staff and nursing staff were also interviewed and their views obtained with respect to the study.

SAMPLE SIZE

The data for studying the waiting time was collected from 100 patients those with cardiac problems, upper respiratory problems, trauma, Road Traffic Accident cases and critical patients who required immediate quality care. 55 patients were asked the questions about satisfaction in emergency department

SCOPE: The study is done only in emergency department with the following inclusion and exclusion criteria

INCLUSION AND EXCLUSION CRITERIA: The data points included both adults and children of various ages. Emergency Department admissions also included "fast track" patients who were stable and walked in for chronic ailment treatments or observation. It also included patients sent by the OP department for patient holding or getting investigations done faster or intravenous drug administration. These cases have been excluded from the study.

DATA COLLECTION TOOLS

The data regarding "waiting time" (the length of time, when patient is waiting idle in the ED for admission) was collected. The details of "arrival time", (the time when the patient is first recognized, as requesting service in the ED) was obtained from the emergency records and compared with the "encounter time" in the HIS. Patient's total lengths of stay from the time a patient entered the ED until he/she is discharged/ transferred out from the ED to the wards; rooms etc. were calculated from electronic medical records. Patients/attendants present in the ED were asked for feedback. They were further asked "for what service the patient is waiting for and from how much time"

The study also included determining the patient satisfaction regarding the waiting times and examined patient perceptions of emergency department wait times and patient experiences. A questionnaire was developed exclusively for the Emergency Department to collect the data.

TOOLS OF ANALYSIS

Data from actual patient responses obtained from patient surveys regarding patient experiences, emergency department services and patient perceptions of emergency department wait times were analyzed and represented in the form of tables and pie charts. Correlation analysis has also been done for certain selected variables to examine the linear relationship.

DATA ANALYSIS FOR THE STUDY OF WAITING TIMES IN EMERGENCY DEPARTMENT

The study covered 100 critical patients, of which 75 % were finally admitted to the hospital while the remaining 25 were discharged from the ED itself after observation and treatment.

Figure 2

Figure 1
No of Patients
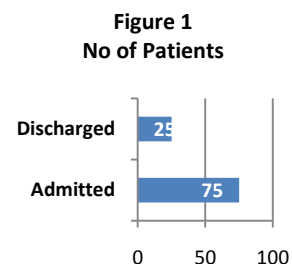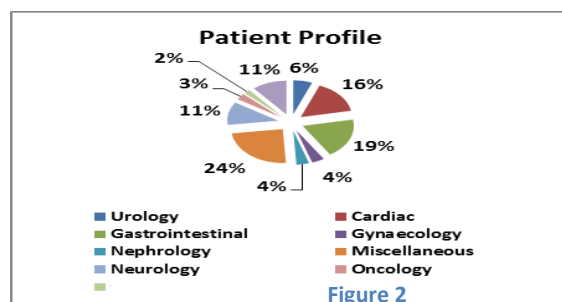
Over 55% of the patients were treated for Cardiac, Gastrointestinal, neurology and respiratory problems. Figure 2 shows the patient profile.

The key stages in patient treatment in the Emergency Department are Encounter, ED Doctor review, diagnostics in lab, and diagnostics in radiology, review by Consultant doctor, waiting for admission and billing/discharge. The different times once the patient enters the ED were noted and represented in figure 3. From the time the patient arrives at the ED, waiting times for Encounter, Bed Allotment, Vitals check, Lab report, Radiology report, Consultant review and the time of admission/discharge were calculated.


Figure 3 Distribution of ED Waiting Times
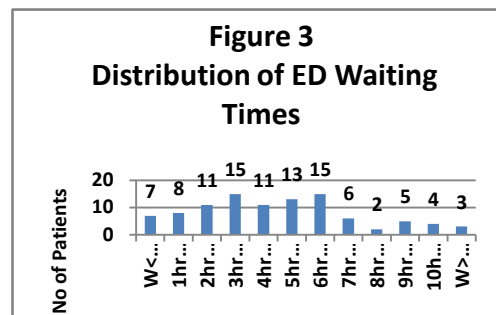
The Encounter, Bed Allotment, Vital check and ED doctor review happened very quickly and are below the mean time of 6 minutes which are represented in figure 4.

The mean waiting time for Lab report was 106 minutes of which the processing of tests accounted for 72 minutes. It can be deduced that there was an average waiting time of 34 minutes to undergo tests at Lab.

The mean waiting time for Radiology report was 162 minutes of which the processing time was 70 minutes. It can be deduced that there was an average waiting time 92 minutes to undergo tests at Radiology.

The mean waiting time for check by a Consultant doctor was 136 minutes. Of this the mean response time of the consultant once the request was made was 51 minutes. The delay of an average of 85 minutes to inform the Consultant needs to be examined further. This could be due to known reasons like patient being kept on observation to
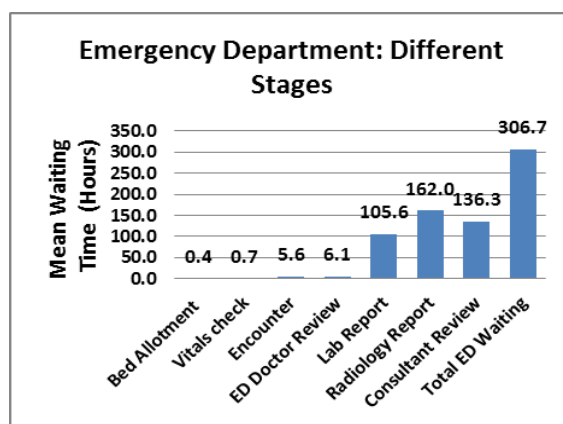
Source: Primary data   Figure 4

assess the criticality etc. but could also be on account of oversight or overburden of attending to too many patients in the ED.

Using the time taken for diagnostic tests at the Lab and Radiology as well as review by the Consultant doctor and observation, the mean waiting time to get admitted to the hospital was deduced to find out the waiting time on account of patient "boarding". This mean waiting time for admission to the hospital was calculated to be 194 minutes.

The total ED waiting time from the time the patient arrives to the time of either admission to the hospital or discharge was calculated. The mean total ED waiting time for 75% of patients who were finally admitted was 323 minutes i.e. 5 hours 23 minutes. The total ED waiting time for all the 100 patients studied (admits + discharges) was calculated to slightly lower at 307 minutes.

The distribution of total ED waiting times was examined. There were only 24% of patient below a mean total ED waiting time of 3 hours with an average of 101 minutes (1hr 41 minutes). The mean total ED waiting time for over 3 hours was calculated as 377 minutes (6hr 17 min) there were almost 12% of patients who had a total ED waiting time over 9 hours.

Of the 75 patients who got admitted to the hospital, 39 patients were admitted into one of the ICU. An analysis was done of the waiting times for the ICU patients and compared with total patients.

Figure 3 shows that the mean total ED waiting time for ICU patients was lower at 272 minutes as compared to the mean of 307 minutes for all 100 patients. The Waiting time for Admission was also lower for the ICU patients at 154 minutes compared to the mean of 178 minutes for all 100 patients. It can be observed that while the wait times for ICU patients are lower, the absolute values are still high.

Figure 5

It is observed that while the Total ED Waiting time was 307 minutes, the waiting time to get admitted was 194 minutes, the waiting time for Consultant check was 136 minutes and the waiting time for Radiology report was 162 minutes. Further Correlation studies were done between the different variables, to examine for linear relationships and the observations are summarized below:
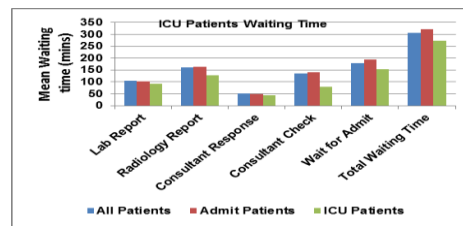
TOTAL ED WAITING TIME VS ED DOCTOR CHECK TIME

The mean ED Doctor Check time Lab for the 100 patients surveyed was just 6.1 mins. The mean Total ED waiting time for these patients was 307 mins (5hrs 7 min). The correlation co-efficient between the total ED waiting time and the ED Doctor Check time was calculated to be (+) 0.20. Figure 6 shows the scatter graph and the correlation co-efficient which leads to the conclusion that **there is a very low positive linear relationship between the two variables - total ED waiting time and the ED Doctor Check Time**.

Figure 6
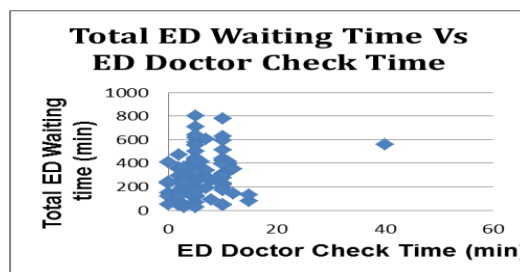
TOTAL ED WAITING TIME VS LAB WAITING TIME

The mean Lab waiting time for the 65 out of the 100 patients who underwent diagnostic tests at the Lab was 106 mins (1hr 46 min). The mean Total ED waiting time for these patients was 327 mins (5hrs 27 min) which is slightly more than the mean Total ED waiting time of 307 mins (5hrs 7 min) for all 100 patients surveyed which is shown in figure 7. The correlation co-efficient between the total ED waiting time and the Laboratory waiting time was calculated to be (+) 0.34. The scatter graph and the correlation co-efficient leads to the conclusion that there is a very low positive linear relationship between the two variables - total ED waiting time and the Lab waiting time.
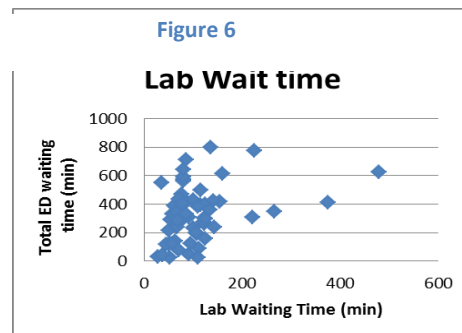

Figure 7

TOTAL ED WAITING TIME VS RADIOLOGY WAITING TIME

The mean Radiology waiting time for the 35 out of the 100 patients who underwent diagnostic tests was 162 mins (2hrs 42 min). The mean Total ED waiting time for these patients was 355 mins (5hrs 55 min) which is more than the mean Total ED waiting time of 307 mins (5hrs 7 min) for all 100 patients surveyed. The correlation co-efficient between the total ED waiting time and the Laboratory waiting time was calculated to be (+) 0.55. The scatter graph and the correlation co-efficient leads to the conclusion that there is a moderate positive linear relationship between the two variables - total ED waiting time and the Lab waiting time which is represented in figure 8.
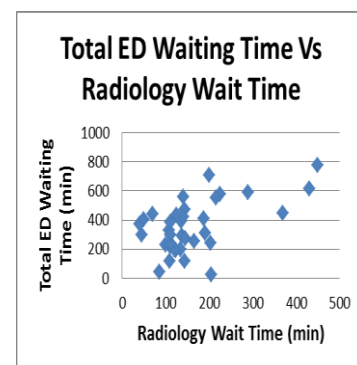

Figure 8

TOTAL ED WAITING TIME VS CONSULTANT CHECK TIME

Figure 9 shows that the mean Consultant check time for the 59 out of the 100 patients who were examined by a Specialist was 136 mins (2hrs 16 min). The mean Total ED waiting time for these patients was 313 mins (5hrs 13 min) which is slightly more than the mean Total ED waiting time of 307 mins (5hrs 7min) for all 100 patients surveyed. Of the total 136 minutes, the mean time taken to place a request for examination by a Consultant was high at 81 minutes while the mean Consultant response time was lower at 51 minutes. The correlation co-efficient between the total ED waiting time and the Consultant Check time was calculated to be (+) 0.68.
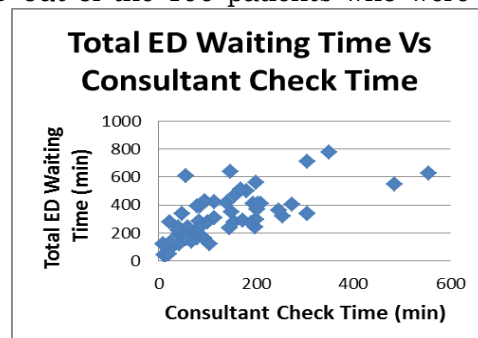

Figure 9

4

The scatter graph and the correlation co-efficient leads to the conclusion that there is an almost high positive linear relationship between the two variables - total ED waiting time and the Consultant Check time.

TOTAL ED WAITING TIME VS WAITING TIME TO ADMIT

The mean Waiting Time to admit for the 75 out the 100 patients who got admitted was derived as 194 mins (3hrs 14 min). The mean Total ED waiting time for the patients admitted was 323 minutes (5hrs 23 min) which is higher than the mean Total ED waiting time of 307 mins (5hrs 7 min) for all patients including discharges. The correlation co-efficient between the total ED waiting time and the Waiting Time for Admit was calculated to be (+) 0.78. The scatter graph and the correlation co-efficient leads to the conclusion that there is a very high positive linear relationship between the two variables - total ED waiting time and Waiting time to Admit which is represented in figure 10.
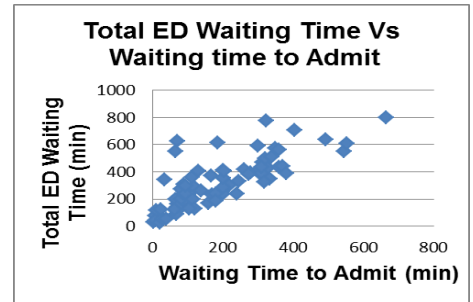

Figure 10

The "Waiting Time for admission" is not readily available as there was no information on the time when the decision to admit the patient is made, so this has been assumed as "the time the patient had to wait after either the diagnostics or the review by the consultant doctor were completed.
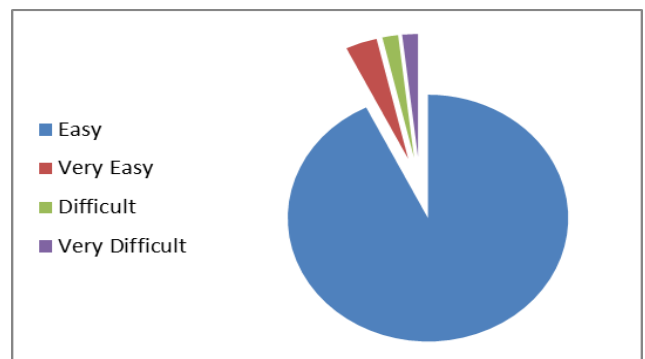
DATA ANALYSIS FOR THE PATIENT SATISFACTION SURVEY
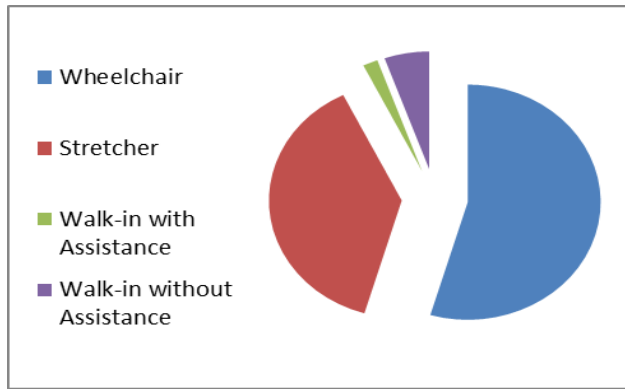
The analysis of responses of patients is summarized below

Location: Identifiable		
Easy	54	98%
Very Easy	0	0%
Difficult	0	0%
Very Difficult	1	2%
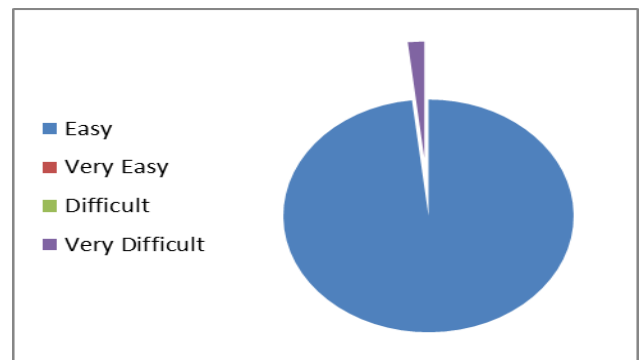
Location: Approachable		
Easy	51	93%
Very Easy	2	4%
Difficult	1	2%
Very Difficult	1	2%

How Received		
Wheelchair	30	55%
Stretcher	21	38%
Walk-in with Assistance	1	2%
Walk-in without	3	5%

How fast was bed alloted		
0-5 min	54	98%
5-10 min	0	0%
10-15 min	0	0%
More than 15 min	1	2%
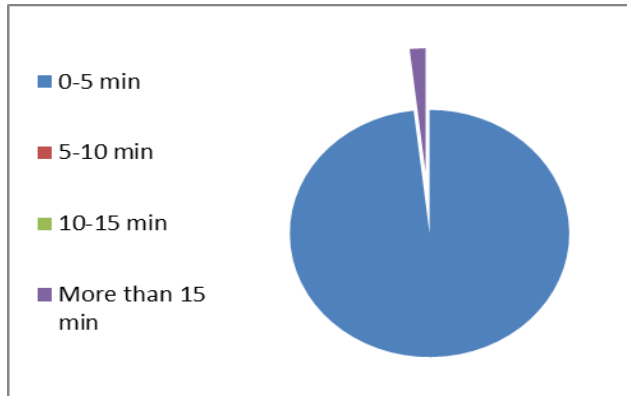
How do you rate nurse services		
Friendly	35	64%
Co-operative	20	36%
Unfriendly	0	0%
Un co-operative	0	0%
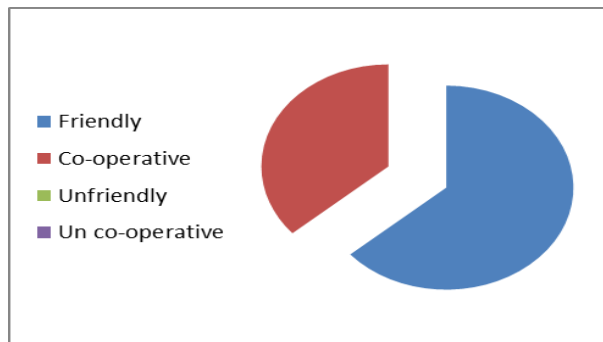
How do you rate the doctor services		
Friendly	28	51%
Informative	27	49%
Unfriendly	0	0%
Un-informative	0	0%
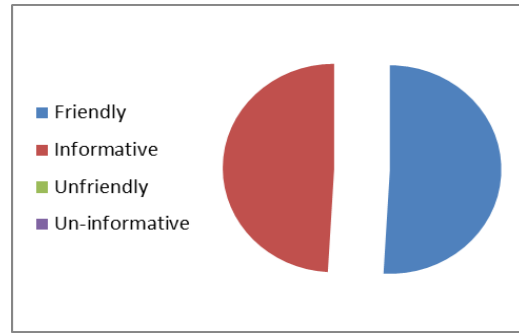
How fast did doctor attend to you		
0-10 min	45	82%
10-15 min	10	18%
15-20 min	0	0%
20-30 min	0	0%
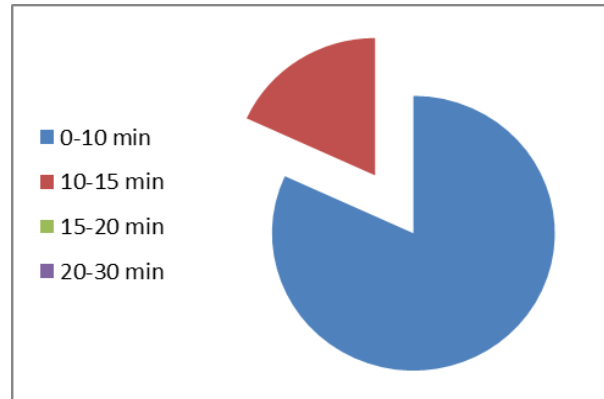
Did the doctor explain the details of treatment / test		
Explained Very less	5	9%
Explained in detail	50	91%
Did not explain	0	0%
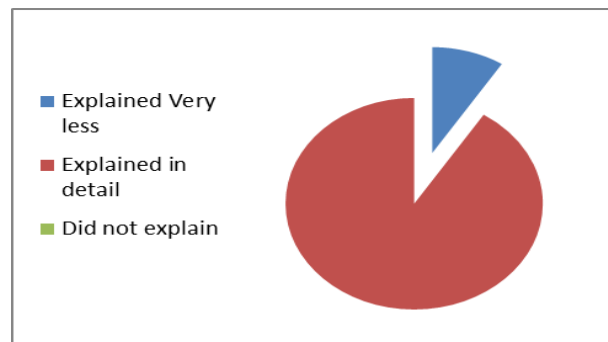
Did the nurse explain details of treatment / test		
Explained Very less	5	9%
Explained in detail	50	91%
Did not explain	0	0%
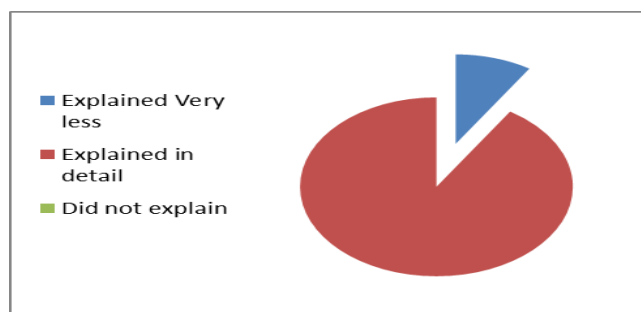
How fast did nurse attend to you		
0-5 min	53	96%
5-10 min	2	4%
10-15 min	0	0%
More than 15 min	0	0%
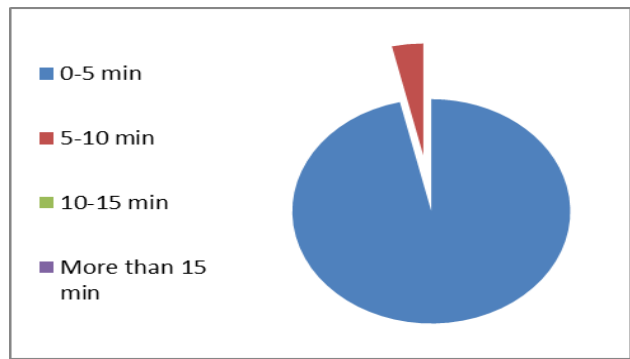
How was the discharge performed		
Slow	13	24%
Time taking	14	25%
Fast	27	49%
Quick and Efficient	1	2%
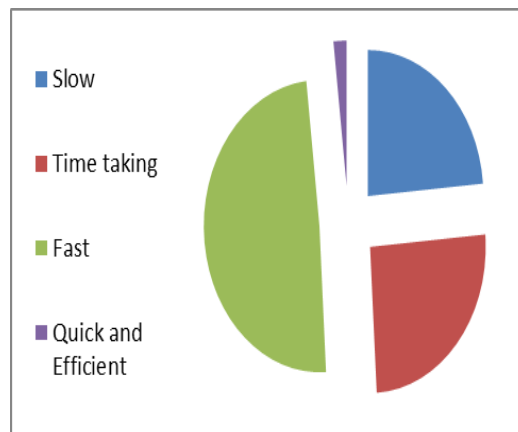
How was the billing conducted		
Slow	6	11%
Time taking	8	15%
Fast	39	71%
Quick and Efficient	2	4%
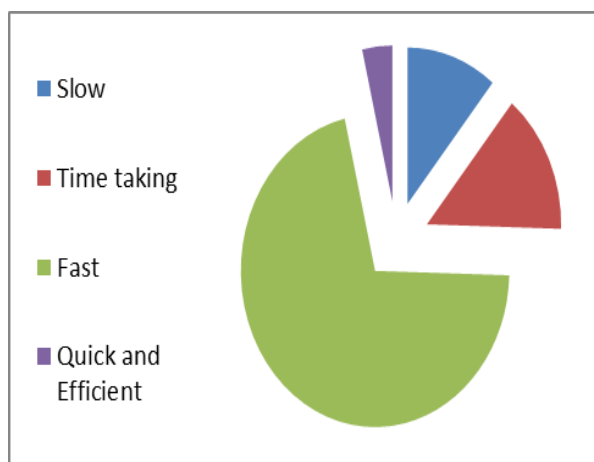
How do you the rate the ambience		
Good	50	91%
Excellent	5	9%
Poor	0	0%
Bad	0	0%
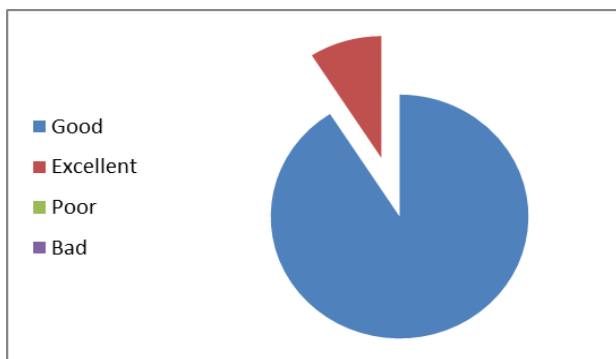
How do you rate stay/treatment in ED		
Satisfactory	49	89%
Above Expectations	4	7%
Unsatisfactory	2	4%
Below Expectations	0	0%
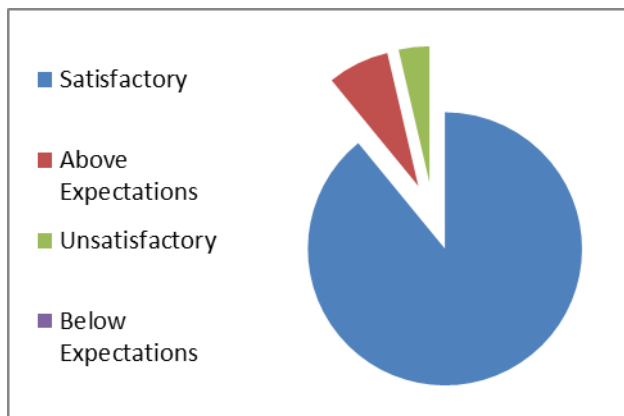
RESULTS AND FINDINGS

The present study was conducted to determine the waiting period of patients in an emergency department and to identify causes which contributes to the delay in the Emergency Department and also their satisfaction regarding ED services.

• The main causes identified contributing to waiting period are patient boarding, delay in consultant counseling, TAT delay in radiology procedures, insufficient staff, non-urgent cases in the ED and non-availability of beds for admission patients

• The total ED waiting time for all patients was found to be in the range of 25 mins to 800 mins with mean waiting time of 307 mins and a standard deviation (SD) of 173 min

• The consultant review waiting time for all patients reviewed by a consultant was found to be in the range of 8 mins to 555 mins with a mean waiting time of 136 mins and a SD of 113 mins

• There was a high positive correlation (correlation coefficient of + 0.68) between Consultant review waiting time and the total ED waiting time.

• Of the mean waiting time of 136 mins for consultant review, 81 mins was the time taken by ED staff to inform the consultant and 51 mins was the response time of the consultant to come and examine the patient

• The radiology report waiting time for all patients who availed radiology was found to be in the range 40 mins to 450 mins with a mean waiting time of 163 mins and a SD of 96 min

• There was a moderate positive correlation (correlation coefficient of +0.55) between radiology report waiting time and the total ED waiting time

• Of the mean radiology report waiting time of 163 mins, 70 mins was the mean radiology processing time while the remaining 93 mins can be deduced as the mean waiting time at radiology for undergoing tests.

• There is a noticeable delay in the ED diagnosis due to diagnostic interventions delays in the hospital. As the radiology department caters for OP, IP, OT patients too besides the ED patients, there are large queuing of patients. Another delay in the radiology department is delay in sending the reports.

• The Laboratory report waiting time was found to be in the range 27 mins to 480 mins with a mean waiting time of 106 mins and a SD of 73 mins

• There was a low positive correlation (correlation coefficient of + 0.34) between the Laboratory report waiting time and the total ED waiting time

• Of the mean Laboratory report waiting time of 106 mins, 72 mins was the mean Laboratory processing time while the remaining 34 mins can be deduced as the mean waiting time at Laboratory for undergoing tests.

• Study of TAT for lab revealed that the most common reasons for test delays were linked to sample collecting and transport, the practice of interrupting routine testing for urgent analyses and communicating results to clinicians.

• The ED Doctor review waiting time was found in the range 0 mins to 40 mins with a mean waiting time of 6.1 mins and a SD of 4.9 mins. There was very low positive correlation (correlation coefficient of + 0.20) between the mean ED Doctor review time and total ED waiting time.

• The mean waiting time for admission or patient "boarding" was derived to be in the range 3 mins to 665 mins with a mean waiting time of 178 mins and a SD of 135 mins.

• There was a very high positive correlation (correlation coefficient of + 0.78) between Waiting time for Admission or patent "boarding" and total ED waiting time, making it as one of the key factors to be addressed for the high ED waiting time.

• The waiting times for ICU admission patients were analyzed and found to be lower than the overall waiting times for all patients. The mean total ED waiting time for ICU patients was 274 mins against the overall mean waiting time of 307 mins. Similarly, the mean derived waiting time for patient "boarding" for ICU admissions was 154 mins as compared to the overall mean time of 178 mins. The absolute numbers are still high and need to be acted upon

• There are large number of non-urgent cases, especially OP patients coming into the ED leading to higher ED waiting time

• 98% of the patients surveyed rated the Emergency department "Easy" or "Very Easy" to **Identify** while 97% "Easy" or "Very easy" when asked if the Emergency department is **Approachable.**

• Majority of patients were received either in a wheelchair or stretcher. 55% of the patients were received in a **wheelchair** while 38% were received in a **stretcher**.

• 98% of the patients rated that the bed allotment within **0-5 mins** while 2% rated that bed allotment was **more than 15 mins**

• 96% of patients rated that the nurse attended to them in **0-5 mins** while the remaining 4% rated **5-10 mins.** 91% rated that the nurses explained the details of treatment **in detail** while the remaining 9% rated as **very less**. 64% rated the nurse services as **friendly** while 36% rated as **co-operative**.

• 82% of patients rated that the doctor attended to them in **0-10 mins** while the remaining 18% rated **10-15 mins.** 91% rated that the doctors explained the details of treatment **in detail** while the remaining 9% rated as **very less**. 51% rated the doctor services as **friendly** while 49% rated as **informative**.

• 9% of the patients rated the ambience of Emergency department as **excellent** while 91% are as **good**.

• Only 49% of the patients rated the discharge as **fast** while an equal 49% rated it as **slow** and **time consuming**.

• Only 71% of the patients rated the billing as **fast** while 26% rated it as **slow** and **time consuming**.

• 96% of the patients rated their stay as either **satisfactory** or **above expectations** while 4% rated as **unsatisfactory**

• The hospital needs to address the patient dissatisfaction with discharge and billing services. The billing and discharge/transfer delays are primarily due to non-availability of beds. The patients cannot be billed and transferred out if there is no bed to accommodate in the ICU/ward.

CONCLUSION

Waiting time in hospital, outpatient clinics affects patient satisfaction, access to care, health outcomes, trust, willingness to return and hospital revenue. Improving how an emergency department functions does not always require more money or new resources. Rather, the focus should be on removing the barriers that impede or slow down patient flow. Each emergency department is unique and remedies have to be tailored to recognize this. The hospital needs to reduce ED waiting times and take the below suggested actions in order to improve patient satisfaction with ED billing and discharge services.

SUGGESTIONS

1. **Design of the Emergency Department:** Hospital has to be redesigned and update the Emergency Department to bring a new type of care to better serve patients by getting them the treatment they need more quickly.

2. Build an Acute Critical Care Unit (ACU): Redesign to build an Acute Care Unit (ACU).

3. Increasing number of beds: Opening up more beds in form of wards and rooms can reduce patient boarding in ED to a large extent.

4. Nurse /Patient ratio: Increasing the staff nurse patient ratio in the ED for priority I beds to 1:1, priority II beds and priority III to 1:2.

5. **Doctor/Patient Ratio:** Increase the resident doctors in the ED, which is currently three to four and change the two shift system to a three shift system for doctors to provide efficient and effective patient care.

6. **Availability of Specialist Doctors:** Detail a specialist trainee from each department exclusively for Emergency department only.

7. Pediatric Emergency Department: Having a separate ED for pediatric care is essential as children are more prone to infections, need special personal care.

8. Satellite Laboratory: A comprehensive satellite laboratory service is an important adjunct to improve the timeliness of care in the emergency department.

9. Satellite Pharmacy: Having pharmacy near by the ED can save a lot of time. Though pneumatic shoot system is used, it does not enable receiving certain necessary drugs like ampules, saline bottles etc.

10. Staff for miscellaneous work: The ED requires a staff exclusively for answering calls, encountering the patients, to handle queries regarding critical values from the central lab etc. which otherwise are done by the ED nurses causing interruption in patient care and loss of time.

11. In order to overcome the delay in diagnostic studies, increase the number of modalities from one to at least two of each in cases like the X-ray machines and ultrasound machines. Increase the number of radiologists

12. Early recognition and discharge of patients from the inpatient units to create beds for the ED particularly during high census periods

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