

# Characteristics of Patients Attending the Emergency Department at the Tripoli Medical Centre

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## Abstract

Studying the characteristics of patients attending an emergency department is important in understanding the issues faced by emergency departments (EDs). Due to the weaknesses in the existing data acquisition in the ED of Tripoli Medical Centre (TMC), there is a need for this kind of study to appreciate the problems affecting ED services. This is a descriptive study of TMC to provide an overview of the ED environment and a description of patient characteristics. ED environment and Patient (adult) features were assessed via the number of patients admitted in a particular time frame, their characteristics (age, gender, nationality and severity), referral and discharge patterns, arrival process, patients waiting time and ED capacity. This study found that during May 2012, 7,100 patients visited the TMC ED, with the peak time for visits found to be between 10:00 and 19:00 hours. 75% of the cases were found to be non-urgent and minor. The vast majority, amounting to 83%, visited the TMC ED without a healthcare professional advice. In addition, 57% were discharged, whilst 25% were subsequently sent to urgent areas. This study concluded there was an inadequacy in terms of the number of beds; Moreover, the waiting time of patients was found to surpass those detailed in the recommended guidelines. Further studies are required to improve systems and service levels within the TMC.

**Keywords:** Emergency Department, Patient characteristics, Access to ED, Hospital capacity, Patient waiting time

## **Introduction**

Patients within the emergency departments (ED) of hospitals receive a significant degree of attention in the literature of health services. Notably, a number of early surveys carried out detail an increase in use, examine and debate on the broadening role of emergency departments beyond simply delivering emergency healthcare (Hunt, Weber, Showstack, Colby & Callahan, 2006; Lacalle & Rabin, 2010; He, YaHou, Toloo, Patrick & Gerald, 2011; Lowthian et al., 2010).

A number of studies have been carried out within the UK and US, all of which direct attention towards ED users, as well as identifying and highlighting their characteristics (Mandelberg, Kuhn & Kohn, 2000; Han, Ospina, Blitz, Strome & Rowe, 2007; Belleville, Busque & Marchand, 2010). Moreover, other studies have delivered summaries of the characteristics of ED users in an attempt to describe and gain understanding in this arena. It is considered that this will help to achieve understanding in regard to the services provided, as well as the patient flow and how much time is assigned on a per-patient basis. Reviewing the characteristics of ED patients helps to deliver sound insight into EDs; subsequently, this facilitates understanding in relation to a number of different elements associated with the issues and obstacles experienced by EDs, namely the hospital capacity and occupancy, number of patients, patterns of arrival, potential bottlenecks (as well as the causes and results of such). It is considered that this would help in devising ways of overcoming such issues (Markham & Graudins 2011).

Irrespective of the value and importance linked to such studies, Libya is one of the developing nations that suffer with problems related to its health system. One of the major problems faced by the healthcare managers of various hospitals is the lack of data relating to EDs patients. Moreover, in terms of ED users' characteristics, there is also a lack of information. Therefore, healthcare managers in Libya are seeking for this kind of study to aid understanding of the problems affecting ED. Tripoli Medical Centre (TMC) hospital is selected for this study. It is considered one of the most advanced health establishments in the provision of high quality medical care and an advanced centre for medical education and training of the medical and Para-medical staff. TMC is one of the largest hospitals in Libya with 1438 total number of beds. This hospital includes an emergency department, which is one of the most important emergency departments in the country as it serves the residents of Tripoli an estimated population of over one million and a half. Based on the importance of the emergency department within TMC, and its problem with lacking in data existing, which is one of the major concerns is taken as the test subject to carry out research. The current study seeks to fulfil the main aim of presenting the ED environment in an empirical way, and accordingly providing an overview and description of the characteristics of those patients attending the TMC ED.

## **Methods**

A descriptive study has been conducted, which explored an urban teaching hospital with an emergency department that receives approximately 85,000 adult ED visits per year. The ED service is provided on a 24-hour basis, led by consultants delivering specialised services, such as cardiology. The patients are classified into five categories according to their condition:

1. Immediate cases, which are directed immediately to an urgent area comprising a resuscitation room, observations rooms, and cardiology. This type of patient should be seen in less than 1 minute.
2. Emergency cases, which are seen immediately or after triage (depending on the severity of their condition), and then directed to an urgent area. This type of patient should be seen within 1–14 minutes.
3. Urgent cases are commonly directed in the same way as emergency patients, but are seen within 15–60 minutes.
4. Minor cases—referred to as semi-urgent in some hospitals—are directed to the main ED area, and should be seen within 1–2 hours.
5. Non-urgent cases received into the main ED area should be seen within 2–24 hours. Every patient (or their relative) has to register in at reception upon arrival at the ED.

### **Data Collection**

In order to obtain data, the following methods were employed:

1. ED records (manual patient's records and ED electronic and manual administrative records).
2. Research forms designed to collect other important data that were not available in the ED records. Participants were ED visitors for May 2012, which totalled 7,100 total visits with an average of 229 visits per day. The sampled data used for this study was validated with the same data set of January 2012 and March 2012.

ED records—both electronic and manual— for all patients that have been presented to ED during May 2012, have been reviewed in order to obtain the information that describes the ED visits and activities; however, there is inadequate information with the capacity to demonstrate other aspects of the ED. For instance, patients' waiting time, and time spent delivering different care services. Therefore, the form was designed to assist the collection of important data for the study. This information was actually related to the time spent waiting for the service.

Five assistants were trained for three days in the use of the form prior to the collection of data. They were also trained in observing the daily operations and activities within the ED. The method was centred on dividing patients into two categories.

The first category included patients with minor and non-urgent conditions who, upon arrival at reception, were asked whether they were prepared to participate. The researcher then explained the form prior to giving it to each patient (or relative) to complete before returning it upon leaving the ED (to be admitted, discharged, or referred to other centres).

The second category concerned patients with extreme emergencies and urgent cases. The assistant's task was to observe, collect, and complete the form for this category.

### **Participants**

Although efforts were made to approach every patient admitted to the emergency department between 08:00 and 17:00 hrs, to fill the designed form, several patients could not be included for various reasons (as described in the Figure 1).

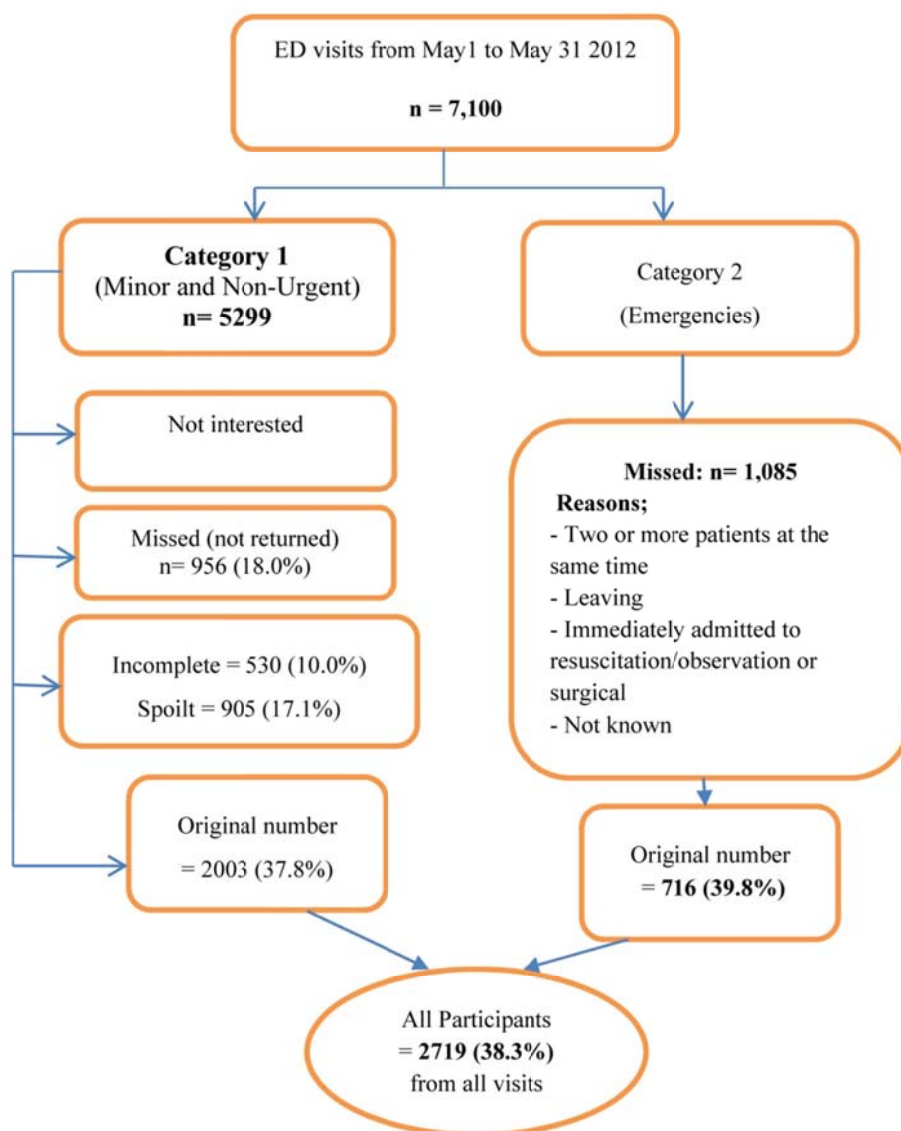


Figure 1. Shows the Patient recruitment flow diagram, May 2012

### Statistical analysis

Data was entered into a Microsoft Excel spread sheet. Categorical variables were reported as percentages, continuous variables were reported as means and standard deviations (SDs).

### Results

#### Sampling

Altogether, 7,100 patients were found to have attending the ED of the TMC. From this figure, more than one-third (38%,  $n = 2,439$ ) participated in the research. In regard to the overall size of the sample, 38% is considered to be a very good representation of a population (Bartlett, Kotrlik & Higgins, 2001). Notably, the patients that were not involved ( $n = 4,661$ ) were excluded on the basis of what is shown in Figure 1.

#### Participant Characteristics

Patient characteristics in the study are summarised in Table 1. The mean age of all ED visitors is 52 years: 39.2 % were 65 or over; just 10.6 % were between 16 and 24 years. Data also indicates that almost all ED users within the study were Libyan. Furthermore, the 5,299 patients (who registered in the ED during May 2012) were minor and non-urgent cases. The remaining 1,801 patients made up the extreme and urgent group.

Table 1. Summary of patients visiting ED, May 2012

variables	Number of patients (%)
<b>Age (year/ mean- SD)</b>	52.3 (7.7) year
(16-24)	755 (10.6%)
(25-44)	1,500 (21.1%)
(45-64)	2,061 (29.1%)
(65 + )	2,784 (39.2%)
<b>Gender</b>	
Male	4,014 (56.5 %)
Female	3,085 (43.5 %)
<b>Nationality</b>	
Libyan	6,897 (97.2 %)
Non-Libyan	203 (2.8 %)
<b>Severity</b>	
Emergencies cases (Immediate, emergent, and Urgent)	1,801 (25.4%)
Minor & Non-Urgent case	5299 (74.6 %)

Patients are able to access the ED in a number of different ways (Figure 2). The majority of ED visits (82.9%) attended the ED without being referred by a healthcare professional; just 9% of all visits were referred by a healthcare professional or a primary or secondary healthcare centre. Moreover, almost 6% of patients were directed to ED by private clinics. Figure 2 also summarises a disposition of the ED. Almost half of those attending emergency departments are discharged, with approximately 17% admitted to hospital and 25.4% admitted to an urgent area of the ED.

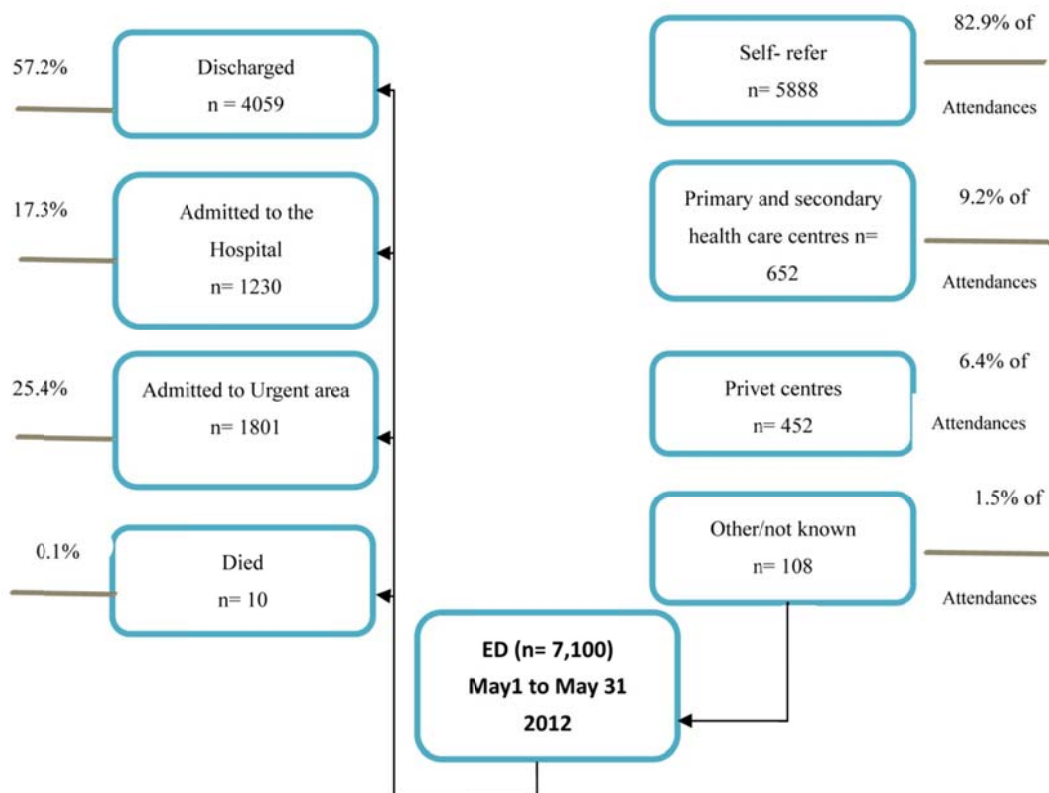


Figure 2. shows the ED patients overview, May 2012

### Patient Arrival Process

The arrival process ensures that the time at which the patient registers within the ED is recorded; varying degrees of detail may be included. In the context of this study, the arrival process will be described in two different ways accordingly to timescale. Notably, Figure 3 provides a middle-level monthly illustration, the time unit is days, Figure 4, on the other hand, provides insight on a daily basis, with time unit in hours.

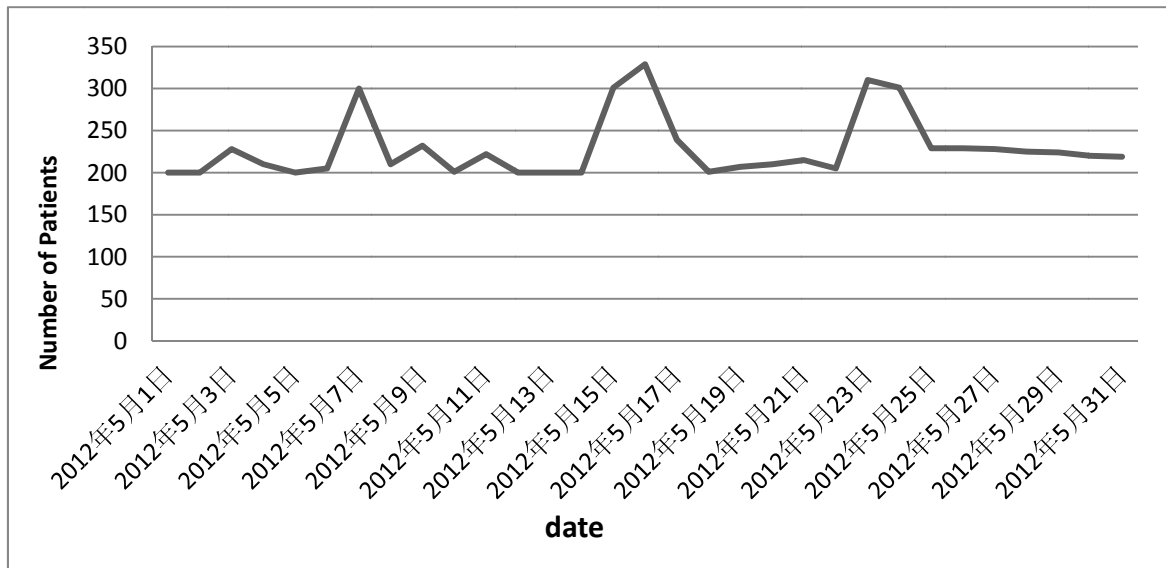


Figure 3. Number of patients per day (May 2012)

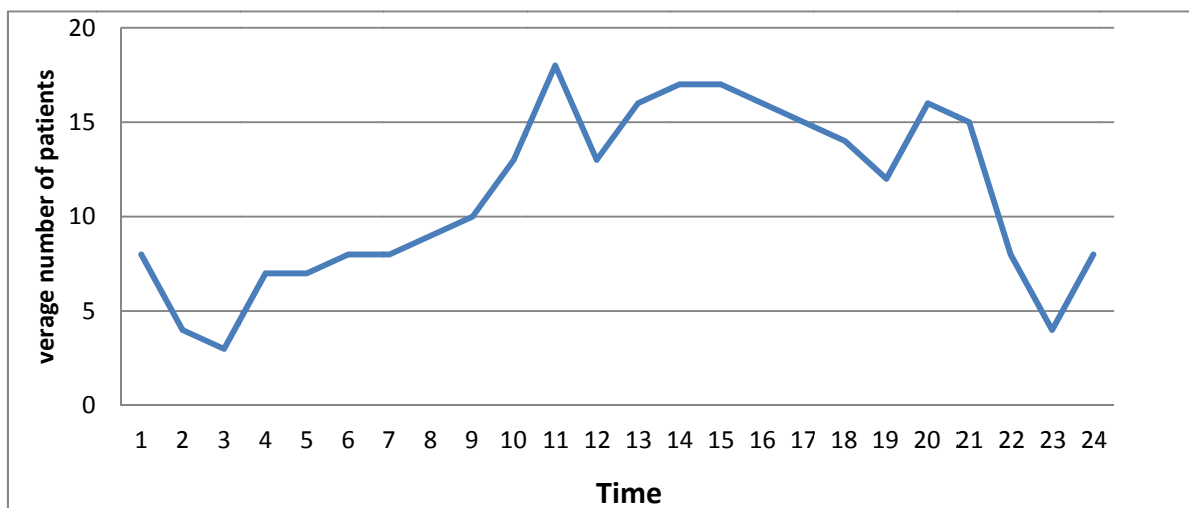


Figure 4. Number of patients per Hour (May 2012, Weekdays)

- **ED capacity**

Data contained in the following table (taken from hospital records and personal observations) displays details of beds and staff in the ED.

Table 2. summarised details of ED capacity during study period (May 2012)

ED Area	Facilities	Details
ED waiting area	There is no proportionality between the number of seats in the waiting area and the number of waiting patients	Patients should wait in the waiting area if all ED beds are taken. They are directed to main or urgent beds on a first come, first served, basis relative their condition.
ED Main area	14 beds	Patients in the main ED first see a physician and then wait (without a physician) for diagnostic testing and treatment, and then see a physician again before being admitted or discharged.
Bed	4 attending physicians from 08:00 to 20:00	
staff	2 attending physicians from 20:00 to 08:00 3 Nurses from 08:00 to 08:00	
ED Urgent area		There is no specific time for patient to stay in resuscitation room.  Patients admitted to the observation unit are like those admitted to the hospital.
Resuscitation	4 beds	
Bed	1 attending physician from 08:00 to 20:00, 1 attending physician from 20:00 to 08:00, and 2 nurses from 08:00 to 08:00	
Staff	7 beds for males and 10 beds for females.	
Observation	2 attending physicians from 08:00 to 20:00 and 2 attending physicians from 20:00 to 8 am. 2 Nurses from 08:00 to 08:00	
Bed	2 beds	
Staff	1 attending physician from 08:00 to 08:00, 1 attending physician from 20:00 to 08:00	
Cardiology		
Bed		
Staff		
* Boarding	No data available about how many beds in hallway	No preset limit on how many patients can board

\*When patients flow back up in the hospital, patients waiting in the ED to be admitted are “boarded.” This means they either take up an ED bed or are placed on gurneys and rolled into holding areas like hallways.

## Waiting Time

The table below provides insight into the time spent by patients waiting for a doctor compared with the recommended timeframe developed by the Emergency Nurses Association. This time frame is implemented in the organisational regulation of the ED. This table



provides some degree of understanding in regard to the percentage of patients that are forced to wait a time exceeding that which is recommended.

Table 3. Average waiting time to see physician and percentage of visits in which recommended time frame by acuity level exceeded in May 2012.

Patient Condition	Average wait time in minutes	% of patients in which wait time exceeded recommended time frame*
Immediate cases (should be seen in less than 1 min)	10	55.8
Emergent ( should be seen within 1 to 14 minutes)	38	53.4
Urgent ( should be seen within 60 to 120 minutes)	53	23.5
Minor (semi urgent) ( should be seen within 1 to 2 hours)	85	22.5
Non – urgent cases (should be seen within 2 to 24 hours)	100	60.3
Recommended time frame is developed by the Emergency Nurses Association. Time patients should spend waiting for doctor depends on a five-level emergency severity Emergency Department of TMC is used this frame in its regulation.		

## Discussion

This paper focused on the description of the emergency department of the Tripoli Medical Centre (TMC). Data was collected by reviewing ED records, and administrative records. A form was designed to collect data that was not available in ED records. Data has been validated by using observation methods, and reviewing the data from previous months of the study.

The average age of all study participants is 52 years, which indicates that most users of the ED are above forty. It is easy to discern this from the data presented in Table 1, which shows that 39 % of all patients (who attended the ED during the study period) were 65 or above whereas patients in the 16 - 24 age group was just 10.6 %. Table 1 also shows that most ED users were male, and the majority of all users were Libyan.

Noteworthy (as shown in Table 1) the majority of patients who use the ED (to obtain medical services) were minor and non-urgent cases (74.6 %). This may be interpreted by data presented in Fig. 2 which describes the access methods to the ED. Most users of ED attended ED based on their decision to seek medical service not by being referred by any other health centre.

In fact, the ‘self-referral’ problem is well known in EDs around the world and considered a reason for ED overcrowding. Several studies have been conducted (in both the USA and the UK) to find the causes that make patients go directly to the ED (Rubin & Bonnin, 1995).

Fig 2 shows that the department admitted approximately 17% to hospital per month. Furthermore, almost 25 % of all users are referred to the urgent area. These cases transferred to the urgent area (especially the observation and resuscitation rooms) are usually dealt with as inpatients, because the length of their stay in the ED may exceed two days.

Of patients present in the ED during the study period, 10 have since passed away, including four who were dead on arrival. This percentage is similar to that of months preceding the study. The department also discharged (to home or any other health centre) the equivalent of 57% of all users. This result is very logical, because most department users were minor or non-urgent cases.

It is worth mentioning that the data obtained from the ED of the TMC (as presented in figure 2) is somewhat similar to results in previous studies that examined the characteristics of emergency departments in many hospitals worldwide, especially those that suffer from some problems, like overcrowding (Moser, Abu-Laban & Van-Beek, 2004; Day, Al-Roubaie & Goldlust, 2012).

Number of patients arriving daily to the ED is close, where the average daily arrival is 229 patients. Note that the peak time for the patient's influx is between 10:00 to 19:00.

One of the more interesting aspects of this study is the shortage of beds compared with other hospitals which are of a similar size and type as the TMC. Table 2 shows that the main area in emergency departments contains 14 beds, while there are approximately 23 beds available in other similar hospitals (Delia, 2007). Also urgent areas containing 23 beds distributed to resuscitation rooms (4 beds), observation rooms (17 beds) and cardiology rooms with just 2 beds. This constitutes a serious shortage of beds compared to other similar hospitals (Khare, Powell, Reinhardt & Lucenti, 2009; Elshove-Bolk et al., 2006).

Patient waiting time (to see a doctor) exceeds the recommended time frame shown in the hospital regulation list. It was found that patients who should be seen in less than a minute, the average waiting time was 10 minutes; and patients who should be seen in less than 15 minutes, were found that the average waiting time for them was more than half an hour.

Although this data is supported by other data in the literature, the average time spent by minor and non-urgent cases exceeds those found in previous studies.

## **Conclusions**

This research is one of the first to have been carried out within this arena in the specific context of Libya. It provides a generalised overview of the characteristics of those patients attending the TMC's ED during the month of May 2012. The data have been validated and verified through conducting a comparison with the data garnered for the previous months of the research.

This particular research highlights the fact that the ED of TMC receives in excess of 7,000 patients on a monthly basis. Such a number of patients is much larger than the numbers witnessed in other hospitals of the same type and with the same capacity.

Markedly, two important points have been established during the course of this study:

1. There is a shortage of beds when comparing the TMC with other hospitals of the same type and capacity;
2. The times patients are required to wait before seeing a doctor significantly exceed those recommended.

In view of the above findings, it is considered that there is a need to conduct further research in this field with the aim of establishing the problems that may occur as a direct result of the issues highlighted during the course of this study. Such research could help to establish solutions, and thus improve the systems within and services delivered by TMC.

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