



The factors affecting the waiting time of outpatients in the emergency unit of selected teaching hospitals of Tehran

Farhad Hemmati¹, Ghahraman Mahmoudi², Fatemeh Dabbaghi², Fahimeh Fatehi³, Esmail Rezazadeh¹

ABSTRACT

Background and Objective: Long stops in the emergency unit will result in patient dissatisfaction and increased casualties. The present study aimed to determine the waiting time of patients visiting the emergency unit of two selected teaching hospitals in Tehran and the factors affecting it.

Methodology: The present research was a cross-sectional descriptive-analytic study which was conducted in 2016. The statistical population included all patients and their caregivers in the emergency unit of Mofid and Ali Asghar hospitals, 335 of whom were selected as the sample. The required data were collected using the patient's waiting time form and an author-made questionnaire, whose validity was confirmed by experts and its reliability was obtained 90% using Cronbach's alpha. The data were analyzed using ANOVA and independent t-test in SPSS-22.

Findings: The results indicated that factors such as the large number of patients, long distance between emergency units, poor communication, and the low number of manpower affect the prolonged patient waiting time. In addition, the results showed the patient waiting time has a significant relationship with working shift, the day of visit, and insurance coverage ($p \leq 0.05$).

Conclusion: The study findings suggested that several factors increase the waiting time of patients in emergency units. Hence, it is recommended to take necessary measures for proper distribution of manpower in a different working shift and also on weekdays and holidays in order to reduce the patient waiting time. In addition, skills and experience of the emergency unit staff need to be improved through training courses.

Keywords: waiting time, emergency unit, hospital, workflow

INTRODUCTION

The waiting time is one of the most common complaints of patients visiting the emergency units of hospitals (1). The emergency unit is one of the most important wards of a hospital whose performance can have a great impact on the performance of other wards of the hospital and patient satisfaction (2). The emergency unit is known as the heart of any hospital (3) and its main task is to provide services in urgent medical cases (4). This unit is of special importance because of the provision of services to different groups of patients (5). Therefore, the health services provided in this unit should be immediate, appropriate, and suitable (6). Emergency units of hospitals are responsible for providing urgent medical care at all times of the day and all days of the year for patients requiring rapid medical interventions. In recent years, factors such as population growth, increased incidence of intentional and unintentional injuries, and drug abuse have led to a high density of clients in emergency units of hospitals (7). Society basically expects emergency units of hospitals to provide immediate and appropriate medical interventions depending on the severity of the clinical situation of patients. Therefore, the waiting time and the length of stay in the emergency unit are the key factors in assessing the quality of care provided in these units (8). Long waiting time for receiving emergency services is one of the common problems of hospitals which can lead to patients' dissatisfaction with the quality of provided services (9). Long waiting time and stay of patients in emergency units is the result of inefficiency of the workflow process in three steps of patient's

¹ Student of Ph.D. by Research, Hospital Administration Research Center, Sari Branch, Islamic Azad University, Sari, Iran

² Associated Professor of Hospital Administration Research Center, Sari Branch, Islamic Azad University, Sari, Iran

³ MSc student of health services management, Sari Branch, Islamic Azad University, Sari, Iran

Correspondence: Ghahraman Mahmoudi

Associated Professor of Hospital Administration Research Center, Sari Branch, Islamic Azad University, Sari, Iran

E-mail: Ghahraman.mahmoodi@gmail.com

Received: 3 Mar 2018, Accepted: 19 May 2018

© 2018 by the authors; licensee Modestum Ltd., UK. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>).

Electronic Journal of General Medicine

arrival at the emergency unit, provision of services, and patient's discharge. In addition to the negative effects on the expectation of therapeutic measures, this may cause a negative attitude towards hospitals and healthcare providers. A basic strategy to reduce the waiting time is the use of triage or prioritization of patients by the urgency of their conditions which requires a high level of concern for patients. The biggest concern in a pediatric emergency unit is about the quality of providing emergency services to a child because of their low age. Therefore, it is necessary to plan for continuous training of personnel in children's problems and techniques for providing the right and fastest services in the shortest possible time and provide the required equipment for serving this group of patients. For more efficiency and improvement of emergency care for children, problems and available resources should be identified. Because of poverty, homelessness, living in crowded places, drug abuse, economic affairs, and exposure to high-risk environments, children may be in a more need of emergency supports (10). The results of a study conducted by Golaghaei *et al.* in emergency units of teaching hospitals Arak indicated the long waiting time of patients admitted to emergency units (11). In addition, another study on the quality of services in the emergency unit of Al-Zahra Hospital showed that the most time-consuming steps in the emergency workflow include performing diagnostic tests, deciding on patient admission, prescribing the necessary measures, and filing (12). The review of studies conducted on the health sector of Iran shows that the mean waiting time of patients in emergency units of the desired hospitals is long. This indicates the existence of problems in the provision of emergency services, poor management, lack of coordination, and inadequate resources. However, studies conducted in Kerman have provided different and controversial results about the mean waiting time of patients. The findings of Zohour *et al.* in Kerman demonstrated that the mean waiting time of patients is about 6 minutes shorter than the international standard which seems somewhat strange and emphasizes the need for further studies (13). Since the waiting time in pediatric emergency units is much more important and critical than other emergency units, the mortality rate is high in such units due to the prolongation of accountability and handling and given that. According to previous studies, the crowding of emergency units and increased waiting time of patients for receiving medical services in these units can increase the number of deaths in hospitals. Planning for the improvement of service delivery at the highest quality and in shortest time requires a comprehensive overview of the current service delivery process and identification of its weaknesses and strengths. Hence, the present study aims to evaluate the factors affecting the waiting time of outpatients in emergency units of selected teaching hospitals in Tehran.

METHODOLOGY

The present research was a cross-sectional descriptive-analytic study which was conducted in 2016. The statistical population included all patients and their caregivers in the emergency unit of Mofid and Ali Asghar hospitals who had not gone through the timing process of the study. Considering a 15% level of confidence and an error rate of 5%, the sample size was calculated to be 335 using the following equation: $n = z^2 PQ/d^2$. Since the number of patients visiting the emergency unit was higher in the morning and evening shifts, the night shift patients accounted for 22% of the sample volume and patients of the morning and evening shifts made up 39% of them. Accordingly, 131, 131, and 73 patients from the morning, evening, and night shifts were selected for the sample. The required data in this study were collected using two questionnaires. To measure the waiting time in the emergency unit by the type of services from admission to discharge (screening and internal emergencies), a questionnaire was developed based on the timetable forms of the Hospital Emergency Administration, affiliated with Deputy of Treatment of the Ministry of Health and Medical Education. The validity of forms was confirmed by experts and informed individuals but their reliability was not needed to be assessed. The second measurement tool was an author-made 10-item questionnaire for investigating the factors affecting the waiting time of patients in emergency units which were scored based on a 5-point Likert scale. This questionnaire was developed after the review and extraction of the most important factors affecting the waiting time of patients based on the timetable forms of the Hospital Emergency Administration, affiliated with Deputy of Treatment of the Ministry of Health and Medical Education. The validity of this questionnaire was confirmed by experts and its reliability coefficient was obtained 90% using Cronbach's alpha. The data were collected by the author who was present in the emergency unit of studied hospitals and measured the conditions of patients from admission to discharge using a stopwatch and timetable forms. In each hospital, the author helped patients and their caregivers visiting the emergency unit in the morning, evening, and night shifts to fill out the questionnaires. The obtained data were statistically analyzed using descriptive statistics (tables, percentage, frequency, mean, and standard deviation). To measure the normality of data distribution, Kolmogorov-Smirnov test was used. Since the data followed a normal distribution, parametric tests were used to examine the hypotheses. In addition, independent t-test, analysis of variance, and Tukey's test were used

Table 1: The frequency and percentage of background variables of respondents in relation to the factors affecting the waiting time of patients in selected hospitals

Variable	Frequency	Percentage	
Gender	Male	157	47.2
	Female	177	52.8
Patient age	Under 3	72	21.5
	3-6	72	21.5
	6-9	128	38.2
	Over 9	63	18.8
Patient's caregiver age	20-30	164	48.95
	31-40	124	37.01
	41-50	47	14.04
Day of visiting the hospital	Weekday	61	18.2
	Holiday	274	81.8
Time of visiting the hospital	Morning shift	143	42.7
	Evening shift	134	40
	Night shift	58	17.3
Transfer to the hospital	Ambulance	97	29
	In parents' car	160	47.7
	From other hospitals	78	23.3
Insurance coverage	Social Security	128	38.2
	Salamat	126	37.6
	Armed Forces	63	17.8
	Others	19	5.4
Hospital name	Ali Asghar	187	54.9
	Mofid	151	45.1

Table 2: The factors affecting the waiting time of patients and their caregivers in the studied hospitals

Variable	Mean	Standard deviation
The large number of patients	4.22	2.83
Long distance between emergency units	3.83	2.81
Poor communication	3.81	2.77
Low number of manpower	3.78	2.78
Shortage of physicians	3.77	2.77
Lack of timely presence of physicians	3.74	2.82
Lack of appropriate timetables and planning	3.61	2.75
Low skillfulness, experience, and knowledge of the staff	3.55	2.87
Shortage of medical equipment	2.13	2.82
Low speed of the medical staff in handling the patients	2.11	2.83

in order to study the difference in the mean waiting time between variables of two groups, more than two groups, and three groups, respectively.

RESULTS

According to the study results, 47.2% of participants were male and 52.8% of them were female and their mean age was 7.5 ± 2.32 . The results also showed that 57.3% of patients had visited the emergency unit in the evening and night shifts and 42.7% of them were related to the morning shift. In addition, 81.8% and 18.2% of patients had visited the hospital during the weekdays and holidays, respectively. In terms of the way of transferring to the hospital, 47.7%, 21%, and 23.3% of patients had been taken to the hospital in their parents' car, by ambulance, and from other hospitals, respectively (see **Table 1**).

Based on the collected data and the results of independent t-test and analysis of variance, the factors affecting the waiting time of patients were identified which are shown in **Table 2**.

From the perspective of patients and their caregivers, the most important factors affecting the waiting time of patients in the emergency units, in an order of preference, are as follow: the large number of patients (4.22), long distance between emergency units (3.83), poor communication (3.81), low number of manpower (3.78), shortage of physicians (3.77), lack of timely presence of physicians (3.74), lack of appropriate timetables and planning (3.61), low skillfulness, experience, and knowledge of the staff (3.55), shortage of medical equipment (2.13), and low speed of the medical staff in handling the patients (2.11) (see **Table 3**).

Table 3: Comparison and ranking of the factors affecting the waiting time of patients and their caregivers in the studied hospitals

Factor	Rank
The large number of patients	1
Long distance between emergency units	2
Poor communication	3
Low number of manpower	4
Shortage of physicians	5
Lack of timely presence of physicians	6
Lack of appropriate timetables and planning	7
Low skillfulness, experience, and knowledge of the staff	8
Shortage of medical equipment	9
Low speed of the medical staff in handling the patients	10

DISCUSSION AND CONCLUSION

The present study aimed to determine the factors affecting the waiting time of patients visiting the emergency unit of two selected teaching hospitals in Tehran. The results showed that the main factors affecting the waiting time of patients include the large number of patients, long distance between emergency units, poor communication, low number of manpower, shortage of physicians, lack of timely presence of physicians, lack of appropriate timetables and planning, low skillfulness, experience, and knowledge of the staff, shortage of medical equipment, and low speed of the medical staff in handling the patients. It seems that the reason for the long waiting time of patients referred from other hospitals is the lack of coordination between these centers and the absence of a comprehensive electronic system between hospitals. The results of Nasiri *et al.* (2012) showed that the large number of patients, lack of timely presence of physicians, poor communication, and low number of manpower are the main factors delaying and prolonging the waiting time of patients from the perspectives of patients and their caregivers (14). Madadi *et al.* reported that the most important factors of delay in receiving hospital services are shortage of guidance signs, poor communication, low number of manpower, restlessness of patients (15). In addition, lack of human resources and equipment to serve patients, increased number of patients visiting the emergency units, financial problems of patients, and long distance between different wards of hospitals have been mentioned as the main factors affecting the waiting time of patients in other studies (16-18). The study of Tayebi *et al.* showed that there is a difference between the studied hospitals in terms of the waiting time of patients (19). The results of Masoumpour *et al.* (2012) about the waiting time for receiving services in the studied hospitals (the screen and triage wards) are consistent with the findings of the present study (20). The findings of a study conducted by Bokhari on reduced waiting time of patients in the emergency unit of Al-Nour Specialized Hospital of Mecca in 2015 corroborated the results of the present study (21). The results of a study conducted by Horowitz in 2010 about the reduced waiting time in the emergency unit of Saskatchewan in Canada are also consistent with the findings of the present study (22). In studies conducted in other areas of the world, it has been shown that the long waiting time and stay of patients in emergency units is the result of inefficiency of the workflow process in three steps of patient's arrival at the emergency unit, provision of services, and patient's discharge. Hence, one of the main reasons for increased waiting time for receiving emergency services is the lack of establishment of a triage unit or, in other words, prioritization of patients (23). Based on the results of this study, it can be concluded that there is a significant difference between working shifts in the mean waiting time for receiving services in the emergency unit. Accordingly, the highest and the lowest mean waiting time were observed in the evening and morning shifts, respectively. This can be due to the crowdedness of hospitals in the evening shift. Therefore, it is necessary that hospital authorities increase the number of staff in evening shifts compared to morning shifts. In addition, there was a significant difference between weekdays and holidays in this regard. This is consistent with the findings of Ramezankhani *et al.* (2016) about the waiting time of patients in emergency units of hospitals affiliated with Kerman University of Medical Sciences (24). Most studies conducted about the waiting time of patients have reported the same results that are consistent with the findings of the present study. Among the factors affecting the waiting time in Iranian hospitals, unfamiliarity of patients with hospital procedures and poor communication were identified as the most important factors in this study. Since this factor causes the confusion of patients, it is necessary to pay a special attention to this issue as a new requirement in hospitals. Patients want to receive services in the shortest possible time. Hence, the waiting time for receiving these services can be reduced by increasing the availability of services. It is recommended that the staff to be distributed in different wards of a hospital depending on the volume of their patients visiting them.

ACKNOWLEDGEMENTS

The authors would like to thank the heads of the studied hospitals and patients who helped us in this research.

REFERENCES

1. Lee G, Endacott R, Flett K, Bushnell R. Characteristics of patients who did not wait for treatment in the emergency department: a follow up survey. *Accident and Emergency Nursing* 2006;14:56-62. <https://doi.org/10.1016/j.aen.2005.11.004>
2. Rowe B, Schull M, Adamson B. *Understanding Emergency Department Wait Times*. 2005;15.
3. Zafarghandi M. [University strategies for quality improvement of emergency system]. *Proceedings of the First Congress on Quality Improvement in Emergency Management*; 2011; Tehran (Persian).
4. Khosravi S, Pouria-Mofrad A, Shamsipour M, Soorany H. [The effects of improvement plan on the emergency services in Kashani & Hajar Hospitals of Shahrekord]. *Journal of Downloaded from jhpm.ir at 23:06 +0330 on Sunday September 24th 2017. Shahrekord University of Medical Sciences*. 2005;7(2):71-80 (Persian).
5. CM F. [Hospital Administration]. Tehran: Social Security Research Institute:1999 (Persian).
6. Heydaranlou E, Khaghani Zadeh M, Ebadi A, Sirati Nir M, Aghdasi Mehr Abad N. [A survey on implementation of FOCUS-PDCA on performance of Tabriz Shahid Mahalati emergency department]. *Journal of Military Medicine*. 2008;10(4):5-9 (Persian).
7. Waseem M, Ravi L, Radeos M, Ganti S. Parental perception of waiting time and its influence on parental satisfaction in an urban pediatric emergency department: are parents accurate in determining waiting time? *Southern medical journal*. 2013;96(9):880-4. <https://doi.org/10.1097/01.SMJ.0000054911.92771.41>
8. Schafermeyer RW, Asplin BR. Hospital and emergency department crowding in the United States. *Emergency Medicine*. 2013;15(1):22-7. <https://doi.org/10.1046/j.1442-2026.2003.00403.x>
9. McHugh M, Van Dyke K, McClelland M, Moss D. *Improving Patient Flow and Reducing Emergency Department Crowding*. 2011:8.
10. Ajami S, Ketabi S, Bagherian Mahmood Abadi H. Reducing waiting time in emergency department at Ayatollah-Kashani Hospital using simulation. *Journal of Health Administration*. 2013;16(51):84-94.
11. Golaghaie F, Sarmadian H, Rafiie M, Nejat N. [A study on waiting time and length of stay of attendants to emergency department of Vali-e-Asr Hospital, Arak-Iran]. *Arak Medical University Journal*. 2008;11(2):74-83 (Persian).
12. Emami M. [A survey on quality of emergency services for patients in Alzahra hospital]. MSc Thesis. Isfahan: Isfahan University of Medical Sciences; 2008 (Persian).
13. Zohoor A, Pilevar Zadeh M. [Study of speed of offering services in emergency department at Kerman Bahonar hospital in 2000]. *Razi Journal of Medical Sciences*. 2003;10(35):413-9 (Persian).
14. Nasiripour A JK, Aghamohamadi S. Study Of Waiting Time In Shahid Dastani's Specialized Clinics Of Shariati Hospital Using By Six Sigma Model. *payavard*. 2011;4(3):50.
15. Maryam MaddiNeshat G-AR, Behroz Azimi, Akram Niknam Assessing trauma patients' waiting time and its associated factors referred to an emergency department. *Payesh*. 2015;2:155-65.
16. *Implementation handbook*. Rockville, MD: Agency for Healthcare Research and Quality. 2009:1-72.
17. Davidoff F, Florance V. The informationist: a new health profession? *Annals of internal medicine*. 2009;132(12):996-8. <https://doi.org/10.7326/0003-4819-132-12-200006200-00012>
18. Abdollahi E FS, Hajian Motlaq N, Abdollahi S. Patient Satisfaction in the Emergency Department of Savodjbolag Hospitals. *Alborz unversity medical journal*. 2015;4(3):176-83. <https://doi.org/10.18869/acadpub.aums.4.3.176>
19. Tabibi SJ, Najafi B, Shoaie S. Waiting time in the emergency department in selected hospitals of Iran University of Medical Sciences. *Pejouhesh dar Pezeshki*. 2009;33(2).
20. Masoumpour S, Rahimi S, Kharazmi E, Kavousi Z, Mosalah NH, Abedi Z. Assessing waiting time in emergency department of Shahid Faghihi hospital, Shiraz and presenting appropriate strategies using quality function deployment (QFD) method, 2011.2012.2013.
21. Bukhari H, Albazli K, Almaslmani S, Attiah A, Bukhary E, Najjar F, et al. Analysis of Waiting Time in Emergency Department of Al-Noor Specialist Hospital, Makkah, Saudi Arabia. *Open Journal of Emergency Medicine*. 2014;2(04):67. <https://doi.org/10.4236/ojem.2014.24012>

22. Horwitz LI, Green J, Bradley EH. US emergency department performance on wait time and length of visit. *Annals of emergency medicine*. 2010;55(2):133-41. <https://doi.org/10.1016/j.annemergmed.2009.07.023>
23. Gilboy N, Tanabe P, Travers D, Rosenau A, Eitel D. *Emergency severity index, version 4: implementation handbook*. Rockville, MD: Agency for Healthcare Research and Quality. 2009:1-72.
24. Ramazankhani A, Marzban S, Naghibzadeh-Tahami A, Sarani A. Assessing waiting time patients in emergency ward of Kerman University of Medical Sciences. *Journal of Health Promotion Management*. 2016;5(2):20-30.



<http://www.ejgm.co.uk>