

Triage effect on wait time of receiving treatment services and patients satisfaction in the emergency department: Example from Iran

Hamid-Reza Khankeh^{1,2}, Davoud Khorasani-Zavareh^{3,4}, Farah Azizi-Naghdloo⁵, Mohammad-Ali Hoseini¹, Mahdi Rahgozar⁶

ABSTRACT

Background: Long wait time interval in emergency department (ED) of hospitals, from the patients' point of view in ED is a major problem causing patients' dissatisfaction and may result increasing in patient morbidity and indirectly nurses dissatisfaction. Evaluation of wait time intervals in ED and giving nursing feedback may improve the quality of services, as well as patient satisfaction. The present study was designed to investigate the effect of nursing triage on receiving treatment of wait time interval and satisfaction of the patients referring to ED in Shahid Rajaee hospital.

Materials and Methods: This study was conducted on patients those referring to Shahid Rajaee hospital in Karaj, Iran employing quasi experimental design dividing in two experiment and control groups during 2009.

This is a quasi-experimental study of which the data were collected by standard questionnaire covering patient satisfaction and measuring wait time. T-test, Mann-Whitney and frequency analysis were used to evaluate the effect of triage on wait time from receiving treatment services and patients' satisfaction.

Results: The findings showed that there was a significant difference between experiment and control groups regarding wait time from receiving treatment services and patients' satisfaction.

Conclusions: Triage could significantly reduce the wait time interval between patients' entrance to ED to receive treatment services and enhance patients' satisfaction. It may help nursing in emergency ward to have better performance and indirectly their satisfaction.

Key words: Nursing, patient satisfaction, triage, wait time

INTRODUCTION

The patients referring to hospitals emergency department (ED) needing immediate care comprise 78% of all patients. Minutes or even the seconds are crucial for these patients since, 75-85% of mortality occurs in the first 20 min post-events (such as a head injury). This is especially true for the cases of road traffic injuries.^[1,2] Most

of the injuries either manage or progress within the first 10 min when major decisions are made.^[3] EDs are actually where critical patients firstly face healthcare team.^[4] ED plays a vital role due to the high number of critical clients.^[5] Time limit, high number of clients, various clients, lack of background information about them, limitation of diagnostic interventions, and the urgency of selecting related treatment are amongst ED features.^[3] From the patients' viewpoint, the, long waiting time interval resulting in patients' dissatisfaction with emergency services is a major problem in hospitals' EDs, as well as their pre-hospital phases.^[1,2]

Basically, increase of wait time is one of the major reasons for the crowd in EDs resulting in patients' leave with no physicians' evaluation, a delay in treatment, patients' dissatisfaction and jeopardizing their lives.^[6,7] On the other hand, a decrease in wait time to receive emergency services brings about on time treatment, a decrease in hospitalization time interval, lower treatment costs and saving in hospital resources.^[8] Meanwhile, the most important criterion used to evaluate EDs is patients' waiting time to receive diagnostic and treatment services.^[9]

¹Disaster Rehabilitation Research Center, School of Nursing, University of Social Welfare and Rehabilitation Science, Tehran, Iran, ²Department of Clinical Science and Education, Karolinska Institutet, Stockholm, Sweden, ³Social Determinants of Health Research Center, Department of Public Health, Urmia University of Medical Sciences, Urmia, Iran, ⁴Department of Public Health, Division of Social Medicine, Karolinska Institutet, Stockholm, Sweden, ⁵Karaj Islamic Azad University, School of Nursing and Midwifery, Karaj, Iran, ⁶Department of Statistics and computer, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Correspondence to: Prof. Davoud Khorasani-Zavareh, Social Determinants of Health Research Center, Urmia University of Medical Sciences, Resalat Avenue, Urmia, Iran.
E-mail: davoud.khorasani@gmail.com

Various methods have been already used to decrease wait time. Triage is one that is the system, which can be easily administrated and manage the time of diagnosis and treatment with regard to patients' status.^[10] Triage is a process that an emergency disease or an injury is classified for the patients referring to EDs in order to provide an appropriate level of treatment and care, be prioritized and transferred in the shortest possible time.^[11,12] Most of times, nurses are the first health staffs admitting the patients to diagnose their problem and administrate emergency care for them.^[13]

Previous studies have been already conducted on patients' time waste in EDs with regard to their satisfaction in Iran,^[1,5] but not on the effect of triage on wait time decrease in EDs. Accordingly, there is a few studies in Iran regarding waiting time and discharge time in emergency department; for instance, study in the Kashani Hospital in Esfahan has been shown that the average time for patients to complete the discharge process in ED was 4.9 h;^[14] the other in Kerman has showed that mean for wait time in ED in Bahonar hospital was about 7 h.^[15] Both studies indicated that long wait time directly affect patients' dissatisfaction. However, the effect of triage on wait time and discharge time did not measure in these studies. Triage also indirectly affects nurses' satisfaction, when the emergency department is crowded. Evaluation of ED wait time interval and patients point of view may improve the quality of emergency care at ED.^[13] Due to feasibility and a lack of similar study in Shahid Rajaei hospital in Karaj, the present study was designed to investigate the effect of triage on wait time to receive treatment services and patients satisfaction those referring to Karaj ED.

MATERIALS AND METHODS

This is a quasi-experimental study, which was conducted on the patients referring to ED of Shahid Rajaei hospital in Karaj during 2009. Experimental condition was the triage as intervention, which was made on cases group vs. control group that did not have triage (see below). According to quasi-experimental design, wait time and patient satisfaction were as dependent variables and then triage was manipulated to check its effect on both groups considering wait time and patient satisfaction.

Shahid Rajaei hospital is located in central district of Karaj. Its emergency department provides both inpatient and outpatient services for internal cardiac and traumatic patients care. It monthly admits about 6,000 patients. The emergency ward has 14 beds, 8 general physicians and 17 nurses. Five nurses work in morning shift, four in evening shift, and four nurses in each night shift.

Considering previous similar studies^[4,16] and due to its feasibility, the samples were considered as 600, by means

of 300 cases and 300 in experiment group. All patients in experiment group were triaged at the time of their entrance vs. control group that did not triage. Patients those come to the ED were included in the study; except those needing cardiopulmonary resuscitation (CPR) at the time of their arrival; and those who had no vital signs, which was no need for their triage, were left out from the study.

A questionnaire including demographic questions, as well as two sections of patient satisfaction and time measurement was used to collect the data. Age, sex, referral route and time measurement included information concerning time of arrival and time of the first visit by a physician were considered. Satisfaction measurement section contained 11 questions covering patients' satisfaction with ED services concerning personnel's behavior in admission, existence of facilities and equipments, and ED staffs' reaction time to start emergency services. It is important to bear in mind that the data collection tool is a national and standard questionnaire that had been made by in Ministry of Health and Medical Education and had been used already and confirmed regarding its validity and reliability. Moreover, in a pilot study the Cronbach's Alpha was measured as 0.8. The principal researcher filled the questionnaire after getting consent from the clients with no intervention in their triage.

The data were collected through interview with patients, or their accompanying if patients are not quite alert and conscious. Using random block sampling method, starting the first day of the study conducting, the principle investigator attends at ED first in morning following in evening and night shift, respectively. Questionnaire of satisfaction was filled at the time of discharge or their transferring to ward for inpatients cases; and at the time of leaving ED for outpatients. Then, the data of wait time for the first visit in ED were collected and satisfaction with the services was sought and then triage was administrated. An equipped room was allocated as triage room at the entrance of ED.

After primary triage of the patients, they were classified and transferred to ED to be visited by a general physician and to receive related care. There were two physicians present in each shift (one for class one referrals and one for outpatients of class two and three). Wait time was measured from early arrival of the patients to triage room (prioritizing with triage system) to the general physicians' visit. Patients' satisfaction with ED services was measured by means of above questionnaire.

The data were analyzed by SPSS version 13 (SPSS, Chicago, IL), as a means of *t*-test to evaluate the effect of triage on

wait time to receive treatment services in experiment vs. control group. Mann Whitney test was used to compare patients' satisfaction to test the effect of triage in tow different groups. The frequency of sex (male and female), education level (illiterate, primary school, secondary school, high school, associate degree, bachelor's degree and over) marital status (single, married, divorces) and referral times to ED (first, second or over) was compared in both experiment and control groups. All statistical analysis was significant if to P value was less than 0.05.

Ethical considerations

The study was approved by the Ethics Committee of University of Social Welfare and Rehabilitation, Tehran, Iran. Interviewees were informed that their participation was confidential, anonymous, and voluntary. Information explaining the aim of the study was provided orally and in writing. The interviewees then signed an informed consent form or verbally consented to participate in the study.

RESULTS

Table 1 compares background characteristics (sex, education level, marital status and referral times) between experiment and control groups. As table shows, 41.3% of the subjects were male in experiment group. Regarding educational level, close to two thirds of experiment group belong to illiterate and primary school compare to about half percent in control group. In total, 63.7% had referred to ED for the first time.

Time effect

Table 2 presents time variable effect between wait time to receive ED physician first visit in experiment, and control groups. There was a significant difference between mean wait time in experiment and control groups (10.69 min in control vs. 8.91 min in experiment group).

Patient satisfaction

Table 3 presents satisfaction in experiment and control groups that reveals higher satisfaction in triaged patients compared to control group ($P = 0.01$)

DISCUSSION

This quasi- experimental study showed that there was a significant difference in wait time and patients' satisfaction in experiment, triaged clients; and control groups, those who received routine services.

Miro *et al.* also managed to decrease wait time through triage. As a result wait time for visiting of the patients decreased from 6.8 min to 4.5 min ($P = 0.004$), which

Table 1: Comparison of background characteristics among patients referring to ED in Shahid Rajaei hospital in Karaj, Iran in both experiment and control groups in 2011

Variable	Control N=300		Experiment N=300	
	Number	%	Number	%
Sex				
Male	140	46.7	164	54.7
Female	160	53.3	136	45.3
Education				
Illiterate	102	34	64	21.3
Primary school	55	18.3	124	41.3
High school	74	24.7	57	19
High school diploma	69	23	47	15.7
Bachelor' degree	0	0	8	2.7
Marital status				
Married	266	88.7	268	89.3
Single	34	11.3	32	10.7
Referral times				
First time	207	69	191	63.7
Second time and over	93	31	109	36.3

Table 2: Comparison of mean, median, minimum and maximum of wait time in patients referring to ED in Shahid Rajaei hospital in Karaj, Iran in both experiment and control groups in 2011

Variable	Group	Number	Mean (SD)	Median (min-max)	P value
Wait time	Experiment	300	10.69 (3.79)	10 (3-20)	0.01
	Control	300	8.91 (3.77)	8 (2-20)	

Table 3: Comparison of mean satisfaction in patients referring to ED in Shahid Rajaei hospital in Karaj, Iran in both experiment and control groups in 2011

Variable	Group	Number	Mean	SD	Mann whitney	P value
Satisfaction	Experiment	300	37.65	5.89	14678.00	0.01
	Control	300	29.59	5.07		

is consistent with our findings in this study.^[17] However, the earlier study did not focus on patient satisfaction, as a result of the triage. Moreover, Tamburlini *et al.* with regard to evaluation of triage function in ED observed that both wait time and patients crowding could decreased after educating the nurses and establishment of a triage system in ED.^[16] This may also imply the value of nurse skills as a means of their continuous education related to their jobs, an important factor that was already pronounced in reducing pre-hospital time interval of post crash events.^[1]

Our study revealed that triage could significantly resulted shorten wait time and increase patients' satisfaction in experiment group. In a study conducted on patients'

satisfaction from ED services, wait time has been indicated as an important factor by the patients and their accompanying persons.^[18] In overall, some other studies have shown that longer wait time decreased patients' satisfaction. Hossoein Zadeh, Amer, Anderson, Edvin and Trial all yielded similar results and claimed that wait time has an invert association with patients' satisfaction in EDs.^[19-23]

In a study conducted in Saudi Arabia, close to two third of the subjects indicated wait time was the main reason for patients' dissatisfaction from ED services, and observed a significant association between patients' satisfaction and wait time.^[22] This also implies more care about the wait time for both emergency services and patients' satisfaction.

Limitation and strength of the study

Researcher presence may affect personnel's function and possibly speed up of personnel, as a means of Hawthorne effect; however, in order to deal with it, they were confirmed that the results will keep confidentially with no report to hospital authorities. Moreover, the observations of the first 3 days were left out in the data in order to diminish bias. Although, Hawthorne effect might have been some effect, we believed that the effect seems to be so little. In addition, due to a lack of enough alertness of 6 patients, principal investigator has to ask the questions with help of patient accompanies. However, it was just a few cases that could not affect the result of the study and its generalization to the patient as respondent.

In conclusion, triage could not only significantly decrease the time interval between patients' arrival and their first visit by a physician but increase patients' satisfaction. With regard to the vital role of triage education in ED of hospitals and the fact that it can increase the speed of ED services, triage can improve the quantity of treatment services, as well as patients' satisfaction. Since, reduction of wait time interval and patient satisfaction is one important goal for nurses in emergency ward, finding from this study may improve nursing performance in relation to their work in the ED.

ACKNOWLEDGEMENT

This study was sponsored both financially and administratively by University of Social Welfare and Rehabilitation Science, School of Nursing, Tehran, Iran. We gratefully acknowledge the very helpful cooperation of the head of the hospital and nursing office of Shahid Rajaei hospital in Karaj, as well as the physicians and personnel in ED.

REFERENCES

1. Bigdeli M, Khorasani-Zavareh D, Mohammadi R. Pre-hospital care time intervals among victims of road traffic injuries in Iran. A cross-sectional study. BMC Public Health 2010;10:406.
2. Khorasani-Zavareh D, Khankeh HR, Mohammadi R, Laflamme L, Bikmoradi A, Haglund BJ. Post-crash management of road traffic injury victims in Iran. Stakeholders' views on current barriers and potential facilitators. BMC Emerg Med 2009;9:8.
3. Cummings P. Cause of death in an emergency department. Am J Emerg Med 1990;8:379-84.
4. Yoon P, Steiner I, Reinhardt G. Analysis of factors influencing length of stay in the emergency department. CJEM 2003;5:155-61.
5. Arshad M, Hadian J. Nurse and emergency. 1st ed. Tehran: Chehr; 1994.
6. Monzon J, Friedman SM, Clarke C, Arenovich T. Patients who leave the emergency department without being seen by a physician: A control-matched study. CJEM 2005;7:107-13.
7. Johnson M, Myers S, Wineholt J, Pollack M, Kusmiesz AL. Patients who leave the emergency department without being seen. J Emerg Nurs 2009;35:105-8.
8. Asefzadeh S. Patient flow analysis in a children's clinic. Int J Qual Health Care 1997;9:143-7.
9. Goldfrank L, Henneman PL, Ling LJ, Prescott JE, Rosen C, Sama A. Emergency center categorization standards. Acad Emerg Med 1999;6:638-55.
10. Sadaghiani E. Hospital organization and management (In Persian). Vol. 1. Tehran: Jahan Rayaneh; 1998. p. 147.
11. Wiebe RA, Rosen LM. Triage in the emergency department. Emerg Med Clin North Am 1991;9:491-505.
12. Lambe S, Washington DL, Fink A, Laouri M, Liu H, Scura Fosse J, et al. Waiting times in California's emergency departments. Ann Emerg Med 2003;41:35-44.
13. Morales-Guijarro AM, Nogales-Cortés MD, Pérez-Tirado L. [Satisfied companion, a quality indicator in emergencies]. Rev Calid Asist 2011;26:47-53.
14. Ajamis S, Ketabi S. Bottlenecks on discharge process in Beheshti hospital (In Persian). J Health Inf Manag 2008;5: Available from: <http://www.him.mui.ac.ir/index.php/him/issue/view/9>.
15. Zohoor AR, Pilevar Zadeh M. Study of speed of offering services in emergency department at kerman Bahonar hospital in 2000. J I Un Med Sci 2003;10:413-20.
16. Tamburlini G, Di Mario S, Maggi RS, Vilarim JN, Gove S. Evaluation of guidelines for emergency triage assessment and treatment in developing countries. Arch Dis Child 1999;81:478-82.
17. Miró O, Sánchez M, Espinosa G, Coll-Vinent B, Bragulat E, Millá J. Analysis of patient flow in the emergency department and the effect of an extensive reorganisation. Emerg Med J 2003;20:143-8.
18. Soleimanpour H, Gholipouri C, Salarilak S, Raoufi P, Vahidi RG, Rouhi AJ, et al. Emergency department patient satisfaction survey in Imam Reza Hospital, Tabriz, Iran. Int J Emerg Med 2011;4:2.
19. Anderson EA, Zwelling LA. Measuring service quality at the University of Texas M. D. Anderson Cancer Center. Int J Health Care Qual Assur 1996;9:9-22.
20. Hwang U, Weber EJ, Richardson LD, Sweet V, Todd K, Abraham G, et al. A research agenda to assure equity during periods of emergency department crowding. Acad Emerg Med 2011;18:1318-23.
21. Vieth TL, Rhodes KV. The effect of crowding on access and

- quality in an academic ED. *Am J Emerg Med* 2006;24:787-94.
22. Ali M el-S, Mahmoud ME. A study of patient satisfaction with primary health care services in Saudi Arabia. *J Community Health* 1993;18:49-54.
23. Boudreaux ED, O'Hea EL. Patient satisfaction in the emergency department: A review of the literature and implications for practice. *J Emerg Med* 2004;26:13-26.

How to cite this article: Khankeh H-R, Khorasani-Zavareh D, Azizi-Naghdloo F, Hoseini M-A, Rahgozar M. Triage effect on wait time of receiving treatment services and patients satisfaction in the emergency department: Example from Iran. *Iranian J Nursing Midwifery Res* 2013;18:79-83.

Source of Support: University of Social Welfare and Rehabilitation Science, School of Nursing, Tehran, Iran, **Conflict of Interest:** None.