The survey of Ways of Reducing Patients' Length of Stay in the Emergency Department: A Systematic Review

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Abstract

Introduction: In recent decades, increasingly crowded emergency departments (ED) cause considerable burden on the world's health care systems. Among the reasons for this bustle is the lengthy stay of patients.

Methods: In this study, a systematic review was used, and the required information, with the purpose of focusing on the research question, was retrieved, evaluated, and integrated.

Results: The results of analyzing the data of 11 selected papers with the inclusion criteria and keywords specified from 2007 to 2014 in line with the research question suggests that there are various methods to reduce the Emergency Department Length Of Stay (EDLOS) of patients which are summarized in several classes.

Equipping and improving of existing facilities in emergency departments, such as triage, observation units, operating and testing rooms, and advanced imaging needed by patients as well as modifying caring processes and adequate staffing are listed as the most important factors affecting the reduced length of stay.

Conclusion: Improving existing structures in the emergency department, facilitating the processes of care, and providing adequate staffing are among the factors that significantly cause the reduced EDLOS. The reduced EDLOS, as a result, causes overcrowding to be reduced, the capacity to accept new patients as well as patient and nurses satisfaction to be increased, and also the quality of medical care to be improved.

Keywords: Emergency Department, Length of Hospital Stay, Nurse, Iran

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1. Introduction

The Emergency Department (ED) is the heart of a hospital (1) and plays a prominent role in saving patients' lives (2). However, this unit suffers from different problems and shortcomings such as crowdedness and limited numbers of beds (3).

Many strategies have been developed for alleviating the problems of the ED and improving the quality of emergency care. One of these strategies is decreasing the length of patients' stay in the ED. The ED length of stay (EDLOS) is defined as the time interval between being admitted to the department and being discharged from it (4) and it is considered as a main criterion for evaluating the quality of emergency care (5).

Thus, the initial management of the emergency department should be based on the prevention of overcrowding and congestion reduction, and administrators should always consider that reducing the length of stay should not lead to lower quality of cares (6). The ideal EDLOS in Iran has been reported to be four hours (7).

However, only 39% of Iranian patients have an EDLOS of shorter than four hours (7) while in Canada, America, and England respectively 76%, 72%, and 96–98% of patients have had an EDLOS of shorter than four hours (8, 9).

The average length of stay in the emergency department in similar studies is as follows:

The EDLOS in other Iranian clinical settings has been 353 (7), 346 (10), and 240 (11) minutes. In other countries, the EDLOS has been reported to be 241 (12), 220 (13), and 155 (14) minutes. This huge difference in the EDLOS in different studies -ranging from 155 to 353 minutes- can be attributed to the differences in the settings, samples, interventions, staffing and management systems of the studies.

The lengthy stay of patients in emergency departments is resulted by ineffectiveness of workflow process in three stages under which a patient enters into the emergency department, receives emergency care, and exits from it. In addition to the negative effect on the expected outcomes of treatments, such an issue may form a negative attitude in

the society towards hospitals and care providers. The length of patients' stay in the ED is an important issue in making health care decisions, the increase of which can impose great costs on patients or health care systems such as insurance companies, and it also increases the risk of nosocomial infections (15). Other consequences resulting from the prolonged stay of patients include patients' dissatisfaction and increased mortality due to accidents (14), a reduction in providing services to patients needing urgent care (7), increased costs for patients, medical staff's fatigue and frustration, and even impairment in the ability of the emergency doctor which is followed by the increased treatment time, which affects the quality of services provided, patients' safety and outcomes of the treatment.

Such problems may increase the number of patients who leave the unit without being visited, revisiting, and the mortality rate (16).

In various sources several ways are proposed and compared to reduce the EDLOS, and due to the fact that studying all the sources would be time-consuming and challenging. In this study we seek to review such methods briefly.

2. Methods

In this study, which is a systematic review, the search for the required information, along with retrieving, evaluating, and integrating them was carried out with the purpose of focusing on the research question. The following research question was posed as: What are the ways to reduce the length of patients' stay in emergency departments?

The research strategy was identifying relevant published articles from 2007 to 2014. In order to do so, electronic searching was performed in both Persian and English languages using the following key words: emergency departments, length of stay and patient, in various databases such as Pubmed, Nursing Science Direct, SID, and CINAHL).

Inclusion criteria to this study were considered to be all the original papers with qualitative and quantitative approaches which were written in both English and Persian during the years 2007 to 2014 which were carried out in the emergency departments of hospitals. Exclusion criteria included editorial reports, commentaries, bulletins, book reviews, short reports, and conference reports due to their concise information answer to the research question and qualitative evaluations. To assess the quality of the collected articles, the researchers reviewed various aspects of the studies, in particular, the methods and validity of the data. Finally, 11 articles were considered to be qualified to be used in this study (Figure 1). The full texts of these

articles, focusing on answering the research question, were abstracted, synthesized, and then classified.

3. Results

Among the 184 articles which were investigated at the beginning, eventually, 11 articles which were related to this study were selected, and the results of the data of these articles revealed that reduce in the EDLOS is dependent on the following factors (Table-1):

1. Available facilities in hospitals such as the number of empty beds in other units of receiving ED patients, available facilities and equipment in the emergency department such as appropriate triage, having observation units, functional operating room, performing required tests, advanced imaging, and any diagnostic practice that could be essential in making fast decisions for patients, will have special effects in reducing the length of stay.

2. The type of hospital being general or specialized and health training or therapeutic.

3. Diagnosing patients' problems and the extent to which they need clinical and paraclinical facilities.

4. The presence of required manpower such as attending and consulting physicians and having enough nurses in order to quickly treat patients.

5. The effectiveness of management in the emergency department and division of labor practices among providers of care and patient treatment and care processes.
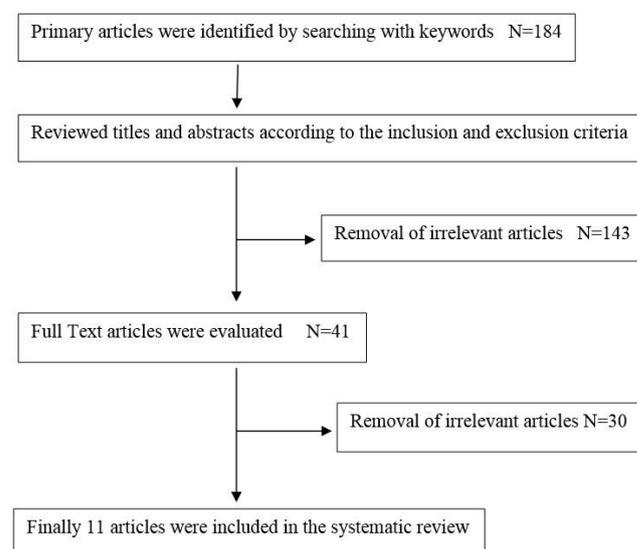

Figure 1. Flow Diagram of article selection

4. Discussion

According to various studies conducted on reducing congestion in the emergency departments, this study was conducted with the purpose of investigating ways of reducing the length of stay of patients in order to reduce overcrowding in the emergency department.

The results of this systematic study showed that the existing facilities in the emergency departments such as Stat lab (17), Observation units for patients, the treatments of whom depends on temporary hospitalization (18), and the triage unit and instructing it are considered as factors reducing the length of stay in emergency departments (19, 20). Furthermore, a study by Kocher (2012), revealed that performing advanced tests and imaging is also considered as a factor causing lengthy stay of patients (21).

With regard to hospitals providing healthcare, in the study by Tabibi (2010) the EDLOS of training hospitals has been mentioned to be higher than in non-training hospitals. The reason for this fact is mentioned to be the nature of training hospitals and the duties of such hospitals regarding training and educating medical and paramedical specialists (10). The diagnosis of patients and the extent to which they need clinical and paraclinical services such as intensive care beds are also mentioned to be among the factors affecting the length of stay (22). Having enough manpower such as medical and advisor specialists (23),

increasing the number of nurses (24), and using specialized nurses are mentioned to be effective for treating the patients quickly and reducing the length of stay (25).

A study has been conducted in the UK, in order to reduce the waiting time in emergency departments., 44% of EDs the following factor involved to increase EDLOS more than 4 hour: inadequate outpatient beds, delayed discharge, delays in access to specialists, insufficient nurses and general physicians, small size of the ED, and delay in the results of laboratory tests (7).

Modifying therapeutic and care management processes such as facilitating the transfer of patients, application of advanced nursing (26), and or decreasing the response time of tests (17, 27), and also admission of patients requiring intensive care in the respective units (13) can significantly reduce the EDLOS. Division of labor management as well as changes in working practices of personnel have also reduced the length of stay (28).

Table 1. The characteristics of reviewed researches about the lenght of stay in emergency departments

Ref	Authors	Study design	Participant number (total)	Interventions	Main findings
25	Dawes Heather A et al (2007)	Randomized controlled trial comparing	111	specialist nurse supported discharge with routine hospital care in gynecology	length of hospital stay can be shortened by the introduction of a specialist nurse
20	Gol aghaye F et al (2008)	Analytical cross-sectional research	1963	using triage in emergency departments	1. Using triage in emergency departments is necessary 2. Planning for presence of specialists in the hospital
10	Tabibi et al (2010)	Descriptive research	249	----	Reviewing the process of service to patients in the emergency department, and training service providers is essential
27	Moghadam et al (2013)	Intervention study used a pre training/post training design	N=33 Pre training N=40 Post training	The intervention was the STEPPS team augmented by simulation	Our trauma team showed be significantly improved in all teamwork domain ratings and overall ratings from pre training to post training
21	Keith E. Kocher, MD, MPH et al (2012)	A secondary analysis	Among 360million weighted ED visits included in this analysis	Effect of testing and treatment on emergency department length of stay	Testing and less substantially treatment were associated with prolonged LOS in the ED, particularly for blood testing and advanced imaging.
14	Brendan T. Parker, MS Catherine Marco, MD(2013)	Prospective convenience sample	309	---	*There was significant variability in ED LOS (median 155 minutes (IQR 75-240)). Patients with longer ED LOS had lower patient satisfaction scores.*
13	Song Hummy et al (2013)	an empirical investigation	N =234,334	Impact of pooling tasks and resources throughput times in a discretionary work setting	Dedicated systems resulted in a 9 percent overall decrease in length of stay, which corresponds to a 25-minute reduction in length of stay

27	Jafakesh et al (2013)	Descriptive research	1066	---	Management decisions for reduce to minimum time
22	z.talleshi et al (2014)	Descriptive case study	15477	Efficacy of new programs to reduce length of stay	For reduce the overcrowding 1.creation of a holding unit 2.active inter-facility transfer 3.governing admittance of patients who need icu care
19	Khatiban (2014)	Interventional study	N=72 before and N=72 after intervention	Triage training	1. Improve the triage time 2. improve the performance of nurses
17	Adam J. Et al (2008)	Before and after study	N=5631 before N=5635 after	Implementing the stat lab	Reduction the ED LOS from 466 min to 402 min

5. Conclusion

The results of the reviewed articles show that the EDLOS depends on many factors, and such a length varies according to the type of disease, the medical facilities available in hospitals, and the type of hospitals. Thus, in addition to accurate identification of all the factors affecting the length of stay, proper planning for effective and fast treatment of patients as well as making efforts to reduce overcrowding in the department should be taken into consideration. Efficient management of treating patients, making all the required health facilities as well as clinical and paraclinical services available, availability of medical and advisor specialists for patients, and finally, properly educating patients and relatives by medical staff are among the most important factors leading to a reduction in the length of patients' stay.

References

1. Bahman Ziari F ARz, Ehteshami A, Javadi A, Asgari Gh, editors. Principles and Management of Hospital Emergency Department. Esfahan University of Medical Sciences;. 2006.
2. Zafarghandi. University strategies for quality improvement of emergency system. Proceedings of the First Congress on Quality Improvement in Emergency Management. Tehran University of Medical Sciences. 2002:7-10.
3. Soremekun OA, Takayesu JK, Bohan SJ. Framework for analyzing wait times and other factors that impact patient satisfaction in the emergency department. J Emerg Med. 2011;41(6):686-92.
4. Cummings GE, Mayes D. A comparative study of designated Trauma Team Leaders on trauma patient survival and emergency department length-of-stay. CJEM. 2007;9(2):105.
5. Arya R, Wei G, McCoy JV, Crane J, Ohman-Strickland P, Eisenstein RM. Decreasing Length of Stay in the Emergency Department With a Split Emergency Severity Index 3 Patient Flow Model. Academic Emergency Medicine. 2013; 20(11):1171-9.
6. Mahmoudi H, Mohmmadi E, Ebadi A. Experience of nurses from the emergency department management:A qualitative study. Iranian Journal of Critical Care Nursing. 2012;4(2):1-10.
7. Jabbari A JM, Khorasani E, Ghaffari M, Majlesi M. Emergency Department Waiting Time at Alzahra Hospital. Director General. 2011;8(4):500-11.
8. Lee MA, Yom YH. A comparative study of patients' and nurses' perceptions of the quality of nursing services, satisfaction and intent to revisit the hospital: a questionnaire survey. Int J Nurs Stud. 2007;44(4):545-55.
9. Coleman P, Nicholl J. Consensus methods to identify a set of potential performance indicators for systems of emergency and urgent care. J Health Serv Res Policy. 2010;15 Suppl 2:12-8.
10. Tabibi SJ NB, Shoaie S. Waiting time in the emergency department in selected hospitals of Iran University of Medical Sciences in 2007. Pejouhesh. 2009;33(2):117-22.
11. Rahee F AA, Safdari S,Yaghobi M. The audit, patient's stay time, before and after intervention in the emergency department of Amin hospital in Isfahan, . Tabriz University of, Medical Sciences and Health Services. 2012;1(2):1-10.
12. Rathlev NK, Chessare J, Olshaker J, Obendorfer D, Mehta SD, Rothenhaus T, et al. Time series analysis of variables associated with daily mean emergency department length of stay. Ann Emerg Med. 2007;49(3):265-71.
13. Song H, Tucker AL, Murrell KL. The Impact of Pooling on Throughput Time in Discretionary Work Settings: An Empirical Investigation of Emergency Department Length of Stay. 2013.
14. Parker BT, Marco C. Emergency department length of stay: accuracy of patient estimates. The western journal of emergency medicine. 2014;15(2):170-5.
15. Green RS, MacIntyre JK. Critical care in the emergency department: an assessment of the length of stay and invasive procedures performed on critically ill ED patients. Scand J Trauma Resusc Emerg Med. 2009;17:47.
16. Vermeulen MJ, Stukel TA, Guttmann A, Rowe BH, Zwarenstein M, Golden B, et al. Evaluation of an emergency department lean process improvement program to reduce length of stay. Ann Emerg Med. 2014;64(5):427-38.
17. Adam J. Singer M, Peter Viccellio, MD, Henry C. Thode Jr., PhD, Jay L. Bock, MD, PhD, Mark C., Henry M. Introduction of a Stat Laboratory Reduces Emergency Department Length of Stay. ACADEMIC EMERGENCY MEDICINE 2008;15:324-8.
18. Mattsson M, Mattsson N, Jorsboe HB. Improvement of clinical quality indicators through reorganization of the acute care by establishing an emergency department-a register study based on data from national indicators. Scand J Trauma Resusc Emerg Med. 2014;22(1):60.
19. Mahnaz Khatiban AK, Arezou Karampourian, Alireza Soltanian, Hossein Kimiaie Asadi, Rasoul Salimi, Zahra Khalili. The effects of the Emergency Severity Index triage education via problem-based learning on the triage nurses' performance and the patients' length of stay in the Emergency Department. JCRPS. 2014;3(2):73-63.

20. 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.
21. Kocher KE, Meurer WJ, Desmond JS, Nallamothu BK. Effect of testing and treatment on emergency department length of stay using a national database. Academic emergency medicine: official journal of the Society for Academic Emergency Medicine. 2012;19(5):525-34.
22. Talleshi Z, Hosseininejad SM, Khatir G, Bozorghi F, Gorji AM, Gorji MA. The effect of new emergency program on patient length of stay in a teaching hospital emergency department of Tehran. Nigerian medical journal : journal of the Nigeria Medical Association. 2014;55(2):134-8.
23. Wu FM, Newman JM, Lasher A, AA. B. Effects of Initiating Palliative Care Consultation in the Emergency Department on Inpatient Length of Stay. Journal ofpalliative medicine. 2013;16(11):1362-7.
24. Yoon P, Steiner I, Reinhardt G. Analysis of factors influencing length of stay in the emergency department. CJEM. 2003;5(3):155.
25. Dawes HA, Docherty T, Traynor I, Gilmore DH, Jardine AG, Knill-Jones R. Specialist nurse supported discharge in gynaecology: A randomised comparison and economic evaluation. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2007;130(2):262-70.
26. Stauber MA. Advanced nursing interventions and length of stay in the emergency department. Journal of emergency nursing: JEN : official publication of the Emergency Department Nurses Association. 2013;39(3):221-5.
27. A jafakesh moghadam Jpn, m masomi,m hashemi,t vafaee,h neyyestany. Evaluation of quickly of the emergency services at hospitals of north khorasan,s medical science University 1390. North khorasan university of medical science. 2013;5(2):307-17.
28. Capella J, Smith S, Philp A, Putnam T, Gilbert C, Fry W, et al. Teamwork training improves the clinical care of trauma patients. Journal of surgical education. 2010;67(6):439-43.