Triage Training in Iran from 2010 to 2020: A Systematic Review on Educational Intervention Studies

Abstract

Background: Accurate decision-making in triage requires continuous education, so triage nurses should receive annual refresher courses. Identifying the most effective method can make the provision of practical education to triage staff in hospitals possible. This review was conducted with the aim to determine the effectiveness of triage education methods in Iran. **Materials and Methods:** In this systematic review on educational intervention studies, international and Iranian medical sciences databases were searched using a defined search strategy compatible with each database. PubMed, Scopus, Web of Science, Google Scholar, SID, Islamic Science Center (ISC), and IranDoc databases were searched for literature published from January 2010 to January 2020. The MeSH terms of "health care staff," "triage," "education," and "Iran" in English and Persian were combined to develop a search strategy. Initially, 768 article titles were retrieved. Finally, 16 articles were selected for the review. **Results:** All conducted studies were quasi-experimental. Half of the studies had used a face-to-face approach for education (workshop, lecture, and simulation), and four studies had used lectures and pamphlets. All studies (except 1) reported that their educational intervention significantly improved nursing knowledge on triage. **Conclusions:** Almost all studies had reported the effectiveness of an educational intervention in improving nurses' triage knowledge. However, it seems that the non-face-to-face method is superior to the face-to-face method because of its learner-centeredness and cost-effectiveness. Moreover, providing educational content using a blended learning approach (simulation and games) can enhance the effectiveness of triage education.

Keywords: *Delivery of health care, triage, education, Iran*

**Naser Javadi[1],
Leili Rostamnia[2],
Rasool Raznahan[3],
Vahid Ghanbari[2]**

[1]Trauma Nursing Research Center, School of Nursing, Kashan University of Medical Sciences, Kashan, Iran, [2]Nursing Department, School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran, [3]Nursing Department, School of Nursing and Midwifery, Torbat Heydariyeh University of Medical Sciences, Razavi Khorasan Province, Torbat Heydariyeh, Iran

Introduction

Triage refers to the process of patients' prioritization for receiving health care in emergency departments without loss of time.[1] Lack of knowledge regarding triage is the main cause of the misclassification of patients.[2-5] Moreover, enough knowledge is an important part of the triage process. Thus, the Iranian Emergency Medical Service Organization guideline emphasizes annual occupational training regarding triage, especially for nursing staff.[1,6] As a result, in the last couple of years, numerous investigations have been conducted to assess the efficacy of different educational methods in improving the knowledge and practice of triage nurses in Iran.[7-17] One study showed that education through lectures can enhance nurses' triage knowledge.[10] Furthermore, Rostampour *et al.* showed that combining several educational methods (such as lecture, hands-on training, and pamphlets)

can effectively increase nurses' triage knowledge.[18]

Despite the implementation of these interventions and annual on-the-job training in all Iranian hospitals, the results of surveys have indicated that nurses have inadequate knowledge and the accuracy of their decision is low. Haghigh *et al.* reported that nurses of emergency departments in Ahvaz (southwest of Iran) had poor knowledge about triage.[5] Several studies have shown that the accuracy of triage decisions made by nurses was low.[4,19] In addition, inadequate knowledge and poor practice regarding triage have been reported among Emergency Medical Technicians (EMTs) in Khuzestan Province, Iran.[20] Familiarity with triage systems leads to consistent decisions among triage nurses.[21,22] Although medical authorities stress the importance of knowledge of triage nurses, they do not agree on the

Address for correspondence:
Dr. Vahid Ghanbari
Emergency Nursing Department, School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Beheshti Blvd, Kermanshah, Iran.
E-mail: vahid.ghanbari@kums. ac.ir

best educational method in respect to its effectiveness on the knowledge of nurses about triage.[2-5] Identifying the most effective method can enable the provision of practical education to triage staff in hospitals. This review was conducted with the aim to determine the effectiveness of triage education methods in Iran.

Materials and Methods

This systematic review was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed, Scopus, Web of Science, Google Scholar, Scientific Information Database (SID), Islamic World Science Citation Center (ISC), and IranDoc databases were searched for literature published from January 2010 to January 2020. The number of articles in each database is shown in the PRISMA flowchart [Figure 1].

The MeSH terms of "Health care," "triage," "education," and "Iran" in English and Persian were combined to develop a search strategy. The search strategy was adopted for each database. The result of the hand-searching of selected articles was added to the search results of databases [Table 1].

The study inclusion criteria included articles on triage training in Iran from January 2010 to January 2020, articles with qualitative and quantitative approaches, articles with full text access, written in English or Persian. The exclusion criteria included the articles presented at conferences and seminars, letters to editor, case reports, and book reviews, lack of access to the full text of articles, articles written in a language other than English or Persian. First, the

titles of searched articles were imported into Endnote software. The duplicate titles were then removed. Titles and abstracts were screened by the first and second authors independently, and any disagreements were resolved by the third author. Articles with unclear abstracts were assessed according to their full text. The process of study selection is presented in the PRISMA flowchart [Figure 1].

Studies eligible for inclusion in the study included studies that performed an educational intervention regarding triage in hospital and pre-hospital settings in Iran and studies that taught triage in normal circumstances, mass-casualty incidents (MCIs), or disasters. Based on the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI), medium-quality and high-quality studies were included in the review. The JBI is an evidence-based healthcare institute, which provides professionals in nursing, midwifery, medicine, and allied health access to resources; it collaborates with over 80 centers in over 90 countries. This tool has a checklist containing nine questions. The reviewer analyzes different parts of the article using this checklist. Each question has four responses (Yes, No, Unclear, or Not Applicable). In the end, the reviewer selects one of the options of "include," "exclude," or "seek further info." If the article is excluded, the reason should be mentioned.[23] Low quality studies and those the full text of which was unavailable were excluded from the review.

Using the JBI-MAStARI, the first and third authors independently assessed the quality of the articles. Any disagreements were resolved through discussion. A data extract form was developed based on the study goal. The data extracted from each article consisted of "the first

Table 1: Search strategy

Database	Combination of MeSH* Terms	Number of articles	Explanation
Medline (pubmed. com)	["Health care staff" (Title/Abstract)] OR [Nurse (Title/Abstract)] AND [triage (Title/Abstract)] AND [education (Title/Abstract)] OR [training (Title/Abstract)] AND [Iran (Title/Abstract)] OR ["Islamic Republic of Iran" (Title/Abstract)]	253	
Scopus (scopus.com)	[TITLE-ABS ("Health care staff") OR TITLE-ABS (nurse) AND TITLE-ABS (triage) AND TITLE-ABS (education) OR TITLE-ABS (training) AND TITLE-ABS (Iran) OR TITLE-ABS ("Islamic republic of Iran")]	7	
Web of Science (app. webofknowledge. com)	TITLE: ("Health care staff") OR TOPIC: (nurse) AND TOPIC: (triage) AND TOPIC: (education) OR TOPIC: (training) AND TOPIC: (Iran) OR TOPIC: ("Islamic Republic of Iran")	58	
ISC (isc.gov.ir)	[("Health care staff") AND (Iran OR "Islamic Republic of Iran") AND (triage OR "triage education" OR "triage training")]	1	
SID (sid.ir)	[("Health care staff") AND (Iran OR "Islamic Republic of Iran") AND (triage OR education OR training)]	8	It is not possible to search Persian databases in a combined way. Therefore, we did a simple, word-for-word search, and then, selected the related and dissimilar items.
Google Scholar (Scholar.google.com)	[("Health care staff") AND (Iran OR "Islamic Republic of Iran") AND (triage OR "education" OR "training")]	124	
IranDoc (irandoc. ac.ir)	[("Health care staff") AND (Iran OR "Islamic Republic of Iran") AND (triage OR "triage education" OR "triage training")]	317	

*MeSH: Medical Subject Headings

author," "year of publication," "sample size," "participants," "study design," teaching method," "conclusion," and "recommendations." After data extraction, the papers were categorized into Face-to-Face (FTF), no-FTF, blended (FTF and no-FTF), and comparative (FTF with no-FTF) methods and analyzed.

Ethical considerations

The institutional review board in the School of Public Health, Tehran University of Medical Sciences, approved this study (IR.TUMS.SPH.REC.1395.508).

Results

Of the 767 titles retrieved from the databases, 293 duplicates were removed. In addition, 457 titles were deleted because they were irrelevant or not related to the implementation of an educational intervention. Moreover, one article was removed because of lack of access to its full text despite emailing its corresponding author and requesting its full text.[24] Then, the remaining 17 full-text articles were reviewed for eligibility. Of these, two articles were removed because of their poor quality,[25,26] and the remaining 15 articles were entered into the study. Next, one article was included as a result of hand-searching the reference list of the selected articles.[27] Finally, 16 articles (10 in English and 6 in Persian) were analyzed [Figure 1].

As seen in Table 2, all studies had a quasi-experimental design. Moreover, seven articles had a single-group intervention, four articles had both intervention and control groups, three researches compared the FTF method and no-FTF method, and one study compared 2 FTF methods.

In all of the included studies, except for the study by Azhough *et al.*,[11] the intervention had a significant effect on the knowledge of participants in educational courses. In a review of 16 selected papers, a posttest was performed in 14 (87%) studies within 1 month after the intervention.[7,8,10-16,27-31] In one study, researchers performed a posttest 6 weeks[9] and in another 3 months[17] after the intervention. In the reviewed papers, triage education was presented through lecture, multimedia software, simulation, workshop, booklet, video podcasting scenario, and role-playing separately or in combination.[7,8,10-16,27-31]

The participants in 11 studies (69%) were emergency nurses,[7,8,11-14,16-18,26,27] in two studies (27,30) nursing students, in two studies (10,29) EMTs, and in one study emergency nurses and EMTs.[9] The educational content of seven studies (44%),[8,9,12,15,16,27,30] six studies,[7,10,13,14,17,28], two studies,[18,29] and pne study[11] was, respectively, related to hospital triage algorithm under normal situations [Emergency Severity Index (ESI)], disaster and mass casualty triage (START algorithm), pre-hospital disaster, and mass casualty triage, and both ESI and START algorithms.
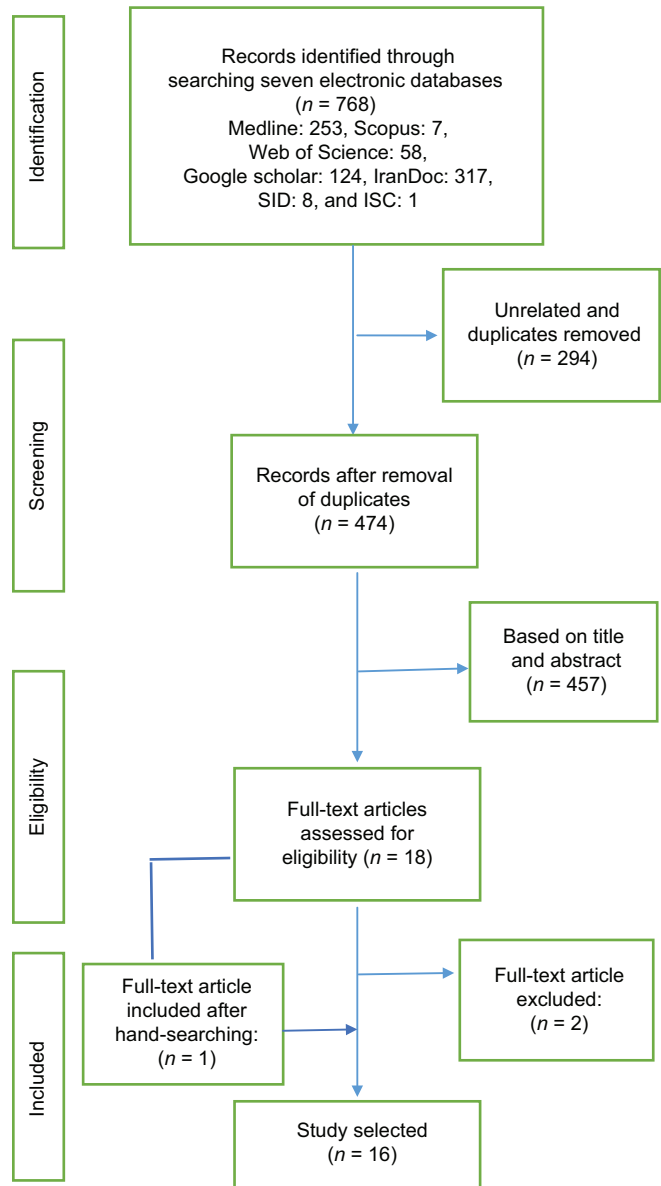

Figure 1: Flow diagram of the study (PRISMA flowchart)

Discussion

Based on the results of the reviewed studies, there are different methods of triage training, each with its special benefits. The strong point of this research is the study of all Iranian educational interventions in the field of triage education and comparison of their effectiveness. Moreover, because all studies were quasi-experimental, there is a possibility of misstatement of study results. The present study was conducted with the aim to compare these methods in order to find the most effective methods.

FTF and no-FTF methods

In all reviewed studies, except for the study by Azhough *et al.*[11] significant changes in participants' knowledge were reported after training courses.[28-30] Rouleau *et al.*[31]

Table 2: Characteristics and quality assessment of the included studies

First author and year of publication	Objectives	Sample size	Study design and triage method	Educational method	Conclusion and recommendations
Haghdoust *et al*.[16] 2010	Determining the effect of triage education …	An intervention group (*n*=40), without a control group	QE*, ESI**	Blended: Presence (lecture and debate), Non-presence (booklet)	Using the blended method for triage training improved the knowledge, attitude, and practice of nurses.
Vahabi *et al*.[28] 2011	Comparing the effect of triage education …	Lecture group (*n*=62), and multimedia group (*n*=61)	START***	Presence (Lecture), Non-presence (multimedia software)	Both of the methods were effective, but the multimedia software method is recommended.
Faraji *et al*.[7] 2013	Determining the effect of simulated training …	An experimental group (*n*=30), and control group (*n*=30)	QE, START	Presence: one day workshop of "disaster triage simulation method"	Using the simulation method on triage training improved the nurses' preparedness to perform disaster triage.
Rahmati *et al*.[9] 2013	Determining the effects of triage education …	Lecture group (*n*=50), without a control group	QE, ESI	Presence (workshop)	Triage education significantly improved the practice and knowledge of nurses and EMT****, and the qualitative indices of the emergency department. Therefore, it is recommended to include theoretical and practical training of triage.
Khatiban *et al*.[15] 2014	Determining the effect of ESI triage education .	An experimental group (*n*=12) Without a control group	QE, ESI	Blended: Presence (lecture and scenario debate), Non-presence (booklet)	Considering the positive effect of the ESI triage, the Problem-Based Learning (PBL) strategy is proposed for training other emergency personnel.
Rostampour *et al*.[18] 2016	Determining the effect of triage education …	An experimental group (*n*=25), and control group (*n*=25)	QE Disaster triage	Presence (lecture)	The use of a pre-advanced organizing model to promote the awareness of nurses, and provide triage disaster training to the faculty of nursing.
Mahmoudi *et al*.[8] 2015	Evaluating the effect of nurses' triage education…	An experimental group (*n*=34), Without a control group	QE, ESI	Blended: Presence (lecture and practical training), Non-presence (booklet)	Nurses' triage training based on the stabilization model reduces the patient's waiting time in the emergency department.
Azhough *et al*.[11] 2015	Investigate the effectiveness of a one-day workshop …	An experimental group (*n*=55), without a control group	QE, ESI, START	Presence (workshop)	The one-day workshop is not effective and reliable for triage knowledge improvement. We propose longer workshops to train more skillful staff.
Abdoos *et al*.[14] 2016	Determining the effect of training …	An experimental group (*n*=50), and control group (*n*=50)	QE, Hospital disaster triage	Presence (lecture)	The efficiency of triage can be significantly improved by training the staff based on updated international guidelines.
Pouraghaei *et al*.[10] 2017	Evaluating the role of education on …	An experimental group (*n*=205), without a control group	QE, START	Presence (lecture and scenario)	Educational classes of pre-hospital triage before disasters are effective in improving the knowledge and practice of employees such as EMTs.
Farhadloo *et al*.[13] 2018	Determining the effect of training …	An experimental group (*n*=70), without a control group	QE, Hospital disaster triage	Presence (simulation)	Training using the simulation method is effective on the preparedness of nurses for triage in emergencies and disasters.
Hoseini *et al*.[12] 2018	Comparing the impact of competency-based …	A workshop group (*n*=25), competency-based group (*n*=25) and control group (*n*=25)	QE, ESI	Presence (workshop and competency-based)	Training using the competency-based method has a greater effect than lecture training on the performance of nurses in the field of triage. The utilization of this method for the retraining of nurses in the field of triage is suggested.
Ahmadreza *et al*.[30] 2018	Investigating the impact of mobile-based …	A Workshop group (*n*=35), and mobile software group (*n*=35)	QE, ESI	Presence (workshop) compared with non-presence (mobile software)	Using the mobile health method increases the knowledge of nurses more than workshops. It is recommended that further studies be conducted on other groups of health-care providers with larger sample sizes.
Delnavaz *et al*.[27] 2018	Comparing the effect of educating ….	Lecture group (*n*=26), video podcasting group (*n*=26)	QE, ESI	Presence (Comparison of lecture with role-playing)	The role-playing method was more effective than the lecture method and is recommended for triage education.

Contd...

Table 2: Contd..

First author and year of publication	Objectives	Sample size	Study design and triage method	Educational method	Conclusion and recommendations
Aghababaeiana et al.[29] 2019	Surveying the effect of triage video podcasting	Lecture group (*n*=30), video podcasting group (*n*=30)	QE, Disaster triage	Presence (Lecture) compared with non-presence (video podcasting)	No significant difference was observed between the effects of the 2 types of education. We believe that video podcasts are ready to replace traditional teaching methods in triage.
Delshad *et al.* [17] 2019	Investigating the effectiveness of participation-based education …	An experimental group (*n*=60), control group (*n*=60)	QE, Hospital disaster triage	Blended: Presence (lecture and Q and A), non-presence (booklet)	The participation-based education program is effective on promoting nursing performance in hospital triage.

*QE: Quasi-experimental; **ESI: Emergency Severity Index; ***START: Simple triage and rapid treatment; ****EMT: Emergency medical technician

concluded that if more attention was paid to e-learning as a form of no-FTF education in nursing, this method could play an important role in enhancing the quality of nursing care. Moradi and Dideban.[32] Ghezeljeh *et al.*,[33] and Rostamnia *et al.*[34] also reported that mobile learning as a kind of no-FTF education method has positive and useful features such as its accessibility and learner-centeredness. FTF and no-FTF have nearly similar effects on enhancing nurses' knowledge regarding evidence-based practice. However, no-FTF is a preferred training method for nurses as it is more cost-effective.[35] Researchers reported that an effective educational method must be student-centered and based on class discussion.[36,37] It seems that these features are in accordance with the no-FTF educational method. Thus, applying these methods in triage training could yield longer and more cost-effective results for learners and hospital managers.

Blended and non-blended approaches

In eight studies, lecture was used as the only educational method the effect of which was significant,[7-14] except in one study.[11] Even though pedagogical educational method, lecturing, has emphasized the role of learners in education,[37] this method neglects the role of learners in their education.[38] Although using lecture alone for the training of triage might have a significant effect on enhancing nurses' knowledge, this effect only remains for a short time. Therefore, the use of a combination of educational methods allowing for the participation of learners in training courses is recommended. In four studies, blended techniques, including lecture, scenario, and educational pamphlets, had been used and the effectiveness of this approach was reported.[8,15-17] This can be because of the benefit of using several different teaching methods. Other benefits of a blended learning approach were the opportunity to review e-content for the learner, reduction of the feeling of isolation, an increase of pervasive interest in the subject under discussion,[39] mental imagery, self-motivation, and maintaining grades.[40]

Using lectures along with other methods such as educational software and group discussion is more effective compared to using lectures alone because learners are more actively engaged in the learning process.[39] A review study reported that a blended approach had a consistently positive effect compared to non-blended learning (pure e-learning or pure FTF method).[40] In another review study, it was reported that, in nursing education, the blended learning approach enhances learners' knowledge and skills. This method enables profound and active learning and is preferred to traditional and FTF methods.[41] As a result, the blended learning method may be suitable in the field of triage for scholars and teachers.

Consolidation of memory

In all of the included studies, except for one,[11] the intervention had a significant effect on the knowledge of

participants in educational courses. Moreover, the results of surveys indicated that nurses have inadequate knowledge and the accuracy of their decision is low.[4,5,19,20] There are various reasons for this contradiction. One of these reasons may be the forgetting of information due to the long interval between training.

Memories are stored in the brain through variation in the basic sensitivity of synaptic transmission between neurons as a result of previous neural activity. There are three different types of memory, which include short-term memory that lasts seconds or at most minutes, intermediate-term memory that lasts days to weeks, and long-term memory that can be recalled up to years or even a lifetime later. Short-term memory can be converted into long-term memory through being recalled weeks or years later.[42] The limitations of this study included restriction on full access to some databases such as Ovid, and lack of access to the full text of some articles.

Conclusion

All education methods, including FTF, no-FTF, non-blended, and blended methods, are effective in triage learning. The results indicate that no-FTF and blended methods have many interesting features versus FTF and non-blended methods in triage training. In all studies, researchers performed posttests up to three months after the intervention. Therefore, regular training of triage content is necessary. Because of the easy access to devices such as mobile phones, virtual networks can be used for the repetition of content and long-term memory consolidation. However, deciding on the most effective educational method requires further studies and the comparison of different learning methods. In conclusion, it can be stated that triage training can be made more effective and efficient through the utilization of the potential capacity of virtual education platforms available in medical sciences universities, social networks, games, and mobile applications.

Acknowledgments

Financial support and sponsorship

Conflicts of interest

Nothing to declare.

References

1. Khanke H, Vaezi H, Nasiri A, Salari A, Moradian M, Akbari Y, *et al*. Hospital Triage in Disasters and Mass Casualty Accidents. 1st Tehran, Iran: Tandis; 2019. 66 p.
2. Hedayati H, Mogharrab M, Moasheri N, Sharifzadeh G. Studying of BUMS' students' knowledge about hospital triage in 2011. Mod Care J2013;9:237-44.
3. Aghababaeian H, Sedaghat S, Taheri N, Mousavi SA, HabibiMoghadam M, Pourmotahari F. Evaluating knowledge and performance of emergency medical services staff regarding pre-hospital triage. Iran Emerg Med J 2017;4:63-7.
4. Kamrani F, Ghaemipour F, Nikravan M, Majd HA. Prevalence of miss triage and outcomes under triage of patients in emergency department. JHPM 2013;2:17-23.
5. Haghigh S, Ashrafizade H, Mojaddami F, Kord B. A survey on knowledge level of the nurses about hospital triage. J Nurs Educ 2017;5:46-51.
6. Saberinia A, Vaezi H, Seyedhoseini Davarani S, Afzali Moghadam M, Hoseinnejad Nedaei H, Seyedhoseini S, *et al*. Instruction for implementation and principles of setting up a hospital triage system in the emergency department. Tehran: Ministry of Health and Medical Education, 2015.
7. Faraji A, Khankeh HR, Hosseini MA, Abdi K, Rezasoltani P. Effect of simulated training course on preparedness of nurses to do prehospital triage. JHPM2013;2:24-9.
8. Mahmoudi H, Mohammadalizadeh A, Khaghanizade M. The effect of nurses' triage training based on stabilization model on the patient's waiting time in emergency department. Iran J Nurs 2015;30:44-51.
9. Rahmati H, Azmoon M, Meibodi MK, Zare N. Effects of triage education on knowledge, practice and qualitative index of emergency room staff: A quasi-interventional study. Bull Emerg Trauma 2013;1:69-75.
10. Pouraghaei M, Tabrizi JS, Moharamzadeh P, Ghafori RR, Rahmani F, Mirfakhraei BN. The effect of start triage education on knowledge and practice of emergency medical technicians in disasters. J Caring Sci 2017;6:119-25.
11. Azhough R, Vahdati SS, Faraji F, Faraji M, Ghorbanian M, Ramouz A, *et al*. One-day triage course for nurses, it is essential. J Emerg Pract Trauma 2015;1:52-5.
12. Hoseini SD, Khankeh HR, Dalvandi A, Saberinia A, Rezasoltani P, Mirzaeirad SZ. Comparing the effect of the two educational methods: Competency-based, and lecture, on the knowledge and performance of nurses in the field of hospital triage. Health Emerg Disasters Quarterly2018;3:77-84.
13. Farhadloo R, Nejad MK, Hoseini MHM, Vahedian M, Masoudi MP. Research paper: Investigating the effect of training with the method of simulation on the knowledge and performance of nursing students in the pre-hospital triage. Health Emerg Disasters Quarterly 2018;3:123-30.
14. Abdoos M, Davarani SHSH, Nejad HH. Impact of training on performance of triage: A comparative study in Tehran emergency department. Int J Hosp Res 2016;5:122-5.
15. Khatiban M, Khazaei A, Karampourian A, Soltanian A, Asadi HK, Salimi R, *et al*. 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. J of Clin Res Paramed Sci 2014;3:63-74.
16. Haghdoost Z, Safari M, Yahyavi H. Effect of Triage Education on knowledge, attitude and practice of nurses in Poursina Educational and Therapeutic Emergency center in Rasht. J Holist Nurs Midwifery 2010;20:14-21.
17. Delshad V, Shirazi FB. The effectiveness of participation-based education on nurse performance in hospital Triage at disaster. Med Sci 2019;23:404-9.
18. Rostampour MJ, Kalroozi F, Pishgooie AH, Aliyari SH. The effect of triage education by pre advance-organizer model on the knowledge staff disaster team nurses. Mil Caring Sci2016;3:141-8.

19. Derakhshanfar H, Mahmoudi H, Noori S, Vafai A, Bozorgi F. Studying the efficiency triage at Shahid Beheshti Hospitals, Tehran, Iran. HealthMED J2015;9:307-15.

20. Sedaghat S, Aghababaeian H, Taheri N, Moghadam AS, Maniey M, Ahvazi LA. Study on the level of knowledge and performance of North Khuzestan medical emergency 115 personnel on pre-hospital triage. Iran J Crit Care Nurs 2012;5:103-8.

21. Ghanbaria V, Ardalan A, Zareiyan A, Nejatia A, Hanfling D, Bagheri A. Ethical prioritization of patients during disaster triage: A systematic review of current evidence. Int Emerg Nurs 2019;43:123-36.

22. Ghanbari V, Zareiyan A, Nejati A, Hanfling D, Ardalan A. Review paper: Ethical patient prioritization in disaster triage: A protocol for a systematic review. Health Emerg Disasters Quarterly 2019;4:113-8.

23. Briggs J. Critical Appraisal Tools: Checklist for Quasi-Experimental Studies. Joanna Briggs Institute; 2017. p. 1-7.

24. Meibidi MK, Yadollahi A, Esfandiari S. The effect of education on the knowledge and practice of emergency department's nurses regarding the patients' triage. Iran J Emerg Med 2014;1:40-4.

25. Ebrahimi M, Ghanbarzehi N, Gorgich ZG, Darban F, shirzadi F. The effect of triage training on the performance of triage nurses and emergency medical staff of Iranshahr. Int J Med Res Health Sci 2016;5:190-6.

26. Aliakbari F, Aein F, Bahrami M. Assessment competencies among emergency nurses for responding in disaster situation with objective structured clinical examination. JHPM 2014;3:47-57.

27. Delnavaz S, Hassankhani H, Roshanga F, Dadashzadeh A, Sarbakhsh P, Ghafourifard M, *et al*. Comparison of scenario-based triage education by lecture and role playing on knowledge and practice of nursing students. Nurse Educ Today 2018;70:54-9.

28. Vahabi YS, Tadrisi SD, Ghayem S, Ebadi A, Daneshmandi M, Nia MS. Comparing the effect of triage education in lecture and multimedia software on nurses learning. Iran J Crit Care Nurs 2011;4:7-12.

29. Aghababaeiana H, Ahvazib LA, Moosavic A, Mazhina SA, Taheryd N, Nourie M, *et al*. Triage live lecture versus triage video podcast in pre-hospital students' education. Afr J Emerg Med 2019;9:81-6.

30. Ahmadreza Y, Elham ID, Shahla M. Utilizing mobile health method to emergency nurses' knowledge about emergency severity index triage. J Educ Health Promot 2018;7:14-21.

31. Rouleau G, Gagnon M-P, Côté J, Payne-Gagnon J, Hudson E, Bouix-Picasso J, *et al*. Effects of e-learning in a continuing education context on nursing care: a review of systematic qualitative, quantitative and mixed studies reviews (protocol) BMJ Open 2017;7:e018441.

32. Moradi E, Didehban H. The status of mobile learning in medical universities: Comments, outcomes and challenges. J Med Cultiv 2018;27:133-45.

33. Ghezeljeh TN, Aliha JM, Haghani H, Javadib N. Effect of education using the virtual social network on the knowledge and attitude of emergency nurses of disaster preparedness: A quasi-experiment study. Nurse Educ Today 2019;73:88-93.

34. Rostamnia L, Ghanbari V, Shabani F, Farahani A, Dehghan-Nayeri N. Evidence-based practice for cardiac intensive care unit nurses: An educational intervention study. J Contin Educ Nurs 2020;51:167-73.

35. Mohadesi H, Feizi A, Salemesafi R. Comparative study of effective teaching indicators from the viewpoints of faculty members and students of Urmia University of Medical Sciences. Bimonthly J Urmia Sch Nurs Midwifery 2012;9:464-71.

36. Tofoghiyan T, Monadi H, Nasrollahi S, Rakhshani MH. Prioritization of the effective teaching parameters; comparing the viewpoints of students and teachers of Sabzevar University of Medical Sciences. Bimonthly Educ Strateg Med Sci 2015;8:1-6.

37. Omidifar N, Yamani N, Yousefi A. The effect of ECG training workshop on medical students' knowledge of ECG reading and interpretation. J Strides Dev Med Educ 2012;3:118-25.

38. Adib-Hajbaghery M, Karimi H. Methods of teaching electrocardiogram: Which one is the best? A review studies. Iran J Med Educ 2016;16:21-9.

39. Liu Q, Peng W, Zhang F, Hu R, Li Y, Yan W. The effectiveness of blended learning in health professions: Systematic review and meta-analysis. J Med Internet Res 2016;18:2-19.

40. Najafi H. Comparing of the effect of blended and traditional teaching on learning. J Res Med Educ 2019;11:54-63.

41. Moonaghi HK, Mohsenizadeh SM. Blended learning and its effectiveness in nursing education: Review. Jundishapur Educ Dev J 2019;10:29-40.

42. Hall JE, Guyton AC. Guyton and Hall Textbook of Medical Physiology Military Caring Sciences. 13rd ed. Mississippi, USA: Elsevier; 2016. p. 737-50.