

# A Comparative Study of the Effect of Triage Training by Role-Playing and Educational Video on the Knowledge and Performance of Emergency Medical Service Staffs in Iran

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## Abbreviations:

START: Simple Triage and Rapid Treatment

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## Abstract

**Introduction:** Educating emergency medical staffs in triage skills is an important aspect of disaster preparedness. The aim of the study was to compare the effect of role-playing and educational video presentation on the learning and performance of the emergency medical service staffs in Khozestan, Iran

**Methods:** A total of 144 emergency technicians were randomly classified into two groups. A researcher trained the first group using an educational video method and the second group with a role-playing method. Data were collected before, immediately, and 15 days after training using a questionnaire covering the three domains of demographic information, triage knowledge, and triage performance. The data were analyzed using defined knowledge and performance parameters.

**Results:** There was no significant difference between the two training methods on performance and immediate knowledge ( $P = .2$ ), lasting knowledge ( $P = .05$ ) and immediate performance ( $P = .35$ ), but there was a statistical advantage for the role-playing method on lasting performance ( $P = .02$ ).

**Conclusion:** The two educational methods equally increase knowledge and performance, but the role-playing method may have a more desirable and lasting effect on performance.

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## Introduction

The process of sorting out multiple casualties for treatment was first described over 200 years ago and is now known as mass-casualty triage.<sup>1,2</sup> Triage is the process of determining the priority of patients' treatments based on the severity of their conditions. This prioritizes the allocation of limited resources when the demand for resources exceeds their availability.<sup>3</sup> Medical triage is a management method that favors societal aspects over individual patients' health care needs. The skills required by triage staff include clinical experience, good judgment, availability, sense of humor, stress-tolerance, knowledge of available resources, problem solving abilities, and sense of anticipation.<sup>4,5</sup>

Triage is an important activity in the initial medical management of mass-casualty victims. The term "triage" originates from the French verb *trier*, meaning "to sort." Disaster triage is defined as "a method of quickly identifying victims who have immediate life-threatening injuries and who have the greatest chance of surviving."<sup>6</sup> Several disaster triage protocols, scales, and algorithms exist.<sup>6-11</sup> The current literature demonstrates the importance of adequate triage during a disaster,<sup>12-18</sup> showing how improper triage can adversely affect the outcome. The most commonly encountered multi-casualty triage system in the United States is the START (simple triage and rapid treatment) system,<sup>6,7</sup> developed in the 1980s by Hoag Memorial Hospital and the Newport Beach, California, Fire Department.<sup>1</sup> This system has become increasingly popular due to its inherent

simplicity and rapidity of use. The initial step in the START triage process is to identify ambulatory patients, who are categorized as minor (green) cases and direct them to a remote treatment and reassessment area. Next, START categorizes patients based on three physiological factors: respiratory rate, pulse perfusion, and mental status. Emergency Medical Services providers are routinely trained in a method of prioritizing patients for treatment and transport. Triage becomes even more critical whenever providers are faced with more patients than they normally can handle. This can happen during a large-scale disaster or may occur more commonly during an accident such as a multivehicle crash.<sup>19</sup> When facing multiple victims in a disastrous event, the key to successful management many victims with limited respondents and resources is triage.<sup>20,21</sup> In a major-casualty incident or a large-scale disaster, the first responders such as emergency medical technicians or members of a disaster medical assistance team should be familiar with a good triage system to fulfill such tasks.

Two potential methods for teaching medical triage are role-playing and use of educational videos. Variables such as age, marital status, educational degree, service history, and profession may affect the ability to learn triage techniques and should be assessed.

In this study, the effects of role-playing and video teaching are assessed in teaching emergency medical personnel how to perform emergency medical triage.

## Methods

This study was a prospective cohort design, comparing two educational methods among emergency response personnel in the north of Khuzestan Province, Iran. Using a quasi-experimental design study, a study sample was selected to include operators, drivers, and technicians who held at least a basic degree. Morgan's sample size<sup>22</sup> was used for estimation of sample size and 144 personnel were randomly selected as subjects of the study.

For this study, a questionnaire was developed by 10 academic professionals and related specialists. Modifications were made and the questionnaires were distributed by professors and specialists. Cronbach's alpha was used to determine the reliability of the questionnaire.<sup>23</sup> Cronbach's alpha for the role-playing and video teaching groups were .88 and .83, respectively. Also, after 10 days a retest was used to evaluate the reliability of the pretest for 30 personnel. Pearson coefficient correlations obtained were the same (0.8) for pretest and retest.

All subjects were pretested using the questionnaire immediately before training. The questionnaire was based on an educational video and a role-playing scenario and had three sections. Included in the questionnaire were demographic information and 15 multiple-choice questions of general triage knowledge and 19 questions to test triage performance. A scoring procedure was followed with knowledge evaluated based on a maximum 15-point scale. Knowledge was considered low for 0 to 5 correct answers, medium for 6 to 10, and best for 10 to 15. For performance there was a potential score of 19 maximum; 0 to 6 it was considered low, 7 to 12 medium, and 13 to 19 best.

After a primary training session and collecting demographic information, the 144 subjects were randomly divided into two groups. The first group consisted of 72 subjects called the "performance" group and the other called the "educational video" group. Then each group was divided into two equal subgroups (36 in each group). The "performance" group was trained according to a scenario based on the educational video. After

explaining the scenario to the subjects, each of them, along with the researcher, role-played triage skills using a reconstructed accident involving 35 injured people. The "educational video" group was trained by a 30-minute teaching video clip at the same time as the role-playing group and in a similar situation. Immediately after finishing the training sessions, the subjects were tested. All subjects of the groups were tested, in written form, 15 days later using the same questions and in the same way.

To analyze the data, statistical descriptive procedures, and also independent pair *t* test, one-way ANOVA, Pearson's correlation coefficient, or their nonparametric equivalents were used. The significance level was .05 and SPSS (version 18.0, International Business Machines Corporation, Armonk, New York USA) was used to analyze data.

## Results

The mean age of subjects was 31.32 (SD = 3.9) years old. The average work experience duration (service time) was 4.20 (SD = 2.68) years. The subjects' demographic characteristics are shown in Table 1. For triage knowledge, the score was 5.69 (SD = 2.5) of 15 total, and for performance it was 5.78 (SD = 3.2) of 19 total.

Using Pearson's correlation coefficient, significant differences were found among service times, as well as the knowledge and performance of the subjects. The correlation coefficient (*r*) was 0.38, ( $P < .001$ ) for knowledge, and .39 for performance ( $P < .001$ ). The correlation of age, knowledge, and performance was 0.21 for knowledge and 0.25 for performance ( $P < .001$ ). An ANOVA test also indicated significant correlations among education degree and the professional career of the personnel with knowledge and performance; however, there was no significant correlation among the subjects' marital status with their knowledge or their performance ( $P = .06$ ). There was no significant mean increase in the subjects' knowledge immediately after the training session and 15 days after the training session in the two experimented methods of teaching the subjects (Table 2). As shown in Table 3, there was a significant difference between the two methods of teaching subjects in terms of role-playing and watching the educational video, although this difference was not significant immediately after the training ( $P = .3$ ). It was, however, significant 15 days after the training session ( $P = .00-.02$ ).

## Discussion

These findings showed that Iranian Emergency Medical Services is a young, expanding organization. In terms of education, most of the subjects in the study held a diploma degree and were basic technicians. This can be accounted for by the low number of educated emergency medical service personnel across Iran compared to other countries, especially in Khuzestan.<sup>24-30</sup>

The study showed that the subjects' knowledge and their performance were low before the training sessions. Sarikaya (2004), and Kuo-Chih (2003) reported similar findings;<sup>31,32</sup> however, this is not in line with Wang's study (2008) in which it was reported that nurses' knowledge about triage was medium.<sup>26</sup> Although, these studies showed nurses' knowledge as medium, more training was indicated for the personnel.<sup>30,33</sup> Chen and colleagues found that both lecturing and educational videos can be similarly effective and that educational videos are slightly more effective than lecturing.<sup>34</sup> On the other hand, the findings showed that role-playing and watching educational videos can be exchanged for training for increasing immediate after-knowledge

Personal Characteristics	Role-playing Group No. (%)	Educational Video Group No. (%)
Educational Degree		
Basic (diploma)	53 (73.6)	55 (76.4)
Intermediate	14 (19.4)	12 (16.7)
Paramedics (BA)	5 (6.9)	5 (6.9)
Total	72 (100)	72 (100)
Marital status		
Single	6 (8.3)	13 (18.1)
Married	66 (91.7)	59 (81.9)
Total	72 (100)	72 (100)
Professional status		
Operator	8 (11.1)	7 (9.7)
Driver	23 (31.9)	33 (45.8)
Technician	41 (56.9)	32 (44.4)
Total	72 (100)	72 (100)

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**Table 1.** Demographic Variables Distribution of Subjects in the Role-playing and Educational Video Groups  
Abbreviation: BA, bachelor’s degree

Difference of Knowledge	Intervention	Number	Mean (SD)	Mean Difference	P Value
Before and immediately after intervention	Educational video	72	6.8 (2.3)	0.4	.21
	Role-playing	72	7.2 (1.8)		
Before and 15 days after intervention	Educational video	72	6.1 (2.4)	0.7	.06
	Role-playing	72	6.8 (1.7)		
Immediately and 15 days after intervention	Educational video	72	0.7 (0.9)	0.2	.14
	Role-playing	72	0.5 (0.8)		

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**Table 2.** Knowledge Scores Based on Time of Intervention

and performance. Karimi-Moneghi, showed similar findings.<sup>35</sup> However, Hazavehei reported a more significant effect of role-playing on knowledge compared with the other methods of training in his studies,<sup>36</sup> which can account for the lesser effect of lecturing as a conventional and old way of teaching for units lacking new technology and science. In other studies, lecturing proved to be less effective compared with watching educational videos.<sup>35</sup> It can be concluded that watching educational videos as well as role playing can increase the knowledge level of staff. In relation to this, Moemennasb, quoting from Beastibell, explains that 75% of learning takes place through seeing and that 70% of material is retained when there is also the possibility of talking about the material one is watching.<sup>37</sup> Therefore, it seems that

training by watching educational videos can increase knowledge and that it can be a good, economical replacement for role-playing.

Knowledge level and performance of the subjects of this study increased after training either by role-playing or watching an educational video. The findings showed that there was no significant difference between role-playing and watching the educational video in terms of increasing the subjects’ knowledge. But in terms of performance, role-playing had a more significant and more lasting effect compared with watching the educational video. On the other hand, the study showed that watching educational videos can be a good and economical way of training personnel and can be used to remove current problems and high expenses for practical courses.

Difference of Performance	Intervention	Number	Mean (SD)	Mean Difference	P Value
Before and immediately after intervention	Educational video	72	8.7 (2.7)	0.4	.35
	Role-playing	72	9.1 (2.3)		
Before and 15 days after intervention	Educational video	72	0.9 (0.2)	0.7	.02
	Role-playing	72	0.2 (0.8)		
Immediately and 15 days after intervention	Educational video	72	0.7 (0.1)	0.2	.00
	Role-playing	72	0.5 (0.8)		

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Table 3. Difference of Means of Knowledge Scores Among Two Groups Based on Time of Intervention

In short, this study showed that teaching by role-playing is more effective than video education and lasts longer. It is because role-playing is based on performing and being involved practically and cooperatively.<sup>36</sup> Study results showed that subjects' performance immediately after training was not significantly different in the two methods. This indicates that use of educational videos for training emergency services personnel can be effective in the short term. To achieve longer and more lasting learning, role-playing is more effective. Karimi-Moneghi, Hazavehei, and Knowles confirm similar results in their studies.<sup>35,36,38</sup>

### Conclusion

The results of this study indicate that both educational videos and role-playing achieve higher triage methods knowledge for emergency services personnel; however, role-playing proved to be more effective 15 days after the training sessions.

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