

# Impact of Training on Performance of Triage: A Comparative Study in Tehran Emergency Department

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## Abstract

**Background and Objectives:** Emergency departments should adapt the most updated standards in order to maximize their capability in delivering urgent health services. In the present study we assessed the effect of training of triage nurses in Tehran Emergency Department on efficiency and accuracy of triage decision making.

**Methods:** In this quasi-experimental study, 100 nurses with mean age of 27 years was randomized into 2 groups. The first group received training based on a new triage international guideline and the second (control) group was left untrained. The ability of trained nurses in decision making and classifying the complications was compared with nurses who followed the current routine triage protocol. The categorical variables were compared by chi-square test.

**Findings:** The total frequency of dispatches based on new international guideline was significantly lower than based on the routine protocol (84% vs. 46%) ( $P < .001$ ). In addition, the proportion of correct dispatches was found to be significantly higher than those by the untrained group (75% vs. 20%) ( $P < .001$ ). Further, frequency of correct triage by trained group turned out to be significantly higher than by the untrained group (80% vs. 30%) ( $P < .001$ ).

**Conclusions:** Our study provides direct evidence for the positive impact of updated training on improved performance of triage process and encourages similar interventions to achieve higher efficiency in emergency departments.

**Keywords:** Triage, Dispatch, Guideline, Training, Nurse, Performance

## Background and Objectives

Triage is the first point of referral for patients requiring urgent health services.<sup>1,2</sup> Triage decisions are associated with medical interventions, and thus correct triage decision making is crucial for saving the life of patient.<sup>3-6</sup> The triage decision-making is a complex clinical process and is often done under limited time, stress, uncertainty, and very small margin of error. Moreover the emergency department personnel are often exposed to heavy workload due to the large number of patients that need categorization and evaluation,<sup>7</sup> which increase the risk of error.

The primary triage decisions mostly include evaluation and classification of the patients based on their health problem and prioritizing allocation of medical resources based on patient complication severity.<sup>3-6,8</sup> Previous stud-

ies have identified several factors that influence triage decision-making, such as patient number,<sup>9,10</sup> nurses' characteristics,<sup>11-14</sup> emergency department workload,<sup>15,16</sup> and financial incentives.<sup>17</sup> International medical guidelines are continuously updated to enhance the standards of clinical processes, including triage. Studies have shown that training of triage personnel can improve the accuracy of their decisions and hence patients' comfort and outcome.<sup>18</sup> Hence, this study was conducted to evaluate the effect of training triage nurses of Tehran Emergency Department based on a newly released international guideline on efficiency of triage process.

## Methods

This quasi-experimental study enrolled 100 nurses from Tehran Emergency Triage. The nurses were randomized into trained and control groups. The trained group received training based on the new international triage

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guideline. The most common complications and contacts (by telephone) to the Tehran Emergency Department were extracted and the nurses were asked to make triage decision. Then the ability of the 2 groups in decision making and classifying the complications was compared.

### Statistical Analyses

Categorical data were presented as percentage (%), and continuous data as mean  $\pm$  standard deviation (SD). Chi-square exact test was used to compare categorical variables. The agreement between 2 protocols was examined by the Kapa test.  $P < .05$  was considered as statistical significance. The data were analyzed using SPSS version 22.0 software package (SPSS Inc, Chicago, IL).

### Results

The total dispatch by the trained group was significantly lower than the group that followed the present protocol. The frequency correct dispatch by training group was significantly higher than by untrained group (Table 1). The frequency of correct triage in training group was significantly higher than in untrained group (Table 1). Agreement between 2 protocols was moderate ( $K = 0.23$ ,  $P = .03$ ) (Table 1).

### Discussion

The purpose of this study was to examine the effect of training on standard guidelines on the performance of triage. The nursing group that received training on international guideline gained significantly higher ability to make triage decision makings with lower total dispatches and lower wrong dispatches. Moreover, the right dispatches by

the nurses in trained group were significantly higher than that by the control group. In line with our results, several studies have shown the positive correlation between training and accuracy of triage decision making.<sup>19-21</sup>

In Addition to knowledge which could be acquired by training, the importance of experience in correct triage decision making has been highlighted in the literature.<sup>22-25</sup> In our sample, the difference between the experience of trained and untrained groups was insignificant, which prevented us to examine the impact of experience in comparison to training. Andersson et al<sup>22</sup> and Hicks et al,<sup>23</sup> have emphasized on personnel experience as the major determinant of efficient triage. However, Cone et al showed that training can improve the accuracy of decision making beginner and experienced triage nurses, irrespective of experience level.<sup>26</sup> Notable, Considine et al who compared the impact of experience and knowledge on triage decision making found knowledge as the dominant factor.<sup>18</sup> These studies both corroborate our results and emphasize the unique role of up-to-date training in improved performance of triage.

Apart from knowledge and experience, previous studies have also identified other factors which can affect efficiency of triage, including nurse characteristics, number of patients, facilities, and environment.<sup>8-11,18,27</sup> A recent study on 157 participants in Iran identified personnel characteristics as the most important factor affecting the triage decision making.<sup>28</sup> Others have shown a positive correlation between nurse skills and right triage decision-making.<sup>24,25</sup>

The moderate consistency between the new triage guideline and current protocol indicates that the triage guideline is significant updated. This finding together with

**Table 1.** Comparison of Routine Protocol and New International Guideline

	Routine Protocol	New International Guideline	P
Sex, n (%)			.43
Female	35 (70)	33 (66)	
Male	15 (30)	17 (34)	
Age, mean $\pm$ SD	27.37 $\pm$ 3.51	26.85 $\pm$ 3.74	.21
Experience, mean $\pm$ SD	4.25 $\pm$ 0.23	4.31 $\pm$ 0.19	.53
Dispatch, n (%)			.001
No	8 (16)	27 (54)	
Yes	42 (84)	23 (46)	
Right dispatch, n (%)			.001
No	40 (80)	13 (26)	
Yes	10 (20)	37 (74)	
Triage, n (%)			.001
Right	15 (30)	40 (80)	
Wrong, n (%)	35 (70)	10 (20)	
Kapa agreement	0.23		.03

positive effect of training of the nurses based on the former strongly recommends similar interventions to alleviate inaccuracy and inefficiency in Iranian emergency departments.

### Study Limitations

The small sample size and short duration of the present study limit generalization of the results. Further large-scale investigations with longer duration may help validate our findings.

### Conclusions

Our study showed that the efficiency of triage can be significantly improved by training the staff based on updated international guidelines. The moderate agreement between the new and present protocols suggests that the improving observed is not merely the result of training, but also the impact of the updated guideline. Therefore, Iranian emergency departments should adopt similar intervention in order to alleviate inaccuracy in triage decision making.

### Authors' Contributions

The authors made similar contributions to this study.

### Competing Interests

The authors declare no competing interests.

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