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# The Relationship between Emergency Medical Services Staff Knowledge of Basic Life Support Indicators

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***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

**Introduction:** One of the most important steps to save patients is to perform resuscitation. The aim of this study was to investigate the knowledge and practice of emergency personnel in Tehran regarding the baseline level of resuscitation operations.
**Methods:** This descriptive cross-sectional study was performed on 200 emergency personnel working in Tehran. The level of awareness questionnaire with 45 qualifications and the base of BLS indicators was prepared and collected.
**Results:** According to Chi-square test, there was a significant correlation between age and practical score. Also, there was a significant relationship between the ALS courses and the acquired theoretical score.

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**Conclusion:** The results of the increase in awareness of this study in relation to previous studies in Iran and especially in the region show that during the last few years, the level of knowledge of medical emergencies personnel has had good improvement, while on the other hand, although there has been improvement in the performance compared with last few years.

*Keywords: Awareness; emergency personnel; BLS.*

## 1. INTRODUCTION

Ischemic heart disease is the leading cause of death in the world, and is expected to increase widely in advanced countries in the next 10 years. There are about 350,000 deaths due to the mentioned cause per year in the United States [1,2]. Brain damage which occurs to the brain 4 to 6 minutes after a defective oxygen supply, leads to death due to this short time, lack of information and skills.

Cardiopulmonary resuscitation is a process whereby the life of the patient can be recovered by restoring the vital organs of the body (heart and lung), and thus the patient can continue his life, restoring operations are done by basic life support (BLS) and advanced cardiac life support (ALS). Low quality resuscitation can lead to poor results, such as patients staying in plant life. Acute cardiovascular events are often seen in pre-hospital settings. Cardiovascular emergency management guidelines have been improved to ensure that fast and effective measures are taken for cardiovascular events outside the hospital [3,4]. Research has shown that various factors are effective in the resuscitation, including age, underlying illness, cause of referral, time between cardio-respiratory failure to resuscitation, and the use of defibrillation. These factors, such as age and sex, cannot be changed, but others may be interfered, such as the onset of rapid resuscitation, the timely use of shock, drug interventions, and the amount of experience and knowledge of the resuscitation group, which can increase the survival of patients [5,6].

Health system personnel need the appropriate skills and information for successful resuscitation. Studies on health workers and EMS agents have shown that resuscitation skills are rapidly disappearing and its science remains more sustainable than its skill [7]. EMS services are a vital part of the emergency care system. This service helps to ensure the necessary certainty for emergency services in a coordinated manner, and therefore emergency staff must have appropriate training and support for effective medical service provision. Education plays a fundamental role in the implementation of the principles of cardiopulmonary resuscitation, and not only makes nurses and EMS officers sure in the process of acquiring cardiopulmonary resuscitation knowledge, but also is effective to stabilize learning [8]. This indicates the importance of learning to save the patient. For this reason, extensive training for EMS staff who are the first to deal with patients with cardiac failure is done before they begin to work. However, there has not been a comprehensive study on the sustainability of knowledge and skills of EMS agents over time as they begin their work. Therefore, in this study, the knowledge and performance of EMS staff regarding ALS indicators with different work history and time intervals are investigated and evaluated with their training on BLS.

## 2. MATERIALS AND METHODS

The present study was a cross-sectional study which was carried out with the aim of studying the knowledge, performance and attitude of medical emergency personnel working in Tehran in cardiopulmonary resuscitation in 2017. The population under study was medical emergency personnel in Tehran with a sample size of 200 people. Data collection instrument in this research was a checklist for examination of staff in the cardiopulmonary resuscitation, which after being prepared, was provided to some faculty members for determining the content validity, and its problems were resolved as far as possible and the researcher used it as a data collection tool. Using the test-retest method, with two-week interval, a 96% correlation in knowledge was confirmed and 81% in the performance section and also Cronbach's alpha of 89% in the knowledge sector and 84% in the performance section were confirmed. In the first part, demographic information questionnaire including age, educational status, number of participants rounds, last period and work experience were collected.

The checklist contained 45 theoretical evaluation questions that looked at the theory of personnel awareness. The time required for all questions was between 30 and 45 minutes. To complete

the checklist, the educational supervisors of the hospitals were used. After their participation, they were given a two-hour training session on how to complete the checklist. After completing the checklists and entering the data into the spss software version 21, descriptive statistics and chi-square test were analyzed.

## 3. RESULTS

In this cross-sectional descriptive study, 200 emergency personnel in Tehran were ranging from 20 to 50 years old, with an average age of 34 years. 50 percent of Participants' education was associate's degree and 17.5% bachelor's degree.

Based on the correlation and Chi-square test, there is a significant relationship between the BLS periods and the obtained theoretical score, there is a significant relationship between education and the obtained score of the theory, and also there is a significant relationship between the work experience and the obtained score of the theory and the same relationship between the number of BLS courses and the theory score gained (Table 1-4).

## 4. DISCUSSION

Considering the fact that during the past few years, cardiopulmonary resuscitation has been established in medical emergencies, and since there is very little evidence for investigating and determining the level of awareness and performance of emergency medical personnel in Iran, this study aims to determine the level of awareness and performance of the emergency medical personnel of the University of Medical Sciences in Tehran and the results also reflected the moderate and increasing outcomes of knowledge and practice of the emergency medical personnel in the area. In this study, 200 emergency medical technicians from Tehran University of Medical Sciences entered the study and their knowledge and skills regarding cardiopulmonary resuscitation were studied. This study showed that knowledge and skills in cardiopulmonary resuscitation were significantly positive. It seems that standardized and qualification-based in-service training and education programs which are needed to maintain and enhance the level of knowledge and competence of these personnel are as a requirement. Members of the resuscitation team must have the necessary skills and knowledge and the ability to perform well in this vital procedure, and be able to increase success in resuscitation as individuals with multiple skills. The results of this study showed that inter-professional training improves performance among resuscitation team members [9].

It is also favorable with Carpenter's (2016) study of increasing physicians' teamwork with nurses to reduce adverse events in the emergency department of American hospitals through inter-professional training [10]. The study found that training long-term cardiopulmonary resuscitation skills and helping to maintain these skills in the long run can have tremendous impact on lifesaving therapy, and long-term continuing training is effective in maintaining it. In a study by Carlyslee et al., 2004, health care staff participating in a focus group stated that inter-professional training makes beginners into experienced individuals, and the beginners think about themselves and what they do, experienced employees think of the whole work and what the team does [11].

Initial identification and activation of resuscitation protocols increase the survival rate of individuals and may even improve cardiac arrhythmias, which will strengthen the importance of proper cardiopulmonary resuscitation training. In our study, BLS, ALS and clinical skills were taught [12].

It seems that standardized and qualification-based in-service training and education programs are needed to maintain and enhance the level of knowledge and competence of these personnel as a requirement [13]. In this study, the performance of personnel in performing cardiopulmonary resuscitation measures was desirable. It seems that the provision of standardized, qualification-based in-service training and retraining programs is essential to maintain and enhance the knowledge and competency of the resuscitation team. Because the resuscitation team faces patients with cardiopulmonary resuscitation and the need for training, practice, and repetition in the field of cardiopulmonary resuscitation is clear and can lead to reduced death rates, complications due to failure of the operation, and as a result it can increase survival rates [14].

The lack of regular and systematic study of in-service retraining and education has been identified as a major barrier to the success of cardiopulmonary resuscitation [15]. In most articles, standard in-service training has been considered as a major contributor to the results

**Table 1. Relationship between BLS courses and theoretical score**

| Case | Course theoretical score | Weak | Moderate | Good | Total | Value | Significance |
|---|---|---|---|---|---|---|---|
| BLS courses and theoretical score | Positive | 0 | 30 (25%) | 90(75%) | 120(60%) | 7.76 | 0.0034 |
| | Negative | 40(50%) | 30(37.5%) | 10(12.5%) | 80(40%) | | |
| | **Total** | 40(20%) | 60(%30) | 100(50%) | 200(100%) | | |

**Table 2. Relationship between education and theoretical score**

| Case | Education theoretical score | Weak | Moderate | Good | Total | Value | Significance |
|---|---|---|---|---|---|---|---|
| Education theoretical score | High school diploma | 25(50%) | 20(40%) | 5(10%) | 50(25%) | 6.54 | 0.041 |
| | Associate degree | 30(30%) | 40(40%) | 30(30%) | 100(50%) | | |
| | Bachelor | 5(14.2%) | 15(42.8%) | 15(42.8%) | 35(17.5%) | | |
| | Master | 0 | 5(33.3%) | 10(66.6%) | 15(7.5%) | | |
| | **Total** | 60(33.3%) | 80(40%) | 60(33.3%) | 200(100%) | | |

**Table 3. Relationship between work experience and theoretical score**

| case | Work experience theoretical score | Weak | Moderate | Good | Total | Value | Significance |
|---|---|---|---|---|---|---|---|
| work experience theoretical score | 5 years | 15(30%) | 30(60%) | 5(10%) | 50(25%) | 8.56 | 0.0.41 |
| | 5 to 10 years | 20(20%) | 40(40%) | 40(40%) | 100(50%) | | |
| | 10 to 15 years | 5(14.2%) | 20(57.1%) | 10(28.5%) | 35(17.5%) | | |
| | Over 15 years | 0 | 5(33.3%) | 10(66.6%) | 15(7.5%) | | |
| | **Total** | 40(20%) | 95(47.5%) | 65(32.5%) | 200(100%) | | |

**Table 4. Relationship between the number of BLS courses and theoretical score**

| case | Number of BLS courses theoretical score | Weak | Moderate | Good | Total | Value | Significance |
|---|---|---|---|---|---|---|---|
| number of BLS courses and theoretical score | Up to 5 courses | 5(14.2%) | 20(57.1%) | 10(28.5%) | 35(17.5%) | 8.43 | 0.01 |
| | 5 to 10 | 30(30%) | 40(40%) | 30(30%) | 100(50%) | | |
| | 10 to 15 | 0 | 5(14.2%) | 30(85.7%) | 35(17.5%) | | |
| | Over 15 | 0 | | 15(100%) | 15(7.5%) | | |
| | **Total** | 35(17.5%) | 65(32.5%) | 75 (37.5%) | 200(100%) | | |

of cardiopulmonary resuscitation and there has been an emphasize to enhance the team's knowledge, performance and skills through standardized and systematic retraining programs [16].

In this study, the number of participants in the study was proportional, so the results can be reliably generalized. The proposal is recommended for other staff of medical universities with the same sample size. The study can also be done qualitatively and through structured interviews.

In a study done at Gorgan University of Medical Sciences on 37 students studying in the last semester of nursing, it was concluded that the difference in the degree of advanced students' performance in cardiopulmonary resuscitation, with regard to the mean of information before and after intervention, had a significant statistical difference.

Also, in the study of the effect of two methods of cardiopulmonary resuscitation training on medical students was conducted, in which the usual educational method (theory and practical workshop) was compared with another new teaching method (longer theoretical and practical workshop with practice in the real environment). The results of this study showed that in both groups, the level of knowledge and performance increased, but in the new educational method, this effect was significantly higher.

Since emergency personnel play a very important role in providing care and are present all day and night in the emergency wards, if necessary, they can recover patients through cardiopulmonary bypass as they are one of the key members of the resuscitation team and also they can be reached by the patient in a timely manner; they can be effective in the patients' survival [17].

The results of awareness raising in this study, compared to previous studies in Iran, and especially in the region, show that during several Last year, the personnel's awareness of medical emergencies was good; on the one hand in the performance issue there have also been performance enhancements over the past few years, but it had less increase in proportion to the level of awareness, and this suggests that educational systems, in addition to theoretical programs, should invest much more and better on staff's awareness increase on practical aspects. On the other hand, about 24% of emergency medical personnel have a Basic degree, although there is a 3-fold reduction in this rate, and there has been growth and development of manpower absorption in about 3 to 4 years, but still we can use the guidelines or regulations so that we can upgrade this Basic staff to an associate or a bachelor holder to increase staff awareness and performance.

## 5. CONCLUSION

Therefore, the results of this study can be used by the competent authorities of the educational and medical departments of medical universities of Iran.

## CONSENT AND ETHICAL APPROVAL

To observe ethical considerations, first, the informed consent form of participation in the study was completed by all participants in the study and signed by them. Also, all participants in the study were assured of the confidentiality of their information.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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