# Evaluating the awareness of ordinary people about relief operations and cardiopulmonary resuscitation when facing out-of-hospital cardiac arrest

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**ABSTRACT**

**Introduction:** The aim of this paper is to evaluate the awareness of ordinary people about relief operations and accurate cardiopulmonary resuscitation when facing out-of-hospital cardiac arrest. **Methods:** This was a cross-sectional study including 500 ordinary people who were randomly selected over a 3-month period in Ahvaz County, Ahvaz, Iran, and then asked to perform resuscitation operation on medical moulages. Their performance was then evaluated using a 21-item checklist. **Results:** The awareness of participants about relief operations were only acceptable in 9 cases. Only 1 (0.2%) of them was able to detect a pulse and blood circulation as well as to relieve any airway obstruction. 7 (1.4%) were able to correctly find the position on the chest where external cardiac massage (ECM) should be performed. And only 1 could perform ECM at a rate of 100-120 compressions/min. **Conclusion:** Results obtained from the present study does not confirm the awareness of ordinary people when encountering OHCA. Hence, it is essential to hold related training courses at appropriate intervals to improve their skills and knowledge.

**Keywords:** Awareness, cardiopulmonary resuscitation, performance

## Introduction

Cardiopulmonary resuscitation (CPR) is an emergency measure taken to preserve the life of a person who is in sudden cardiac arrest (SCA) or cardiac arrest due to an unexpected incident. Performing basic CPR procedure within 4-6 minutes after cardiac arrest—just before brain death—can dramatically increase the chance of restoring spontaneous blood circulation and survival up to four times until further measures are taken at the clinical center.[1,2]

CPR is an effort to restore the breathing and circulation aiming to improve survival through basic and advanced measures including fast detecting and recognizing cardiac arrest and dialing the emergency number "115" to inform emergency centers about the incident, chest compressions at an standard rate, airway management, artificial breathing (mouth-to-mouth resuscitation or mechanical ventilation) and fast defibrillation (by professional rescuers).[3,4] There is no report on performing CPR in Iran by a supervisor and/or ordinary people, but the operations are carried out in different countries at different levels, mainly related to educational and cultural levels. In Iran, the CPR, the reasons for not performing it, and the type of aid measures taken seemed to differ due to different educational, cultural and social aspects.[5] Though advances have been made, cardiac arrest remains the most important health problem in the country. In addition, it is also one of the causes of sudden death in most countries, which often happen outside the hospital (OHCA).[6]

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Given the time importance, nearby people—as the primary contributors—are clearly at play. Otherwise, the life-saving time will be lost before medical emergency forces arrive. Obviously, complications are reduced with a positive attitude towards first aid procedures, motivation for acquiring relevant knowledge and having public skills in providing first medical assistance to injured patients. These can all dramatically increase the chances of survival. The CPR program was developed in the form of educating first aid procedures for all, with the measures taken by the incident and medical emergencies management in cooperation with other institutions in Iran, just after the announcement by the Ministry of Health in 2007. Certainly, any planning for the future requires basics, with the aim of determining the level of training required; and, undoubtedly, research is required in this regard.[7]

Ali Mohammadi (2017) reported a low level of knowledge and performance about CPR in high school students in Isfahan, Iran.[8] Masdari *et al.* (2017) reported a low level of awareness and attitude towards the CPR among firefighters, drivers and policemen in Sari, Iran.[7] Özbilgin *et al.* (2015) found in their study that only 3.6% of participants in Turkey were able to accurately perform CPR procedure outside the hospital.[9] Dobbiem *et al.* (2017) showed that 56% of the ordinary people do not have an appropriate level of awareness and confidence needed to perform the CPR procedure.[10] Salehi *et al.* (2015) report a low level of knowledge and performance of patients' attendants, which increased significantly after training.[11] Jarrah *et al.* (2018) showed that 86% of trained people have been able to perform CPR procedure correctly.[12] Ordinary people are the first/nearest, who have access to the incident and/or the patient. Therefore, adequate knowledge about CPR procedure, the positive attitude toward first aids aiming to implement relief operations and reducing related injuries are necessary.[6] The present study, therefore, was conducted in Ahvaz County, Iran, in 2017 aiming to evaluate the awareness of ordinary people about relief operations and CPR when facing out-of-hospital cardiac arrest (OHCA).

## Methods

This was a descriptive study carried out during a three-month period in 2017. Participants were 500 ordinary people, who were randomly selected from 20 districts (25 from each district) in Ahvaz city, Iran. They were from districts Kianshahr, Lashkar, Shahrak-e Haffari, Taleghani, Kooy-e Sadi, Khoramshahr Junction, Zeytoon Karmandi, Manba-e Ab, Kooy-e Navvab, Zeytoon Kargrif Sad Dastgah, Kianpars, Khoramkoosh, Padadshahr, Zand Cross, Abadan Terminal, Pardis, Amanieh, Saheli Blvd and Kianabad. Participants were asked individually to perform CPR procedure on a human-like moulage. Their function was evaluated using a 21-item checklist. The checklist contains 4 sections, according to the 2015 reference: The first part contained personal information as well as a record of the CPR training course. The second part consisted of 4 questions on mental issues and maintaining calm in real-life situations as well as help from others and emergency centers by dialing the emergency number "115". The third part contained 7 questions about the initial facing OHCA and

preliminary evaluations. The fourth part contained 10 questions about relief operations and CPR. We then informed the emergency department about an OHCA case by dialing the emergency number "115" aiming to determine the time it takes for relief workers to arrive at the place where the incident has occurred.

Scoring was based on a 3-point Likert scale including 3 levels, namely good (3), moderate (2) and weak (1). The scores ranged from 21 to 63 and were categorized into 3 categories, namely good (64-50), moderate (35-49), and weak (21-34). A questionnaire and a checklist were prepared—besides the study of books, papers and benefiting expert opinions—and then submitted to 10 faculty members of the Faculty of Nursing and Midwifery and clinical professionals. The necessary modifications were made based on professionals' comments. The assay-observation method was used to determine the study's reliability, where the performance of the units studied simultaneously was studied through the observation of another researcher with the same level of education and experience and the study's reliability was estimated at 84%. After proposing the study objectives under ethical code IR.AUMS.REC.1396.1128, obtained from the University, the necessary confidentiality of the information was provided and explanations were presented on the possibility of leaving the study in cases of reluctance. The ethical principles of using existing resources were also observed. The Kolmogorov-Smirnov test was used to examine the normal distribution of data. Data were analyzed using IBM SPSS Statistics V21 and related parameters including mean, standard deviation (SD), Chi-square test and Fisher test. Results with $P$ value less than 0.05 were considered as significant.

## Results

In the present study, 323 (64.7%) of patients were male, 244 (48.8%) aged 15-31 years, 146 (29.2%) had diploma, 141 (28.2%) were self-employed, 393 (78.6%) had not completed a course on CPR procedure, and 108 (29.2%) had little knowledge of the subject mainly from cyberspace and television [Table 1]. Chi-square results showed a significant relationship between age group and success in performing CPR procedure ($P = 0.04$). Fisher test results indicated that the majority of participants have no previous background about the subject ($P = 0.001$).

Performing CPR procedure were unsatisfactory with 300 (60%) participants while acceptable only in 45 (9%) cases. 13 (2.6%) participants performed the procedure placidity. Only one (0.2) participant was able to accurately detect the pulse and circulation as well as to check airway for any possible obstruction. 7 (1.4%) of the participants were able to correctly recognize the ECM position on the chest, and only one could perform ECM at a rate of 100-120 compressions/min. None of the participants checked for vital signs after 5 ECM-breathing cycles [Table 2].

A digital chronometer was used to indicate how long does it take for an ambulance to arrive. The highest and lowest recorded times were 17:46 and 5:40 minutes, respectively.

## Table 1: Evaluation of frequency and demographic variables using descriptive tests

| Variable | | Frequency (%) | Significant level using both Chi-square and Fisher tests |
|---|---|---|---|
| Age (years) | 15-31 | 244 (48.8) | *P=0.04 |
| | 32-48 | 189 (37.8) | |
| | 49-65 | 67 (13.4) | |
| Gender | Male | 323 (64.7) | P=0.302 |
| | Female | 177 (35.4) | |
| Occupation | Housewife | 113 (22.6) | P=0.078 |
| | Employee | 97 (19.4) | |
| | Firefighter | 1 (0.2) | |
| | Student | 71 (14.2) | |
| | Military person | 22 (4.4) | |
| | Professor or teacher | 28 (5.6) | |
| | Self-employed | 141 (28.2) | |
| | Retired | 21 (4.2) | |
| | Medical personnel | 6 (1.2) | |
| Education | Under diploma | 122 (24.4) | P=0.67 |
| | Diploma | 146 (29.2) | |
| | Associate degree | 73 (14.6) | |
| | Bachelor | 113 (22.6) | |
| | Master | 35 (7) | |
| | Ph.D | 11 (2.2) | |
| Formal course | Yes | 107 (21.4) | P=0.051 |
| | No | 393 (78.6) | |
| Knowledge acquiring | While on duty | 48 (9) | P=0.051 |
| | Media and television | 108 (21.6) | |
| | School and university | 25 (5) | |
| | Red crescent | 30 (6) | |
| | Free educational centers | 12 (2.4) | |
| | Neither | 280 (56) | |

*All are significant except gender and education.

## Discussion

The present study was designed to evaluate the awareness of 500 ordinary people about relief operations and CPR when facing OHCA in Ahvaz County, Iran, in 2017. According to the results, 20% of participants had acceptable CPR performance. Chen *et al.* (2017) studied 2094 high school students in China and found acceptable performance only in 25.6% of participants.[13] A similar result was reported in a study carried out by Ali Shammah *et al.* (2018) in Saudi Arabia on 98 students, where only 7.97% of participants were able to perform CPR as correctly as possible.[14] Ozbilgin *et al.* (2016) studied 259 football players in Turkey and found that 38% of participants have adequate awareness about the CPR procedure.[9] The level of awareness of the patients' attendants was estimated to be between 15-60% in European countries (Perkins *et al.*, 0000); they reported higher rates in Spain and Germany, but a lower rate in Sweden.[15] Masdari *et al.* (2017) studied 500 firefighters, drivers, and policemen and reported the lowest level of awareness about CPR procedure (69%) with taxi drivers[7]. This can be occur due to inadequate training throughout the country.

Results of the present study revealed that only 4.2% of participants have the ability to perform ECM operations; whereas the report released by Ozbilgin *et al.* (2016) showed that 52% and 34.3% of students can accurately perform ECM on correct position on the chest and at a standard depth, respectively.[9] Wang reported that 79% of students can perform ECM on the correct position and at a standard depth.[16]

When assessing the ventilation status, it was found that about 13% of participants are able to perform artificial breathing at certain rhythms. Ozbilgin *et al.* (2016) reported that 26.7%

## Table 2: Frequency and performance of participants when facing OHCA

| Index | Frequency (%) |
|---|---|
| Keeping cool and high performance | 13 (2.6) |
| Ability to adapt to the situation and detect the patient's status | 11 (2.2) |
| Requesting help from others | 389 (77.8) |
| Dialing the number "115" to inform the emergency center | 175 (35) |
| Initial measures to check patient's consciousness by, for example, calling him/her or painful excitation | 2 (0.2) |
| Detecting the pulse rate and circulation accurately | 1 (0.2) |
| Visiting patient for normal breathing | 3 (0.6) |
| Airway management | 1 (0.2) |
| Managing airway obstruction at standard position (lifting the patient's chin up in conjugation with his/her backward head) | 6 (1.2) |
| Managing airway obstruction in patients with spinal cord injury | 0 (0) |
| Recognizing the correct ECM position on the chest | 7 (1.4) |
| ECM-performing ability | 7 (1.4) |
| Performing chest compressions at the standard depth (between 5 cm and 6 cm) | 6 (1.2) |
| Performing chest compressions at the standard rate (100 to 120 per minute) | 1 (0.2) |
| Coordinating accurate compression's pressure, depth, and rate | 0 (0) |
| Observing ECM intervals | 0 (0) |
| Ability to artificial breathing | 60 (12) |
| Performing artificial breathing at a standard rate (30 breaths per minute) | 7 (1.4) |
| Coordinating ECM with artificial breathing | 23 (4.6) |
| Detecting vital signs after five ECM-breathing cycles (each contains 30 compressions and 2 breaths) | 0 (0) |

of patients are able to accurately perform mouth-to-mouth resuscitation.[9] Wang reported that 63.5% of trained students can perform mechanical ventilation using Bag Valve Mask (BVM).[16]

According to the results of the present study, only 4.6% of participants were able to simultaneously perform ECM and artificial breathing, while this was reported to be 28.7% in Özbilgin *et al.*(2015) and 11% in Cu *et al.*(2009) study.[9,17]

Only 2.4% of participants showed acceptable performance in checking for the pulse, breathing, consciousness, and airway management; whereas correct evaluating of the patient's consciousness and breathing were reported in[9] to be 40.7% and 49.3%, respectively. As reported in[12] 49.3% of participants (29% of them with the previous background on the subject) were able to simultaneously evaluate the pulse, breathing, and consciousness. In the present study, 21% of patients had an educational background. There has reported a positive relationship between the basic knowledge of the rescuer and the CPR performance.[6]

At the same time, older participants showed a higher CPR performance, probably due to more information they have acquired during their life through experiencing, media, etc.

## Conclusion

According to the results of the present study, the performance of ordinary people when facing OHCA is not acceptable and, therefore, courses on CPR procedure should be held at appropriate intervals to improve their awareness and skills.

## Conflicts of interest

There are no conflicts of interest.

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