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## Knowledge and attitude towards cardiopulmonary resuscitation among Saudi population

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### Abstract

**Background:** Cardiac and respiratory arrest is a life-threatening condition that requires immediate response as it can lead to death or serious damage to brain cells, if emergency help is not provided. Cardiopulmonary Resuscitation (CPR) is the most important action can be performed by bystanders to improve the survival.

**Aim:** To assess the knowledge of laypersons trained in cardiopulmonary resuscitation and their willingness to resuscitate people who arrest outside healthcare facilities.

**Method:** This is a cross sectional study conducted at 3 regions in Saudi Arabia on laypersons. The study was conducted using self-administrated questionnaire.

**Results:** The study included 55 layperson who attended CPR training, 72.7% of them received it during the period from 2011 to 2017. Around half of the participants (52.4%) thought that they don't need to apply what they learned in the CPR training courses. More than half of them (58.2%) would call the ambulance if they encounter Out of Hospital Cardiac Arrest, while only 18.2% would start CPR. Obliging students and employees to receive the CPR training was the preferred methods by participants to increase the awareness about managing OHCA cases (56.4% and 21.8%, respectively).

**Conclusion:** The attitude of laypersons was low toward performing CPR, which might be due to insufficient training, lack of practical training or other factors that should be investigated in further studies.

**Keywords:** Attitude, CPR, training, laypersons

### Introduction

Cardiac and respiratory arrest is a sudden loss of cardiac and respiratory functions, respectively. It is a life-threatening condition that requires immediate response as it can lead to death or serious damage to brain cells, if emergency help is not provided. Cardiopulmonary Resuscitation (CPR) is the most important action can be performed by bystanders to improve the survival chance of a person suffering Out of Hospital Cardiac Arrest (OHCA) [1]. Outcome is time sensitive, as without CPR, individuals loose 7% of their brain cells every minute, after arrest. Hence, effective and timely management of patients who suffer from such condition outside healthcare facilities save their lives but would require immediate availability of individuals competent in cardiopulmonary resuscitation.

Globally, 25,000-300,000 patients experience Out of Hospital Cardiac Arrest (OHCA) per year [2]. Sudden cardiac death (SCD) accounts for 15-20% of all global deaths [3, 4]. Cardio-Pulmonary Resuscitation (CPR) is a lifesaving intervention (that can be provided by non-health care professionals) which aims to reduce morbidity and mortality in medical emergencies such as heart attack, suffocation, drowning and other emergency conditions that lead to circulatory collapse [5]. Only about 46% of OHCA victims get the help they need before advanced medical personnel arrives on the scene, and nearly 90% of them die, according to the AHA. Survival rate can be increased by performing CPR immediately [5]. CPR technique depends on maintaining oxygenated blood flow to the vital organs [6]. Early initiation of bystander CPR is associated with double the likelihood of survival from cardiac arrest compared with no CPR before arrival of emergency medical services [7-9]. An increased level of training within the community may increase the proportion of patients with OHCA who receive CPR before arrival of the EMS [8].

Equipping individuals in the Community with CPR knowledge, through offering training courses, is essential for saving lives, provided that they maintain the knowledge and have the willingness to perform CPR immediately [10]. Practical training in CPR strengthens the participants' self-efficacy and increases willingness to intervene in a real OHCA situation [11, 12].

A community-based study in the Northern Area of Saudi Arabia showed high level of knowledge about CPR but concluded that this might be attributed to the majority of highly educated participants and recommended public CPR training programs [13]. On the other hand, Alshudukhi *et al.* found that Saudi population lacks CPR knowledge [14]. Similarly, a study from Jeddah conducted on non-medical individuals showed that there was lack of knowledge about CPR [15]. In Al-Khobar city, a study concluded that 86.5% of males and 80.8% of females had no awareness about CPR [16]. Even in Riyadh, the capital city of Saudi Arabia, studies demonstrated that 56% of secondary students had inadequate knowledge about CPR [17], as compared to 31% of university students [18]. A recent study in Sweden conducted on native and other students to test their knowledge after CPR training courses, demonstrated that students scored up to 67% directly after training, and up to 61% at 6 months. Additionally, it demonstrated that most students (up to 85%) who received CPR training were willing to perform CPR on a friend but were less willing to perform it on a stranger (up to 52% after training). This percentage, however, has come down to 31% at 6 months [10]. A study in Saudi Arabia, demonstrated that overall positive attitudes of healthcare professionals to perform CPR were seen in 53.4% of pre-training respondents and 64.8% of post-training respondents [19]. A similar study on laypersons in Saudi Arabia could not be found.

The aim of this study is to assess the knowledge of laypersons trained in cardiopulmonary resuscitation and their willingness to resuscitate people who arrest outside healthcare facilities.

#### The specific objectives of this study are

1. To measure the knowledge of laypersons trained in CPR; and
2. To measure their willingness to resuscitate people who arrest outside healthcare facilities.

## Subjects and Methods

This study was of cross-sectional design that was conducted on laypersons who received training on CPR in the three main regions of Saudi Arabia; Dammam, Riyadh and Jeddah during the period of November to December 2019. The study was performed using self-administrated validated questionnaire to investigate participants' knowledge about CPR and their willingness to resuscitate people who arrest outside healthcare facilities. Face validity was done by two consultants then pilot study was done on 32 questionnaires. Data collection was done on public places: parks, malls and coffee shops in Dammam, Riyadh and Jeddah. The target population was those of either gender, 18 years and older, and non-healthcare professionals (laypersons).

## Statistical analysis

Data were analyzed using SPSS software version 16. Simple descriptive analysis was used in the form of numbers and percent for qualitative variables, whereas mean and standard deviation were used for quantitative variables.

## Results

The present study included 55 participants who received training; 72.7% of them received it during the period from 2011 to 2017, 0.1% during the period from 2000 to 2010, and 18.1% in the period before 2000. Around one third of the participants (32.6%) received the training in hospitals and medical centers, 12.5% in the Saudi Oil Company ARAMCO, 10.9% in Kharj, 9.1% in each of Jeddah, Dammam, Hail, and Faraby Medical College, and 3.6% in Madina Munawarah. CPR training was provided for free of charge for 40% of participants, 38.2% paid from 1 to 100 SAR, and the remaining 21.8% paid more than 100 SAR. Almost half of the participants (49.1%) thought that the cost was average, as compared to 41.8% who thought it was cheap, and 9.1% who thought it was costly. CPR training course duration was only one day for 20% of the participants, one week for 36.4% of them, two weeks for 40% of them, and two months for 3.6% of them. Around half of the participants (52.4%) thought that they don't need to apply what they learned in the CPR training courses, while the remaining 47.3% thought that they need to apply what they learned in the CPR training courses. The percentage of those who performed CPR was almost similar to those who didn't (46.2% and 43.7%, respectively). (Table1).

**Table 1** the CPR Training Details

Questions	Answers	N	%
When did you receive training?	Before 2000	10	18.1
	2000-2010	5	0.1
	2011-2017	40	72.7
Where did you receive training?	Hospital or medical center	20	36.2
	Jeddah	5	9.1
	Dammam	5	9.1
	Hail	5	9.1
	Faraby Medical College	5	9.1
	ARAMCO	7	12.5
	Madina Munawarah	2	3.6
	Kharj	6	10.9
Cost	Free	22	40.0
	1-100	21	38.2
	>100	12	21.8
Duration of course	One day	11	20.0

	One week	20	36.4
	Two week	22	40.0
	Two months	2	3.6
Assessment of cost	Cheap	23	41.8
	Average	27	49.1
	High	5	9.1
Do you need to apply what you learn in the CPR training?	Yes	26*	47.3
	No	29	52.7
Performed resuscitation?	Yes*	12	46.2
	No	14	43.8

When attitude/response of CPR trained participants toward unconscious individuals, found outside hospitals (OHCA), was investigated, it was found that more than half of them (58.2%) would call the ambulance, while only 18.2% would start CPR. The remainder chose to transfer unconscious individuals to the nearest hospital or even do nothing (16.4% and 7.3% respectively).

When their knowledge about assessing pulsation was checked, 45.5% thought that they should check carotid artery, 18.2% thought that they should check radial artery, 16.4% thought that they should check brachial artery, and 20% thought that they should use the stethoscope.

When asked about the use of Heimlich maneuver, 58.2% thought it shall be used in cases of difficulties of breathing, while 41.8% thought it shall be used in stroke cases.

More than two thirds of the participants (70.9%) thought that up to 75% of OHCA individuals could be rescued by CPR, while 18.2% of them thought that this percentage could reach up to 90% as compared to the remaining 10.9% of them who thought that this percentage could be as low as 25%.

Obliging students and employees to receive the CPR training was the preferred methods by participants to increase the awareness about managing OHCA cases (56.4% and 21.8%, respectively). One third of participants (34.5%) thought that such awareness might be increased by providing CPR training courses for free, 36.4% by increasing number of courses, 20% by education, 9.1% by receiving private courses, and 18.2% by granting financial incentives after receiving the CPR training (Table2).

**Table 2** The reaction of participants who received the CPR training toward CPR cases

Questions	Answers	N (55)	%
Q1 What you do when you see unconscious individual?	Call the ambulance	32	58.2
	Start to resuscitate	10	18.2
	Transfer the patient to a hospital	9	16.4
	Nothing	4	7.3
Q2 Assessing pulsation	Carotid	25	45.5
	Radial	10	18.2
	Brachial	9	16.4
	Stethoscope	11	20.0
Heimlich maneuver used in?	Difficulties in breathing	32	58.2
	Stroke	23	41.8
Percentages of rescuing the resuscitation cases	75%	39	70.9
	25%	6	10.9
	90%	10	18.2
How to raise* awareness?	Free courses	19	34.5
	Obligate all students	31	56.4
	Obligate employees	12	21.8
	Increase courses number	20	36.4
	Education	11	20.0
	Private courses	5	9.1
	Financial incentives	10	18.2

\*More than one answer is allowed

**Discussion**

In the present study, knowledge of laypersons trained in CPR and their willingness to resuscitate people who arrest outside healthcare facilities were assessed. Most of the participants (72.7%) received training during the last decade, which reflects increasing interests and awareness of laypersons about importance of such lifesaving knowledge and skills in Saudi Arabia. It also reflects the support that the providers of such courses pay to encourage laypersons to get trained, as demonstrated by the free or very low fees of most of these courses (40% for free and 38.2% for less than a 100 SR). More than 90% of the participants believed that the cost of such training courses was either cheap or average. This training was conducted mostly in hospitals

and medical centers (32.6%), which demonstrate the important role that healthcare organizations play in educating the public about CPR. In Eastern Province of the country, the Saudi ARAMCO company has always participated in community-based educational programs, including CPR, which was demonstrated in 12.5% of the participants being trained there. Several studies in Saudi Arabia demonstrated the low percentages of CPR-trained laypersons in all the country generally but also in the major cities; Riyadh, Jeddah and Khobar [14-18]. These findings don't contradict with this study's findings as this study was performed on trained laypersons only. As a matter of fact, this study demonstrates that the growing interest and awareness, discussed above, would improve the percentage

of trained laypersons in Saudi Arabia.

The period of these training courses for most of the participants were longer than the usual one-day duration for healthcare professionals' training courses, as it was one or two weeks in 36.4% and 40%, respectively. This is expected because laypersons would need longer duration of training than healthcare professionals in such medically related knowledge and skills. There was no significant difference between those who thought that they would need to apply what they learned and those who didn't think so, as well as between those who actually performed CPR and those who didn't.

Despite the growing interest in CPR training for laypersons and increasing awareness about its importance, less than one fifth of the participants (who were already trained for CPR) determined that they will start CPR in OHCA cases, while most of them (58.2%) would call ambulance for help. In its study, AHA found that 46% of OHCA victims get the help they need before advanced medical personnel arrives on the scene, which is more than double the results in this study in Saudi Arabia [5]. Even healthcare professionals in Saudi Arabia demonstrated overall positive attitudes to perform CPR in only 53.4% of pre-training respondents and 64.8% of post-training respondents, which is better than results of laypersons, but less than expected for healthcare professionals [19]. Similar results were found in a study from Ethiopia which was conducted on graduate health professionals and showed that their attitude and skills about CPR were insufficient and the authors suggested performing training for them [20].

Such disappointing responses were found despite that almost 90% of the participants believed that more than 75% of OHCA cases could be saved by CPR. This might mean that training is not good enough to positively affect the attitude toward performing CPR when needed for OHCA cases. This might also indicate that these training courses were not good enough to improve knowledge and confidence in performing CPR. This was supported by the lack of knowledge of these participants, as less than half of them knew where to check correctly for pulsation and a little more than half knew the indication for Heimlich maneuver. Similar lack of knowledge was found in a study in Sweden which demonstrated that students scored up to 67% directly after training, and up to 61% at 6 months [10]. A study in UK agreed with our participants' opinion that increasing level of training within the community might increase the proportion of patients with OHCA who receive CPR before arrival of the EMS [8]. European Resuscitation Guidelines and another study from Norway emphasized on the importance of practical training in CPR to strengthen the participants' self-efficacy and increases willingness to intervene in a real OHCA situation [11, 12]. This should be considered when designing such courses for laypersons in Saudi Arabia, and emphasis shall be given to practical aspect of training.

A study from UK demonstrated that training had an impact on the attitude of individuals toward CPR [21]. Another study conducted on nurses had also shown that their attitude was improved after training [22]. In a Saudi study, it was found that attitude toward CPR could be improved by repeated educational programs [23]. Another Saudi study conducted on students reported that their overall attitude was positive toward CPR [24].

The most important solutions from participants' point of

views was to oblige students and employees to take CPR courses, increase their numbers and make them for free.

### Limitations

The present study included a small sample size. Its results couldn't be compared to other studies as the previous studies had different designs. In addition, previous studies that assessed the training and attitude of general population toward CPR didn't exist in Saudi Arabia.

### Conclusion

Although individuals had got training courses about CPR, and although training courses are increasing and supported by low cost, the attitude of laypersons was low which might be due to insufficient training, lack of practical training or other factors that should be investigated in further studies. It is recommended to perform a study with larger sample size.

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