

## Population awareness and attitude towards cardiopulmonary resuscitation in Makkah, Saudi Arabia – A cross sectional study

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### Peer-review Method

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### ABSTRACT

**Background:** The abrupt loss of heart function or cardiac arrest is considered emergency conditions that result in loss of blood flow from the failure of the heart to pump effectively. If instant help is not provided directly to victims who suffer from cardiac arrest, sudden death can occur. Therefore, it is essential to provide immediate CPR. In the holy city Makkah, a huge number of pilgrims come annually from different parts of the world; any accident can occur that indicates an immediate CPR to save life and decrease mortality. Our study is the first to be done in Makkah. **Objective:** Our main aim was to assess the knowledge and attitude of general population in Makkah toward CPR. **Method:** This is a cross-sectional study from November 2020 to January 2021 was performed using an online survey. **Results:** Total of 101 participants, around 50.5% attended CPR preparation course. Around 42.6% witnessed a real situation of CPR, while only 9.9% were able to apply CPR by themselves. Most of the study participants have inadequate knowledge about CPR including only 18.8% knew the correct number of chest compressions per minutes, 36.6% knew the correct depth of chest compression, 35.6% knew the correct rate of breath to chest compression for adult victim and only 19.8% knew the correct duration for one cycle of CPR. **Conclusion:** We revealed that there is an inadequate knowledge among general population regarding CPR in Makkah. Therefore, more educational intervention should be applied.

**Keywords:** Cardiopulmonary resuscitation, CPR, Makkah, Saudi Arabia, public awareness.

### 1. INTRODUCTION

Cardiac arrest is a life-threatening condition in which a sudden loss of cardiac function and systemic circulation happened (Myat et al., 2018). About 350,000 out of hospital cardiac arrest (OHCA) incidents occur annually among adults in the U.S (Benjamin et al., 2019). The most common cause of adult cardiac arrest is ventricular fibrillation (Goyal et al., 2017). Cardiac arrest can lead to



sudden death if immediate help is not provided (Schrock et al., 2011). Thus, timing is very important. Despite development in emergency departments, survival after OHCA remains low and less than 10% of patients with OHCA survive (Sasson et al., 2010; Berdowski et al., 2010; Esinberg et al., 1991). Successful outcomes of OHCA dependent on collaboration between public, emergency medical services and healthcare professionals to provide immediate cardiopulmonary resuscitation (CPR) by public to increase survival rate. CPR provides oxygenation and circulation to the body during cardiac arrest via performing a collection of interventions (Goyal et al., 2017). Conventional manual CPR, combining chest compressions with rescue breathing can provide up to 33% of normal cardiac output and oxygenation when done properly (Perkins et al., 2015).

Cardiopulmonary resuscitation is essential in cases of suffocation, near drowning, electrocution injuries, heart attacks, and many other situation where breathing or heart beat stopped (Al-Turki et al., 2008). When the heart stops, the absence of oxygenated blood can lead to irreversible brain damage within a few minutes and death will occur within 10 min (Goldstein et al., 1991). All healthcare professionals including nurses and pharmacists must know how to perform CPR (Rigimotlagh et al., 2020). As it became mandatory for healthcare workers to have a valid CPR certificate in order to work (Goyal et al., 2017).

In Saudi Arabia, different studied reported lack of knowledge and poor practice toward CPR among university students within different regions among Saudi Arabia conducted in Taif, Jeddah, Jazan, Hael and Riyadh (Al-Turki et al., 2008; Al-Shamiri et al., 2017; Khader et al., 2016; Qara et al., 2019; Ahmed et al., 2018; Owaid Alsharari et al., 2018; Alshudukhi et al., 2018). Furthermore, inadequate knowledge was reported among teachers in Qasim as well as Riyadh (AlEnizi et al., 2016; Alharbi et al., 2016; Alduraywish et al., 2020). To our knowledge, no study has been conducted so far in Makkah despite the importance of this kind of knowledge among all Makkah residents not only university students or teachers. Makkah is a very critical city in which it serves guests from all over the world for Haj and Umrah. Thus, it is valuable to understand and able to practice CPR for Makkah society.

In current study, we aim to assess the general knowledge and attitude of Makkah residents regarding basic life support including CPR. In our believe, the results of this study could help to understand the need of Makkah society to more Health Awareness Campaigns implantation in order to save lives.

## 2. METHODOLOGY

### Study design

This is a cross-sectional study with a total of 101 participants who completed the questionnaire from November 2020 to January 2021 within Makkah, Saudi Arabia.

### Data collection

The online survey was anonymous, prepared in Arabic- language format. Consent of participants was considered by their submission. The questionnaire had four sections; demographic characteristics, previous exposure to CPR, attitude and knowledge toward CPR cases.

### Statistical analysis

All the variables were analyzed using SPSS Var 23.0 software 2015. Descriptive analyses such as percentages and graphs were used to describe the findings of this study.

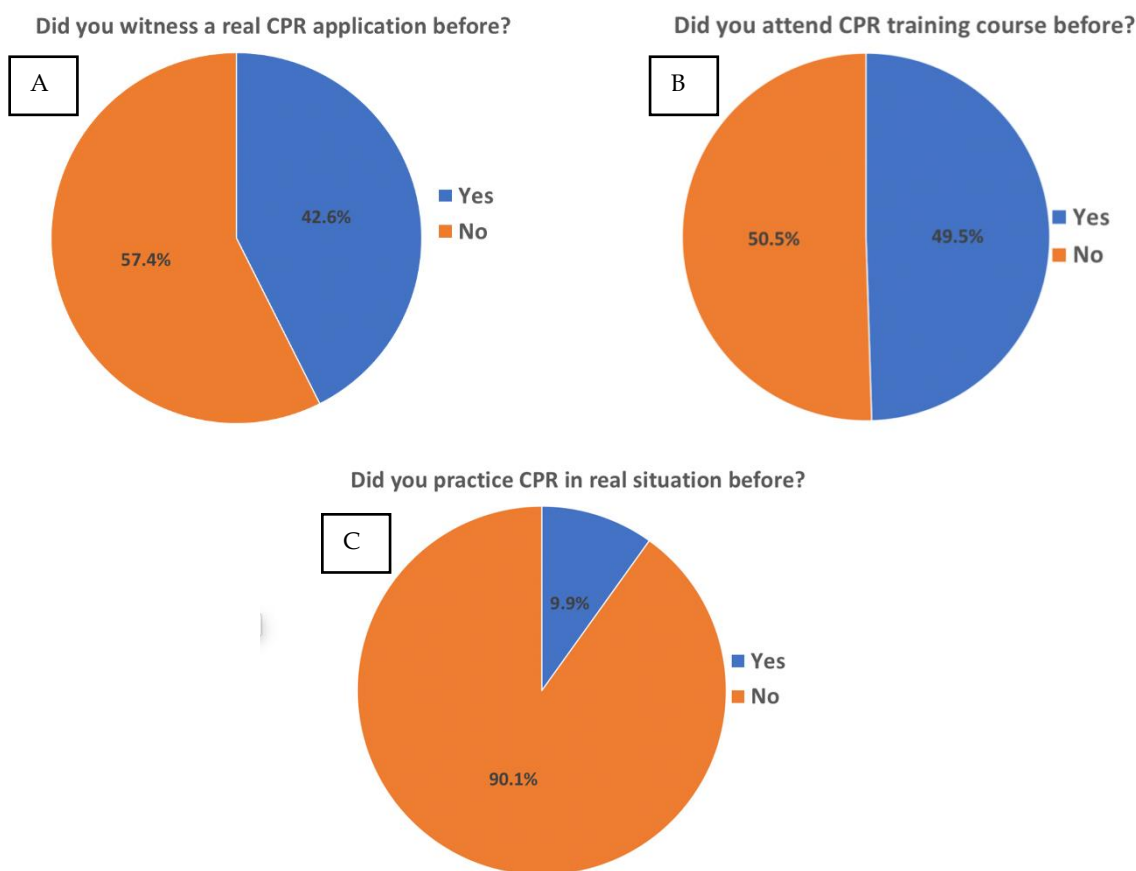
## 3. RESULTS

Basic demographic characteristics of patients who were involved in this study are summarized in table 1. Patients included in this study were predominantly female (88.1%, n=89). Among participants, around 50.5% attended CPR preparation courses previously (Fig. 1A). Approximately, 42.6% witnessed a real situation of CPR to save lives (Fig. 1B). However, only 9.9% participated in CPR by themselves (Fig. 1C).

**Table 1** Demographic characteristic; Table represents demographic characteristics of the study population; data presented in actual patient’s numbers and percentage (%).

Demographic characteristic		Actual patients’ numbers (Percentage %)
Gender	Male	12 (11.9%)
	Female	89 (88.1%)
Age	<18	9 (8.9%)

	19-30	55 (54.5%)
	31-45	29 (28.7%)
	>46	8 (7.9%)
Education Level	High school	12 (11.9%)
	Bachelor	67 (66.3%)
	Master	10 (9.9%)
	Ph.D.	11 (10.9%)
	Other	1 (1%)
Working/Studying area	Medical area	33 (32.7%)
	Non-medical area	35 (34.7%)
	Not working	33 (32.7%)



**Figure 1** Previous exposure to CPR among participants.

Regarding participant’s attitude in dealing with a case requiring CPR, 61.4% of participants said they will be able to call emergency department and perform CPR if they faced a situation that needs to. Furthermore, 71.3% of participants said they will be able to follow instructions if they were directed orally to do CPR and 72.2% of participants knew the emergency contact number (Table 2).

Assessing general population knowledge about CPR as indicated in Table 3, represents only 39.6% who recognized when victim really need CPR. Around 37.6% said they will look for the safety of the place as a first step in CPR. Even though, 85.1% knew the place of chest compression, only 18.8% knew the correct number of chest compressions per minutes, 36.6% knew the correct depth of chest compression, 35.6% knew the correct rate of breath to chest compression for adult victim and only 19.8% knew the correct duration for one cycle of CPR. Asking participants about AED clarify that 64.4%of participants knew the AED, but only 18.8% knew who can use it (Table 3).

**Table 2** Dealing with a case requiring CPR. Table represents participants knowledge towards CPR; data presented in actual patient's numbers and percentage (%).

Dealing with a case requiring CPR		Responses number (Percentage %)
How participants deal with the situation	call emergency department and start CPR	62 (61.4%)
	call emergency department and do massage to the heart	11 (10.9%)
	call emergency department and wait	16 (15.8%)
	wait for a help	7 (6.9%)
	I am not sure	5 (5%)
Will you able to perform CPR if you revived oral instruction via calling emergency department	Yes	72 (71.3%)
	No	4 (4%)
	Not sure	25 (24.8%)
Do you know ambulance number to call?	Yes	73 (72.2%)
	No	24 (23.7%)
	I don't know	4 (3.9%)

**Table 3** Knowledge about CPR; Table represents participants knowledge towards CPR; data presented in actual patient's numbers and percentage (%).

Knowledge about CPR		Responses number (Percentage %)
When victim really need CPR	Not beating	30 (29.7%)
	Irregular breathing	21 (20.85)
	Loss of consciousness	40 (39.6%)
	I don't know	10 (9.9%)
What is the first step in CPR	Give chest compression	39 (38.6%)
	Give 2 breaths	16 (15.8%)
	Check safety	38 (37.6%)
	I don't know	8 (7.9%)
What is the number of chest compressions per minutes	100	19 (18.8%)
	90	7 (6.9%)
	30	42 (41.6%)
	I don't know	33 (32.7%)
What is the depth of chest compression	1 inch = 2.5 cm	28 (27.7%)
	2 inches = 5 cm	37 (36.6%)
	3 inches = 7.6 cm	1 (1%)
	I don't know	35 (34.7%)
What is the correct place of chest compression	Chest, between nipples	86 (85.1%)
	Chest, left side near the heart	8 (7.9%)
	I don't know	7 (6.9%)
What is the rate of breath to chest compression for adult victim	2:15	20 (19.8%)
	2:30	36 (35.6%)
	5:30	8 (7.9%)
	I don't know	37 (36.6%)
What is the duration for one cycle of CPR	1 minute	32 (31.7%)
	2 minutes	20 (19.8%)
	3 minutes	10 (9.9%)
	I don't know	39 (38.6%)
AED is an automated external	True	65 (64.4%)

<b>defibrillator that recognizes ventricular fibrillation and other dysrhythmias and delivers an electric shock at the right time</b>	False	12 (11.9%)
	I don't know	24 (23.8%)
<b>Who can use AED</b>	Any one	19 (18.8%)
	Medical staff only	27 (26.7%)
	Approved persons only	39 (38.6%)
	I don't know	16 (15.8%)

#### 4. DISCUSSION

Cardiopulmonary resuscitation (CPR) is a life-saving technique, which involves a sequences of life saving steps that increase the survival rates next to sudden cardiac arrest (SCA) (Lee et al., 2013). As SCA mostly occurs outside the hospital and as CPR is an urgent situation to save the life, it should be performed by the bystanders who witnessed the event. Therefore, training of large number of people in communities is an important public issue. In a large city such as Makkah, which faces heavy traffic on the road and receive millions of pilgrims annually, indicates the immediate need of CPR as crucial for saving student lives and significantly reduce the risk of mortality. To our knowledge, this is the first study to assess population awareness and attitude towards cardiopulmonary resuscitation in Makkah.

This study reported 42.6% of participants who witnessed a real situation of CPR to save lives, while only 9.9% were able to participate in CPR. This percentage is even lower than what has been found in a study conducted in Jeddah with 21.1% of participants who were able to perform CPR (Qara et al., 2019). Despite positive attitude of most participant toward dealing with emergency cases which may need CPR, the result of this study revealed that general population in Makkah have inadequate knowledge about CPR. Majority were not familiar to most of basic knowledge about CPR including 81.2%, 63.4%, 64.4% of participants did not know the correct number, depth and rate of chest compressions. Same findings of low level of knowledge was reported in a study conducted in Jeddah with only 32.7% of the participants knowing how to give a chest compression (Qara et al., 2019).

Even half of participants received previous training in CPR, results indicate lack of knowledge about CPR. Therefore, enrollment in a second course to refresh memories and improve their skills in performing CPR may be needed. Support from the Saudi Heart Association is essential to ensure that the training is as widespread as possible though establishment of cardiopulmonary resuscitation training centers, health awareness campaigns and media involvement. The limitations of our study include the small sample size and the fact that it was conducted in a large city where the level of education is highest.

#### 5. CONCLUSION

Current study reveals inadequate self-awareness level in general population in Makkah about CPR. Thus, there is a strong need of Makkah society to more Health Awareness Campaigns and training courses implantation in order to save lives.

**Conflict of Interest:** The authors have not declared any conflict of interests.

**Ethical Clearance:** Ethical approval was obtained from IRB commity at College of Medicine, Umm Al-Qura University (ethical approval code: (HAPO-02-K-012-2021-02-548).

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#### Data and materials availability

All data associated with this study are present in the paper.

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