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# Assessment of the levels of awareness toward cardiopulmonary resuscitation: A community-based study in Northern Saudi Arabia

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## Abstract:

**BACKGROUND:** Cardiopulmonary resuscitation (CPR) is a procedure performed in an emergency when the heart stops. Early initiation of CPR can save many lives. Thus, the aim of the present study was to assess the level of awareness toward CPR in a community-based study in Northern Saudi Arabia.

**MATERIALS AND METHODS:** This is a cross-sectional survey conducted in the city of Hail, Northern Saudi Arabia. Data about CPR were obtained from 442 Saudi volunteers living in the city of Hail.

**RESULTS:** A family history of ischemic heart disease was indicated in 148/442 (33.5%) of the participants. On asking the participants whether they have previous information about CPR, about 258/442 (58.4%) persons indicated "Yes," 118/442 (26.6%) replied "May be," and the remaining 66/442 (15%) replied "No."

**CONCLUSION:** The study showed a high level of awareness about CPR, which might be attributed to the majority of highly educated participants. Effective and sustainable public CPR training programs are needed to be implemented to preserve better knowledge and awareness of CPR in the general population.

## Keywords:

Awareness, cardiovascular disease, cardiopulmonary resuscitation, Saudi Arabia

## Introduction

Cardiovascular diseases (CVDs) are the number 1 cause of death globally.<sup>[1]</sup> Cardiopulmonary resuscitation (CPR) is a collection of interventions performed to provide oxygenation and circulation to the body during cardiac arrest.<sup>[2]</sup> Rapid response systems (RRSs) are considered an important tool for improving patient safety. Introduction of an RRS resulted in a 50% reduction in cardiac arrest rates and/or unexpected death. However, this

decrease was not statistically significant partly due to the low baseline incidence. Moreover, delayed activation due to the two-tiered medical emergency team activation procedure and suboptimal adherence of the ward staff to the RRS procedures may have further abated the positive results.<sup>[3]</sup> "Code blue" events and related resuscitation efforts involve multidisciplinary bedside teams that implement specialized interventions aimed at patient revival. Activities include performing effective chest compressions, assessing and restoring a perfusing cardiac

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rhythm, stabilizing the airway, and treating the underlying cause of the arrest.<sup>[4]</sup>

Nurses are usually the first to identify the need for and initiate CPR on patients with cardiopulmonary arrest in the hospital setting. CPR has been shown to reduce in-hospital deaths when received from adequately trained health-care professionals.<sup>[5]</sup>

CPR is important for survival from out-of-hospital cardiac arrest (OHCA). However, recent research indicates that the quality of CPR is an important and often overlooked factor affecting survival. Individual factors, training, awareness, technique, and rescuer fatigue may influence the quality of CPR. Quality components of CPR include rate, ratio, depth, and ventilation-compression ratio. Locally, limited information is available regarding the quality of CPR being performed for OHCA. Strategies to improve the quality of CPR include research, training, education as well as incorporating appropriate technologies that measure and feedback the quality of CPR. These technologies are at the heart of recent advances, as they now make it feasible to provide routine feedback to rescuers providing CPR, through the integration of feedback devices into training equipment, defibrillators, and standalone CPR assist devices.<sup>[6]</sup>

Young women in Saudi Arabia have an unusually high risk for CVD. Since the number of risk factors (e.g. physical inactivity) increases substantially between the ages of 20 and 35, there is a need to develop prevention programs to lower the CVD risk through diet and exercise.<sup>[7,8]</sup> Therefore, there is a need for population education and training for high-quality CPR. Thus, the aim of the present study was to assess the level of awareness toward CPR in a community-based study in Northern Saudi Arabia.

## Materials and Methods

This is a cross-sectional survey conducted in the city of Hail, Northern Saudi Arabia. Data about CPR were obtained from 442 Saudi volunteers living in the city of Hail. Participants were randomly selected by simple random regardless of age, gender, and education or occupation.

A purposeful questionnaire was designed and used for obtaining of the necessary data. The following information was obtained from each participant: age, sex, and education level. Questions regarding awareness about CPR were also included, which comprised: Do you have a family history of ischemic heart disease (IHD)? Do you have information about CPR? Do you know the meaning of CPR? CPR means (ventilation and chest compressions, ventilation only, chest compressions only,

chest massage), is it important to know about CPR? Why it is not important to know about CPR? and the source of information about CPR.

Statistical Package for the Social Sciences (version 16, Manufactured by IBM, Armonk, New York, United States) was used for analysis and to perform Pearson's Chi-square test for statistical significance (*P* value). The 95% confidence level and confidence intervals were used. *P* < 0.05 was considered statistically significant.

## Ethical consent

Each participant was asked to sign a written ethical consent during the questionnaire's interview. The informed ethical consent form was designed and approved by the ethical committee of the College of Medicine (University of Hail, Saudi Arabia) Research Board (ECM-UOH2/2018).

## Results

The present study assessed the level of awareness about CPR among 442 participants, their ages ranging from 18 to 66 years. Out of the 442 participants, 250 (56.8%) were males and 192 (43.4%) were females, giving male: female ratio of 1.30:1.00 with regard to the distribution of age, most of the study participants were relatively younger. About 153 persons were found between 18 and 25 years followed by those at age more than 40 years, representing 131 participants. Moreover, the distribution of age was relatively similar between males and females age groups, as indicated in Table 1 and Figure 1.

With regard to the level of education, the majority of the participants were graduated from university representing 272 individuals followed by those in general education representing 143 persons, as indicated in Table 1 and Figure 1.

**Table 1: Distribution of the study population by demographical characteristics**

Variable	Category	Males	Females	Total
Age (years)	18-25	79	74	153
	26-30	34	32	66
	31-35	31	21	52
	36-40	17	23	40
	40+	89	42	131
	Total	250	192	442
Education	General education	75	68	143
	Graduate	154	118	272
	Postgraduate	21	6	27
	Total	250	192	442
Occupation	Teachers	55	71	126
	Students	75	73	148
	Employees	70	9	79
	Jobless	50	39	89
	Total	250	192	442

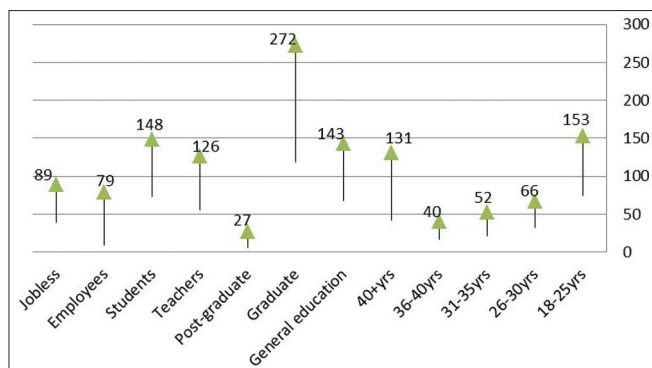


Figure 1: Description of the study population by demographical characteristics

With regard to the occupation, most of participants were students followed by teachers constituting 148 and 126 participants, respectively as shown in Figure 1 and Table 1.

Table 2 summarizes the distribution of the study population by sex and knowledge about CPR. About 148/442 (33.5%) of the study participants were found with a family history of IHD. Out of 128 participants, 65 were males and the remaining 63 were females. On asking the participants "Do you have information about CPR," 258/442 (58.4%) answered "Yes," 118/442 (26.6%) answered "May be," and the remaining 66/442 (15%) answered "No," On asking the participants "Do you know the meaning of CPR," 324 participants answered "Yes" of whom 176/250 (70.4%) were males and 148/192 (77%) were females.

On asking the participants about the meaning of CPR, 293 (159 males and 134 females) answered "It is ventilation and chest compressions," 2 answered "Ventilation only," 22 answered "Chest compressions only," and 5 answered as it is Chest massage.

The distribution of the study population by sex and knowledge about CPR's importance is summarized in Table 3. On asking the participants, whether it is important to know about CPR, 435 (246 males and 189 females) answered "Yes." For those answered "No," 3 believed that "There are many health care providers," 2 just answered that "It is not important," and 2 persons answered "It doesn't matter for me,"

Table 4 summarizes the distribution of the study population by sex and source of information about CPR. The majority of the study participants got their knowledge about CPR from social media, followed by education, reading, and relatives or friends, constituting 103, 44, 35, and 22, respectively, as shown in Figure 2.

With regard to the education and knowledge about CPR, when asking the participants "Do you have information

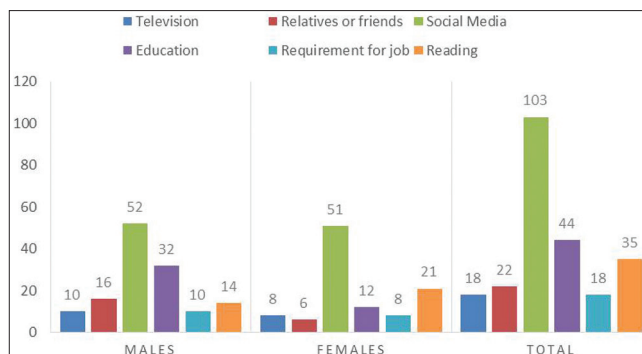


Figure 2: Description of the study population by sex and source of information about cardiopulmonary resuscitation

Table 2: Distribution of the study population by sex and knowledge about cardiopulmonary resuscitation

Variable	Category	Males	Females	Total
Do you have a family history of IHD	Yes	65	63	128
	No	185	129	314
	Total	250	192	442
Do you have information about CPR	Yes	155	103	258
	May be	74	44	118
	No	21	45	66
Total	250	192	442	
Do you know the meaning of CPR	Yes	176	148	324
	No	74	44	118
CPR means	Ventilation and chest compressions	159	134	293
	Ventilation only	0	2	2
	Chest compressions only	12	10	22
	Chest massage	3	2	5
	Total	174	148	322

CPR=Cardiopulmonary resuscitation, IHD=Ischemic heart disease

Table 3: Distribution of the study population by sex and knowledge about the important of cardiopulmonary resuscitation

Variable	Category	Males	Females	Total
Is it important to know about CPR	Yes	246	189	435
	No	4	3	7
	Total	250	192	442
Why it is not important to know about CPR	There are many health care providers	2	1	3
	It is not important	1	1	2
	It doesn't matter for me	1	1	2
	Total	4	3	7

CPR=Cardiopulmonary resuscitation

about CPR," about 65.5%, 54%, and 64.3% of the general education, graduate, and postgraduate, respectively, answered "Yes," On asking the participants "Do you know the meaning of CPR," around 79%, 71.3%, and 64.3% of the general education, graduate, and postgraduate, respectively, answered "Yes," On asking the participants about the meaning of CPR, 100, 177, and 15 of general education, graduate and postgraduate study participants have indicated it as "Ventilation and

chest compressions," Moreover, about 10, 10, and 2 of general education, graduate, and postgraduate study participants have indicated it as "Chest compressions only," as indicated in Table 5.

With regard to the education and knowledge about CPR, when asking the participants "Do you have information about CPR," about 45.2%, 72.8%, 63.3%, and 50% of the teachers, students, employees, and jobless, respectively, answered "Yes," On asking the participants "Do you know the meaning of CPR," around 64.5%, 82.4%, 72.2%, and 67.4% of the teachers, students, employees, and jobless, respectively, answered "Yes." On asking the

participants about the meaning of CPR, 79, 111, 54, and 49 of the teachers, students, employees, and jobless study participants have indicated it as "Ventilation and chest compressions." Moreover, about 4, 8, 2, and 8 teachers, students, employees, and jobless study participants have indicated it as "Chest compressions only," as indicated in Table 6.

## Discussion

CPR is a lifesaving procedure valuable in several emergencies, such as a heart attack or breathing failure or heartbeat motionless. Therefore, training of large section of population to do CPR can save many accidental emergencies, particularly those with health-related jobs. Consequently, in the present study, we tried to highlight the significance of awareness toward CPR in a community-based study in Northern Saudi Arabia, regarding involvement of as much volunteers as possible in this context.

In the present study, a large section of Saudi people with diverse education levels, occupation sectors, age ranges, and sex were included. About 33.5% of the study participants were found with IHD. Such people may be

**Table 4: Distribution of the study population by sex and source of information about cardiopulmonary resuscitation**

Variable	Males	Females	Total
Television	10	8	18
Relatives or friends	16	6	22
Social media	52	51	103
Education (school or university)	32	12	44
Requirement for job	10	8	18
Reading	14	21	35
Total	134	106	240

**Table 5: Distribution of the study subjects by education and knowledge about cardiopulmonary resuscitation**

Variable	Category	General education	Graduate	Postgraduate	Total
Do you have information about CPR	Yes	93	147	18	258
	May be	30	78	10	118
	No	19	47	0	66
	Total	142	272	28	442
Do you know the meaning of CPR	Yes	112	194	18	324
	No	30	78	10	118
	Total	142	272	28	442
CPR means	Ventilation and chest compressions	100	177	15	292
	Ventilation only	1	1	0	2
	Chest compressions only	10	10	2	22
	Chest message	1	4	0	5
	Total	112	192	17	321

CPR=Cardiopulmonary resuscitation

**Table 6: Distribution of the study subjects by education and knowledge about cardiopulmonary resuscitation**

Variable	Category	Teachers	Students	Employees	Jobless	Total
Do you have information about CPR	Yes	57	107	50	44	258
	May be	41	26	22	29	118
	No	28	14	7	15	64
	Total	126	147	79	88	440
Do you know the meaning of CPR	Yes	85	122	57	60	324
	No	41	26	22	29	118
	Total	126	148	79	89	442
CPR means	Ventilation and chest compressions	79	111	54	49	293
	Ventilation only	1	1	0	0	2
	Chest compressions only	4	8	2	8	22
	Chest message	1	2	1	1	5
	Total	85	122	57	58	322

CPR=Cardiopulmonary resuscitation



more aware about the CPR than others. It was reported that people with family history of IHD are more aware about CPR, either they got a training course about CPR or got more information about basic lifesaving including CPR.<sup>[9]</sup>

When asking the participants “Do you have information about CPR,” around 58.4% answered “Yes,” and this is relatively low percentage in population witnessing a rapid increase in CVDs,<sup>[10]</sup> which necessitates the need for rapid interventions. As CVD were more common among females in Saudi Arabia,<sup>[7]</sup> targeting females is a priority.

On asking the participants “Do you know the meaning of CPR,” 73% participants answered “Yes.” This high percentage may be attributed to the large number of well-educated section of the study population.

On asking the participants about the meaning of CPR, 66% answered “It is ventilation and chest compressions.” CPR includes the manual application of chest compressions and ventilations to patients in cardiac arrest, done in an effort to maintain viability until advanced help arrives.<sup>[11]</sup> Because CPR guidelines apply to the overall general public and health-care providers, they should comply with each country’s ethnicity, culture, laws, and medical environment. Thus, each country develops CPR guidelines based on the latest scientific knowledge and provides these guidelines to health-care providers and the general public to improve survival rates among patients with cardiac arrest.<sup>[12]</sup>

On asking the participants, whether it is important to know about CPR, 98.4% answered “Yes.” These findings indicate a very high level of knowledge about CPR among the enrolled study participants.<sup>[13]</sup> However, studies from Saudi Arabia in this context have shown conflicting results. Public awareness and knowledge on CPR was inadequate even among the younger population, and among parents with disabled children. The general public were willing to improve their knowledge and skills of CPR.<sup>[13]</sup> In a study to measure knowledge of basic life support (BLS) and attitudes toward BLS training among female health students at a women’s university in Saudi Arabia, the overall knowledge about BLS among the students was very poor; although the attitudes toward BLS training were positive. This indicates the willingness of community to get involved in such activities. These findings call for an improvement in BLS education among Saudi female health students so as to ensure appropriate responses in cardiac arrest or other emergency situations.<sup>[14]</sup> Another study assessed the level of awareness and attitudes toward BLS among Saudi dental students and interns. The study demonstrates poor knowledge among dental

students regarding BLS and showed the urgent need for continuous refreshing courses for this critical topic.<sup>[15]</sup>

The most important source of knowledge about CPR was social media and educational entities. Despite a large volume of tweets, Twitter can be filtered to identify public knowledge and information seeking and sharing about cardiac arrest. To better engage via social media, health-care providers can distil tweets by user, content, temporal trends, and message dissemination. Further understanding of information shared by the public in this forum could suggest new approaches for improving resuscitation related education.<sup>[16]</sup>

Moreover, in the present study, the education was found to have impact on the general awareness and knowledge about CPR. The knowledge increase with the elevation of education level. It was reported that older age, lesser education, and lower income were associated with reduced likelihood of CPR training.<sup>[17,18]</sup> Although the present study has a limitation of including more educated people, it has value of motivating the community and health service providers in Saudi Arabia toward this important issue.

## Conclusion

The study showed a high level of awareness about CPR, which might be attributed to the majority of highly educated participants. Effective and sustainable public CPR training programs is needed to be implemented to preserve better knowledge and awareness of CPR in the general population. Further study optimizing the demographical factors is required.

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## Conflicts of interest

There are no conflicts of interest.

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