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.[1] Cardiopulmonary resuscitation (CPR) is a collection of interventions performed to provide oxygenation and circulation to the body during cardiac arrest.[2] 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.[3] “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...
rhythm, stabilizing the airway, and treating the underlying cause of the arrest.[4]

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.[5]

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.[6]

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.[7,8] 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   |
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 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

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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 message                  | 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
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
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.[9]

When asking the participants “Do you have information about CPR,” around 58.4% answered “Yes,” and this is a relatively low percentage in population witnessing a rapid increase in CVDs,[10] which necessitates the need for rapid interventions. As CVD were more common among females in Saudi Arabia,[7] 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.[11] 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.[12]

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.[13] 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.[13] 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.[14] 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.[15]

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 distill 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.[16]

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.[17,18] 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.

**Financial support and sponsorship**
The study supported by the authors

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. World Health Organization. Cardiovascular 2018. Available from: http://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds). [Last accessed on 2018 Nov 22].
2. Sciammarella JC, Patel PH. Cardiopulmonary Resuscitation. In: StatPearls. Treasure Island (FL): StatPearls Publishing; January, 2018. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470402/. [Last updated on 2017 Nov 18].
3. Simmes FM, Schoonhoven L, Mintjes J, Fikkers BG, van der Hoeven JG. Incidence of cardiac arrests and unexpected deaths in surgical patients before and after implementation of a rapid response system. Ann Intensive Care 2012;2:20.
4. Vindigni SM, Lessing JN, Carlomb DJ. Hospital resuscitation teams: A review of the risks to the healthcare worker. J Intensive Care 2017;5:59.
5. Rajeswaran L, Cox M, Moeng S, Tsimi BM. Assessment of nurses’ cardiopulmonary resuscitation knowledge and skills within three
district hospitals in Botswana. Afr J Prim Health Care Fam Med 2018;10:e1-6.

6. Ong EH. Improving the quality of CPR in the community. Singapore Med J 2011;52:586-91.

7. Kalaf H, AlMesned A, Soomro T, Lasheen W, Ewidi M, Al-Mohameed AA, et al. Cardiovascular disease risk profile among young Saudi women of al-Qassim, Saudi Arabia: A cross-sectional study. Int J Health Sci (Qassim) 2016;10:29-37.

8. Al-Zoughool M, Al-Ahmari H, Khan A. Patterns of physical activity and the risk of coronary heart disease: A Pilot study. Int J Environ Res Public Health 2018;15. pii: E778.

9. Safarova MS, Bailey KR, Kullo IJ. Association of a family history of coronary heart disease with initiation of statin therapy in individuals at intermediate risk: Post hoc analysis of a randomized clinical trial. JAMA Cardiol 2016;1:364-6.

10. M Alquaiz A, R Siddiqui A, H Qureshi R, A Fouda M, A Almuneef M, A Habib F, et al. Women health in Saudi Arabia: A review of non-communicable diseases and their risk factors. Pak J Med Sci 2014;30:422-31.

11. Bhatnagar V, Jinjil K, Dwivedi D, Verma R, Tandon U. Cardiopulmonary resuscitation: Unusual techniques for unusual situations. J Emerg Trauma Shock 2018;11:31-7.

12. Hwang SO, Chung SP, Song KJ, Kim H, Rho TH, Park KN, et al. Part 1. The update process and highlights: 2015 Korean guidelines for cardiopulmonary resuscitation. Clin Exp Emerg Med 2016;3:51-9.

13. Al-Turkistani HK. Awareness and knowledge of pediatric cardio-pulmonary resuscitation in the community of al-Khobar city. J Family Community Med 2014;21:125-9.

14. Al-Mohaissen MA. Knowledge and attitudes towards basic life support among health students at a Saudi women’s university. Sultan Qaboos Univ Med J 2017;17:e59-65.

15. Al-Shamiri HM, Al-Maweri SA, Shugaa-Addin B, Alaizari NA, Hunaish A. Awareness of basic life support among Saudi dental students and interns. Eur J Dent 2017;11:521-5.

16. Bosley JC, Zhao NW, Hill S, Shofer FS, Asch DA, Becker LB, et al. Decoding twitter: Surveillance and trends for cardiac arrest and resuscitation communication. Resuscitation 2013;84:206-12.

17. Blewer AL, Ibrahim SA, Leary M, Dutwin D, McNally B, Anderson ML, et al. Cardiopulmonary resuscitation training disparities in the United States. J Am Heart Assoc 2017;6. pii: e006124.

18. Özbilgin Ş, Akan M, Hanci V, Aygün C, Kuvaki B. Evaluation of public awareness, knowledge and attitudes about cardiopulmonary resuscitation: Report of İzmir. Turk J Anaesthesiol Reanim 2015;43:396-405.