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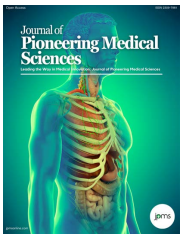

Knowledge and Right Practice of Pediatric Cardiopulmonary Resuscitation among Childhood Studies Students in Makkah Region

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Abstract **Objectives:** Cardiopulmonary resuscitation (CPR) is a vital emergency procedure performed in sudden cardiac arrest victims to return spontaneous circulation and intact brain function. In emergencies, schools' teachers and kindergarten staff are expected to play a significant role in performing CPR on children. This study aims to assess the knowledge of pediatric CPR guidelines among childhood studies students at three major universities in Makkah region, Saudi Arabia. **Methods:** This cross-sectional study was conducted using an 11-statement questionnaire about CPR guidelines knowledge created by authors that was administered to childhood studies students in The Kingdom of Saudi Arabia, including King Abdulaziz University-Jeddah, Umm Al-Qura University- Makkah and Taif University in Al-Taif. **Results:** 247 students included, only 27% had attended CPR course while the remaining did not. Information about CPR was mainly from social media (45%), followed by their college (33%). 2% of those who attended a CPR Course admit that they do not know how to perform it, while 23% didn't participate in a CPR course saying they could perform it. The majority of both groups had poor CPR guidelines knowledge, with only 30-40% with acceptable knowledge. There was a nonsignificant statistical difference between certified participants and who claim the ability to perform CPR. **Conclusion:** This study has revealed that most childhood study students do not have adequate knowledge about CPR. A CPR license should be a requirement for graduation and employment. It also demonstrated that the impact of social media was nonnegligible in the group of study.

Key Words Cardiopulmonary, resuscitation, knowledge, Cardiopulmonary, resuscitation guidelines, kindergarten students, Makkah region, pediatric, social media

INTRODUCTION

Cardiopulmonary resuscitation (CPR) is an emergency procedure performed in sudden cardiac arrest victims to return spontaneous circulation and intact brain function, including children [1]. Children have an increased risk of unintentional injuries, as their bodies and behaviors are still developing [2]; these injuries might affect their circulation and breathing. Approximately 16,000 pediatric patients in the United States suffer from cardiac arrest each year [3], which is associated with poor survival; the mortality rate of out-of-hospital cardiac arrest in children and infants is 90% [4]. Therefore, as cardiac arrest is a serious condition, the importance of CPR for survival and better neurological outcomes after cardiac arrest should be emphasized [5]. According to data from the American Heart Association, the percentage survival of out-of- hospital cardiac arrests in pediatric patients was only 8.4%; most survivors were left with neurological impairments and the best outcomes were noted in children who received immediate CPR [6].

In 2018, a cross-sectional study of the non-medical population in Jeddah showed that only 39% of participants were able to perform CPR [7]. A similar study conducted in Al-Khobar City, which included 753 participants (483 females and 270 males), reported that 84.3% of females and

92.2% of males failed to perform chest compression and mouth-to-mouth resuscitation [8]. In addition, a previous study conducted by King Abdulaziz Medical City in 2018 concluded inadequate awareness and knowledge of infant CPR among mothers [9].

Most schools depend on teachers and other staff to perform first aid and CPR without employing a nurse [2]. A previous study conducted among Riyadh schoolteachers in 2016 reported inadequate public awareness and knowledge of CPR skills [10]. Since pediatric CPR knowledge is currently inadequate and the mortality rate is increasing, awareness of the importance of pediatric CPR knowledge needs to be improved. Furthermore, knowledge of CPR should be essential for schoolteachers and kindergarten staff because they spend much time with children and may encounter cases of cardiac arrest.

However, at present, no study has been conducted to assess the knowledge and awareness of CPR in kindergarten staff. Therefore, this study aimed to evaluate the knowledge of pediatric CPR among female students of childhood studies (future kindergarten staff).

METHODS

A descriptive, cross-sectional study was conducted through an online survey after obtaining approval from the Unit of Biomedical Ethics, Research unit at King Abdulaziz University Hospital (KAUH) (Reference no. 284-21), in the Western province of Saudi Arabia between May 2021 and June 2021. It included a 24-item questionnaire containing three sections: demographic data, nine items about CPR course attendance and CPR awareness and 11 items testing a participant's knowledge of CPR performance guidelines, including assessments and essential steps in the resuscitation of infant and young children as per 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency. Getting six or more correct answers is considered acceptable guidelines knowledge, while below that is inadequate knowledge. The authors formulated this questionnaire based on a literature review and it was conducted in Arabic language after translation from English origin.

The questionnaire was distributed to female childhood studies students in three universities: King Abdulaziz University in Jeddah, Umm Al-Qura University in Makkah and Taif University in Taif. This was sent as a Google form link to the students through social media (WhatsApp and Telegram). Voluntary participation through questionnaire completion was considered as consent. The inclusion criteria were female childhood studies students from Western universities with knowledge of child and infant sociology and psychology. Those who were not familiar with the term CPR were excluded. The specialty has eight levels, laying a foundation for a career in child and infant education and health care at kindergartens.

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Nominal variables were expressed as numbers and percentages. Comparisons between groups were tested using the χ^2 tests. Statistical significance was considered if the p-value was <0.05.

RESULTS

The number of study participants was 318 (mean age: 22.41 years): 37% (117/318) were from King Abdulaziz University, 36% (115/318) from Umm Al-Qura University and 27% (86/318) from Taif University. In total, 22% (70/318) of the students were unaware of CPR and were thus excluded.

CPR Course Attendance and Awareness

45% (111/247) of participants received their CPR awareness and knowledge through social media, while college was the source in 33% (82/247) (Figure 1). Only 27% (87/247) had attended a CPR course, 60% of them had participated once, 31% had participated twice and 9% had attended more than twice. About two percent (2/87) of those who participated in a CPR course admitted that they did not know how to perform CPR.

Ninety percent (162/180) of participants who did not know how to perform CPR stated they were willing to attend a CPR course. Surprisingly, 23% (53/247) of participants claimed their ability to perform CPR despite not attending any CPR course.

Knowledge of CPR Performance Guidelines:

Those who could perform CPR (attended a CPR course vs. not attended) were introduced to the third part of the questionnaire, which included 11 questions to determine their knowledge regarding CPR guidelines. Of those who had attended a CPR course, only 39% (33/85) had an acceptable knowledge level, and only one answered 9/11 questions correctly, while the remaining had between six and eight correct answers. The remaining had inadequate CPR guidelines knowledge. Among those who did not attend a CPR course but claimed the ability to perform it, 30% (16/53) had an acceptable level of knowledge and only one participant got 8 out of 11 questions correct. At the same time, the remaining group with an inadequate level of knowledge (Table 1). There was a non-significant difference statistically between the two groups (p = 0.539). Overall, none of the participants answered all the questions correctly.

Table 1: Cardiopulmonary resuscitation guidelines knowledge correct answers

Knowledge level	Number of correct answers out of 11	Attended CPR course (total number 85)	Did not attend CPR course (Total number 53)
Inadequate	0-4	32.9% (28)	35.8 %(19)
	5	27% (23)	34% (18)
Acceptable	6-8	39% (33)	28% (15)
	9-10	1.1% (1)	2% (1)

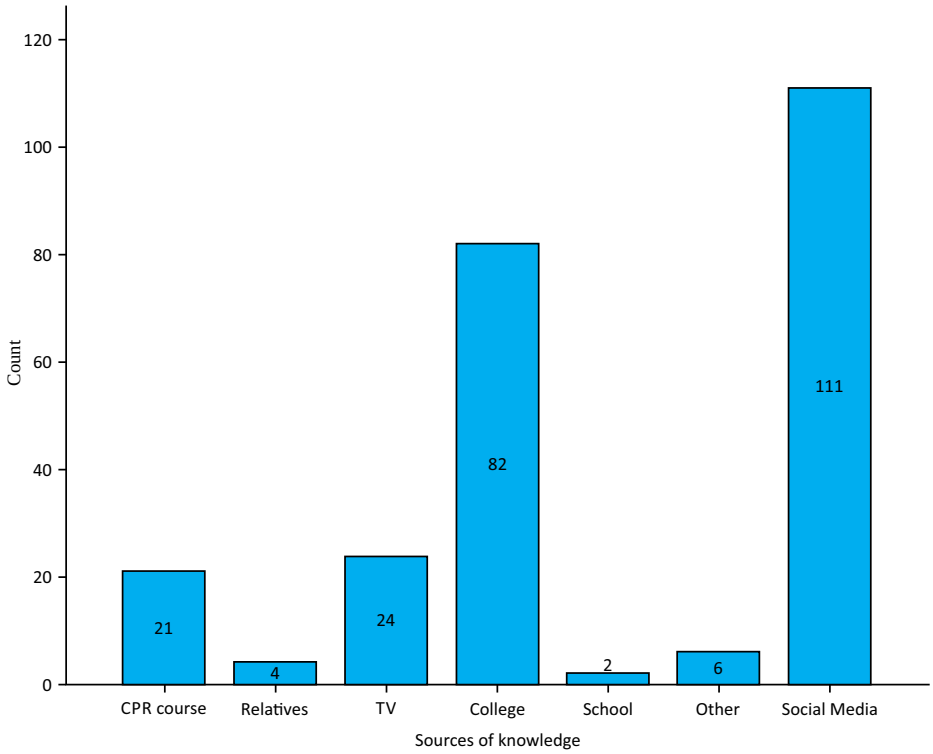

Figure 1: Cardiopulmonary resuscitation Knowledge sources among participants

DISCUSSION

CPR knowledge and practice are important factors determining the outcomes of emergencies among children. We have studied this knowledge in three western area major universities in Saudi Arabia. The mean participant age was 22.4 years, which was expected, as all the participants were university students. Moreover, young participants are expected to have better CPR knowledge, evidenced by a study conducted in Riyadh, Saudi Arabia, which found that most individuals with CPR knowledge learned it while enrolled in university [10].

A majority of both groups had poor CPR guidelines knowledge without a significant statistical difference, as shown in other studies in Saudi Arabia performed in Riyadh and Al-Qassim [10,11]. But we believe the practical training part during CPR courses, if studied, will reveal the difference between both groups. Nevertheless, considering these results, participants with a CPR license may face real-life situations where they are not able to perform CPR correctly, which may lead to failure of the resuscitation attempt, as shown by Alharbi *et al.* [10] when only 38.9% of teachers performed CPR when needed. Most of the participants understood the importance of CPR, which was reflected by their willingness to attend a training course.

Poor CPR knowledge could be due to the non-renewal of participants' CPR certifications, resulting in a decline in their CPR skills and knowledge. Therefore, there is a need to increase students' exposure to CPR training by establishing CPR training centers with the help of the Saudi Heart Association (the official organizing body in Saudi Arabia). We found that 78% of the participants' knowledge was obtained from social media and college; therefore, education can be more effectively performed through courses inside the university and announcements through social media. In addition, our results showed the power of social media in disseminating information which was shown by Alharbi et al. [10] as 15% only five years back and now 45%, which goes with the inflation of social media in the past few years. Despite this, social media is a dangerous tool because not all information spread through this medium is accurate; besides, it gave some participants a false impression regarding their capability of performing CPR in an emergency situation where help is needed from professionals during a critical time frame.

From the limitations of our study is the small number of participants from only three cities in the western province of Saudi Arabia; thus, the study population does not represent all teachers and students who deal with children in Saudi Arabia. Additionally, there was no way to confirm whether the participants had prior CPR training by asking for a CPR license or certificate, for instance. Lastly, we only tested the participant's theoretical knowledge; practical testing is also essential but was beyond our study aim.

CONCLUSION

This study revealed that most childhood studies students lack adequate knowledge of CPR. We suggest that being certified in CPR should be required to graduate and obtain

employment. Furthermore, a renewal of CPR certification should be enforced every two years per American Heart Association guidelines to update knowledge and skills. Future studies should focus on the reasons behind the prevalence of poor knowledge regarding CPR even after taking CPR courses. The impact of social media was nonnegligible in the group of study.

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