



Research Article

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Assessment of Awareness and Attitudes Regarding Automated External Defibrillators (AED) In Sports Facilities in Jeddah, Saudi Arabia

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ABSTRACT

Background: Sudden cardiac death (SCD) is a leading cause of death in young athletes. Most of those events occur during exercise and in sports facilities. We sought to assess awareness and attitudes towards automated external defibrillators (AED) in sports facilities in Jeddah, Saudi Arabia. **Methods:** The survey included 293 individuals who attend 18 different sports facilities in Jeddah, Saudi Arabia to estimate the overall knowledge level of CPR and AED usage and determine general attitudes toward intervening in the setting of sudden cardiac arrest (SCA). We included adult participants who were 18 years of age or older. After explaining the aim of our study, each participant was consented to participate in the survey. The survey included 33 questions to assess demographic characteristics, knowledge, and skills of CPR, confidence to perform CPR and to use AED. **Results:** A total of 293 candidates completed the questionnaire. Mean age was 28.33 ± 8.22 years. Only 19 candidates who worked in sports facilities agreed to participate in our survey, of those only 10 participants had previous CPR training but only 8 (42.1%) had the self-confidence to do CPR and use AED. Of individuals who participated in the survey, 110 (37%) of them indicated that they were more likely to intervene in an SCA after receiving the proper training. 140 (47.7%) participants of our cohort were reluctant to perform CPR because they were anxious about harming the arrested patient. 108 (36%) of our cohort could explain the purpose of using AED. Unfortunately, 101 (34.5%) of our sample did not know the number of Red Crescent for emergency calls. 73 (53.7%) of the total 136 participants who received CPR training before stated that they are able to use AED. Our survey showed that 264 (90.1%) wished to receive BLS training course if it was announced in order to qualify them for performing CPR and applying AED. **Conclusion:** Our survey showed insufficient knowledge in all aspects of CPR skills and inadequate knowledge of AED and its purpose of use in sports facilities in Jeddah. We recommend initiating an effective national public campaign to increase the public awareness of the importance of CPR and AED performance using different pathways for education through media and new legislations.

Key words: AED, Defibrillation, CPR, Resuscitation, sudden cardiac death, sudden cardiac arrest.

INTRODUCTION

Sudden cardiac death (SCD) is one of the leading causes of death in young athletes and it is associated with different underlying structural heart diseases or electrical abnormalities. Placement of automated external defibrillators (AEDs) in sports facilities is crucial when compared to other public locations to facilitate early defibrillation in cases of sudden cardiac arrest, which improves the chances of survival, not only for athletes but also for other attendees at athletic events.[1] Survival rates of out-of-hospital cardiac arrest remain relatively low (2-20%), but there is a noticeable improvement lately in outcomes due to improvements in survival chain and more frequent placement of AED's in public areas, as well as increased awareness of their importance. [2, 3] The American Heart Association (AHA) recommends that AED be placed in targeted public areas, which has at least a 20% annual probability that the device will be used. Specific areas, such as sports arenas, shopping malls, large buildings, gated communities, doctor's offices and should have the priority to have AEDs. [4]

In a study of the outcomes after sudden cardiac arrest (SCA) in sports centers, the only independent predictor of successful survival without neurological deficit after exercise-related SCA in sports and fitness centers was the immediate defibrillation using AED available in the facility. [5]

A national French survey of individuals suffered from SCA during sports reported previously 5-year data from 2005 to 2010 and showed that 52% of SCA cases occurred in sports facilities. Survival rate was 22.8%, which was higher among the individuals suffered from SCA in sports facilities compared to those occurring outside (8.0%) ($P < .0001$). Patients who had SCA in sports facilities were younger (42.1 vs 51.3 years, $P < .0001$). Better survival rate was explained by witnessed events and early initiated bystander cardiopulmonary resuscitation. [6]

We sought in this study to assess the knowledge and attitudes towards automated external defibrillators (AED) in sports facilities in Jeddah, Saudi Arabia.

SURVEYED POPULATION AND STUDY DESIGN:

A convenience survey of 293 individuals who attended 18 different sports facilities in Jeddah, Saudi Arabia was conducted to estimate the overall knowledge level of CPR and AED usage and to determine general attitudes in sports facilities toward intervening in the setting of SCA. We included adult participants, 18 years of age or older and we identified participants who had a medical background. After explaining the aim of our study, each participant was consented to participate in the survey. The survey included 33 questions to assess demographic characteristics, knowledge, and skills of CPR, confidence to perform CPR and to use AED.

Statistical Analysis

Data were collected, tabulated, organized, and statistically analyzed using SPSS version 23.0 (SPSS Inc., Chicago, IL, USA). Chi-square test was used for statistical comparison of categorical variables. Qualitative data were expressed as number and percent distribution while quantitative variables were expressed as mean and standard deviation. A P-value of 0.05 was considered statistically significant. There was no missing data in the dataset, so missing data management was not required.

RESULTS

A total of 293 candidates completed the questionnaire. 260 (88%) participants were Saudis, 292 of them were males and only 1 female. The mean age was 28.33 ± 8.22 years. We divided the sample into two groups: the health sector with 107 participants (36.5%) and non-health sector with 186 participants (63.5). The demographic data are shown in Table 1. Only 19 candidates who worked in sports facilities agreed to participate in our survey, of those 10 participants had previous CPR training but only 8 (42.1%) had the self-confidence to do CPR and to use AED (Table 2). Of the individuals who participated in the survey, 110 (37%) indicated that they were more likely to intervene in a case of SCA and use AED after receiving the training. Unfortunately, 101 (34.5%) did not know the number of Red Crescent for emergency calls.

Table 1: Baseline characteristics of all respondents (n = 293)

Characteristics	N (%)
Age in years (mean \pm SD)	28.33 \pm 8.22
Nationality	
Saudi	260 (88.7)
Non-Saudi	33 (11.3)
Employment	
In the health sector	107 (36.5)
In non-health sector	186 (63.5)
Employees of the gym	
Yes	19 (6.5)
No	274 (93.5)

Table 2: Distribution of gym employees by knowledge of the emergency number of Red Crescent, CPR training, CPR steps, and confidence to perform CPR and AED use (Table 19).

Characteristics	N (%), Total N=19
Knows emergency phone number of Red Crescent	9 (47.4)
Received CPR training	10 (52.6)
Witnessed sudden cardiac arrest	4 (21.1)
Knows how to perform CPR steps	
Open the airway	12 (63.2)
Breathing examination	8 (42.1)

Mouth to mouth breath	7 (36.8)
Chest compression	8 (42.1)
Confident to do CPR	8 (42.1)
Confident to use AED	8 (42.1)

136 (46.4%) of the candidates reported that they had previously received training in CPR with 59 (43%) participant had received their training course more than two years ago. Regarding the initial step of cardiac arrest, 126 (43%) suggested calling an ambulance, 118 (40.3%) chose to perform a pulse & consciousness examination, and 44 (15%) suggested to start with CPR immediately. While 177 (60.4%) knew the proper location for performing chest compressions, of those only 93 (31.7%) could actually perform CPR during emergencies. On the other hand, 140 (47.7%) candidates were reluctant to perform CPR because they were anxious about hurting the arrested patient (Table 3).

In regards to AED, 108 (36%) participants could explain the purpose of using an AED and 110 (37.5%) stated that they were able to use it. Moreover, 73 (53.7%) of a total of 136 participants who received CPR training previously, stated that they were able to use an AED. Our survey showed that 264 (90.1%) wished to receive BLS training course if it was announced in order to qualify them for performing CPR and using AED appropriately (Table 4).

Table 3: Answers to the CPR related questions and comparison of the answers in gym employees vs others and CPR trained respondents vs others (n = 293)

Questions	Responses	All participants (n = 293)	Works in gym (n = 19)	Do not work in a gym (n = 274)	p-value (OR)	Have CPR training (n = 136)	Do not have CPR training (n = 157)	p-value (OR)
		N (%)	N (%)	N (%)		N (%)	N (%)	
Do you know the number of red crescents?	Yes	192 (65.5)	9(47.4)	183(66.8)	.085 (OR 0.448)	104(76.5)	88(56.1)	<.001 (OR 2.548)
	No	101 (34.5)	10(52.6)	91(33.2)		32(23.5)	69(43.9)	
Have you ever witnessed cases of SCA?	Once	31 (10.6)	4(21.1)	27(9.9)	.090 (OR 2.440)	16(11.8)	15(9.6)	.540 (OR 1.262)
	More than once	262 (89.4)	15(78.9)	247(90.1)		120(88.2)	142(90.4)	
If you witnessed a case of SCA, what is the first step in CPR?	Contact ambulance	126 (43.0)	7(36.8)	119(43.4)	.150	39(28.7)	87(55.4)	.112
	Pulse & consciousness examination	118 (40.3)	6(31.6)	112(40.9)		82(60.33)	36(22.9)	
	CPR	44 (15.0)	5(26.3)	39(14.2)		14(10.3)	30(19.1)	
	Other	5 (1.7)	1(5.3)	4(1.5)		1(0.7)	4(2.5)	
Have you participated in a CPR course?	Yes	136 (46.4)	10(52.6)	126(46.0)	.574 (OR 1.305)			
	No	157 (53.6)	9(47.4)	148(54.0)				
Can you perform CPR in emergencies?	Yes	93 (31.7)	8(42.1)	85(31.0)	.194	77(56.6)	16(10.2)	<.001
	No	100 (34.1)	7(36.8)	93(33.9)		11(8.1)	89(56.7)	
	To some extent	100 (34.1)	4(21.1)	96(35.0)		48(35.3)	52(33.1)	
What prevents you from starting CPR?	Fear of hurting the patient	140 (10.6)	1(5.3)	30(10.9)	.768	10(7.4)	21(13.4)	.367
	Lack of experience	131 (44.7)	8(42.1)	123(44.9)		44(32.4)	87(55.4)	
	Fear of legal issue if the patient dies	22 (7.5)	1(5.3)	21(7.7)		10(7.4)	12(7.6)	
Can you apply the following skills?	Open the airway	146(49.8)	12(63.2)	134(48.9)	.230(0.558)	109(80.1)	37(23.6)	<.001(0.076)
	Breathing examination	154(52.6)	8(42.1)	146(53.3)	.891(1.568)	112(82.4)	42(26.8)	<.001(0.078)
	Mouth to mouth breath	151(51.5)	7(36.8)	144(52.6)	.185(1.899)	102(75.0)	49(31.2)	<.001(0.151)
	Chest compression	177 (60.4)	8(42.1)	169(61.7)	.092(2.213)	112(82.4)	65(41.4)	.001(151)
		72 (24.6)	5(26.3)	67(24.5)	.855(0.906)	7(5.1)	65(41.4)	<.001(13.020)

	Cannot apply any skill							
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Table 4: Answers to AED related question and comparison of the answers in gym employees vs others and CPR trained respondents vs others (n = 293)

Questions	Responses	All participant (n = 293)	Works in gym (n = 19)	Do not work in a gym (n = 274)	p-value	Have CPR training (n = 136)	Do not have CPR training (n = 157)	p-value
		N (%)	N (%)	N (%)		N (%)		
Do you know what are automatic external defibrillators?	Yes No	227 (77.5) 66 (22.5)	13(68.4) 6(31.6)	214(78.1) 60(21.9)	.330	119(87.5) 17(12.5)	108(68.8) 49(31.2)	<.001
Why should AED be used early when SCA occurs?	To restore normal heart rhythm in cases of serious pulse I am not sure	108 (36.9) 185 (63.1)	6(31.6) 13(68.4)	102(37.2) 172(62.8)	.622 (OR 0.778)	89(65.4) 47(34.6)	19(12.1) 138(87.9)	<.001 (OR 13.754)
If the AED is available, can you use it?	Yes No To some extent	110 (37.5) 88 (30.0) 95 (32.4)	10(52.6) 5(26.3) 4(21.1)	100(36.5) 83(30.3) 91(33.2)	.154	73(53.7) 26(19.1) 37(27.2)	37(23.6) 62(39.5) 58(36.9)	<.001
Do you think you are able to use AED?	Yes No	116 (39.6) 177 (60.4)	8(42.1) 11(57.9)	108(39.4) 166(60.6)	.817	75(55.1) 61(44.9)	41(26.1) 116(73.9)	<.001
What prevents you from using AED?	I don't know how to use it I don't have enough experience	89 (30.4) 204 (69.6)	4(21.1) 5(26.3)	85(31.0) 90(32.8)	.810	28(20.6) 40(29.4)	61(38.9) 55(35.0)	.136
Is there AED in the gym you are visiting?	Yes No I don't know	6 (2.0) 246 (84.0) 41 (14.0)	0(0.0) 18(94.7) 1(5.3)	6(2.2) 228(83.2) 40(14.6)	.210	5(3.7) 117(86.0) 14(10.3)	1(0.6) 129(82.2) 27(17.2)	.190
Do you think it's important to have an AED in the gym?	no yes I don't know	24 (8.2) 151 (51.5) 118 (40.3)	0(0.0) 13(68.4) 6(31.6)	24(8.8) 138(50.4) 112(40.9)	.227	15(11.0) 74(54.4) 47(34.6)	9(5.7) 77(49.0) 71(45.2)	.151
From your point of view, providing AED in sports clubs and public places will help reduce death from heart attacks outside hospitals.	no yes I don't know	103 (35.2) 6 (2.0) 184 (62.8)	0(0.0) 15(78.9) 4(21.1)	88(32.1) 6(2.2) 180(65.7)	.001	45(33.1) 2(1.5) 89(65.4)	58(36.9) 4(2.5) 95(60.5)	.334
If you see an announcement for a training course that qualifies you for CPR and AED, will you register?	Yes No Maybe	264 (90.1) 1 (0.3) 28 (9.6)	19(100) 0(0.0) 0(0.0)	245(89.4) 1(0.4) 28(10.2)	.138	124(91.2) 1(0.7) 11(8.1)	140(89.2) 0(0.0) 17(10.8)	.494

DISCUSSION

Heart disease is the second most commonly occurring disease in developed and developing countries. [7, 8] The most frequently encountered cause of SCD in individuals younger than 35 years of age is structural heart disease, for example, hypertrophic cardiomyopathies (36%) and coronary artery anomalies (17%). [9] In addition, there are other cardiovascular diseases, which could be implicated, such as myocarditis, and arrhythmogenic right ventricular dysplasia (ARVD), primary electrical heart diseases, heart valve, aortic

anomalies, and systemic diseases, which represent only a small incidence of 1-6%. Substance abuse is also considered one of the causes of SCD in young individuals with unknown incidence. [10]

In our study, we sought to assess the level of awareness and attitudes towards performing CPR and applying AED in case of a witnessed SCA in sports facilities in Jeddah, Saudi Arabia. It was shown in previous studies that the single greatest determinant of survival following SCA is the time duration from collapse to successful defibrillation, with survival rates declining by 7% to 10% per minute for every minute defibrillation is delayed. [11, 12] 46.4% of our candidates, participated in the study received CPR course previously and this percentage is higher than previous studies mostly due to including some health care providers in the survey.

Till now, Basic Life Support (BLS) is not a mandatory requirement in Saudi Arabia, except in very few workplaces, mainly in the medical sector. [13-16] In our study, employees of sports facilities who had prior CPR training were surprisingly only 52.6%, despite the well known increased incidence of exercise-related events. Also, it is known from previously reported studies [17] that exercise-induced cardiac arrest that occurs at a sports facility has a better prognosis when compared to exercise-related arrest that occurs outside of such facility. This can be explained by the fact that arrest is witnessed, rapidly initiated bystander CPR and availability of AED, which can readily treat shockable rhythms. This overall correlates with better prognosis. [6] The initial step of evaluating a cardiac arrest victim was different among participants who received BLS training and those who had no prior BLS training and this explained that the training quality was not enough even for those who received BLS course, The huge gap between trained and non-trained participants can be explained by the fact that they acquired their CPR knowledge through media or internet. According to our results, 31% of the participants can do CPR during emergencies. However, lower rates of conducting CPR were reported by a study in Japan, in which 19% of the participants witnessed a sudden death but only 4% of them started CPR. 47.7% of the participants were reluctant to perform CPR because of their fear to hurt the arrested patient. However, 44% were reluctant due to lack of experience and 7.5% due to fear of legal litigation if the patient dies. The main obstacle to AED implementation in such spaces is financial and sometimes due to resistance to taking on new responsibilities, such as delivering shocks to a collapsed candidate with SCA, especially in non-medical personnel, periodic device maintenance, and assessment of device readiness. [1, 18]

Performing CPR or using an AED by a person who is not knowledgeable about its use and proper application can be dangerous to the patient and attending personnel around the patient.[19] Moreover, simply having an AED located near an arrest does not guarantee accessibility. Thus, AED coverage depends on spatial and temporal accessibility. [18] Again, these findings emphasize the importance of finding a drastic solution and starting a national campaign to increase the awareness and knowledge about appropriate CPR and correct any mistaken beliefs by the public. National and social media can also play a vital role in raising the public awareness of CPR as well as AED.

Limitations:

Limitations of this study include the small number of participants and that the study focused only on sports facilities in a single city.

CONCLUSION:

Our survey showed insufficient knowledge in all aspects of CPR skills and inadequate knowledge of AED and its purpose of use in sports facilities in Jeddah. We recommend initiating a national effective public campaign to increase the public awareness of the importance of CPR and AED performance using different pathways for education through media and new legislations.

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