

Awareness of the Public about Sudden Cardiac Death in Saudi Arabia

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Abstract

Background: Sudden cardiac death (SCD) is a common and devastating event, often occurring in the prime of life and having profound consequences for surviving members of the individual's family.

Objective: To determine the public awareness regards the causes, risk factors and management of sudden cardiac arrest (SCA) and screening of families at higher risk of sudden cardiac death (SCD) in Saudi Arabia.

Methods: A cross-sectional study was conducted among the general populations of Saudi Arabia in different localities. Data was collected by using an online pre-designed self-administered questionnaire distributed via social media network. Sociodemographic and awareness data was obtained.

Results: Out of the studied 4309 respondents, 68% were females, 67.3% were university or higher educated. Most of the respondents (91.8%) have heard about SCA. More than half the participants (58.7%) knew the difference between SCA and heart attacks. Chest pain and tightness were the most known warning symptoms of SCA; 63% and 57.0% respectively. Around half the respondents knew cessation of pulse and loss of consciousness are immediate symptoms of SCA. 39.3% did not know the causes of SCA. Family history of SCD was reported in 19.9%, among which, 25.4% did screening for heart diseases. Most of the participants (75.2%) have heard of CPR and 34.1% can perform CPR skillfully, 39.5% know the right action if they see a SCA subject.

Conclusion: In our study, most of the respondents (91.8%) have heard about SCA, 58.7% knew the difference between SCA and heart attacks, 34.1% can perform CPR skillfully, 39.5% know the right action if they see a SCA subject.

Keywords: Awareness; The Public; Sudden Cardiac Death; Saudi Arabia

Introduction

Sudden cardiac death (SCD) is death due to a cardiovascular cause in a person with or without preexisting heart disease that occurs within one hour of the onset of symptoms [1]. Further, sudden cardiac arrest (SCA) is the sudden cessation of cardiac activity so that the victim becomes unresponsive, with no normal breathing and no signs of circulation. If corrective measures are not taken rapidly, the blood flow to the brain slows to essentially zero and ultimately leading to death [2].

Despite major advances in management and prevention in high-risk patients, SCD remains a major public health problem estimated to account for over 50% of coronary heart disease (CHD) deaths and 15 - 20% of all deaths [3]. The global annual incidence of out-of-hospital

SCA is much lower in Asia (52.5 per 100,000 person-years) as compared to Europe (86.4 per 100,000 person-years), North America (98.1 per 100,000 person-years), and Australia (111.9 per 100,000 person-years) [4].

In Saudi Arabia, Nofal HK, *et al.* [5] reported that between retrospectively investigated 1273 deaths, 223 were sudden deaths, and 59.6% of which were of cardiovascular cause.

CHD is known to be the most common pathology underlying SCD accounting for up to 80% of all cases, followed by cardiomyopathies, inherited arrhythmia syndromes, and valvular heart disease [6]. Males are more likely to suffer from SCA. Warning symptoms like black-outs may precede a cardiac arrest. However, these symptoms are usually unrecognized or ignored by the individual. Approximately 50% of SCA patients show asystole, and 19% to 23% have PEA as the first identifiable rhythm [7,8].

Treatment for SCA should be initiated immediately by lay people or emergency medical services. It includes cardiopulmonary resuscitation (CPR) and using an automated external defibrillator (AED) if available. CPR provides enough oxygen to the brain until a stable electrical rhythm can be established and AED applies electricity which stops the arrhythmia, allowing the heart to re-establish an effective rhythm. The overall survival for out-of-hospital SCA is around 7% [9].

Survival from SCA largely depends on bystander intervention with CPR and automated external defibrillators (AEDs), so the public awareness of SCA is vital. While several public awareness studies have been conducted, up to our knowledge, there is no previous studies about awareness of the public about sudden heart death in Saudi Arabia.

Objective of the Study

The aim of this study is to determine the public awareness regards the causes, risk factors, and management of sudden cardiac arrest (SCA), and screening of families at higher risk of sudden cardiac death (SCD) in Saudi Arabia.

Methodology

A cross-sectional study was conducted in different regions of Saudi Arabia from the period of 1 to 30 August 2020 among the general populations of Saudi Arabia in different localities.

Sample size was calculated by using sample size equation through the following formula ($N = (Z\alpha)^2 \times ([p(1-p)]/d^2)$)

Where:

n = Estimated sample size.

Z α at 5% level of significance = 1.96

d = Level of precision and is estimated to be 0.05

p = High awareness levels in two previous studies (30%).

Actual sample size = (Primary sample size \times design effect (estimated to be 1.5) considering target population more than 10000, and study power 95%.

Data was collected by using an online pre-designed self-administered questionnaire distributed via social media network.

The questionnaire included questions about sociodemographic characters of participants such as (age, marital status, educational level, working status), questions about the awareness about sudden cardiac death such as (hearing of sudden cardiac death, knowing the difference between sudden cardiac arrest and heart attacks, symptoms of sudden cardiac arrest) and questions about the family history and management such as (family history of sudden and unexpected death, screening of cardiac disease among families with history of sudden death and knowing how to perform CPR).

A pilot study was conducted on 20 respondents before the beginning of the study period to determine the applicability and adequacy of the questionnaire, further additional modifications will be done after testing, and the questionnaire was re-administered.

Data was analyzed by using statistical package for the social sciences (SPSS, version 23) and results was presented by tabular and graphical presentation according to the study objectives.

Ethical consideration

An ethical approval to conduct this study was obtained from the research ethics committee of the King Fahd Medical City. The questionnaire contains a brief introduction to explain the aim of the study to the participants. Participants was informed that participation is completely voluntary. No names were recorded on the questionnaires. All questionnaires was kept safe.

Results

Table 1 shows gender, age group, educational level, marital status, employment, and suffering from any chronic disease in the studied population. Out of the studied 4309 participants, 68% were females. More than one third were older than 40 years. Most of the studied population were university or higher educated (67.3%). Two thirds were married, and 29.9% were singles. Most of the participants were employed (60.7%). Among suffering from any chronic diseases, 9.8% reported suffering from chronic hypertension, 6.6% reported diabetes mellitus, 9.7% thought they were obese, coronary heart disease and atherosclerosis were reported in 0.8% and 0.6%, respectively. 78.3% of the studied population did not suffer from any chronic diseases.

Variables	Frequency (N = 4309)	Percent
Gender		
Male	1379	32.0
Female	2930	68.0
Age groups		
20 years or less	501	11.6
21 - 30 years	1339	31.1
31 - 40 years	1017	23.6
More than 40 years	1452	33.7
Educational level		
Illiterate	33	.8
Primary	50	1.2
Preparatory	209	4.9
Secondary	1118	25.9
University degree	2899	67.3
Marital status		

Single	1288	29.9
Married	2871	66.6
Divorced	89	2.1
Widowed	61	1.4
Employment		
Employed	1692	39.3
Unemployed	2617	60.7
*Suffering from any chronic disease		
Hypertension	424	9.8%
Diabetes	283	6.6%
Obesity	417	9.7%
Coronary heart disease	33	0.8%
Atherosclerosis	25	0.6%
None	3375	78.3%

Table 1: Socio-demographic characteristics of the participants, KSA, 2020 (N = 4309).

*: There is overlapping.

Table 2 shows the awareness of the participants towards SCD. Most of the respondents (91.8%) have heard about SCA. 78.4% believed that any age group can suffer from SCA, with almost two thirds (62.6%) knowing that it is more prevalent among older age. 35.2% of the participants were not sure if SCA affects the brain. More than half the participants (58.7%) knew the difference between SCA and heart attacks.

Item	True	False	I do not know
Having heard about sudden cardiac arrest.	3956	353	-
	91.8%	8.2%	
Any age group can suffer from sudden cardiac arrest.	3379	227	703
	78.4%	5.3%	16.3%
Sudden cardiac arrest is more prevalent in older age than in young age.	2698	583	1028
	62.6%	13.5%	23.9%
Sudden cardiac arrest affects the brain.	2470	321	1518
	57.3%	7.4%	35.2%
Life style and dietary habits may predispose to sudden cardiac arrest.	2210	1998	101
	51.3%	46.4%	2.3%
There is a difference between sudden cardiac arrest and heart attack.	3653	168	488
	84.8%	3.9%	11.3%
If the answer is true, what is the difference between sudden cardiac arrest and heart attack? (N = 3653)	Frequency (No.)		Percent (%)
Heart attack is more dangerous than sudden cardiac arrest.	320		8.8%
Sudden cardiac arrest always causes death.	1188		32.5%
Sudden cardiac arrest causes loss of consciousness and pulse, while heart attack does not.	2145		58.7%

Table 2: Awareness of the participants towards sudden cardiac death, KSA, 2020 (N = 4309).

Table 3 illustrates the knowledge about causes, signs, symptoms, and screening and management of SCA among the participants. Chest pain and tightness were the most known warning symptoms of SCA; 63% and 57.0% respectively. Vomiting was known by only 9.4%. Around half the respondents knew cessation of pulse and loss of consciousness are immediate symptoms of SCA. 39.3% did not know what causes SCA. Family history of SCD in younger than 50 years old was reported in 19.9%, among which, 25.4% did screening for heart diseases. Most of the participants (75.2%) have heard of CPR, and 34.1% can perform CPR skillfully. 39.5% know the right action if they see a SCA subject. Only 21.6% have heard of AED, and the majority think it is not available in public places in their cities.

Variables	Frequency (N = 4309)	Percent (%)
*What are the warning symptoms of sudden cardiac arrest?		
Tiredness	1187	27.5%
Fainting	1107	25.7%
Decreased conscious level	1592	36.9%
Chest pain	2721	63.1%
Chest tightness	2457	57.0%
Palpitations	1990	46.2%
Vomiting	404	9.4%
*What are the immediate symptoms of sudden cardiac arrest?		
Sudden collapse	1425	33.1%
Cessation of pulse	2216	51.4%
Cessation of breathing	1207	28.0%
Loss of consciousness	2056	47.7%
*What are the causes of sudden cardiac arrest?		
Cardiomyopathies	1535	35.6%
Coronary heart disease	1485	34.4%
Congenital heart diseases	602	14.0%
Arrhythmias	1025	23.8%
Do not know	1695	39.3%
Family history of sudden death younger than 50 years old		
Yes	858	19.9%
No	3451	80.1%
If the answer is yes, screening for heart diseases (N = 858)		
Yes	218	25.4%
No	640	74.6%
Having heard of CPR		
Yes	3242	75.2%
No	1067	24.8%
Ability to perform CPR skillfully		
Yes	1471	34.1%
No	2838	65.9%

Right action if you see someone unconscious and has no pulse		
Performing CPR before calling emergency	2345	54.4%
Calling emergency before performing CPR	1701	39.5%
Waking him up	263	6.1%
*Motive to performing CPR on a SCA victim		
The victim is someone I love	491	11.4%
Knowing that CPR can double a victim's survival chances	2210	51.3%
CPR training is free of charge in my community	386	9.0%
Humanity duty	3137	72.8%
Barriers to performing CPR on a SCA victim		
Concerns about hurting the victim	1699	39.4%
Fear of legal responsibility	800	18.6%
Feeling unconfident of my CPR skills to help	1810	42.0%
Having heard of AED		
Yes	931	21.6%
No	3378	78.4%
AED packages availability in public places of the city		
Yes	443	10.3%
No	2334	54.2%
I do not know	1532	35.6%

Table 3: Knowledge about causes, signs, symptoms and screening and management of sudden cardiac arrest among the participants, KSA, 2020 (N = 4309).

*: There is overlapping.

Discussion

Sudden cardiac death (SCD) is a common and devastating event, often occurring in the prime of life and having profound consequences for surviving members of the individual's family [10]. Death from sudden cardiac arrest remains very common worldwide [11,12]. Cardiac arrest causes 350,000 deaths each year in Europe [13]. In the US, the mortality rate due to cardiac arrest is more than 90%, causing 276,000 deaths annually [14]. SCD continues to be an important public-health problem, largely because the majority of SCDs occur in individuals without previously diagnosed heart disease who do not meet the high-risk criteria defined by clinical trials and cohort studies [15,16]. Sudden cardiac death (SCD) defined as a death due to a cardiovascular cause that occurs within one hour of the onset of symptoms it occurs when the heart stops beating or is not beating sufficiently to maintain perfusion and life [17]. This is across sectional study was conducted among 4309 participants, KSA. The study aimed to determine awareness and knowledge about sudden cardiac death.

According to awareness of the participants towards sudden cardiac death, our study reported that the majority of participants 91.8% had heard of sudden cardiac arrest, 78.4% said that any age group can suffer from sudden cardiac arrest, nearly two third of cases 62.6% agreed that sudden cardiac arrest is more prevalent in older age than in young age. More than half 57.3% think that sudden cardiac arrest affects the brain, 51.3% think that life style and dietary habits may predispose to sudden cardiac arrest and the majority 84.8% agreed that there is a difference between sudden cardiac arrest and heart attack; among them 58.7% said that sudden cardiac arrest causes loss of consciousness and pulse, while heart attack does not, 32.5% said that sudden cardiac arrest always causes death but, 8.8% said that

heart attack is more dangerous than sudden cardiac arrest. Another study reported that most participants differentiated between the terms “Cardiac arrest” and “Heart attack” and the vast majority agreed that cardiac arrest could happen to anyone regardless of age and sex [18]. It is increasingly recognized that SCA is preceded by warning symptoms and signs which, if promptly recognized, could greatly hasten first-response [19]. As regards warning symptoms of sudden cardiac arrest; the majority 63.1% reported chest pain followed by 57% for chest tightness, 46.2% palpitations and 36.9% for decreased conscious level. Other symptoms reported; tiredness, fainting and vomiting. Moreover, there were immediate symptoms of sudden cardiac arrest was mentioned from them cessation of pulse reported by nearly half (51.4%) of participants followed by loss of consciousness, sudden collapse and cessation of breathing. Muller, *et al.* [20] dispatched physicians with SCA emergency teams in Germany to interview survivors or bystanders for antecedent events or symptoms. They concluded that SCA is “not as sudden as typically defined”. Three quarters of patients suffered from identifiable symptoms including angina pectoris and dyspnea. Other study reported that the highest rates for the signs of cardiac arrest were for chest pain (43%), respiratory standstill (39.7%), loss of consciousness (38%) and difficulty breathing (35.7%) [21]. Another study reported; Less than half of participants were able to identify all the presenting signs of cardiac arrest including collapse or fainting, abnormal breathing, and unresponsiveness [18]. The causes for SCA are imprecisely defined and evolving. Coronary artery disease is the most common cause of sudden cardiac death, accounting for up to 80% of all cases. Cardiomyopathies and genetic channelopathies account for the remaining causes [17]. In accordance to this our study reported that 35.6% think that cardiomyopathies as a cause of sudden cardiac death followed by coronary heart disease 34.4%, arrhythmias 23.8% and congenital heart diseases reported by 14% of participants.

CPR knowledge and skills are of great importance to the public and communities, as they are life-saving skills from which all members of society benefit. Regarding to knowledge of participants about CPR; the majority 75.2% had heard of PCR but only, 34.1% had ability to perform CPR skillfully. More than half of subjects 54.4% reported that they will perform CPR before calling emergency as a right action if they see someone unconscious and has no pulse, 39.5% said that they will call emergency before performing CPR and only 6.1% will wake the patients up. Results from another study showed that only 37% of the sample knew how to perform chest compression if they witnessed a sudden cardiac arrest and 74.3% indicated that they could give both chest compression and ventilation, among participants had witnessed a sudden cardiac arrest 42.8% called the ambulance, 20% told someone to call for help, 10% gave chest compression, 10% gave mouth-to-mouth breathing and 8.6% just watched and left [21].

As regard the reasons that motive to performing CPR on a SCA victim; the majority 72.8% reported humanity duty, nearly half of subjects 51.3% said that knowing that CPR can double a victim’s survival chances and 11.4% reported the victim is someone I love as a reason motivate them to performing CPR on a SCA victim. Furthermore, regarding to barriers to performing CPR on a SCA victim; 42% reported feeling unconfident of my CPR skills to help, 39.4% for concerns about hurting the victim and 18.6% reported fear of legal responsibility. Another study found that top motivators to learn CPR were: SCA can happen to anyone, anywhere, anytime-including a loved one (55%), immediate CPR can double or triple survival (52%), and availability of convenient and free CPR training options (49%) and barriers to action which reported include concern about hurting the victim (42%), lack of confidence/competence (40%), liability concerns (34%), and belief someone else would be more competent (34%) [22].

Our study reported that only 21.6% had heard of automated external defibrillator (AED) and more than half (54.2%) reported that AED packages not available in public places of the city. Similar to our results another study reported; there was no familiarity with the term “AED” and with AED use with only 33.9% recognizing what AED actually stands and 16.3% feeling comfortable and capable of applying an AED to a cardiac arrest patient [18].

Conclusion and Recommendations

In our study, most of the respondents (91.8%) have heard about SCA, 58.7% knew the difference between SCA and heart attacks, 34.1% can perform CPR skillfully, 39.5% know the right action if they see a SCA subject. So, we recommend decision makers more health

education sessions to increase the public awareness about this emerging health problem, its causes and risk factors and the right action toward the cases. Also. More detailed large-scale research is needed to find more causes, risk factors and good management of the cases of this catastrophe.

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Conflict of Interest

The authors declared that there was not any conflict of interest.

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