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Knowledge of Non-medical Individuals about Cardiopulmonary Resuscitation in Case of Cardiac Arrest: A Cross-Sectional Study in the Population of Marat City, Saudi Arabia

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Abstract

Introduction: A high-quality cardiopulmonary resuscitation is a fundamental component of initial care, as most sudden cardiac arrests happen at home. The aim of this study is to assess the knowledge and attitude of non-medical people related to cardiopulmonary resuscitation in the case of out-of-hospital cardiac arrest among individuals in Marat City, Saudi Arabia.

Methods: This is a cross-sectional study that included 140 of non-medical individual in Marat city. A self-administered questionnaire was distributed to the participants in order to assess the community's willingness to perform CPR and to determine the barriers towards performing CPR. It consists of 3 sections, the first section questioning about demographic and background variables. The second section is a check list for collecting data about the willingness to perform CPR, while the third section will focus on participants' barriers towards performing CPR. The data were be analyzed to present the findings in the descriptive and inferential statistics at a level of 0.05 significance.

Results: Out of 140 participants, 88 (62.9%) were females with mean age of (28.1 ± 2.4) years. The main manifestation of more than half of the respondents suggested that the main sign of sudden cardiac arrest is chest pain (72.0%). The main feature of consciousness evaluation that was reported by more than two quarters was "no response when called" 77.1%, which is followed by "no response when touched" (52.9%). The main reason that may prevent someone from giving a chest compression to a stranger was reported as "making a mistake" (67.9%) followed by "punishment due to legal reasons" (8.6%). More than half of the sample (61.4%) defined the device defibrillator as It is a device used to restart a heart that has stopped working, while (72.1%) of the sample don't have any idea about where an 'automated external defibrillator' or a 'pacemaker' can be found.

Conclusions: Community knowledge of CPR is limited when compared to neighboring countries' knowledge levels. Furthermore, some false beliefs exist. By generalizing CPR training to the general public, the level of knowledge and awareness of CPR among adults in society can be increased; as a result, the rate of witnesses who begin CPR can be improved.

Keyword: *Knowledge, Cardiopulmonary Resuscitation, Cardiac arrest, Saudi*

Introduction

The incidence of adult non-hospital cardiac arrest is found to be 95.9 cases per 100,000 individuals per year [4, 5]. Every year, sudden cardiac arrest is the leading cause of mortality for millions of people around the world [1]. If cardiac massage is administered effectively until help arrives, it is possible to save the lives of fifty thousand people per year. The beneficial effects of CPR are totally dependent on bystander knowledge and performance in influencing survival odds [2]. Better outcomes are linked to increased public education, enhanced program quality, and public access to automated external defibrillators (AEDs) [3,4,5].

Numerous studies have been undertaken in various community settings to investigate the CPR-related knowledge and training level of people who are not involved in health care. In Turkey, 40.7% of people living in a highly educated region reported having received CPR training and 3.6% had previously performed bystander CPR [2]. This requires an improvement of community awareness about recognizing the signs of cardiac arrest and determining when to start performing CPR. Only 28.7% of respondents in a Saudi survey based in Jeddah said they had ever gotten CPR instruction, compared to 25.6% in China, 29 percent in Jordan, 40.7% in Izmir, and 55.7% in Australia [6,7,8,9,10]. The largest percentages were found in regions where various efforts are being made to enhance CPR training, such as Canada and Germany, with 64 percent and 83.2 percent, respectively [11,12].

In different countries, the proportion and severity of bystander CPR instruction varies. The main reason for the disparity in bystander CPR training between countries is due to differences in education and training systems, such as CPR instruction as part of the middle school curriculum and the acquisition of a driver's license. Respondents are less inclined to perform CPR due to a lack of expertise and confidence, a fear of doing anything wrong, and a fear of legal culpability [6]. The aim of this study is to assess the knowledge and attitude of non-medical

people related to cardiopulmonary resuscitation in the case of out-of-hospital cardiac arrest among individuals in Marat City, Saudi Arabia.

Methods

This is a cross-sectional study that included 140 of non-medical individual in Marat city during the period between April and July 2022. A self-administered questionnaire was distributed to the participants in order to assess the community's willingness to perform CPR and to determine the barriers towards performing CPR. It consists of 3 sections, the first section questioning about demographic and background variables. The second section is a check list for collecting data about the willingness to perform CPR, while the third section will focus on participants' barriers towards performing CPR.

Before filling the questionnaire, the goal of the study was explained and verbal consent was gained from all of the participants in the study. Between April and July 2022. The questionnaire was distributed to residents of Marat, Saudi Arabia, We recruited participants from shopping centers, walkways, parks, coffee shops, and supermarkets to ensure participant diversity. The inclusion criteria were an age of older than or equal to 18 years and Non-medical Individuals. After data collection, The data was entered and analyzed using the SPSS statistical software program version 17. The information was presented using descriptive statistics such as frequencies and percentages. Means and standard deviations were used to present quantitative variables. A p-value of 0.05 was used to determine statistical significance. The subjects were chosen according to the criteria and they were interviewed after their informed consent was obtained to participate in the study. After reassured about their privacy, as any obtained information would be strictly confidential. The data were be analyzed to present the findings in the descriptive and inferential statistics. The descriptive statistics include frequencies and percentages for categorical variables, while means,

median and standard deviations were used to summarize numerical data. The chi-square test was used to detect significant differences in categorical variable, while t-test and ANOVA was used to compare means of continuous variables. The significant associations between demographic and breastfeeding variables was detected at < 0.05 significance level.

Results

Out of 140 participants, 88 (62.9%) were females with mean age of (28.1 ± 2.4) years. The majority of levels of Education in the samples (73.6 %) were university students, and seventy nine (56.4.8%) of the sample were employees (table 1). Table (2) shows knowledge regarding the prodromal symptoms and signs of sudden cardiac arrest. The main manifestation of more than half of the respondents suggested that the main sign of sudden cardiac arrest is chest pain (72.%), followed by difficulty in breathing (59.3%), loss of consciousness (51.4%), and discontinuation of breathing (50.7%). The rest of the manifestations suggested by the respondents to indicate sudden cardiac arrest are presented as a person is not moving (35.7%), faintness of the skin (32.9%), cyanosis (32.1%), discontinuation of circulation (25%), and nausea (8.6%).

The main feature of consciousness evaluation that was reported by more than two quarters was “no response when called” 77.1%, which is followed by “no response when touched” (52.9%). However, more than half (50.7) said the unconscious person should not moving at all. Regarding Respiratory evaluation, the main reported manifestation was “not having any respiratory movement” (70%), followed by “not having any respiratory sound” (57.6%), Then “no coming air out of the mouth of an individual (55%). In the circulation evaluation, about two quarters (65%) revealed not feeling a pulse in the vessels of the neck (table 3). About (87%) haven't seen before sudden death, while (7.9%) witnessed a sudden death of somebody from a family and (5%) was witness a stranger have sudden death. About (13%) of the sample were witnessed a sudden death and (4.3%) of them answered the question of what they do in this

Table (1): Socio demographic characteristics of the studied samples

Characteristics	Studied sample N= 140	
	No	%
Age category:		
From 18 to 25 years	26	18.6%
From 26 to 35 years	55	39.3%
From 36 to 45 years	41	29.3%
From 46 to 55 years	13	9.3%
Above 56 years	5	3.6%
Age: Mean± SD	(28.1 ± 2.4)	
GENDER:		
Male	52	37.1%
Female	88	62.9%
Education Level :		
Not Educate	-	-
Elementary	-	-
Intermediate	1	0.7%
High School	20	14.3%
University Students .	103	73.6%
Post-Graduate	16	11.4%
Occupation:		
Student	19	13.6%
Work	79	56.4%
Unemployed	32	22.9%
Retired	10	7.1%

situation, such as they will call an ambulance, tell somebody to call for help, and call for help by telephone. On the another hand, about (2.9%) said they will give chest compressions and conduct mouth-to-mouth ventilation (table 4).

Table(5) shows attitudes of the participants towards CPR. For those who answered the question “to whom would you apply CPR without hesitation” 133 (95.%) stated a family member, followed by friends (75%), then Neighbour (58.6%). About the question “what would you do in the case of a family member”, the response of “call an ambulance” was selected by (53.6%), and “begin to give a chest compression” was selected by (32.1%), while for the question “call an ambulance” was reported by (57.9%), and ‘begin to give a cardiac chest compression’ was stated by (25%).

Table (2): regarding the prodromal symptoms and signs of sudden cardiac arrest

Symptoms and signs of sudden cardiac arrest	Studied sample N= 140	
	No	%
- Loss of consciousness	72	51.4%
- Discontinuation of breathing	71	50.7%
- Discontinuation of circulation	35	25%
- Cyanosis	45	32.1%
- Nausea	12	8.6%
- Difficulty in breathing	83	59.3%
- Chest pain	101	72.1%
- Faintness of the skin	46	32.9%
- The individual is not moving	50	35.7%

The main reason that may prevent someone from giving a chest compression to either a friend/relative was reported as 'making a mistake' (78.6%) followed by "causing bone fractures" (6.4%). The main reason that may prevent someone from giving a chest compression to a stranger was reported as "making a mistake" (67.9%) followed by ' Punishment due to legal reasons (8.6%).

Among those who answered the question " what is chest compression means" 53.9% reported they would apply strong compression to the chest at certain intervals (compress), while (70.7%) of the sample-reported that they don't know how to give chest compression in the case of cardiac arrest and respiratory standstill. Among participants who answered the question "Have you received any training", 71.4% did not received any training in CPR. About 28.6% of the sample received training in CPR. While was (11.4%) received the training At a course given by the trainers of the ministry of health, followed by about 8.6% received training at university, while those did it during military service was (2.1%) as demonstrated in table 6. For the answer "what BLS

applications can you apply" about 37% reported "don't know" (37.1%). Those who said they can do both ventilate and give chest compression accounted for (21.4%), followed by those who can open the airway (17.9%). About (14%) of the sample was reported The proper rate of chest compression /artificial ventilation during the chest compression (30 compressions/ 2 breaths). More than one-quarter of the sample was reported about areas must chest compression be applied in to be the middle of the chest (38.6%). The answer about the rate of chest compression was reported by (17.1%) as it least 100 compressions per minute. Regarding the sample reported the force that must be applied during chest compression, 46.4% said moderate force as the rib cage moves down 5 to 6 cm. More than half of the sample (61.4%) defined the device defibrillator as It is a device used to restart a heart that has stopped working, while (72.1%) of the sample don't have any idea about where an 'automated external defibrillator' or a 'pacemaker' can be found (table 7).

Discussion

It is very important is learn CPR to save individuals who have cardiac disease. The present study aimed to assess the knowledge and barriers of non-medical people related to cardiopulmonary resuscitation in the case of out-of-hospital cardiac arrest among individuals in Marat City, Saudi Arabia. According to the results we calculated the percentage of non-medical people who had received CPR courses in the past. We found only 40 (28.6%). our rate of training was very lower than that of countries where CPR courses are required. In Slovenia, (69.4%) , (64%) in Australia [14], and (75%) in Poland [13] . These disparate findings of the sample had participated in previous CPR training, which was associated with before obtaining a driver's license or enrolling in certain jobs in countries training during the acquisition of driver's licenses [2].

In our country, at this time, it is not a mandatory requirement, except in very few workplaces. Participants showed some logical awareness of the signs of Sudden Cardiac Arrest. The main manifestations reported as Loss of consciousness,

Discontinuation of breathing, and Discontinuation of circulation were the most common signs of SCA (51.4%, 50.7%, and 25%, respectively). In terms of BLS application, (21.4%) were able to perform both breathing and cardiac compression, which was lower than the results of the Turkish study (28.7%) and the Slovenian study (38%). In comparison, (37.1%) did not know how to perform either of these actions, which was lower than the findings of the Turkish study (38.6 %) and the Slovenian study (45.4 %) [9,5] . Furthermore, when asked about the specifics of breathing and cardiac compression (for example, compression rate, compression force, compression place, and compression to breathing ratio), our study population revealed the same level of knowledge as those in previous studies from other countries, which was very low in general, with a clear significant difference between people who received training versus those who did not receive training. This emphasizes the importance of implementing an immediate intervention to increase knowledge to save as many cardiac arrest patients as possible.

Our findings show that (12.9%) of our population has experienced sudden death, with more than half of those patients being family members (7.9%). Unfortunately, only (2.9%) of these cases initiated CPR. The main reason for not performing CPR (78.6%) is fear of making a mistake, which could be explained by their population's lack of knowledge. Similarly, (18.6%) in the Turkish study reported experiencing a sudden death, and (22%) initiated CPR [9]. A study in Japan found that the main reason behind not conducting CPR was fear of disease transmission (28%) [15]. A large number of participants (95%) report feeling comfortable performing CPR on a member of their family or a stranger (35.7%). Another study conducted in Arizona found that (80%) of participants felt comfortable performing CPR on a member of their family and (50%) felt the same way about a stranger [16]. When we asked our participants about the same situation happening to strangers, the percentage of those willing to start CPR dropped to (35.7%) , though the most common reason remained a fear of performing it incorrectly (67.9 %). However, the fear of legal

problems and disease transmission grew to (8.6% and 5.7 %), respectively. Concerns about making a mistake were the most common reason for unwillingness to perform CPR in the Arizona study (22.8 %), while (17.7 %) were hesitant due to potential legal issues [16]. Again, these findings highlight the importance of developing a solution to increase CPR knowledge and correct existing misconceptions..

Conclusions

Community knowledge of CPR is limited when compared to neighboring countries' knowledge levels. Furthermore, some false beliefs exist. By generalizing CPR training to the general public, the level of knowledge and awareness of CPR among adults in society can be increased; as a result, the rate of witnesses who begin CPR can be increased. Based on these findings we recommend improving the campaigns promoting CPR training. For example, we recommend that schools and universities hold a BLS course every year and make it a requirement. We advise our government makes a BLS course required before obtaining a driver's license or enrolling in some jobs that require contact with other people. We suggest establishing a routine examination of CPR awareness and knowledge, which will assess the benefits of conducting BLS courses and attempt to elucidate the weak points so that future courses can be improved.

Conflict of interests

The authors declared no conflict of interests.

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Table (3): Identification of Cardiac Arrest Findings among the participants

Variables	Studied sample N= 140	
	No	%
<u>Consciousness Evaluation:</u>		
- No response when called	108	77.1%
- No response when touch	74	52.9
- Not moving at all	71	50.7
- I don't know	10	7.1%
<u>Respiratory evaluation:</u>		
- Not having any respiratory movement	98	70
- Not having any respiratory sound	82	57.6
- No coming air out of the mouth of an individual	77	55%
- No steaming up of a mirror placed in front of the mouth of an individual	24	17.1%
- I don't know	10	7.1
<u>Circulation evaluation: :</u>		
- Not feeling a pulse in the vessels of the neck	91	65%
- Not feeling a pulse in the vessels of the arm	68	48.6%
- I don't know	32	22.9%

Table(4): Responses to witnessing a sudden death among the participants

Responses	Studied sample N= 140	
	No=140	%
Witnessed a sudden death:		
- Somebody from my family	11	7.9%
- Somebody from my friends or acquaintances	0	0
- A stranger	7	5%
- I have not seen this	122	87.1%
what did you do in the situation: (N=18)		
- I began to give chest compressions	0	0
- I conducted mouth to mouth ventilation	1	0.7%
- I both gave chest compressions and conducted mouth to mouth ventilation (I gave CPR)	4	2.9%
- I called an ambulance	6	4.3%
- I told somebody to call for help	6	4.3%
- I call for help by telephone	1	0.7%
- I just watched and left		

Table(5): Attitudes towards CPR among the participants

Attitudes	Studied sample N= 140	
	No	%
If somebody from among your family members or friends felt faint (sudden death), what would you do:	133	95%
- Someone from the family	105	75%
- Friend	82	58.6%
- Neighbor	53	37.9%
- A youth in the sports hall	50	35.7%
- A stranger in the supermarket	42	30%
- A person who has poor personal hygiene at the bus stop	32	22.9%
- A gamin who is drug-dependent and uses glue, hashish, and/or heroin		
If somebody from among your family members or friends felt faint (sudden death), what would you do?	45	32.1%
- I would begin to give chest compression	75	53.6%
- I would call an ambulance	20	14.3
- I would call somebody or call for help	0	0
- I would just watch and leave		
If you witness a stranger feeling faint, what would you do?		
- I would begin to give chest compression	35	25%
- I would call an ambulance	81	57.9%
- I would call somebody or call for help	24	17.1%
- I would just watch and leave	0	0
What concerns may prevent you from giving chest compression to your friends or relatives?		
- Making a mistake	110	78.6%
- Causing bone fractures	9	6.4%
- Causing harm to organs	9	1.4%
- Stopping a working heart	9	1.4%
- Punishment due to legal reasons	5	3.6%
- Contamination by blood or vomiting	2	1.4%
- Contracting a contagious disease	4	2.9%
- Other	6	4.3%
What concerns may prevent you from giving chest compression to a stranger?	95	67.9%
- Making a mistake	7	5%
- Causing bone fractures	2	1.4%
- Causing harm to organs	6	4.3%
- Stopping a working heart	12	8.6%
- Punishment due to legal reasons	2	1.4%
- Contamination by blood or vomiting	8	5.7%
- Contracting a contagious disease	8	5.7%
- Other		

Table (6): Knowledge and Training Status about CPR among the participants

Knowledge and training	Studied sample N= 140	
	No	%
What do you think a "chest compression" means?: <ul style="list-style-type: none"> - To scrub the chest at certain intervals - To apply strong compression to the chest at certain intervals (compress) - To scrub the heart direct opening the chest wall - To apply compression directly to the heart opening the chest wall - I have no idea 	13 75 2 5 45	9.3% 53.6% 1.4% 3.6% 32.1%
Do you know how to give chest compression in the case of cardiac arrest and respiratory standstill? <ul style="list-style-type: none"> - No - Yes 	99 41	70.7% 29.3%
Have you received any training? <ul style="list-style-type: none"> - No - Yes 	100 40	71.4% 28.6%
Where? (N=40) <ul style="list-style-type: none"> - At school - At university - During my military service - During the driving school - At a course given by the trainers of the ministry of health - In a sports club - At a course given in the workplace - Television –internet-media 	2 12 3 2 16 1 3 1	1.4% 8.6% 2.1% 1.4% 11.4% 0.7% 2.1% 0.7%

Table (6): Knowledge and skills of conducting a CPR, among the participants

Skills	Studied sample N= 140	
	No=140	%
What BLS applications can you apply?:		
I can open the airway	25	17.9%
I can ventilate/conduct mouth-to-mouth ventilation	14	10%
I can give chest compression	19	13.6%
I can both ventilate and give chest compression	30	21.4%
I do not know	52	37.1%
What is the proper rate of chest compression /artificial ventilation during the chest compression (compressions/ breaths)?		
5/1	64	45.7%
15/2	21	15%
30/2	19	13.6%
Other	36	25.7%
Which of the following areas must chest compression be applied on?		
An upper part of the chest	18	12.9%
Middle of the chest	54	38.6%
A lower part of the chest	21	15%
Other	47	33.6%
What must be the rate of the chest compression?		
At least 150 times per minute	7	5%
At least 100 times per minute	24	17.1%
At least 50 times per minute	36	25.7%
I don't know	73	52.1%
How much force must be applied during chest compression?		
Enough that the rib cage moves down 1 cm to 2 cm	53	37.9%
Moderate force, such that the rib cage moves down 5 to 6 cm	65	46.4%
High force, such that the rib cage moves down 6 cm to 10 cm	3	2.1%
As much force as possible	19	13.6%
What do you know about the device defined as a defibrillator that is used during the chest compression when necessary?		
I have never heard of it	33	23.6%
I have heard of it before but not seen it	23	16.4%
It is a device supporting respiration	19	13.6%
It is a device used to restart a heart that has stopped working	76	61.4%

Do you have any idea about where an 'automated external defibrillator' or a 'pacemaker' can be found?		
I don't know	101	72.1%
Yes	39	27.9%

