Awareness Of Heart Attack Symptoms and Action Toward It Among General Population In Saudi Arabia: A Cross Sectional Study

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ABSTRACT

To assess the level of awareness of heart attack (HA) symptoms and action toward it among the general population in Saudi Arabia. A descriptive cross-sectional study was conducted in Saudi Arabia from September to December 2021. The total number of participants is 10044, individuals who met our criteria (N = 9,536) was selected as study participants, who were residents in Saudi Arabia, aged 18 years and older. An online questionnaire included questions about demographic characteristics, knowledge and awareness of heart attack symptoms and action toward it was distributed through social media. Then, data were entered into the excel sheet, then into the Statistical Package for the Social Sciences for analysis. Knowledge of the participants about HA warning symptoms; only (3.2%) knew the seven symptoms of HA while (24.9%) of respondents only knew one symptom. Regarding the knowledge of the first action towards heart attack; (44.3%) stated that the first action is to call an ambulance. The correct ambulance service number was identified by (53.04%) of respondents. The findings revealed good awareness of the typical HA symptoms only. Generally, participants had poor awareness of recognizing all alarming HA symptoms and appropriate action toward it. Further educational efforts to the community are required to raise awareness, avoid pre-hospital delay, and reducing the mortality rate.

Keywords: Knowledge, awareness, cardiovascular diseases, heart attack, Saudi Arabia.

INTRODUCTION

Cardiovascular diseases (CVDs) are a set of diseases that affect the heart and blood vessels. According to the World Health Organization (WHO), they are still the leading cause of mortality worldwide, with 17.9 million in 2019, or 32 % of all global deaths. 85 % of these deaths are caused by heart attacks and strokes [1]. Furthermore, in Gulf Council countries such as Saudi Arabia, CVD is becoming a significant health concern, where it is estimated to account for more than 45 % of all deaths [2]. The most common CVDs worldwide is myocardial infarction (MI), commonly known as heart attack (HA). It is a serious medical emergency in which the blood supply to the heart is suddenly blocked [3]. According to previous research, more than half of HA deaths occur within one hour of the onset of symptoms before the patient is admitted to a medical facility. Patients delaying calls for an ambulance or transfer to a hospital is known as a pre-hospital delay. This delay may occur due to a lack of awareness of HA symptoms, which raises death rates. Other patients delay due to denial, anxiety, or unwarranted trust in self-administration. A prolonged prehospital delay in receiving emergency medications can seriously affect a patient's prognosis while they are suffering from a HA [4] Research clearly documents that knowledge of warning signs and symptoms of HA can prompt action to seek treatment in a timely manner and help in early detection to decrease mortality and morbidity among those experiencing HAs. The recommended knowledge for HA includes knowing the major warning signs and symptoms of a HA (chest pain or discomfort; pain or discomfort in the arms or shoulder; pain or discomfort in the jaw, neck, or back; feeling weak, lightheaded, or faint; and shortness of breath) and knowing to call 911 if there is a suspected case of HA [5].

Many studies in different countries have explored the awareness of HA warning signs and action toward It. Their results demonstrate inadequate awareness [4,6-9].

We believe that with good education to the community and more efforts to raise public awareness regarding alarming symptoms of HA and the benefit of using ambulance system services, we will have some improvement at the level of public awareness and reduce pre-hospital delay time and therefore reduce death rates of patients with HAs. According to our database search, there are lacking studies in Saudi Arabia regarding public awareness of HA. Given the great importance of the topic, we planned to carry out this study. This study aims to assess the level of awareness of heart attack symptoms and action toward it among the general population in Saudi Arabia.

MATERIALS AND METHOD

A descriptive cross-sectional study was conducted in Saudi Arabia. Data collection started from September to December 2021. All individuals who residents in Saudi Arabia, aged 18

years and older, were eligible to participate, while any healthcare workers, academicians, and students related to any healthcare discipline or who did not speak Arabic were excluded. The participants were selected via a random sampling technique from all five regions of Saudi Arabia (Eastern, Western, Northern, Southern, Central). An online survey was distributed using Google Platform through social media for data collection. While 10044 participants began the online survey, 508 responses were excluded from the data set. A final sample of 9536 individuals was selected as study participants.

The questionnaire was constructed and formulated from relevant literature [4,7] and carefully evaluated by researchers based on the consultation with three experts at Umm Al-Qura university to assess content validity with all suggested modifications were applied after consensus, then the survey was piloted amongst peoples who were not included in the study (n = 18) to assess item's reliability. It was initially drafted in English, then two of the study researchers independently translated it into Arabic. Subsequently, professional linguists performed proofreading to check for errors and inconsistencies carefully.

The questionnaire consists of 19 questions under three main sections. The First section included eight questions about participant's socio-demographic (age, gender, nationality, region, education, marital status, income, and occupation). The second section included eight questions related to participant's awareness about warning signs and risk factors of HA. The third section included three questions related to the appropriate actions toward HA.

Mainly 2 items were used to assess the level of awareness of the warning signs and symptoms of and appropriate action toward HA. With regard to the awareness of the warning signs and symptoms of HA, the participants were asked about 7 signs and symptoms: sudden pain or discomfort in the chest, sudden pain or discomfort in the arms or shoulders, sudden pain in the jaw, neck, or back, abdominal discomfort, sudden shortness of breath, dizziness or syncope, sweating. The overall awareness was obtained using percentage. If it was less than 50% considered to have poor awareness level, if it was 50%-75% considered to have moderate awareness level, and if it was 75% or more considered to have good awareness level. Regarding the awareness of the appropriate action toward HA. Those who answered "call an ambulance" to the question were identified as having good awareness.

Ethical approval was obtained from the biomedical ethics committee, Umm Al-Qura University, Makkah, Saudi Arabia. Ethical approval number: (HAPO-02-K-012-2021-09-761). Participation was voluntary, and informed consent was taken from the study participants after explaining the study objectives. Their information will be kept anonymous and utilized for research purposes only.

For data Analysis We used Microsoft XL spreadsheets to enter the data. Data were uploaded to a Statistical Package for the Social Studies (SPSS) version 28 spreadsheet after checking

for completeness and minor typographical mistakes (IBM, Armonk, NY). Descriptive statistics were expressed as percentages for categorical variables, with a p-value of less than 5% considered significant. The Chi-square test was used to compare categorical variables.

RESULTS

Demographic Characteristics

A total sample of 10044 individuals, of which 508 were healthcare professionals or academicians related to healthcare disciplines, were excluded from the study. The study included 9536 individuals, including 6280 (65.1%) women and 3256 (34.1%) men. Table 1 shows that the largest group of respondents 4543 (47.6%) were 18–25 years old. In addition, 3063 (32.1%) of respondents were from the western region of Saudi Arabia, and 5249 (55%) of them had a bachelor's degree. Furthermore, 3858 (40.5%) of the respondents were employed, and 3031 (31.8%) of the respondents were unemployed. We divided nationality into Saudi and non-Saudi groups; the majority of respondents were Saudi 8891 (93.2%). Most of the respondents 4498 (47.2%) had monthly incomes of more than 10,000 SR ($\approx$USD 2665). Additionally, approximately 703 (7%) had a past medical history of HA.

Table 1: Demographic characteristics of respondents

	category	Frequency (%)
Age (year's)	18 - 25	4543 (47.6)
	26-39	2500 (26.2)
	40 and above	2493 (26.1)
Gender	Male	3256 (34.1)
	Female	6280 (65.9)
Nationality	Saudi	8891 (93.2)
	Non-Saudi	645 (6.8)
Region	Western Region	3063 (32.1)
	Eastern Region	1231 (12.9)
	Northern Region	1629 (17.1)
	Southern Region	1753 (18.4)
	Central Region	1860 (19.5)
Education	postgraduate degree (PhD, Master)	476 (5)
	bachelor's	5249 (55)
	Diploma	944 (9.9)
	High school	2419 (25.4)
	Middle school	302 (3.2)
	Primary school	84 (0.9)
	Others	62 (0.7)
Marital status	Single	4858 (50.9)
	Married	4217 (44.2)
	Divorce	291 (3.1)
	widow	170 (1.8)
Monthly Income	Less than 5,000 SR ($\approx$USD 1332)	1840 (19.3)
	5000-10,000 SR ($\approx$USD 1332- 2665)	3198 (33.5)
	More than 10,000 SR ($\approx$USD 2665)	4498 (47.2)
Occupation	Employed	3858 (40.5)
	Unemployed	3031 (31.8)

	Student	2375 (24.9)
	Retired	272 (2.9)
Past medical history of HA	Yes	703 (7.4)
	No	8833 (92.6)

Awareness of each symptom of heart attack

Awareness of HA according to socio-demographic characteristics is shown in Table 2. The majority of respondents (75.2%) recognized sudden pain or discomfort in the chest as HA symptoms, followed by shortness of breath (66.2%), sudden pain or discomfort in the arms or shoulders (44,6%), and syncope or dizziness (39.5%). On the other hand, the lowest percentage of the respondents (9.5%) recognized abdominal discomfort as HA symptoms. Overall, the chi-square test showed that respondents who were married had better awareness of sudden pain or discomfort in the chest than others (p = <0.001) and sudden shortness of breath (p = <0.001). In addition, respondents from the Western region reported greater awareness of sudden pain or discomfort in the chest, sudden pain or discomfort in the arms or shoulders, and sudden shortness of breath compared to others (p = 0.001 and less). However, respondents from the Eastern region showed better awareness of syncope or dizziness and sweating than did individuals of others (p = <0.001), while the Southern region demonstrated higher awareness of abdominal discomfort and sudden pain in the jaw, neck, or back than did individuals of other regions (p = 0.001; p = <0.001).

Table 2: Awareness of each symptom of heart attack

	Percentage % of Answer Yes						
	Characteristics	Abdominal discomfort	Sweating	Sudden Pain in the Jaw, Neck, or Back	Dizziness or syncope	Sudden pain in the arms or shoulder	Sudden shortness of breath	Sudden pain or discomfort in the chest
	Total	9.6	35.8	15	39.5	44.6	66.2	75.2
Age (years)	18–25	10.6	35	14.9	45.9	37.8	67.3	75.5
	26–39	8.4	34.2	13.7	37.7	46.5	64.1	75
	40 and above	9.6	35.8	16.3	29.6	55.1	66.2	74.8
	p-value	0.004	<0.001	0.032	<0.001	<0.001	0.027	0.798
Gender	Male	9.9	32.4	14.6	38.7	39.4	59.2	70.3
	Female	9.4	37.6	15.1	39.9	47.2	69.8	77.7
	p-value	0.441	<0.001	0.486	0.242	<0.001	<0.001	<0.001
Nationality	Saudi	9.7	36.1	15.1	39.6	45.1	66.6	75.6
	Non-Saudi	8.5	31.9	13.2	38.1	36.7	60.3	68.8
	p-value	0.368	0.034	0.208	0.479	<0.001	0.001	<0.001
Region	Western Region	9.5	37.1	14.6	39.2	48.8	67.3	78.9
	Eastern Region	8.7	40.4	14.2	41.2	43.8	66	77.4
	Northern Region	9.1	31	13.1	35.8	42.2	62.1	72.1
	Southern Region	12.1	33.5	18.1	44	42.1	68.3	71.6
	Central Region	8.3	37.1	14.6	37.8	42.4	66	73.5
	p-value	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Education	postgraduate degree (PhD, Master)	13	45.6	21.2	37.2	59.5	68.9	75.4
	bachelor's	8.4	37.5	14.3	37.7	47.6	68.3	78.5
	Diploma	8.3	32.2	12.6	35.5	41	62.6	70.2
	High school	11.7	33.6	15.9	44.9	38.2	64.4	73
	Middle school	9.3	28.5	14.6	43.4	40.1	56.6	62.3
	Primary school	15.5	20.2	19	41.7	23.8	54.8	52.4
	Others	12.9	19.4	16.1	30.6	25.8	53.2	43.5
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Marital status	Single	10.3	35.6	14.6	44.1	39.1	66.4	75.6
	Married	8.4	36.2	14.6	34.9	50.2	67.2	76.4

	Divorce	15.1	36.4	22.3	34.7	52.2	58.8	64.9
	Widow	9.6	31.8	22.4	31.8	50	48.2	48.8
	p-value	<0.001	0.67	<0.001	<0.001	<0.001	<0.001	<0.001
Monthly Income	Less than 5,000	12.4	33	14.7	42	36.5	64.2	70.6
	5,000–1,0000	8.8	31.8	14.2	39.7	42	64.6	73.9
	More than 10,000	9	39.9	15.6	38.3	49.8	68.1	22.1
	p-value	<0.001	<0.001	0.193	0.021	<0.001	<0.001	<0.001
Occupation	Employed	9.1	34.6	16.2	36.2	47.5	62.5	71.5
	Unemployed	10.6	35.3	15	40.1	44.7	68.1	76.6
	Student	9.5	37.5	12.7	45.7	37.6	69.8	79.4
	Retired	6.3	44.1	15.8	25	62.5	65.8	73.9
	p-value	0.53	0.003	0.002	<0.001	<0.001	<0.001	<0.001
Past medical history of HA	Yes	15.1	35.3	21.9	34	50.4	59	66.6
	No	9.2	35.9	14.4	39.9	44.1	66.7	75.8
	p-value	<0.001	0.755	<0.001	0.002	0.001	<0.001	<0.001

Table 3: Knowledge of the participants about heart attack and appropriate action (calling an ambulance)

	Category	Frequency (%)
Heard about HA	Yes	8600 (90.2)
	No	936 (9.8)
History of HA among relatives, acquaintances, or neighbors	Yes	4140 (43.4)
	No	5396 (56.6)
Being aware HA requires prompt treatment	yes	9018 (94.6)
	No	518 (5.4)
Being aware of ambulance number	Yes	5058 (53.04)
	No	4478 (46.96)
Received any information related to HA	Yes	4223 (44.3)
	No	5313 (55.7)
	Health care professionals	954 (12.9)
	Television	1498 (20.2)
	Books	734 (9.9)
Source of information *	Social media	2433 (32.9)
	Promotional leaflets	916 (12.4)
	Seminars	589 (8)
	Others	276 (3.7)

Knowledge of heart attack and appropriate action (calling an ambulance)

The majority of respondents 8600 (90.2%) had heard about HA, being aware HA requires prompt treatment 9018 (94.6%), whereas only 4223 (44.3%) received information related to HA (Table 3). The majority of respondents received information from social media 2433 (32.9%), followed by television 1498 (20.2%), health care professionals 954 (12.9%). Furthermore, 5058 (53.04%) of respondents identified the correct number to call an ambulance. The participants stated that the first actions to take for someone having a HA are to call an ambulance 4226 (44.3%), followed by putting them on their back, opening their collar, and raising their feet 1824 (19.1%), taking them to the nearest hospital 1548 (16.2%) and perform CPR 759 (8%) (Figure 1).

Table 4 shows that participants knew the seven symptoms of HA were 303 (3.2%), furthermore 2379 (24.9%) of respondents only knew one symptom. The largest group of respondents were aware of hypertension as a risk factor 6616 (69.4%), followed by smoking 5644 (59.2%), obesity 5405 (56.7%), on the other hand, only 1862 (19.5%) identify physical inactivity as a risk factor of HA.

Table 3 * According to responses

Table 4: Knowledge of the participants about heart attack warning symptoms, signs, and risk factors

Response n (%)	n	(%)
Awareness of HA symptoms by the number of the symptoms		
1	2379	24.9
2	1624	17

3	2585	27.1
4	1709	7.9
5	703	7.4
6	233	2.4
7	303	3.2
Risk factors		
Stress	2648	27.8
Smoking	5644	59.2
Poor nutrition/eating fatty foods	4556	27.8
Obesity	5405	56.7
Hypertension	6616	69.4
Alcohol use	3534	37.1
High cholesterol	4703	49.3
Genetic tendency	3421	35.9
Physical inactivity	1862	19.5
Diabetes mellitus	3062	32.1
Older age	2379	24.9
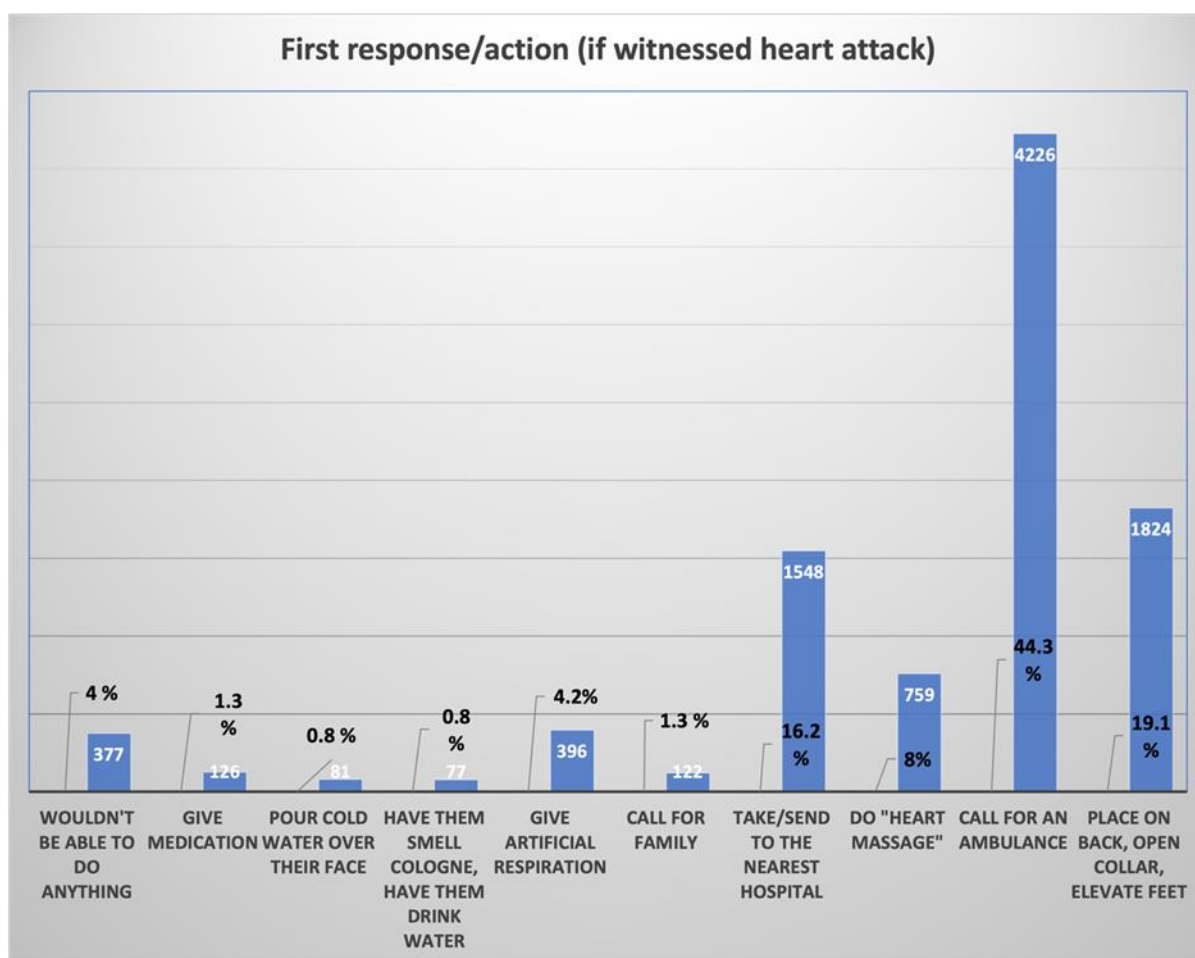
Figure 1: First response/action (if witnessed heart attack)

DISCUSSION

More than half of HA mortality occurs within the first hour of the onset of symptoms before the patient's admission to a medical facility. Patients delaying calls for an ambulance or transfer to a hospital is known as pre-hospital delay. This delay may occur due to a lack of awareness of HA symptoms, which raises death rates. The current research was conducted

among the general population in Saudi Arabia to assess the level of awareness of HA symptoms, risk factors, and action toward it, and determine the factors affecting public awareness of HA.

The majority of respondents 90.2% had heard about HA, 7.4% of participants had a past medical history of HA, and 56.6% had a history among relatives, acquaintances, or neighbors. 94.6% aware that HA requires prompt treatment. Only 44.3% had received information related to HA. Regarding the source of the received information, the majority of respondents received information from social media 32.9%; this was followed by television 20.2%, Health care professionals 12.9%.

This research's results reported a high level of awareness of the typical symptoms of HA, such as sudden pain or discomfort in the chest 75.2% and shortness of breath 66.2%. Additionally, it reported a lesser level of awareness of the typical symptoms, such as sudden pain or discomfort in the arms or shoulders 44.6% and syncope or dizziness 39.5%. Moreover, it reported the least level of awareness for abdominal discomfort 9.5%. Only 3.2% of participants knew all symptoms of HA. These results are not consistent with the results of another study conducted among the lay public in Kuantan, Pahang, Malaysia [4], to assess their awareness of, and action taken in response to, the signs and symptoms of a HA. Malaysians showed lower awareness of the typical HA symptoms, such as chest pain, dyspnea, and weakness or dizziness. Similarly, the awareness of atypical symptoms, such as sudden pain or discomfort in the jaw, neck, or back and sudden pain or discomfort in the arm or shoulder was low.

Regarding the awareness of the appropriate action toward HA in this study in Saudi Arabia, which is calling the ambulance was answered correctly by only 44.3%, approximately less than half of the participants. These findings, when compared with a study conducted among the Turkish population to determine the level of knowledge and awareness of risk factors and warning signs of HA [7]. Which reported that the Turkish population has lower awareness as 22.2% of individuals thought about calling an ambulance as a first action. While the Malaysians study reported the awareness of the appropriate action to call an ambulance (through 999) was very low as 35.6% of their population choose to call the ambulance as a first action [4]. While when compared to another study conducted in US [10] which showed a good awareness level, more than 95% of individuals chose to call an ambulance as a first action. This high level of knowledge due to the substantial efforts of the American Heart Association, the US Department of Health and Human Services, the National Heart, Lung, and Blood Institute, and the US centers for disease control and prevention to improve awareness of MI symptoms by initiatives, awareness campaigns and courses.

Furthermore, 53.04% of respondents in this Saudi study identified the correct number to call an ambulance. It is necessary to know the appropriate actions in the case of HA, but it is not adequate to avoid prehospital delay. 24.9 % of the participants in this Saudi study only know one symptom of HA. People who have lack awareness of the symptoms of HA may respond slowly in seeking medical care even if they know the first appropriate actions.

Another component of HA awareness is knowledge about the risk factors; the largest group of participants were aware of hypertension as a risk factor 69.4%, this was followed by smoking 59.2%, obesity 56.7%, and only 19.5% were aware of physical inactivity as a risk factor. When compared to the Turkish study [7], 65.6% of participants ranked stress as a risk factor, followed by smoking 23.0%, and poor nutrition/ eating fatty foods 12.6%.

Regarding the relationship between sociodemographic characteristics and the level of awareness, results showed that married respondents had better awareness of sudden pain or discomfort in the chest than others. Additionally, respondents from Western region reported greater awareness of sudden pain or discomfort in the chest, sudden pain or discomfort in the arms or shoulders, and sudden shortness of breath compared to others. However, respondents from Eastern region showed better awareness of syncope or dizziness and sweating than others. In comparison, the Southern region demonstrated higher awareness of abdominal discomfort and sudden pain in the jaw, neck, or back than individuals of other regions.

The level of awareness for each individual about HA symptoms and the first action toward it makes a massive difference in the speed of the patient's arrival to the hospital; hence, the needed intervention will be initiated rapidly as the patient with HA arrives early. Lack of awareness of the first action toward patients with a HA in this study demonstrates that society needs to increase the number of individuals trained in cardiopulmonary resuscitation (CPR) by conducting more CPR courses for employees in their workplaces and university and school students.

Although many people are aware of some symptoms of HA, such as sudden chest pain or discomfort 75%, Sudden shortness of breath 66.2%, and sudden pain in the arms or shoulders 44.7%, However, a minimal number recognize all the symptoms of a HA, which indicates that society needs to raise awareness about HA, its typical and atypical symptoms, and how to deal with it; because it is essential for each individual to be aware of all symptoms of HA, so we suggest to arrange health promotion programs and campaigns in all the five regions in Saudi Arabia to increase public awareness of HA, and it's risk factors.

Strength and Limitations

A few limitations of this study have been confined to two points:

First, there is a significant difference between males and females, as the majority were females. Second, the data in this study was self-reported, resulting in various levels of

credibility. This study is the first study on awareness of HA symptoms and the first action toward it in Saudi Arabia with this vast sample size (n=10044).

CONCLUSION

The study assesses the awareness of HA symptoms, risk factors, and action toward it. The findings revealed a high level of awareness of the typical HA symptoms only. However, there is a deficient in recognizing all HA symptoms. Although, low level of awareness of the appropriate first step to take in the event of a HA, which is calling an ambulance. Further educational efforts are required to avoid increasing mortality and morbidity; It is critical to improving awareness and response to indicators of HA.

AUTHOR CONTRIBUTION

Dr. Abdulhalim Serafi, the lead author of the manuscript, was actively involved in the conception and execution of this project. In addition, all authors have actively participated in recommendation generation, conducting the literature review, and contributing to the manuscript's development, review, and finalization.

ABBREVIATION LIST

(CVDs) Cardiovascular diseases

(MI) Myocardial infarction

(HA) Heart attack

(US) United States

(CPR) Cardiopulmonary resuscitation

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