Evaluation and Assessment of Community Awareness About Coronary Artery Disease in the Aseer Region

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Abstract

Background
Coronary artery disease (CAD), a severe cardiovascular disorder, still remains the major reason for death among adults. In Saudi Arabia, the most common risk factors noticed were hypertension, diabetes, smoking, and dyslipidemia. To date, various therapies have been used for managing CAD, but primary prevention remains the cornerstone to reducing the incidence of CAD-linked mortality and morbidity. The present research aimed to evaluate public awareness levels about CAD in the Aseer region of Saudi Arabia.

Materials and methods
A structured questionnaire was used to assess the demographic variables, information regarding risk factors, and knowledge and awareness about CAD. To analyze the knowledge and awareness of the general population regarding CAD, 26 well-constructed questions were framed and asked. General characteristics like knowledge, awareness, risk factors, signs and symptoms, complications, effects, treatment, and prevention of CAD were recorded by asking questions with different options. The data obtained were then subjected to statistical analysis using SPSS version 20.0 software (IBM Corp., Armonk, NY).

Results
Out of 651 participants, 66.51% were males and 33.48% were females, and 36.40% were aged between 26 and 35 years. Of the participants, 14.13% had a positive family history of CAD, 66.05% had inactive lifestyle habits, and 59.60% did not report any stress. A total of 61.29% were unaware of CAD, but many of them were aware of the risk factors, symptoms, and complications of the disease. A total of 5.529% were suffering from CAD, with a time period of less than one year. Only 1.84% of participants were taking medicines for CAD.

Conclusion
Our study suggested that the community of the Aseer region of Saudi Arabia has meager knowledge and awareness about CAD. Westernized lifestyles and urbanization have caused poor physical well-being in people, leading to increased risk factors for CAD. Thus, we suggest that different educational public health awareness programs should be implemented by the Ministry of Health, Saudi Arabia to decrease the prevalence of these life-threatening diseases.

Categories: Cardiology, Internal Medicine, Medical Education
Keywords: knowledge, awareness, saudi arabia, aseer, coronary artery disease

Introduction
Noncommunicable diseases (NCDs) accounted for the primary reason of mortality worldwide, with about 71% death rate, among which cardiovascular disease (CVD) has been reported to be the main cause [1]. It has been found that CVD leads to 17.9 million deaths worldwide, out of which coronary artery disease (CAD) was liable for 7.4 million (41.3%) deaths worldwide [2].

In 2018, the World Health Organization (WHO) estimated that countries of the Gulf Cooperation Council (GCC), i.e., Oman, Saudi Arabia, United Arab Emirates, and Kuwait, accounted for 36%, 57%, 40%, and 41%, respectively, contributing the maximum fraction of mortality worldwide because of CVD [2]. Among Middle Eastern countries, the prevalence of CAD was estimated between 5.6% and 13.4% [3]. In Saudi Arabia, the CAD prevalence rate is 5-6% [4]. This high prevalence is because of increased urbanization, rapid socioeconomic growth, a sedentary lifestyle, and increased fast food intake [5].

CAD, a severe cardiovascular disorder, affects about one-third of middle-aged women and 50% of middle-
aged men in developed nations [6]. Despite the reduced rate of mortality with CAD, it still remains the major reason for death among adults (>35 years of age) [6].

Various risk factors have been identified leading to CAD such as obesity, diabetes mellitus, smoking, hypertension, stress, dyslipidemia, sedentary lifestyle, fast food intake, old age, and positive family history [7]. In countries of the Middle Eastern region, including Saudi Arabia, the most common risk factors noticed were hypertension, diabetes, smoking, and dyslipidemia [8]. The age group at highest risk was observed to be a decade younger than the mean age (55-63 years) for the disease worldwide [8].

To date, various therapies have been used for managing CAD, but still, prevention remains the cornerstone to reducing the incidence of CAD-linked mortality and morbidity. For preventing the risk factors of CAD, the general public should have adequate knowledge and awareness about the disease. The present research aimed to evaluate public awareness levels about CAD in the Aseer region of Saudi Arabia.

Materials And Methods
The present cross-sectional study was a questionnaire-based study conducted from April 2021 to August 2021. A structured questionnaire was used to assess the demographic variables, information regarding risk factors, and knowledge and awareness about CAD. The validity of the questionnaire was assessed and found to be appropriate (α = 0.84). The study was conducted in accordance with the Declaration of Helsinki and was approved by the Research Ethics Committee of King Khalid University (approval number: ECM 2021-4908). Informed written consent was obtained from all the study subjects prior to their enrolment in this study. The demographic data collected were gender, nationality, area of living, age, education, occupation, marital status, history of smoking, diabetes, hypertension, obesity, and dyslipidemia.

To analyze the knowledge and awareness of the general population regarding CAD, 26 well-constructed questions were framed and asked. The response to all these questions was recorded. General characteristics like knowledge, awareness, risk factors, signs and symptoms, complications, effects, treatment, and prevention of CAD were recorded by asking questions with different options.

The data obtained were then subjected to statistical analysis using IBM SPSS version 20.0 software (IBM Corp., Armonk, NY). Descriptive statistics, i.e., frequencies and percentages, were computed. The comparative analysis was done using chi-square statistical analysis.

Results
Demographic data were recorded in terms of gender, nationality, region of living, age, education, occupation, marital status, history of smoking, diabetes, hypertension, obesity, dyslipidemia, and place of residence (Table 1).

| Demographic parameters (n = 651) | Frequency | Percentage | Chi-square | P-value |
|---------------------------------|-----------|------------|------------|---------|
| Gender                          |           |            |            |         |
| Male                            | 433       | 66.51306   | 23.923     | 0.012*  |
| Female                          | 218       | 33.48694   |            |         |
| Nationality                     |           |            |            |         |
| Saudi                           | 604       | 92.78034   | 18.651     | 0.001*  |
| Non-Saudi                       | 47        | 7.219662   |            |         |
| Region of living                |           |            |            |         |
| Aseer Region                    | 618       | 94.93088   |            |         |
| Central Region                  | 15        | 2.304147   |            |         |
| North Region                    | 5         | 0.768049   | 11.81      | 0.034*  |
| South Region                    | 5         | 0.768049   |            |         |
| East Region                     | 3         | 0.460829   |            |         |
| West Region                     | 5         | 0.768049   |            |         |
| Age groups                      |           |            |            |         |
| 18-25                           | 164       | 25.19201   |            |         |
| 26-35                           | 237       | 36.40553   |            |         |
| 36-45                           | 170       | 26.11367   | 29.971     | 0.013*  |
| 46-55                           | 52        | 7.987711   |            |         |
| 56-65                           | 28        | 4.301075   |            |         |
| Education          |          |          |        |       |
|--------------------|----------|----------|--------|-------|
| College/university | 346      | 53.149   |        | 0.05* |
| Middle school      | 46       | 7.066052 |        |       |
| High school        | 228      | 35.02304 | 25.615 |       |
| Elementary         | 16       | 2.457757 |        |       |
| Illiterate         | 15       | 2.304147 |        |       |
| Middle school      | 46       | 7.066052 |        |       |
| High school        | 228      | 35.02304 |        |       |
| Elementary         | 16       | 2.457757 |        |       |
| Illiterate         | 15       | 2.304147 |        |       |
| Occupation         |          |          |        |       |
| Student            | 177      | 27.18894 |        |       |
| Civilian job       | 272      | 41.78187 |        |       |
| Businessman        | 1        | 0.15361  |        |       |
| Health practitioner| 28       | 4.301075 |        |       |
| Housewife          | 4        | 0.614439 | 72.817 | 0.037*|
| Military           | 143      | 21.96621 |        |       |
| Private sector     | 3        | 0.460829 |        |       |
| Retired            | 9        | 1.382488 |        |       |
| Unemployed         | 14       | 2.150538 |        |       |
| Marital status     |          |          |        |       |
| Married            | 381      | 58.52535 |        |       |
| Single             | 198      | 30.41475 | 17.003 | 1.819 |
| Divorced           | 72       | 11.05991 |        |       |
| Smoking            |          |          |        |       |
| Yes                | 224      | 34.4086  | 38.716 | 0.034*|
| No                 | 427      | 65.5914  |        |       |
| Diabetic           |          |          |        |       |
| Yes                | 129      | 19.81567 |        |       |
| No                 | 453      | 69.58525 | 29.887 | 0.04* |
| Don’t know         | 69       | 10.59908 |        |       |
| Hypertension       |          |          |        |       |
| Yes                | 115      | 17.66513 |        |       |
| No                 | 388      | 59.60061 | 37.525 | 0.005*|
| Don’t know         | 148      | 22.73425 |        |       |
| Obesity            |          |          |        |       |
| Yes                | 112      | 17.2043  |        |       |
| No                 | 392      | 60.21505 | 32.81  | 0.002*|
| Don’t know         | 147      | 22.58065 |        |       |
| Dyslipidemia       |          |          |        |       |
| Yes                | 104      | 15.97542 |        |       |
| No                 | 360      | 55.29954 | 28.001 | 0.02* |
| Don’t know         | 187      | 28.72504 |        |       |
| Region of living   |          |          |        |       |
| Low altitude       | 327      | 50.23041 | 36.817 | 1.771 |
| High altitude      | 324      | 49.76959 |        |       |
| Where do you live? |          |          |        |       |
| Non-urban area     | 172      | 26.42089 | 26.918 | 0.033*|
| Urban area         | 479      | 73.57911 |        |       |

**TABLE 1: Demographic variables and comorbidity status of patients**

* P-value < 0.05 is significant.

A total of 651 participants were included in the study, with 66.51% males and 33.48% females, having a
statistically significant difference ($p < 0.05$). Of the participants, 92.78% belonged to Saudi Arabia, and 94.93% were from the Aseer region. Most of them belonged to urban areas, with no difference in the altitude of the region. Maximum (36.40%) subjects were aged 26–35 years and the minimum subjects were aged 56–65 years. Maximum subjects (53.14%) were with academic qualification of a diploma, and the minimum subjects were uneducated, with a statistically significant difference. Most of the participants (41.78%) were doing civilian jobs, with the maximum having married marital status. Regarding the habit of smoking, 65.59% were non-smokers, with a statistically significant difference. Maximum participants had a negative history of various systemic diseases, including diabetes, hypertension, obesity, and dyslipidemia, with statistically significant differences ($p < 0.05$).

Table 2 shows the responses to 26 questions asked to access the knowledge and related factors observed among the general population for CAD. The participants who were having diabetes, hypertension, and dyslipidemia were asked about the time of occurrence and duration of the disease. It was observed that the most common time period they encountered diabetes, hypertension, and dyslipidemia was one to three years, four to six years, and one to three years, respectively, with a statistically insignificant difference ($p > 0.05$). Of the participants, 14.15% had a positive family history of CAD, and 86.32% of participants had a negative history of chronic kidney disease, with a maximum duration of one to three years. Of the participants, 66.05% had inactive lifestyle habits, and 59.60% did not have any stress. It was found that 61.29% were unaware of CAD. But many of them were aware of gender predilection, risk factors, symptoms, and complications of the disease. In our study, 5.52% were suffering from CAD, with a time period of less than one year. Only 1.84% of participants were taking medicines for CAD.

| Questions                        | Frequency | Percentage | Chi-square | P-value |
|----------------------------------|-----------|------------|------------|---------|
| For how long do you have diabetes? |           |            |            |         |
| <1 year                          | 10        | 1.536098   |            |         |
| 1-3 years                        | 31        | 4.761905   |            |         |
| 4-6 years                        | 29        | 4.454685   | 27.619     | 0.064   |
| 7-9 years                        | 12        | 1.843318   |            |         |
| >10 years                        | 15        | 2.304147   |            |         |
| <1 year                          | 10        | 1.536098   |            |         |
| 1-3 years                        | 19        | 2.918587   |            |         |
| 4-6 years                        | 30        | 4.608296   | 29.662     | 0.071   |
| 7-9 years                        | 8         | 1.228879   |            |         |
| >10 years                        | 6         | 0.921659   |            |         |
| For how long do you have hypertension? |         |            |            |         |
| <1 year                          | 20        | 3.072197   |            |         |
| 1-3 years                        | 28        | 4.301075   |            |         |
| 4-6 years                        | 23        | 3.533026   | 19.001     | 0.067   |
| 7-9 years                        | 8         | 1.228879   |            |         |
| >10 years                        | 2         | 0.30722    |            |         |
| For how long do you have dyslipidemia? |         |            |            |         |
| <1 year                          | 92        | 14.1321    |            |         |
| Yes                              | 92        | 14.1321    |            |         |
| No                               | 558       | 85.71429   |            |         |
| Don't know                       | 1         | 0.15361    | 22.410     | 0.017*  |
| Family history of coronary artery disease? |         |            |            |         |
| Yes                              | 89        | 13.67127   | 41.918     | 0.016*  |
| No                               | 562       | 86.32873   |            |         |
| Chronic kidney disease?          |           |            |            |         |
| <1 year                          | 3         | 0.460829   |            |         |
| 1-3 years                        | 29        | 4.454685   |            |         |
| 4-6 years                        | 18        | 2.764977   | 12.881     | 0.07    |
| 7-9 years                        | 4         | 0.614439   |            |         |
| >10 years                        | 3         | 0.460829   |            |         |

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| Question                                                                 | Yes     | No      | p-value |
|------------------------------------------------------------------------|---------|---------|---------|
| Active lifestyle                                                       | 221     | 430     | 0.032*  |
| Do you have any psychosocial stress?                                   | 263     | 388     | 0.031*  |
| Do you have any idea about coronary artery disease?                    | 252     | 399     | 0.045*  |
| How do you define coronary artery disease (CAD)?                       |         |         |         |
| It is fluid accumulating in the pericardium preventing the heart from doing complete pumping | 36      | 5.529954|         |
| A mismatch between blood supply and metabolic demand of cardiac muscles mostly due to the narrowing of blood vessels | 118     | 18.12596| 0.05*   |
| Do you have any idea about coronary artery disease?                    |         |         |         |
| It is the closure of one or more of the cardiac chambers either atria or ventricles | 83      | 12.74062|         |
| It is an irregular heart rate due to different causes                   | 32      | 4.915515|         |
| Which gender is more prone to coronary artery disease?                 |         |         |         |
| Male                                                                   | 196     | 30.1075 |         |
| Female                                                                 | 132     | 20.2765 | 0.037*  |
| Which one of the following do you think is the most common cause of coronary artery disease in our society: |         |         |         |
| Sedentary lifestyle                                                    | 229     | 35.17665|         |
| Nosocomial cause                                                       | 197     | 30.26114|         |
| Aortitis                                                               | 176     | 27.03533|         |
| Connective tissue disorder                                             | 49      | 7.526882|         |
| Which one of the following do you think is a risk factor for coronary artery disease? |         |         |         |
| Male                                                                   | 184     | 28.26421|         |
| Positive family history                                                | 319     | 49.00154|         |
| Dyslipidemia                                                           | 123     | 18.89401|         |
| Diabetes                                                               | 83      | 12.74062|         |
| Hypertension                                                           | 219     | 33.64055|         |
| Age above 45                                                           | 83      | 12.74062|         |
| Smoking                                                                | 42      | 6.451613|         |
| Obesity                                                                | 35      | 5.376344|         |
| Alcohol                                                                | 30      | 4.608295|         |

*Significant at p < 0.05
Illicit drugs 15 2.304147
Sedentary lifestyle 53 8.141321
Female gender 153 23.5023

Do you think when you take a cholesterol-lowering drug it makes you eat as you want a fatty meal? Yes 152 23.34869 26.910 0.031*
No 499 76.65131

Do you think most coronary artery disease patients need surgery? Yes 234 35.9447 23.001 0.041*
No 417 64.0553

Complications of coronary artery disease include
- Heart failure 329 50.53763
- Arrhythmia 103 15.82181
- Stroke 155 23.80952
- Asthma 30 4.608296 31.118 0.026*
- Pericarditis 63 9.677419
- Meningitis 43 6.605223
- No major complication 68 10.44547

Do you think that coronary artery disease patients after being managed as per guidelines have a good prognosis? Yes 136 20.89094 22.817 0.003*
No 515 79.10906

Do you have coronary artery disease? Yes, I have 36 5.529954 31.715 0.042*
No, I do not have 615 94.47005
<1 year 11 1.689708
1-3 years 10 1.536098
4-6 years 5 0.768049 12.615 0.071
7-9 years 3 0.460829
>10 years 1 0.15361

For how long do you have coronary artery disease? Are you taking heart disease medication? Yes 12 1.843318 31.601 0.005*
No 639 98.15688

**TABLE 2: Response to questions**

* P-value < 0.05 is significant.

**Discussion**

A limited number of studies have been found in the literature on the awareness and knowledge of CAD among the community of Saudi Arabia. The purpose of this study was to evaluate the public awareness levels of CAD in the Aseer region of Saudi Arabia. We observed male predominance in our study, with most of the subjects belonging to the urban population and those who were in college or completed college. Similar results were observed in a previous study [5], in which it was observed that most of the participants were college-going students.

We observed that although 14.13% of participants had a positive family history of CAD (e.g. diabetes mellitus, hypertension, obesity, and dyslipidemia), still participants were not aware of any precautions regarding the control of risk factors of CAD. Still, 66.05% had inactive lifestyle habits and 61.29% were unaware of CAD. They showed meager knowledge about the disease. The percentage was higher in our study as compared to previous studies [9,10].

A comparatively lower level of awareness and knowledge among our study group could be because of scarce awareness programs for the community, less number of community health centers, and less knowledge.
about health studies.

Related to awareness about risk factors, symptoms, and complications of the disease, study participants were having better knowledge. The results of our study were consistent with a previous study [11]. The studies conducted in other Gulf countries of Dubai [12] and Kuwait [13] also showed similar results. It might be because of the better education level of study participants and most of them belonged to the urban region. Thus, we suggest that awareness can be uplifted via various educational programs, so a better control over CAD, its risk factors, and associated complications can be achieved among the population of Saudi Arabia.

In our study, 14.13% of participants had a positive family history of CAD. Family history was defined as the presence of coronary heart disease (CHD) (i.e., angina, myocardial infarction, and myocardial revascularization) in a first-degree male or female relative (i.e., parents, siblings, and children) before age 55 or 65 years, respectively. Of the participants, 5.529% were suffering from CAD, with a time period of less than one year. Only 1.84% of participants were taking medicines as per the American College of Cardiology (ACC) guidelines for CAD. Studies have demonstrated that a family history of CHD is associated with an approximately 1.5- to 2.0-fold higher risk of CHD independent of conventional risk factors highlighting the contribution of genetic factors to disease susceptibility [14].

We observed that 66.05% had a sedentary lifestyle, which could be an important risk factor for CAD. Similar findings were found in a previous study [15-17], which also advocated that the intake of junk food and a sedentary lifestyle are one of the major modifiable risk factors for CAD.

Due to the rapid development of the economy in Saudi Arabia, lifestyle has changed, posing risk to CAD. Thus, various educational awareness programs should be started by the Ministry of Health, Saudi Arabia in the community to encourage people regarding the role of physical activities to control the incidence of CAD.

Conclusions

Our study suggested that the community of the Aseer region of Saudi Arabia has meager knowledge and awareness about CAD. Westernized lifestyles and urbanization have caused poor physical well-being in people, leading to increased risk factors for CAD. Thus, we suggest that different educational public health awareness programs should be implemented by the Ministry of Health, Saudi Arabia to decrease the prevalence of these life-threatening diseases. More prospective studies with greater sample sizes should be conducted in the future considering various regions of Saudi Arabia.

Additional Information

Disclosures

**Human subjects:** Consent was obtained or waived by all participants in this study. Research Ethics Committee, King Khalid University issued approval ECM 2021–4908. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Research Ethics Committee of King Khalid University. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following:** Payment/services info:** All authors declare that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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