Brief communication

Prevalence of coronary artery disease and its associated risk factors in Aljouf region of Saudi Arabia

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Abstract

Objective:Toevaluate the prevalence of coronary artery disease (CAD) with its associated risk factors among Saudi population in Aljouf, Sakaka, Saudi Arabia.

Methods: This is a retrospective hospital based study conducted at King Abdul Aziz specialized hospital Sakaka Aljouf, Saudi Arabia by selecting participants with diagnosed CAD by coronary angiogram, the meanage 55.1 ± 10.8 yrs (range 35-75-years)over a period ofJanuary 2019to December 2019. Demographic characteristics included age, sex,diabetes, hypertension, smoking and family history of CAD. Laboratory data included such as total cholesterol, triglyceride, LDL and HDL levels. Collected data were analyzed by using SPSS 20.00software.

Results: One hundred two participants, out of eight hundred fifty five were diagnosed CADwhich included 64.7% stable angina and 35.2% unstable angina. The total prevalence of CAD obtained from this study was11.9% among male and female was7.89% and 4.621% respectively (P<0.0001). Diabetes (85.7%) and dyslipidemia 94.2%weremost important risk factors in female compared to male 59.1% and 62.2% respectively, while hypertension 82% higher in male than female 51.4 % considers as a significant (p<0.001). Smoking considered as an individual risk factor of 94% for male coronary artery disease patients.

Conclusion:The prevalence of CAD was higher in male 7.89 % than female 4.21% and its associated risk factors including hypertension and cigarette smoking.

Keywords: Coronary artery disease; smoking; hypertension;diabetes

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Introduction

Cardiovascular disease (CVD) is the most important cause of death across the world, on an average every 37 seconds someone in the USA died due to CVD, coronary artery disease (CAD) is the major public health issue not only in developed countries, but also recently CAD incidence rate significantly increasing in developing countries.[1]

In the United States of America (USA), CAD is the most important cause of death in adults approximately over the age of 35-years.[2] While, there were many studies in Asians countries and recognized that have the highest prevalence of CAD in the world.[2]In India the prevalence of coronary artery disease gradually increased 1%-6% from 1960 to 1995 in both urban and in rural areas and it has almost doubled compared to previous data. However, demographic shifts, modified lifestyles, the history of increase blood pressure, tobacco use, obesity and diabetes may consider to rapidly increasing of CVD in the future.[3] Diet is one of the most important components for life style which is contributing as risk factors for increasing CAD. In a previous study documented that the mortality from CAD is gradually decreased in developed countries, while it is growing to be as an epidemic in developing countries and may lead to further next two decades become the most important global health problem.[4] In the Kingdom of Saudi Arabia (KSA), the data on prevalence of CAD is insufficient, while some region was published about CAD depend only on hospital based.[4]Conversely the food habits of Saudi population have rich in animal protein and fats which were linked with increased CAD incidence.[5] In addition, the previous data from Saudi Arabia has been found high prevalence of obesity, hypertension and hyperlipidemia that may contribute to CAD.[6]However, other coronary artery disease study conducted by Saudi Arabia had identified hypertension 26%, diabetes mellitus 22% and both were responsible

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to increase CAD prevalence about 6% and more common in urban people than rural. Moreover, in urban people, age, male gender, body mass index, smoking, elevated total cholesterols and triglyceride levels, hypertension, dysglycemia were significantly linked with coronary artery disease.[7-9]Moreover,it has been recognized that in Saudi Arabia, in total diabetes mellitus (DM) was 23.7%, whereas, male 26.2% and female 21.5%, and DM has a strong association with CAD among the Saudi population.[10-11]Additionally, among the hypertensive Saudi population there was evidence that 34% had suffered with diabetes mellitus which was directly associated with increased CAD prevalence. Prior study also demonstrated cigarette smoking was an important individual riskfactor for CAD in Saudi population.[12] Moreover, consumption of smoking rates has highest in North Africa and the Middle East, compared to western countries, since 1990s to onwards.[13]Still, there was no data available of prevalence of coronary artery disease on community based in KSA. On the other hand, there was evidence that the majority of the patients admitted in cardiac hospital due to attack coronary artery disease.[14]

In Aljouf region, there were many patients admitted tothe cardiac center among them most of due to suffering from coronary artery disease and no study still focuses on the prevalence of CAD in this region. Therefore, current study designs to know about the prevalence of coronary artery disease and its associated risk factors in Saudi population from the hospital database in Aljouf region.

Methods

This retrospective study was conducted at the cardiac department of King Abdul Aziz specialized Hospital (KAASH) Sakaka, Aljouf, Saudi Arabia to evaluation the prevalence of coronary artery diseases (CAD) and its associated risk factors over a period of January 2019 to December 2019 from the hospital records data. There is only one cardiac specializedhospital in Aljouf region and all cardiac related patients referred to this hospital. From clinical symptoms, ECG changes, and finally CAD patients wereconfirmed by the invasive angiogram of this study enrolled subjects.Stable and unstable angina patients were categorized according to ACC/ESC clinical protocols. We randomly selected a total of eight hundred fifty five consecutive patients amongthemone hundred two were participated with the mean age 57.1 ± 9.8 years, with their associated risk factors that was identified to be traditional risk factors for CAD such as history of hypertension, DM, smoking and as well as family history of CAD**.** Laboratory analysis included total cholesterol, triglyceride, low density lipoprotein (LDL) and high density lipoprotein (HDL) level, in addition to records of blood pressure.

Statistical Analysis

All the data were analyzed by using the SPSS 20.00 statistical softwareprogram(SPSS Inc, IL, USA).The data presented the percentages for different items, and mean, standard deviation and range of diversity. Data weight cases, descriptive study, cross tab and chi-square test were conducted for categorical variables. One-way ANOVA followed by post hoc test were used for normal distributed groups, Kruskal–Wallis tests were performed for abnormal distributed parameters. The significant of differences was considered at $P < 0.05$.

Ethical clearance: This study was approved by ethics committee ofKing Abdul Aziz specialized Hospital (KAASH) Sakaka, Aljouf, Saudi Arabia.

Results

Total eight hundred fifty five patients randomly collected from the cardiac department of KAASH; among one hundred two(male 65.6% and female 34.3%)participants who were diagnosed with coronary artery disease (CAD) with definite inclusion criteria in a period of January 2019 to December 2019were included this study. The demographic characteristics arerepresented in Table1.

Table 1. The baseline and clinicalcharacteristicsof the participantsin this study

Variables	Frequency %	Total
Mean age	57.1 ± 9.8	102
Diabetes	70 (68.6)	102
Total cholesterol	92(90.1)	102
Triglyceride >200mg/dl	77(75.4)	102
LDL>130mg/dl	78(76.4)	102
HDL<35mg/dl	57(55.8)	102
Systolic blood pressure>140mmHg	73 (71.5)	102
Diastolic blood pressure>90 mmHg	61(59.8)	102
Family history of CAD	84(82.3)	102
Smoking	63(61.7)	102

The overall prevalence of CAD is 11.9%, this figure for male 7.89% and female 4.21%. The prevalence was significantly higher in male as in comparisonto female (p<0.001). In Table 1shown the smoking 61.7%, diabetes 68.6%, hypertension (Systolic blood pressure>140mmHg,Diastolic blood pressure>90 mmHg) 71.5%, 59.8%, TG75.4%,family history of CAD 82.3%,high serum totalcholesterol90.1%, serum LDL 76.4% and HDL 55.8% were highly prevalentamong 102 participants.

Table 2. The prevalence of CAD related risk factors among different age groups in both male and female subjects.

Factors	Male (n=67)					Female (n=35)					
	Age (Years)					Age (Yours)					
	Total	40-49	50-59	60-65	>65	Total	40-49	50-59	60-65	>65	P -value
Diabetes	40 (59.7)	12	20	6	2	30(85.7)	7	13	7	3	p<0.001
Hypertension	55 (82)	10	26	13	6	18 (51.4)	3	10	3	2	p<0.001
Smoking	63 (94)	12	26	22	3	-	-	-	-	-	-
Dyslipidemia	42 (62.6)	11	18	9	4	33 (94.2)	7	13	9	4	p<0.001

Diabetes and dyslipidemia are more common in female 85.7 % , 94.2 compared to male 59.7%,62.6% respectively, while hypertension comparatively higher in male 82% than female 51.4% which were considered as significant (p<0.001). As well as smoking was only found 94% male CAD patients (Table 2).

Table 3. The Prevalence of CAD among different ages in both genders.

Variables	Stable angina patients%	Unstable anginapatients %	P values
Male (n=67)	41(61.1)	26 (38.8)	P <0.001
(40-49) yrs (50-59)yrs (60-65)yrs >65yrs	2 (4.8) 9 (21.9) 19 (46.3) 11 (26.8)	1 (3.8) 7 (27) 13 (50) 4 (15.38)	
Female (n=35)	25(71.4)	10 (28.5)	P <0.001
(40-49)yrs (50-59)yrs (60-65)yrs >65yrs	1 (2.4) 6 (14.6) 12 (29.2) 6 (14.6)	1 (3.8) 1 (3.8) 5 (19.2) 3 (8.3)	

The prevalence of stable and unstable CAD among different ages in both male and female participants was presented in Table 3. The total number of male CAD was sixty seven among stable angina 41(61.1%) and unstable angina 26(38.8%)with age range in between 30 to above 65 years. The total number of female CAD was thirty five among stable angina 25(60%) and as well as unstable angina 10 (28.5%) with same age groups. These results indicated the male and female stable angina significantly higher than unstable angina, besides, male stable angina higher compared to female stable angina (P <0.001),details were displayed in figure 1.

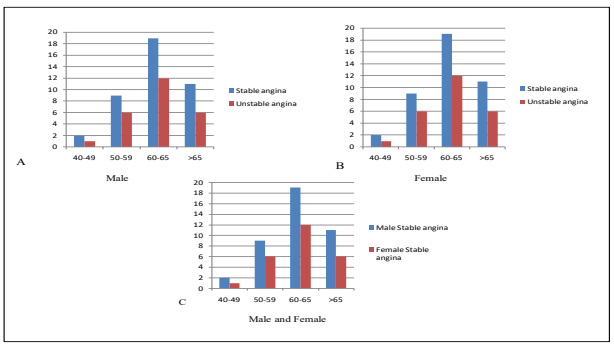

Figure 1. (A) Stable and unstable angina among (40-49) yrs, (50-59) yrs, and above 65yrs in male subjects. (B) Age related stable and unstable angina in female groups. A and B has shown significantly higher stable angina than unstable angina (P <0.001). (C) Male stable angina statistically higher as compared to female. (P <0.001)

Discussion

There was no previous data regarding coronary artery disease patients with its associated risk factors in Sakaka, Aljouf, Saudi Arabia. This study presented the CAD patients from January 2019 to December 2019 that enhances the definite figure in suffering of CAD in Aljouf region. Coronary artery disease (CAD) is the most common cause of disability and death which was increasing in globally day by day. To reduce the number of CAD, it is very important to know the current situation of CAD that help to proper intervention otherwise it may cause the major health burden. The data presented in this study report 11.9% overall prevalence of CAD, among in male 7.89% and female 4.21% which were similar prevalence in India such as 5.8% and 3.5% respectively.[15] However, the prevalence of CAD in China has 2%, Europe 5% and United State 6.9% which were lower than our study.[16] The observations of CAD in KSA were gradually increasing the prevalence of risk factors due to modified life style and changing food habit.In the present study found that male and female stable angina patients were (61.1%), (71.4%) and unstable angina patients were (38.8%), (28.5%) in male and female subjects respectively.The current study recognized CAD number proportionally increasing with aging. In this study, age of all participants in between 40 and over 65 years, and found CAD is increasing in advance age such as angina pectoris in age between 60-65 years, and higher in male compared to female. In previously reported that prevalence of age related CAD in USA was from 7% (40-49)yrs, 13% (50-59) yrs, 16%(60-69)yrs and 22%(70-79)yrs which was similar to our results.[16] The relationship of CAD in male and female associated with aging, the male was found higher than female in different populations of countries.[12]Beside, present study results noticed that stable angina in female patients comparatively higher 71.4% than male patients 61.1% ($p < 0.001$).

In the present study resultsshown CAD with its associated risk factors for all 102 participants such as diabetes (68.6%), total cholesterol(90.1%), triglyceride>200mg/dl(75.4%), LDL>130mg/dl(76.4%), HDL<35mg/dl (55.8%), systolic blood pressure>140mmHg(71.5%), diastolic blood pressure>90 mmHg(59.8%), family history of CAD (82.3%) and smoking (61.7%). This study results clearly recommended that CAD subjects significantly associated with diabetes, dyslipidemia, hypertension and cigarette smoking among Saudi patients.The smoking is 94 % in male and act as an important individual risk factor.However, similarity results found in previous studies that TC, TG and smoking was definite risk factors for CAD.[12]In the present study found diabetes 85.7% and59.7% in female and male as considering a significant role in the development of CAD. In addition, dyslipidemia94.2% and 62.6% found in female and male respectively. The current study results showed a higher prevalence of CAD that similar to a previous study.[17] Furthermore,the present study, provided data from one hospital due to one specialized hospital (KAASH) available which has referred the patient from different places. As well conducting the retrospective study, this study results were comprehensive to the patients with CAD who attended in the cardiac department of KAASH.

Conclusion and future recommendations

Hypertension, diabetes and cigarette smoking is a very important major risk factor for CAD in Aljouf region. Therefore, urgently need further interventions, including social awareness and regular health check up to detect them CAD and its associated risk factors in early stage and give them proper management to prevent CAD induced complications and reduce mortality rate. In the present study have some limitations that data only from one regional cardiac hospital with a smaller sample size, therefore, need different regional with multicenter larger studies to get more CAD and its underlying risk factors information in Saudi Arabia.

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Conflict of interest: None

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