Prevalence of Coronary Heart Diseases Risk Factors among Healthcare Male Students in KSAU-HS Riyadh, Saudi Arabia

Awadelkarim Abdulla Elneama [a#*], Aamir Omair [b≡], Abdullah Abdulhadi Alharbi [cφ], Alhommedi Shaker Alhabbad [cφ], Raed Awadh Alshehri [cφ] and Talal Abdullah Alqarni [cφ]

[a] *Adult Cardiology, King Abdulaziz Medical City, Saudi Arabia.*
[b] *Medical Education, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Saudi Arabia.*
[c] *College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Saudi Arabia.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Background: Coronary heart disease (CHD) is a condition in which plaque builds up on the inner walls of coronary arteries and can lead to blood clot formation. It is the leading cause of death worldwide. Developing coronary heart disease takes long period and its risk factors can be found in young people.
Objectives: Study of risk factors that contribute to the pathogenesis of coronary artery disease.
Methods: A cross-sectional study was done at King Saud bin Abdul-Aziz University in Riyadh. Non-probability convenience sampling was used to select 151 health care students. The data was collected through questionnaire and physical measurements. The data was entered and analyzed by SPSS.

_____

[#] *Consultant;*
[≡] *Lecturer;*
[φ] *Intern*

Results: More than half of the students eat fruits one or less time per week which accounts for 53.6%. Moreover, 28.5% of them eat vegetables one time or less per week. Regarding healthy food containing healthy fat such as fish, 76.2% of the students include healthy fat food in their diet more than two times per week. The percentage of those who eat fast food and consume soft drinks is 80.8% and 70.2% more than two times per week respectively. Furthermore, the percentage of the students who are smokers, either currently or occasionally is 49%. Concerning physical activity, 31.3% of the students exercise more than two times weekly, and only 7.3% of the students watch TV more than four hours per day. On the other hand, the majority which accounts for 54.3% of the students use computer, laptop, or tablet more than four hours per day. Regarding premature CAD, 3.3% of the students reported positive and 16.2% of them reported positive for CHD family history. Finally, 1.3% of the found to have DM.

1. INTRODUCTION

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and they include: coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, and deep vein thrombosis. CVDs are the number one cause of death globally: more people die annually from CVDs than from any other cause [1].

Coronary risk factors generally classified into two main categories: modifiable and nonmodifiable risk factors.

1.1 High Blood Pressure

A study by Allen et al found that people who have increases or decreases in blood pressure during middle age have associated higher and lower remaining lifetime risk for cardiovascular disease. This suggests that prevention efforts should continue to emphasize the importance of lowering blood pressure in order to avoid hypertension [2].

1.2 Cigarette Smoking

Cessation of cigarette smoking constitutes the single most important preventive measure for CAD. As early as the 1950s, studies reported a strong association between cigarette smoke exposure and heart disease. Persons who consume more than 20 cigarettes daily have a 2- to 3-fold increase in total heart disease. Continued smoking is a major risk factor for recurrent heart attacks [3].

1.3 Diabetes Mellitus

A disorder of metabolism, diabetes mellitus causes the pancreas to produce either insulin deficiency or insulin resistance. Glucose builds up in the blood stream, overflows through the kidneys into the urine, and results in the body losing its main source of energy, even though the blood contains large amounts of glucose.

1.4 Obesity

Obesity is associated with elevated vascular risk in population studies. In addition, this condition has been associated with glucose intolerance, insulin resistance, hypertension, physical inactivity, and dyslipidemia [4,5].

1.5 Metabolic Syndrome

Metabolic syndrome is characterized by a group of medical conditions that places people at risk for both heart disease and type 2 diabetes mellitus. In the Kuopio Ischemic Heart Disease Risk Factor Study, patients with metabolic syndrome had significantly higher rates of coronary, cardiovascular, and all-cause mortality [6].

1.6 Mental Stress, Depression, Cardiovascular Risk

Depression has been strongly implicated in predicting CAD [7]. Adrenergic stimulation during stress can increase myocardial oxygen requirements, can cause vasoconstriction, and has been linked to platelet and endothelial dysfunction [8] and metabolic syndrome [9].

Coronary heart disease is a condition in which plaque builds up on the inner walls of coronary arteries and can lead to blood clot formation. The blockage of coronary arteries happens gradually over years, but eventually the plaque hardens or ruptures. At this point, it narrows the coronary

arteries and prevents the flow of oxygenated blood to the heart [10].

CHD has many symptoms, but chest pain is considered as the most common symptom [11]. Other symptoms are shortness of breath, pain in the neck, weakness, and sweating [12]. The diagnosis of CHD depends on many aspects including history, physical examination and investigations. The following investigations are very important for healthcare providers to identify CHD [13]. Electrocardiography (ECG), and Blood tests (for fasting glucose and/or glycosylated hemoglobin, renal function, LFTs, TFTs, lipid profile, cardiac enzymes, ESR or CRP). Finally, coronary angiography may be used to confirm the diagnosis if the listed tests above indicates coronary heart disease.

According to World Health Organization (WHO) data published in 2014 [14], Saudi Arabia placed at 27th rank in the world for CVD. A research by Al-Nozha et al that was done in a community-based national epidemiological health survey, conducted by examining Saudi subjects in the age group of 30-70-years of selected households over a 5-year period between 1995 and 2000. They found a total of 17232 Saudi subjects were selected in the study, and 16917 participated (98.2% response rate). Four thousand and four subjects (23.7%), out of 16917 were diagnosed to have DM. Thus, the overall prevalence of DM obtained from this study is 23.7% in KSA [15]. Another study that was done during the educational year 2012–2013 at King Abdulaziz University (KAU), Jeddah, Saudi Arabia. The results were the commonest risk factors of CHDs were daily intake of high fat diet (73.4%), physical inactivity (57.9%), overweight/or obesity (31.2%) and daily consumption of fast food (13.1%). Hyper-cholesterolemia (17.2%) and hypertension (9.3%) were also prevalent risk factors. Smoking prevalence was low (2.8%). Males had significantly higher mean scores for most of CHD risk factors compared to females ($p < 0.05$) [16]. Another study that was done in 2019, was conducted a cross-sectional survey at King Abdulaziz University Hospital in Jeddah. Patients started on lipid-lowering and/or antihypertensive and/or antidiabetic treatments without a history of established cardiovascular disease were interviewed. Two hundred and fifty high-risk individuals (80.0% female) were interviewed. Overall, 72% of the patients had been diagnosed with hypertension, 61.2% of patients had dyslipidemia, and approximately two-thirds of patients had diabetes mellitus [17].

This study emphasizes the importance of estimating the prevalence for CHD risk factors in healthcare male students in KSAU-HS, Riyadh. The aim of this study is to determine the prevalence of coronary heart diseases (CHD) risk factors among King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) male students in Riyadh, Saudi Arabia. Moreover, it aims to describe the prevalence of CHD risk factors.

2. METHODS

The study was conducted in King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Saudi Arabia. It was a cross sectional study using confidence level of 95% and the sample size was limited number (250). The margin of error was calculated to be 6% within the expected outcome for one of the risk factors at 50%. The sampling technique was by dividing healthcare students into five groups. Selection was done by college and year. Then, non-probability convenience sampling which is a technique where the subjects are selected because of their accessibility to the researcher.

A non-probability convenience sampling was used on College of Medicine, Dentistry, Pharmacy, Applied Medical Sciences, and College of Science and Health Professions to give students a self-administered questionnaire. Questions about socio-demographic variables that include age, marital status, parent's education, and family income. The questionnaire also includes questions about risk factors of CHD including smoking, Diabetes Mellitus, hypertension, nutritional habits, type of fat used for cooking, fruits & vegetables consumption, physical activity, dyslipidemia, family history of premature CHD, and family history of obesity. After the self-administered questionnaire, four co-investigators performed physical measurements to complete the data.

Expected main outcomes were weight & height (BMI) using a weight & height scale, waist to hip conference ratio (WHR) using a meter, blood pressure (BP) using a sphygmomanometer, and random blood glucose (RBG) using a glucometer. There were five groups according to the colleges above, and the selection was done by convenience sampling. Aself-administered questionnaire was used; socio-demographic variables were the independent variables and risk factors of CHD was the main outcome variables.

SPSS was used for data entry and analysis. Categorical data such as smoking and physical inactivity was represented by percentages and frequencies. Chi Square test was used for comparing the categorical variables between the same groups. A p-value of <0.05 was considered to show a statistically significant difference.

3. RESULTS

The study population was composed of 151 health care student from AMS, COSHP, and medicine colleges. Table one shows socio-demographic information of the health care student enrolled in the study including: educational year, 11.3% were from the first year, 7.9% from the second year, 58.9% from the third year, 17.9% from the fourth year, and 4% from fifth year due to inavailabiility. Also, 68.2% of the father's education is collage or higher. However, 54.3% of the mother's education is collage or higher. Regarding family income, 58.3% earn more than 20,000 SAR each month.

Table two shows thatmore than half of the students eat fruits one time or less per week which accounts 53.6%. Moreover, 28.5% of them eat vegetables one or less time per week. Out of the students, 76.2% of them includefood containing healthy fat in their diet more than two times per week, 80.8% and 70.2% eat fast food and soft drink more than two times per week respectivly.

Regarding table three, the students who smoke account for 49%, ethier cuurently or occasionally. Only 31.3% of the studentsexercise more than two times weekly. Regarding watching TV, only 7.3% of the student watch TV more than four hours, while 54,3% of them use computer,laptop, or taplet more than four hours. Only small percent of the students report premature CAD family history 3.3%,while 16.2% of them report CHD family history. Finally, 1.3% of the found to have DM.

Table 1. Socio-demograaphic information of the health care students enrolled in the study: (N=151)

Collage:	N (%)
AMS	33 (21.9%)
COSHP	33 (21.9%)
Medicine	85 (56.3%)
Year:	
1st	17 (11.3%)
2nd	12 (7.9%)
3rd	89(58.9%)
4th	27(17.9%)
5th	6(4%)
Father education:	
Up to high school	48 (31.8%)
Collage or higher	103(68.2%)
Mother education:	
Up to high school	96 (45.7%)
Collage or higher	82(54.3%)
Family income:	
Up to 20,000 SAR	63 (41.7%)
More than 20,000 SAR	88 (58.3%)

Table 2. Nutritional habits, fruits & vegetables consumption of the health care student enrolled in the study: (N=151)

	Appropriate*	Inappropraite*
Fruits	70 (46.4%)	81 (53.6%)
Vegetables	108(79.5%)	43(28.5)
Healthy fat food	115 (76.2%)	36(23.8)
Fast food	29(19.2%)	122 (80.8)
Soft drink	44(29.1)	106(70.2%)

* For fruits, vegetables, healthe fat food, appropiate = two or more per week.
* For soft drink and fast food appropriate = one or less per week.

Table 3. Smoking, physical activity, Diabetes Mellitus, family history of premature CHD. (N=151)

Smoking:	N (%)
Never	62 (41.1%)
Occasional	21 (13.9%)
Current	53 (35.1%)
Excersise:	
Yes	47 (31.1%)
Watching TV:	
Up to 4 hours	140 (92.7%)
More than 4 hours	11 (7.3%)
Using computer/laptop/taplet:	
Up to 4 hours	69 (45.6%)
More than 4 hours	82 (54.3%)
Diabetes mellitus:	
no	149 (98.7%)
CHD family history :	
Yes	24 (16.2%)
Premature CAD family history:	
Yes	5 (3.3%)

4. DISCUSSION

The current study looks at CHD risk factors not only among medical students but all health care students in King Saud bin Abdulaziz University for Health sciences. According to the US National Health and Nutrition Examination Surveys (NHANES) data among young adults aged 20-40 years (1999-2006) revealed that two-thirds have at least one CVD risk factor [18]. Furthermore, about 90% of individuals with CHD have at least one risk factor as smoking, diabetes, hypertension [19]. A study shows that from 2003 obesity is becoming a pandemic [20]. These finding concur with results of study in King Fahd University in Dammam city, KSA 47.1% [21]. Comparable rates were also reported from two other Saudi studies one done among male medical students in Al-Qassim University 46.5% [22] and the other study was done among male students at King Saud University, Riyadh, KSA 54% [23]. These alarming high rates of overweight and obesity among Saudi young adult may need rapid targeted university intervention.

Study was done in 2011 showed that frequent fast-food eating (three or more) is associated with poorer diet quality, greater weight gain, also physical activity is considered protective against CHD [24]. However, our study showed that students who exercise accounts for only 31%. Sedentary life behaviors like watching TV and using computer increase risk of CHD 4.8%. We found that 92,7% watch TV up to four hours per day and 54% use computer, laptop, or tablet more than four hours per day.

According to Framingham risk score, the risk of developing CHD increases with increasing number of risk factors in an individual [25]. We found that 96% of our population have one risk factor or more, whereas 37% of them have at least two risk factors. After excluding high blood pressure as it needs more than one reading to be accurate, we found that 9% don't have any risk factor.

Finally, there were some limitations to this study. We did not achieve our sample size which was 250. Furthermore, dentistry and pharmacy students were not reachable. In addition, female students were excluded from the beginning. Cholesterol levels were not measured. The measurement of blood pressure was done in standard technique yet one reading is not enough.

5. CONCLUSION

According to Framingham risk score, the risk of developing CHD increases by increasing number of risk factors in an individual. We found that 96% of our population have one risk factor or more, whereas 37% of them have at least two risk factors. After excluding high blood pressure as it needs more than one reading to be accurate, we found that 9% don't have any risk factor. Finally, after reviewing the data results, we recommend annual medical checkup for all

students. Also, there should be more effort in increasing the awareness of the student. Finally, the university should provide healthy diet and include physical activity in the schedule.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Cardiovascular diseases (CVDs) [Internet]. World Health Organization; 2017. [Cited 19 April 2017] Available:http://www.who.int/mediacentre/factsheets/fs317/en/
2. Allen N, Berry JD, Ning H, et al. Impact of blood pressure and blood pressure change during middle age on the remaining lifetime risk for cardiovascular disease: The cardiovascular lifetime risk pooling project. Circulation. 2012;125(1):37-44. [Medline].
3. Rea TD, Heckbert SR, Kaplan RC, et al. Smoking status and risk for recurrent coronary events after myocardial infarction. Ann Intern Med. 2002;137(6):494-500.
4. Rexrode KM, Carey VJ, Hennekens CH, et al. Abdominal adiposity and coronary heart disease in women. JAMA. 1998;280(21):1843-8.
5. Bacha F, Edmundowicz D, Sutton-Tyrell K, Lee S, Tfayli H, Arslanian SA. Coronary artery calcification in obese youth: what are the phenotypic and metabolic determinants? Diabetes Care. 2014;37(9):2632-9. [Medline].
6. Lakka HM, Laaksonen DE, Lakka TA, et al. The metabolic syndrome and total and cardiovascular disease mortality in middle-aged men. JAMA. 2002;288(21):2709-16.
7. Rugulies R. Depression as a predictor for coronary heart disease. A review and meta-analysis. Am J Prev Med. 2002;23(1):51-61. [Medline].
8. Ghiadoni L, Donald AE, Cropley M, et al. Mental stress induces transient endothelial dysfunction in humans. Circulation. 2000;102(20):2473- [Medline].
9. Hjemdahl P. Stress and the metabolic syndrome: an interesting but enigmatic association. Circulation. 2002;106(21):2634-6. [Medline].
10. Cardiovascular disease risk factors World Heart Federation [Internet]. World-heart-federation.org; 2017. [Cited 19 April 2017] Available:http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/
11. What are the signs and symptoms of coronary heart disease - NHLBI, NIH [Internet]. National Heart, Lung, and Blood Institute (NHLBI). [Cited 19 April 2017] Available:https://www.nhlbi.nih.gov/health/health-topics/topics/cad/signs
12. NHS Choices coronary heart disease - Symptoms - [Internet]. Nhs.uk; 2017. [Cited 19 April 2017] Available:http://www.nhs.uk/Conditions/Coronary-heart-disease/Pages/Symptoms.aspx
13. Cardiovascular History and Examination [Internet]. Patient.info; 2017. [Cited 1 August 2017] Available:https://patient.info/doctor/cardiovascular-history-and-examination
14. World Health Organization. Noncommunicable diseases country profiles; 2014 [Internet]. [Cited 19 April 2017] Available:http://www.who.int/nmh/publications/ncd-profiles-2014/en/
15. Al-Nozha MM, Arafah MR, Al-Mazrou Al-Maatouq et al. Coronary artery disease in Saudi Arabia. Saudi Med J. 2004;25(11):1603-10.
16. Sabra AA, Taha AZ, Al-Sebiany AM, Al-Kurashi NY, Al-Zubier AG. Coronary heart disease risk factors: prevalence and behavior among male university students in Dammam City, Saudi Arabia. J Egypt Public Health Assoc. 2007;82(1-2):21-42.
17. Ghamri RA, Alzahrani NS, Alharthi AM, Gadah HJ, Badoghaish BG, Alzahrani AA. Cardiovascular risk factors among high-risk individuals attending the general practice at king Abdulaziz University Hospital: A cross-sectional study. BMC Cardiovascular Disorders. 2019; 19(1):268. Available:https://doi.org/10.1186/s12872-019-1261-6

18. Oikonen M, Laitinen TT, Magnussen CG, Steinberger J, Sinaiko AR, Dwyer T, et al. Ideal cardiovascular health in young adult populations from the United States, Finland, and Australia and its association with cIMT: The International Childhood Cardiovascular Cohort Consortium. J Am Heart Assoc. 2013;2:e000244.

19. Berry JD, Lloyd-Jones DM, Garside DB, Greenland P: Framingham risk score and prediction of coronary heart disease death in young men. Am Heart J. 2007;154(1):80–86.

20. Bertsias G, Mammas I, Linardakis M, Kafatos A: Overweight and obesity in relation to cardiovascular disease risk factors among medical students in Crete. Greece BMC Public Health. 2003;3:3.

21. Sabra AA, Taha AZ, Al-Sebiany AM, Al-Kurashi NY, Al-Zubier AG: Coronary heart disease risk factors: prevalence and behavior among male university students in Dammam City, Saudi Arabia. J Egypt Public Health Assoc. 2007;82:21–42.

22. Inam SN. Prevalence of Overweight and Obesity among Students of a Medical College in Saudi Arabia. Jlumhs. 2008;7:41–43.

23. Al Turki YA: Overweight and obesity among university students, Riyadh, Saudi Arabia. Middle East J Fam Med. 2007;5(2):1–3.

24. Larson N, Neumark-Sztainer D, Laska MN, Story M: Young adults and eating away from home: associations with dietary intake patterns and weight status differ by choice of restaurant: Young adults and eating away from home: Associations with dietary intake patterns and weight status. J Am Diet Assoc. 2011;111(11):1696–1703.

25. Tremblay MS, Willms JD: Is the Canadian childhood obesity epidemic related to physical inactivity? Int J Obes Relat Metab Disord. 2003;27(9):1100–1105.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/76733