ORIGINAL RESEARCH

EVALUATION OF VARIOUS RISK FACTORS FOR THE DEVELOPMENT OF CORONARY ARTERY DISEASE

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ABSTRACT

Background: To evaluate various risk factors for the development of coronary artery disease.
Methods: Eighty- five patients of coronary artery disease of both genders were included and parameters such as family history, history of smoking, diabetes, obesity, high body mass index (BMI), high cholesterol, etc. were recorded.
Results: Out of 85 patients, males were 52 (61.1%) and females were 33 (38.9%). The mean SBP was 124.6 mm Hg in males and 122.4 mm Hg in females. The mean DBP was 82.4 mm Hg in males and 80.2 mm Hg in females. FPG was 95.2 mg/dL in males and 93.4 mg/dL in females. PPPG was 134.5 mg/dL in males and 132.6 mg/dL in females. The mean total cholesterol level was 184.2 mg/dL in males and 182.8 mg/dL in females. The mean HDL was 43.2 mg/dL in males and 45.2 mg/dL in females. The difference was significant ($P < 0.05$). Risk factors for CAD were smoking seen in 75% of males and 24% of females, diabetes in 62% of males and 78% of females, hypertension in 83% of males and 90% of females, dyslipidemia in 45% males and 52% of females, family history of CAD in 11% males and 9% females and obesity in 27% males and 51% females. A significant difference was seen ($P < 0.05$).
Conclusion: The common risk factors of coronary artery disease were diabetes, hypertension, smoking, dyslipidaemia, obesity, alcoholism, and positive family history.
Keywords: Diabetes, Hypertension, Obesity

INTRODUCTION

Coronary artery disease (CAD), also known as coronary heart disease or ischemic heart disease, is a condition that affects the arteries supplying blood to the heart muscle. It is the most common type of heart disease and a leading cause of death worldwide.[1] In CAD, the coronary arteries, which are responsible for delivering oxygen-rich blood to the heart, become narrowed or blocked due to the accumulation of fatty deposits called plaques. These plaques are typically composed of cholesterol, calcium, and other substances. As the plaques grow, they can restrict blood flow to the heart, leading to various symptoms and complications.[2]

There are many risk factors for CAD and some can be controlled but not others. The risk factors that can be controlled (modifiable) are high BP; high blood cholesterol levels; smoking; diabetes; overweight or obesity; lack of physical activity; unhealthy diet and stress.[3] Those that cannot be controlled (conventional) are age (simply getting older increases risk); sex (men are generally at greater risk of coronary artery disease); family history; and race.[4] Hypertension is one of the risks

in the development of CHD. Being overweight or obese increases the likelihood of CAD.[5] Lack of regular physical activity is associated with an increased risk of CAD. Consuming a diet high in saturated and trans fats, cholesterol, and sodium can contribute to CAD. Symptoms of coronary artery disease may include chest pain or discomfort (angina), shortness of breath, fatigue, heart palpitations, and, in severe cases, heart attack (myocardial infarction).[6,7] We performed this study to evaluate various risk factors for the development of coronary artery disease.

MATERIALS & METHOD

After considering the utility of the study and obtaining approval from the ethical research & review committee, we selected eighty- five patients of coronary artery disease of both genders. Patients' consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Parameters such as family history, history of smoking, diabetes, obesity, high body mass index (BMI), high cholesterol, substance abuse was recorded. Assessment of serum lipid profile, complete hemogram, urine analysis and echocardiography (ECG) were performed. The results were compiled and subjected to statistical analysis using Mann- Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table I Patients distribution

Total- 85		
Gender	Males	Females
Number (%)	52 (61.1%)	33 (38.9%)

Out of 85 patients, males were 52 (61.1%) and females were 33 (38.9%) (Table I).

Table II Laboratory parameters

| Parameters	Males	Females	P value
SBP (mm Hg)	124.6	122.4	0.92
DBP (mm Hg)	82.4	80.2	0.75
FPG (mg/dL)	95.2	93.4	0.05
PPPG (mg/dL)	134.5	132.6	0.04
Total cholesterol (mg/dL)	184.2	182.8	0.12
HDL (mg/dL)	43.2	45.2	0.05

The mean SBP was 124.6 mm Hg in males and 122.4 mm Hg in females. The mean DBP was 82.4 mm Hg in males and 80.2 mm Hg in females. FPG was 95.2 mg/dL in males and 93.4 mg/dL in females. PPPG was 134.5 mg/dL in males and 132.6 mg/dL in females. The mean total cholesterol level was 184.2 mg/dL in males and 182.8 mg/dL in females. The mean HDL was 43.2 mg/dL in males and 45.2 mg/dL in females. The difference was significant (P< 0.05) (Table II).

Table III Percentage of risk factors

Parameters	Males	Females	P value
Smoking	75%	24%	0.01
Diabetes	62%	78%	0.05
Hypertension	83%	90%	0.71

Dyslipidaemia	45%	52%	0.92
Family history of CAD	11%	9%	0.87
Obesity	27%	51%	0.01

Risk factors for CAD were smoking seen in 75% of males and 24% of females, diabetes in 62% of males and 78% of females, hypertension in 83% of males and 90% of females, dyslipidemia in 45% males and 52% of females, family history of CAD in 11% males and 9% females and obesity in 27% males and 51% females. A significant difference was seen (P< 0.05) (Table III, graph I).
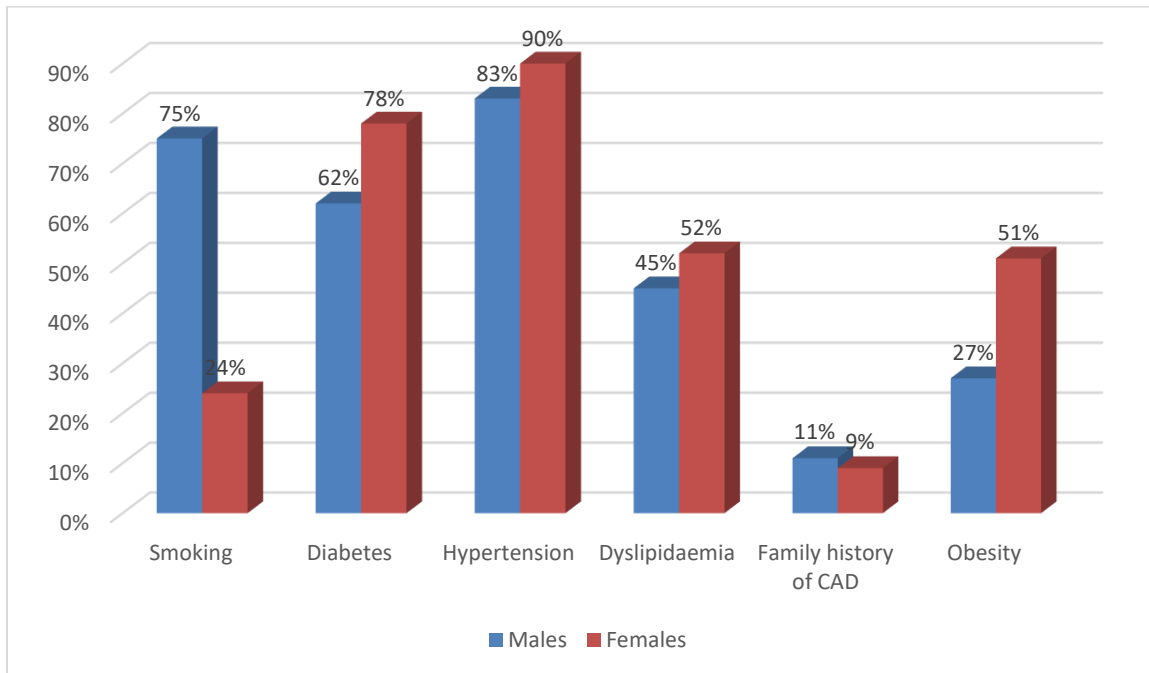
Graph I Percentage of risk factors

DISCUSSION

Coronary artery disease (CAD) often leads to myocardial infarction, which may be fatal. Risk factors can be used to predict CAD, which may subsequently lead to prevention or early intervention.[8,9] Patient data such as co-morbidities, medication history, social history, and family history are required to determine the risk factors for a disease. CAD is the most common type of heart disease observed in the general population and the incidence of CAD is rising globally.[10,11] The costs involved in managing CAD are significantly high, creating an enormous burden on healthcare systems worldwide. Thus, it is important to predict patients at risk of CAD. CAD prediction can assist clinicians in providing early intervention and consequently prevent the development of CAD.[12,13] We performed this study to evaluate various risk factors for the development of coronary artery disease.

Our results showed that out of 85 patients, males were 52 (61.1%) and females were 33 (38.9%). Gupta et al[14] correlated the prevalence of obesity with risk factors. Urban women (8.9% versus 4.5%) and rural men (50.0% vs 40.6%) had higher rates of smoking and tobacco use. Obesity, truncal obesity, hypertension, hypercholesterolemia, diabetes, and metabolic syndrome were more common in urban subjects. The age-adjusted prevalence (%) of obesity was 9.4, 21.1, 35.6, 54.0, and 50.9 for males and 8.9, 15.7, 45.1, 61.5, and 57.7 for women in various cohorts, including

rural JHW and urban JHW-1, JHW-2, JHW-3, and JHW-4. 3.2, 19.6, 41.4, 31.1, and 31.1 percent of males and 10.1, 49.5, 42.1, 51.7, and 50.5 percent of females were found to be truncal obese. The mean SBP was 124.6 mm Hg in males and 122.4 mm Hg in females. The mean DBP was 82.4 mm Hg in males and 80.2 mm Hg in females. FPG was 95.2 mg/dL in males and 93.4 mg/dL in females. PPPG was 134.5 mg/dL in males and 132.6 mg/dL in females. The mean total cholesterol level was 184.2 mg/dL in males and 182.8 mg/dL in females. The mean HDL was 43.2 mg/dL in males and 45.2 mg/dL in females. Sekhri et al[15] evaluated the prevalence of risk factors for coronary artery disease (CAD). The study revealed that 4.6% of the study population had a family history of premature CAD. The overall prevalence of diabetes was 16% (5.6% diagnosed during the study and the remaining 10.4% already on medication). Hypertension was present in 21% of subjects. The prevalence of dyslipidemia was significantly high, with 45.6% of study subjects having a high total cholesterol/high density lipoprotein ratio. Overall, 78.6% subjects had two or more risk factors for CAD.

Our results showed that risk factors for CAD were smoking seen in 75% of males and 24% of females, diabetes in 62% of males and 78% of females, hypertension in 83% of males and 90% of females, dyslipidemia in 45% males and 52% of females, family history of CAD in 11% males and 9% females and obesity in 27% males and 51% females. Singh et al[16] enrolled 162 rural and 152 urban subjects aged 26-65 years. In comparison with rural subjects, urban subjects had a higher prevalence of coronary artery disease (8.6 vs. 3.0%) and diabetes (7.9 vs 2.5%), higher blood pressures. Fasting plasma insulin and high density lipoprotein cholesterol levels in urban subjects were comparable with rural subjects. Mean body weights were significantly higher in urban women, but not in men, than in rural subjects. However, the body mass index (22.9 +/- 4.2 vs. 21.6 +/- 2.4 kg/m2) and waist-hip girth ratio (0.89 +/- 0.10 vs. 0.86 +/- 0.07) were significantly higher in urban men compared to rural men without such differences in women. Underlying these differences in risk factors, urban subjects had three times better socioeconomic status than rural subjects and were eating higher total and saturated fat, cholesterol and refined carbohydrates and lower total and complex carbohydrates compared to rural men and women. Energy expenditure during routine and spare time physical activity was significantly higher in rural compared to urban subjects. Those patients who had risk factors, showed lesser physical activity and had greater adverse factors in the diet compared to subjects without risk factors. Body mass index and waist-hip girth ratio in patients with risk factors were significantly higher than in subjects without risk factors.

CONCLUSION

The common risk factors of coronary artery disease were diabetes, hypertension, smoking, dyslipidaemia, obesity, alcoholism, and positive family history.

REFERENCES

1. Joshi P, Islam S, Pais P, Reddy S, Dorairaj P, Kazmi K, et al. Risk factors for early myocardial infarction in South Asians compared with individuals in other countries. JAMA 2007:297:286-294.
2. Dwivedi S, Anupam P. Chathurvedi A, Cardiovascular risk factor in young coronary artery heart disease patient around East Delhi. South Asian Journal Preventive Cardiology 1997; 1:21-26.
3. Enas EA, Salim Yusuf, Jawahar Mehta. Meeting of the International Working Group on Coronary Artery Disease in South Asians. Indian Heart J 1998; 48: 727-32.

4. Low PS, Heng C, Saha N, Tay J. Racial variation of cord plasma lipoprotein concentrations in relation to coronary risk levels: A study of three ethnic group in Singapore. Pediatr Res 1996; 40: 718-22.
5. Mohan V, Deepa R. Risk factors for coronary artery diseases in Indians. J Assoc Physicians India 2004;52:95–7.
6. Hasan A, Agarwal A, Anjum Parvez MA. Premature coronary artery disease and risk factors in India. Indian Journal of Cardiology ISSN. 2012;972:1622.
7. Rao M, Xavier D, Devi P, et al.: Prevalence, treatments and outcomes of coronary artery disease in Indians: a systematic review. Indian Heart J. 2015;67(4):302–310.
8. Hatmi Z, Tahvildari S, Motlag AG, et al.: Prevalence of coronary artery disease risk factors in Iran: A population based survey. BMC Cardiovasc. Disord. 2007;7(1):32.
9. Fox T. Trends in cardiovascular mortality In Europe. Circulation 1997; 96: 3817.
10. Stamler J, Wentworth D, Neaton JD. Is relationship between serum cholesterol and risk of premature death from coronary heart disease continuous and graded? Findings in 356,222 primary screenees of the multiple risk factor intervention trial (MRFIT) JAMA. 1986;256:2823–8.
11. Anderson KM, Castelli WP, Levy D. Cholesterol and mortality 30 years of follow-up from the Framingham study. JAMA. 1987;257:2176–80.
12. Vasan RS, Larson MG, Leip EP, Evans JC, O'Donnell CJ, Kannel WB, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. N Engl J Med. 2001;345:1291–7.
13. 15. O'Donnell CJ, Elosua R. Cardiovascular risk factors. Insights from Framingham heart study. Rev Esp Cardiol. 2008;61:299–310.
14. Gupta R, Gupta VP, Bhagat N, et al. Obesity is the major determinant of coronary risk factors in India: Jaipur Heart Watch studies. Indian Heart J 2008;60:26–33.
15. Sekhri T, Kanwar RS, Wilfred R, Chugh P, Chhillar M, Aggarwal R, Sharma YK, Sethi J, Sundriyal J, Bhadra K, Singh S. Prevalence of risk factors for coronary artery disease in an urban Indian population. BMJ open. 2014 Dec 1;4(12):e005346.
16. Singh RB, Ghosh S, Niaz MA, et al. Epidemiologic study of diet and coronary risk factors in relation to central obesity and insulin levels in the rural and urban populations of north India. Int J Cardiol 1995;47:245–55.