

Original research article

Modifiable risk factors for coronary artery disease identified in apparently healthy individuals

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Abstract

In the Indian population, there is a dearth of data on modifiable coronary artery disease (CAD) risk factors, which hinders the implementation of assessments and preventative programs in this group. This study compared the modifiable risk factors for coronary artery disease (CAD) among patients who had already been diagnosed with CAD and healthy volunteers who came from the same community as the CAD patients.

Keywords: Modifiable, risk factors, coronary artery disease, healthy individuals

Introduction

Coronary artery disease marked by decreased blood flow through the coronary arteries to myocardium as a result atherosclerotic plaque. Atherosclerosis is the major cause whereas vasculitis, aortitis and autoimmune connective diseases are rare causes for CAD. (Ganong) In atherosclerosis there is lipid rich deposits accumulation in the arterial wall, it will be symptomatic when enlarged atherosclerotic plaque compromises myocardial perfusion, or ulceration, disruption of atheroma. (Davidson's). Its common presentation as Angina and leads to infarction if the there 75% obstruction of coronary artery. As per the WHO estimate, in 2016, death due to cardiovascular disease was 17.8 Million-that corresponds to 31% of global deaths, further more in India, 27% of the total deaths due to Non communicable disease were due to cardiovascular disease. (WHO (2022) Cardiovascular diseases in India. <https://www.who.int/india/health-topics/cardiovascular-diseases>)

Identifying those at highest risk of CVDs and ensuring they receive appropriate treatment can prevent premature deaths. (<https://www.who.int/india/health-topics/cardiovascular-diseases>), Age, male gender, family history of coronary artery disease, diabetes, hypertension, smoking, hyperlipidemia are the risk factors for atherosclerosis. It has been observed on review of literature that this kind of study is entirely new to this geographical area, hence the present study was undertaken with an objective to determine the variation in the blood pressure, biochemical parameters such as blood sugar and few lipid parameters in healthy individuals.

Materials and Method

This observational study of cross sectional type was conducted on 60(100) healthy volunteers in the age group of 40-60 years both males and females who had come for physical check up to know their health status to Rural medical college of south India during the period Jan 2022 to June 2022, by simple random sampling method after obtaining the ethical clearance from Institutional ethical committee.

Subjects with history of hypertension, diabetes, coronary artery diseases and those with history of chest pain, palpitation, excessive sweating, breathlessness were excluded from the study. Each participant was instructed to fill the consent form after explaining them about the purpose of the study. Detailed history was taken from all subjects which was followed by clinical examination. Weight was measured by using digital weighing machine, Height was measured by using measuring tape then Body mass index was calculated. Pulse was recorded by counting the radial artery pulsation for one minute, Blood pressure was measured by using Sphygmomanometer and stethoscope. Subjects were given instructions to undergo blood investigations. Collection of blood sample for investigation-Subjects were instructed to come with overnight fasting then 5ml of the blood sample was collected. Blood Sugar (method), Total cholesterol method, HDL method.

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Risk factor	Definition
Hypertension	Systolic BP \geq 140 mm Hg and/or diastolic BP \geq 90 mm Hg during the visit and/or presence of anti-hypertensive drug treatment; considered known if the subject was aware of this condition
Diabetes mellitus	FPG \geq 126 mg/dL and/or PPPG \geq 200 mg/dL at the time of investigation and/or presence of anti-diabetic drug treatment; considered known if the subject was aware of this condition
Obesity	BMI \geq 30 kg/m ²
Overweight	BMI \geq 25 kg/m ²
Hypercholesterolaemia	Total blood cholesterol \geq 200 mg/dL
Decreased HDL cholesterol	\leq 40 mg/dL
Adverse total cholesterol/HDL ratio (dyslipidemia)	\geq 4.5
Age	$>$ 45 years in men and $>$ 55 years in women
Sex	Male sex
Family history of CAD	Premature CAD in first degree relatives ($<$ 55 years in men and $<$ 65 years in women)
Risk factors for CAD	Age, sex, family history, diabetes mellitus, smoking, dyslipidemia, hypertension and obesity

- BMI, body mass index; CAD, coronary artery disease; FPG, fasting plasma glucose; HDL, high density lipoprotein; PPPG, post-prandial plasma glucose.

Results

Table 1: Percentage (%) of risk factors in the study population (n=12 608)

Parameters	Total (n=60)	Men (n=30)	Women (n=30)	p Value
Family history of CAD	38	18	20	--
Smoking	32	28	04	$<$ 0.001
BMI $>$ 25 kg/m ² Mean \pm SD	31	26	05	$<$ 0.001
BMI 25-30 kg/m ² Mean \pm SD	17	14	03	$<$ 0.001
BMI \geq 30 kg/m ² Mean \pm SD	12	12	Nil	$<$ 0.05
Diabetes mellitus	29	14	15	--
Hypertension	34	16	18	--
Dyslipidemia	39	15	14	--

Discussion

Men working in a factory in northern India were the subjects of a study conducted by Prabhakaran *et al.* 7, which came to similar conclusions. 62% of the population had a high blood total cholesterol/HDL ratio, 47% of the population was overweight, 30% of the population had hypertension, and 15% of the population had diabetes. In addition, Prabhakaran and colleagues demonstrated that 47% of their research participants had at least two risk factors for CAD [1]. In the current study, 78.6% of participants had two or more risk factors for CAD.

In another study that was conducted in 2008, Mohan and Deepa found that the following prevalences of significant risk factors for cardiovascular disease were found: diabetes 11.9%, hypertension 25.4%, dyslipidemia 40.2%, hypertriglyceridaemia 28.3%, overweight (BMI 23 kg/m²) 60.2%, and metabolic syndrome 34.1% [2].

Several more research have come to the same conclusions regarding the general population of India [4-12]. According to the findings of Ramchandran *et al.*, the incidence of diabetes and impaired glucose tolerance is on the rise in the urban population of Chennai [10]. In their study from 2002, Gupta and colleagues demonstrated that smoking and poor levels of physical exercise were extremely common among metropolitan individuals aged 20-39 [8]. According to the findings of Goel *et al.*, in 2003, a family history of coronary artery disease (CAD) is an additional significant independent risk factor for CAD [12]. It is possible to bring the incidence of coronary artery disease down by focusing on its risk factors and taking preventative measures. This calls for shifts on both the individual and the communal level in order to be successful. It is possible to reduce the risk of coronary artery disease by modifying risk factors such as smoking, having elevated amounts of body fat, eating too much fat and salt, and leading a sedentary lifestyle in conjunction with the use of preventative drugs that are easily accessible and inexpensive. The

general public's knowledge can be raised through the use of mediums such as television and other forms of media. Community members might also be urged to encourage local resident welfare associations and religious groups to promote a healthy lifestyle and exercise among the community.

Conclusion

The current study reveals that there is a high prevalence of CAD risk factors in the population of India. The study population was typical of the population of the entire country, and the results of the study reflect the rising trend of CAD in rural India.

References

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