

Risk Factors of Premature Coronary Artery Disease

Mujaddid Mudassir¹, Javed Iqbal², Muhammad Shafique Arshad³, Ali Raza⁴, Qudsia Anjum Qureshi⁵

^{1,4} Postgraduate Resident, Department of Cardiology, Pakistan Institute of Medical Sciences, Islamabad.

³ Professor, Department of Cardiology, Pakistan Institute of Medical Sciences, Islamabad.

² Associate Professor of Cardiac Surgery, Rawalpindi Institute of Cardiology, Rawalpindi.

⁵ Assistant Professor, Department of Anaesthesia, Rawalpindi Institute of Cardiology, Rawalpindi.

Author's Contribution

¹ Conception of study

¹ Experimentation/Study conduction

² Analysis/Interpretation/Discussion

⁴ Manuscript Writing

⁵ Critical Review

³ Facilitation and Material analysis

Corresponding Author

Dr. Mujaddid Mudassir,

Postgraduate Resident,

Department of Cardiology,

Pakistan Institute of Medical Sciences, Islamabad

Email: mujaddidmudassir26@gmail.com

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Abstract

Introduction: Coronary artery disease (CAD) is one of the commonest and leading causes of death throughout the world. It is becoming common in the younger age group as well. This study was carried out to analyze the risk factors present in young patients who presented with acute Myocardial Infarction (M.I).

Materials and Methods: In this descriptive cross-sectional study, we included 120 patients of age 20-35 years of age who presented with the first episode of acute M.I. Study was conducted at Pakistan Institute of Medical Sciences, Islamabad, Department of Cardiology for all patients with first MI from 1st February 2016 to 31st January 2018. Twelve risk factors were studied including Gender, Hypertension, Diabetes mellitus, dyslipidemia, sedentary lifestyle, family history of premature CAD, obesity, smoking, dietary habits, profession, socioeconomic stress, drug addictions. The frequency of risk factors was calculated.

Results: Results showed that some of the risk factors were present in higher proportion e.g. smoking, sedentary lifestyle, poor dietary habits, and stressful socioeconomic conditions. Most of the patients in the younger age group were drivers. The results of our study showed that male patients were higher (93.3%) in proportion to female patients (6.7%). 33% of patients were drivers, 13% plumbers, 13% shopkeepers, 10% businessmen, 8% laborers, 5% policemen, 5% students, 5% bank officers, 3% engineers, 2% teachers, 1% doctors. 68.3% of patients were smokers. 58.3% of patients were having high-stress scores. 23.3% of patients were having moderate stress score. 18.3% were having a low-stress score. 56% of patients were having dyslipidemia. 48% of patients were obese. Family history was present in 26.7% of patients.

Conclusion: For patients presenting with premature CAD, Some of the modifiable risk factors include hypertension, sedentary lifestyle, fatty dietary habits, obesity, smoking, diabetes, dyslipidemia. The profession also affects the development of IHD as is evident from our study. So, primary preventive strategies need to be implied to prevent the development of IHD, especially in individuals who are at risk.

Keywords: IHD, Smokers, Dyslipidemia, MI, CAD.

Introduction

One of the common causes of death worldwide is cardiovascular diseases (CVD). It is estimated that almost 23.6 million people will die from CVD by the year 2030.¹ In low-income and middle-income countries, the rate of CVD has increased to a greater extent.² CVD also includes acute myocardial infarction which is becoming common in the young population over the last few years. Risk factors are numerous. Clinical presentation and prognosis differ among old and young individuals.³ It also varies among different regions of the world. People from South Asia have a greater death rate than other countries of the world.^{4,5,6} Also it occurs about 5 to 10 years earlier in South Asian people as compared to western countries.^{7,8} It is estimated that the increase in coronary artery disease (CAD) in South Asia is more than any other region in the world⁹ and the next 20 years it is expected to rise by more than twofold.¹⁰

Premature CAD is defined in those patients having a father or 1st-degree male relative of fewer than 55 years of age and history of ischemic heart disease (IHD) or 1st-degree female relative of age less than 65 years and history of ischemic heart disease.¹¹

There are numerous risk factors for premature CAD which includes traditional as well as novel risk factors. Smoking is one of the risk factors with strong association.¹²⁻¹⁴ Other risk factors include Diabetes Mellitus, hypertension, dyslipidemia, metabolic syndrome, family history of IHD.¹⁵

There are several novel risk factors for premature coronary artery disease. For example Factor V Leiden mutation, homocysteine, apolipoprotein(a).¹⁶⁻¹⁸

The Coronary Artery Risk Development in Young Adults (CARDIA) study associated lower socioeconomic status, smoking, and psychometric stress with the risk of developing CAD.¹⁹

Some of the common risk factors in the Pakistan population include hypertension, Diabetes mellitus, smoking, hyperlipidemia socioeconomic stress factors, sedentary lifestyle, and poor dietary habits. Prevention of these risk factors can lead to prevention in the development of CAD and therefore its consequences. Our study aims to focus on the common risk factors associated with acute myocardial infarction in young individuals of less than 35 years of age and to use this knowledge to prevent such events in individuals at risk of CAD. We also included profession in our study and its correlation with IHD.

Materials and Methods

This is a descriptive cross-sectional study. 120 patients were included who presented with the first episode of acute M.I. Study was conducted at the cardiac centre, Pakistan Institute of Medical Sciences, Islamabad. The study period included 2 years from 1st February 2016 to 31st January 2018 and was done by the principal investigator under the supervision of their academic supervisors.

Patients included were from 20-35 years of age, those having typical chest pain suggestive of acute M.I, characteristic ECG changes, and raised cardiac enzymes.

Patients above 35 years of age, those having old M.I, stable or unstable angina were excluded from the study.

The following risk factors were studied:

Gender, family history Of premature CAD (Defined as those patients having a father or 1st-degree male relative of fewer than 55 years of age and history of ischemic heart disease or 1st-degree female relative of age less than 65 years of age and history of ischemic heart disease.¹¹ Smokers (Current smokers defined as those who had smoked in last 12 months and past smokers were those who had smoked more than 12 months ago), hypertension (hypertensive patients taken were those who were already on antihypertensive medications or having blood pressure >140/90 on two or more occasions).²⁰ Diabetes mellitus (Diabetics defined as those already on antidiabetic medication or having fasting blood sugar level of >126 mg/dl or random blood sugar level of > 200 mg/dl)²¹, dyslipidemia (dyslipidemia is an important risk factor of atherosclerosis)²², fasting lipid levels were taken within 24 hours of acute myocardial infarction (Total cholesterol >200 mg/dl, LDL >130 mg/dl, Triglycerides >160 mg/dl were considered high lipid levels. HDL<45 mg/dl was considered a risk factor for M.I), Obesity (patients having BMI equal to or greater than 30 kg/m² were taken as obese. Those having BMI less than 30 kg/m² were taken as non-obese).²³ Dietary habits (patients' dietary habits were investigated, whether they were taking diets rich in fat, high fibers, vegetables, or fruits. We asked about desi ghee parathas and the number of eggs/day. Those taking more than 1 desi ghee paratha or egg were classified as having a high fatty diet), profession (patients' profession was also asked and correlated with acute M.I), physical activity (patients' level of physical activity was discussed. Those who were

having five km walk a day, five times/week were defined as physically active), drug addictions (alcohol and other drug addictions were discussed), socioeconomic stress (stress was assessed by asking questions according to perceived stress scale (PSS) and stress scoring was done. Stress was classified according to this scale as high intensity, moderate-intensity, or low intensity).

Data Analysis: Data were recorded and analyzed using SPSS v 22.0. Qualitative variables were reported using percentages and quantitative variables by using mean ± standard deviation. Student T-test was applied to compare differences in the percentage of different risk factors in young versus those reported in the literature for the normal population. A p-value of <0.05 was considered to be statistically significant.

Results

The results of our study showed that male patients were higher (93.3%) in proportion to female patients (6.7%). 33% of patients were drivers, 13% plumbers, 13% shopkeepers, 10% businessmen, 8% laborers, 5% policemen, 5% students, 5% bank officers, 3% engineers, 2% teachers, 1% doctors.

Smoking appeared to be an important risk factor. 68.3% of patients were smokers. Similarly stressful socioeconomic factors were important. 58.3% of patients were having high-stress scores. 23.3% of patients were having moderate stress scores. 18.3% were having low-stress scores. 56% of patients were having dyslipidemia. 48% of patients were obese. Family history was present in 26.7% of patients. Hypertension was present in 30% of patients. Diabetes Mellitus in 11.7% of patients.

70% of patients consumed a diet rich in fats. Similarly, 70% had a sedentary lifestyle. 1.7% drug-addicted (cocaine) were reported.

Table 1: Risk factors in premature CAD

Risk Factors	Percentage (%)
Male	93.3%
Smokers	68.3%
Dyslipidemia	56%
Hypertension	30%
Diabetes mellitus	11.7%
Obesity	48%
Sedentary lifestyle	70%
Fatty dietary habits	70%
Stressful life	68.3%
Family history	26.7%
Drug addiction	1.7%

Table 2: Profession and premature CAD

Profession	Percentage (%)
Drivers	33%
Plumbers	13%
Shopkeeper	13%
Businessmen	10%
Laborers	8%
Policemen	5%
Students	5%
Bank officers	5%
Engineers	3%
Teachers	2%
Doctors	1%

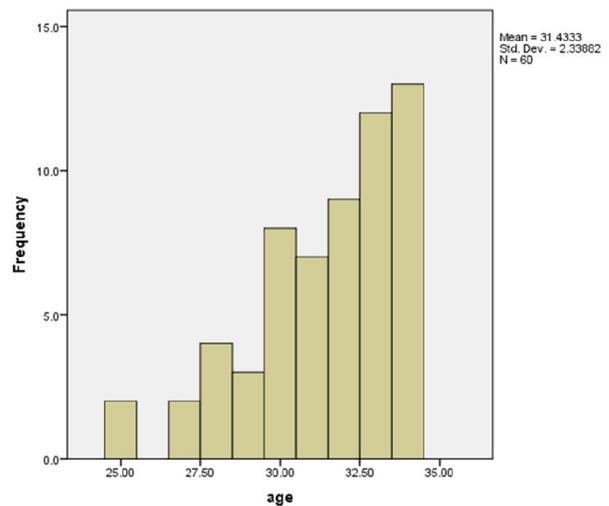


Figure 1: Histogram showing the distribution of study population according to age strata

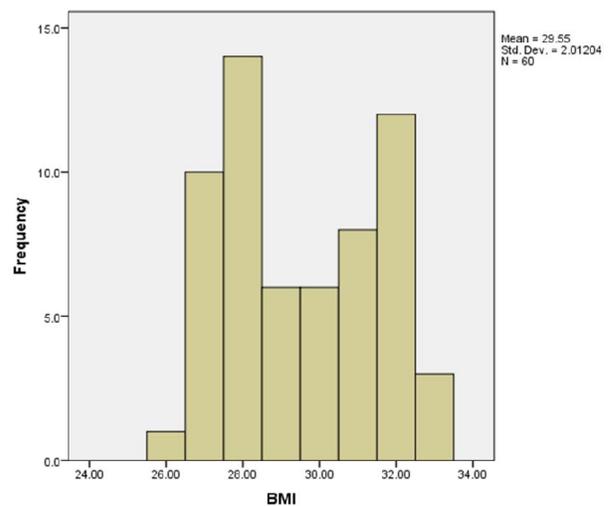


Figure 2: Distribution of study population according to BMI

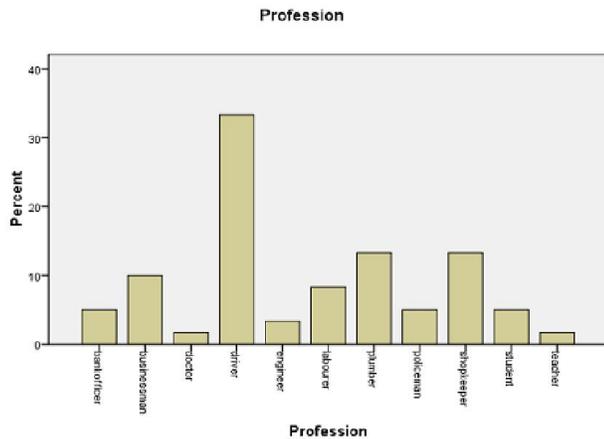


Figure 3: Distribution of study population according to occupation

Discussion

Coronary artery disease (CAD) is the leading cause of death worldwide and exerts a heavy socioeconomic burden on society.²⁴ Pakistan is experiencing an increase in coronary artery disease burden with the passage of time.²⁵ The prevalence of CAD has increased in Pakistan in recent years. One in every 4 middle-aged men in our country suffers from CAD.²¹ The young generation having CAD is also increasing in number in Pakistan. There are several risk factors prevalent in this generation like smoking and hyperlipidemia.¹⁸ We conducted our study to evaluate the frequency of various risk factors causing CAD in young individuals less than 35 years of age in our country. We also included occupation and socioeconomic stress as risk factors of CAD in addition to other common risk factors.

Male gender is an independent risk factor for CAD. In females before menopause, estrogen has a protective effect from Ischemic Heart Disease (IHD). This protective factor is not present in males. By the age of 40 years in males, there is a 50% lifetime risk of developing CAD while it is 33% in females of similar age. In our study, 93.3% of patients were males which highlights the importance of gender as a risk factor. In another study, 97.2% of young patients having IHD were males while in another study, 85% of young patients having IHD were males.

Smoking is an important risk factor for CAD. In Pakistan more than half of young patients with IHD are smokers.²³ In our study 68.3% of patients were smokers.

Family history is also an important risk factor of IHD in young patients.¹¹ Genetic factors play an important

role. In our study, 26.7% of patients had a positive family history.

Hypertension is also a risk factor for IHD. There is an important association between hypertension and CAD.¹⁶ It accelerates the process of atherosclerosis. In our study 45% of patients were hypertensive. This indicates that hypertension is increasing in the younger population which is possibly due to a sedentary lifestyle, bad dietary habits, and stressful life.

Diabetes mellitus is an important risk factor for IHD in both men and women.²⁴ It causes IHD in young people as well.^{17,18} It causes atherosclerosis in microvessels as well as macro vessels. In our study 11.7% of patients were Diabetic.

Dyslipidemia is another important risk factor of IHD.¹⁹ It is common in our population because of multiple factors including genetics, obesity, fatty diet intake, sedentary lifestyle. Triglycerides (TGs) in increased amounts are also an independent risk factor of IHD.²⁰ In our study we measured LDL, HDL, TGs, Total cholesterol, and results showed that 56% of patients were having dyslipidemia.

Obesity is also a risk factor of IHD in young people.²¹ It can be a part of metabolic syndrome which includes obesity, hypertension, dyslipidemias, insulin resistance. Metabolic syndrome can lead to IHD.¹²⁻¹⁴ In our study patients having BMI equal to or greater than 30 were classified as obese. 48% of patients in our study were obese. Physical inactivity and poor dietary habits also lead to obesity which is common in our population. Weight reduction can lead to reduced lipid levels as well as reduction of high blood pressure which reduces the risk of IHD.^{10,15}

A sedentary lifestyle is also a risk factor for IHD. It has been recognized as a risk factor in our population as well. Physical inactivity was associated with an increased risk of IHD in a study conducted in Peshawar. In our study, 70% of patients were having a sedentary lifestyle. There is also a lack of awareness in our population about the importance of the physical activity to prevent IHD. So emphasis should be made to educate people about its importance.

Diet is an important risk factor for IHD. However, in our country, the majority of people do not recognize the importance of a healthy diet. In our study, 70% of patients were consuming a diet rich in fat including Ghee, butter, eggs, red meat on regular basis along with a sedentary lifestyle. So, primary prevention strategies should also be objective at dietary education in our country.

We also studied the profession of our patients and we found out that the highest number (33%) of them were drivers, who were having a sedentary lifestyle, socioeconomic stress burden, poor dietary habits and 85% of these drivers were smokers. So an aggregate of risk factors was present in this profession resulting in their highest percentage in our study.

Socioeconomic risk factors are also an important cause of IHD. In our study, 68.3% of patients were having stressful socioeconomic conditions including poor monthly income, large family burden, and chronic diseases. These factors also lead to smoking and therefore increased risk of IHD.

Only 1 patient was addicted to cocaine in our study. No other drug addiction was present.

Conclusion

IHD is increasing in our young population due to several risk factors most of which are modifiable e.g. Hypertension, sedentary lifestyle, fatty dietary habits, obesity, smoking, diabetes, dyslipidemia. The profession also has an important correlation with IHD. This factor has not been studied in detail previously. Our study has proved that profession can be correlated with IHD due to stressful life, smoking, sedentary lifestyle all exposing the person to a higher risk of developing IHD. There is also a lack of awareness in our community regarding most of these risk factors. So, primary preventive strategies need to be applied to educate the people.

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