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Original Article

Association Between Potential Risk Factors and the Occurrence of Coronary Artery Disease

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ABSTRACT

Coronary artery disease is the major reason for high death rates in the United States and other European countries. In Pakistan, men are at greater risk of developing (CAD) in early ages as compared to women. A good deal of people suffering from CAD in Pakistan, belongs to the lower middle socioeconomic level. Aims of the present study were to observe risk factors associated with coronary artery disease e.g. smoking, hypertension, diabetes and obesity. **Methods**: It was a case control study carried out in Mayo hospital, a tertiary care hospital of Lahore. The study sample was 200, from which 100 were cases and other 100 were controls. In cases 77 were males and 23 were females and in controls 52 were males and 48 females were enrolled by using non-probability sampling. SPSS software was used to analyze the data and for finding out the association between different risk factors and CAD. **Results:** CAD was 4 times more in hypertensive cases as compared to non hypertensive cases; there is statistically significant association of hypertension with coronary artery disease. 42 were diabetics and 58 were non diabetic, and in controls 16 were diabetics and 84 were non-diabetic. There is statistically significant association of diabetes with coronary artery disease. In CAD patients 49 were smokers and 52 were non smokers. In controls 22 were smokers and 78 were non smokers. There is statistically significant association of smoking with coronary artery disease. In coronary artery disease patients 48 were obese and 52 were non-obese. In controls 27 were obese and 73 were non obese. There is statistically significant association of obesity with CAD. **Conclusion:** The present research has highlighted the increasing prevalence of CAD and its risk factors e.g. hypertension, diabetes mellitus, smoking and obesity. Development of focused strategies to improve awareness regarding coronary artery disease and its potential risk factors along with stressing on lifestyle modification is need of the hour.

INTRODUCTION

Coronary artery disease (CAD) is the most prevalent disease of heart, which results due to the accumulation of a waxy material inside the lumen of the coronary arteries [1]. This substance is known as plaque. Coronary arteries supply oxygenated blood to the heart muscles. CAD is developed due to insufficient blood supply to the heart muscles because blood vessels permit less blood to pass through them due to plaque formation [2,3]. As the volume of blood reaching the heart decreases, heart suffers from a shortage of oxygen resulting in myocardial infarction, heart attack or tissue death [4]. Coronary artery disease can lead to typical chest pain, heart attack, heart failure and abnormal heart rhythm [5]. Coronary artery disease is the leading cause of deaths worldwide due to CVD, with more than 4.5 million deaths occurring in the

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developing world [6]. CAD is the primary cause of death worldwide [7]. It is one of the significant causes of elevated morbidity and death rates in the United States and other developed countries. Indo-Pakistani population is at highest risk of developing CAD [8]. One in five middle-aged adults in urban Pakistan may have underlying CAD [9]. Obesity, depression, hypercholesterolemia, diabetes, smoking and elevated homocysteine are the risk factors for CAD [10]. Confined body fat distribution has a prominent impact on metabolism insufficiency and CVD imperilments. Rigorous abdominal (visceral) fat deposition is also a risk factor for CAD, dyslipidaemia, high blood pressure, stroke, and type 2 diabetes [11]. Indo-Pakistani populations have one of the highest risks of CAD in the world. Onset of depression is also seen among patients suffering from CAD [12]. CAD related to atherosclerosis is common. The adult atherosclerotic plaque is responsible for the symptoms of stable angina pectoris. The complications of the plaque (rupture, erosion) will lead to coronary thrombosis and subsequently to myocardial infarction and/or unexpected death [13]. Coronary artery disease is rapid emerging as the major concern for afflicting people across the globe [14]. Coronary atherosclerosis may also serve as an eminent causative factor for myocardial infarction, angina pectoris, arrhythmia heart failure, and sudden death [15]. As Pakistani population has an elevated incidence of CAD, the aim of this study is to fathom significant association between different potential risk factors liable for the onset of CAD. By finding out the clear association it will be easier to create awareness among people for the prevention of those factors and in response reducing the occurrence of CAD.

METHODS

This study was carried out using case control study design for the duration of one year. Non probability sampling technique was utilized to gather the samples. It was a hospital based, case control study undertaken in different wards i.e., CCU, ICU, Medical Ward and Outpatient Departments of Mayo Hospital, Lahore. Sample size was 200, from which 100 were cases and other 100 were controls which were consented and fulfilled the inclusion criteria. Data was entered and analyzed with the help of SPSS latest version. Descriptive statistic Mean ±S. D was used to describe the quantitative variables. Frequency tables, bar charts, and pie charts were used to describe the qualitative data. Chi square test was used to see the association among different variables. Odds ratio was calculated to see the risk in relation to different other variables.

RESULTS

	Coronary Artery Disease		
Diabetes Mellitus	**Cases**	**Controls**	**Total**
Yes	42 (21%)	16 (8%)	58
No	58 (29%)	84 (42%)	142
Total	**100**	**100**	**200**

Table 1: Case Control study between DM and CAD

Odds Ratio=3.80, p-value=0.000, (p-value<0.01). This table shows 21% patients were diabetic whereas 29% were non-diabetic. There is statistically significant association of diabetes with coronary artery disease.

	Coronary Artery Disease		
Smoking	**Cases**	**Controls**	**Total**
Yes	49 (24.5%)	22 (11.0%)	71
No	51 (25.5%)	78 (39.0%)	129
Total	**100**	**100**	200

Table 2: Case Control study between smoking and CAD

Odds Ratio=3.40, p-value=0.00 (p-value<0.01). This table presents approximately an equal % of CAD patients who were smokers and non-smokers. There is statistically significant association of smoking with coronary artery disease.

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	Coronary Artery Disease		
Obesity	**Cases**	**Controls**	**Total**
Yes	48 (24%)	27 (13.5%)	75
No	52 (26%)	73 (36.5%)	125
Total	**100**	**100**	**200**

Table 3: Case Control study between Obesity and CAD

Table 3: Odds Raito=2.49, p-value=0.002 (p-value<0.01). Presented data shows 24% CAD patients were obese whereas 26% were non-obese. There is statistically significant association of obesity with coronary artery disease.

	Coronary Artery Disease		
Hypertension	**Cases**	**Controls**	**Total**
Yes	66 (33%)	32 (16%)	98
No	34 (17%)	68 (34%)	102
Total	**100**	**100**	200

Table 4: Case Control study between Hypertension and CAD

Odds Ratio=4.125, p-value=0.000, (p-value<0.01). Data given above shows 33% patients were suffering from hypertension whereas only 17% were non-hypertensive. There is statistically significant association of hypertension with coronary artery disease.

DISCUSSION

Total 200 patients were enrolled in this study that was presented with chest pain. Out of which 100 were cases (coronary artery disease was diagnosed on angiography) while the other 100 patients were control (whose angiography finding was normal). In their study, 100 patients were examined, out of which 39 were without a serious coronary lesion and the left over 61 patients were having at least one lesion which was greater than 50% within the central branches of the coronary arteries [16]. Considering sample patients having positive angiographic reports, 77 were males and 23 were females [17]. Hypertension was significantly associated with coronary artery disease patients (p-value=0.000, OR=4.125). Significant association was also reported between hypertension and coronary artery disease patients [18]. In another study hypertension was significantly associated with coronary artery disease [19]. The current study showed significant relationship between diabetes and coronary artery disease patients (p-value=0.000, OR=3.80). Significant results were shown in the study done by Reynolds et al in 2010 for diabetes and hypertension for coronary artery disease patients (Reynolds et al., 2010) [20].

CONCLUSIONS

This study has highlighted the increasing prevalence of CAD and its risk factors e.g. high blood pressure, diabetes mellitus, smoking and obesity. Considering the current situation of the disease, it is crucial to develop customized strategies for providing awareness regarding coronary artery disease and its risk factors along with pressing on change in lifestyle. In this study it was noticed that coronary artery disease is prevalent or high in hypertensive, obese, diabetics or smokers individuals.

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