

The effect of multiple risk factors on the Severity of Coronary Artery Blockage among the Patients who had undergone Angiography in the Cardiology Unit of JHL

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ABSTRACT

Introduction: Coronary artery disease (CAD) is the leading cause of mortality in the elderly. Traditional cardiovascular risk factors (CVRFs) such as advancing age, diabetes mellitus, hypertension, dyslipidemia, smoking, obesity, and family history of CAD are well recognized for their association with clinical events and acute coronary syndromes; however, the correlation between CVRFs and atherosclerotic burden, assessed angiographically, is not as well established, with the studies reporting variable and inconsistent results.

Objectives: To study the effect of multiple risk factors on the severity of coronary artery blockage among the patients who had undergone angiography.

Study Design: A Descriptive Cross Sectional Study.

Place and Duration of Study: This study was carried out at Cardiac Unit Jinnah Hospital Lahore from May 2010 to July 2010.

Material & Methods: The study included 120 patients undergoing angiography and were assessed for severity of risk factors. Cross tabulation was performed with dependent variable, severity of coronary artery disease and independent variables like familial tendency, smoking, Diabetes, hypertension, obesity and high cholesterol level. Chi square test was applied to see statistical significance.

Results: Severity of coronary artery disease was assessed by number of coronary vessels involved. Vessels with more than 50% blockage on angiography were labeled as blockade. Among them 42 % of the subjects had one vessel involved and 78% of the subjects had more than one vessel involved. Mean age of subject were 53.0 yrs with SD + 11.7. 76.7 % were male and 23.3 % were female. 49.2 % had familial history of Coronary artery disease 66.7 % were smokers. 38.3 % of subjects had diabetes mellitus. 68.3 % of the subjects had hypertension. 37.5 % of the subjects were overweight. 17.5 % of the subjects had cholesterol level > 250 mg/dl 75.8% of the subjects had a proximal blockade, 20.0 % had a distal blockade and 4.2 % had both proximal and distal blockade. Smoking, duration of smoking, number of cigarettes smoked per day and obesity are positively associated with severity of coronary artery disease and are statistically significant ($P < .05$). While high cholesterol level, diabetes and Hypertension had a non-significant relationship in our study..

Conclusion: There is a significant association between the severity of risk factors and the severity of coronary artery disease. The association of Smoking, duration of smoking, number of cigarettes smoked per day and obesity with severity of coronary artery disease is statistically significant ($P < .05$).

Key words: Coronary blockage, Risk factors, Coronary artery disease, Coronary Angiography.

INTRODUCTION

The commonest cause of myocardial ischemia is reduction in coronary blood flow due to atherosclerotic coronary arterial obstruction. Thus, Ischemic Heart Disease (IHD) is often termed Coronary Artery Disease (CAD) or Coronary Heart Disease (CHD). IHD is the generic designation for a group of closely related syndromes resulting from myocardial ischemia. These syndromes are the late manifestations of coronary atherosclerosis that probably began during childhood or adolescence.^{1,2}

The clinical manifestations of IHD can be divided into four syndromes. Myocardial Infarction (MI), Angina,

Chronic IHD causing heart failure and sudden cardiac death. The prevalence and severity of the disease among individuals and groups are related to a number of factors, some are constitutional but others acquired and potentially controllable. The risk factors that predispose to atherosclerosis and resultant IHD have been identified by means of a number of prospective studies in well defined population groups; multiple risk factors may have a multiplicative effect.^{3,6} Age, gender and family history are non modifiable risk factors whereas hyperlipidemia, hypertension, cigarette smoking, diabetes and obesity are modifiable risk factors.

People of Indo-Asian origin have one of the highest susceptibilities to coronary artery disease (CAD) in the world, and it is therefore unsurprising that CAD is now the leading cause of death in the Indo-Pakistan subcontinent.⁴

Coronary artery disease (CAD) is the leading cause of mortality in the elderly, and more than 80% of the mortality due to CAD occurs in persons older than 65 years. Traditional cardiovascular risk factors (CVRFs) such as advancing age, diabetes mellitus, hypertension, dyslipidemia, smoking, obesity, and family history of CAD are well recognized for their association with clinical events and acute coronary syndromes; however, the correlation between CVRFs and atherosclerotic burden, assessed angiographically, is not as well established, with the studies reporting variable and inconsistent results.⁵⁻⁷ We designed this study to compare the severity of risk factors with the severity of coronary blockage, to assess the hypothesis that "The risk factors are more severe in patients who have severe coronary blockage as compared to the ones who have mild to moderate blockage.", and to identify those patients who have increased severity of risk factors so that they can be given intensive care.

MATERIAL AND METHODS

A descriptive cross sectional study was carried out at Cardiac Unit Jinnah Hospital Lahore from May to July 2010. The study included 120 patients undergoing angiography through purposive sampling technique. Minimum sample size was estimated using WHO statistical software Epi-info. The expected Odds ratio with smoking as risk factor was taken as 3.5 at 80% power and 95% significance level. Calculated sample size was 115 rounded off to 120.

After informed consent detailed demographic characteristics clinical history was taken. Risk factor evaluation and severity was done according to operational definitions. Coronary artery disease severity was categorized after their angiography findings (Vessels with more than 50% blockage on angiography were labeled as blockade) and severity was categorized according to number of vessels involved.

Data was entered and analyzed in SPSS. Frequency and percentage were tabulated for severity of coronary blockage and risk factors. Cross tabulation was done between severity of coronary blockage and risk factors severity and chi square was applied to assess the statistical significance.

RESULTS

In this study 120 subjects undergoing coronary angiography were selected. Mean age of subject were 53.0 yrs with SD $\pm$ 11.7. 29.2 % of the subjects were less than 45 years of age, and 70.8 % were more than 45 years of age. 76.7 % were male and 23.3 % were

female. 92.5 % of the subjects were married and 7.5 % were single.

49.2 % of the patients had familial history of Coronary artery disease among them 56.0 % had one or both parent with coronary artery disease, 30.5% had a sibling with coronary artery disease and 13.5 % had both. 66.7 % were smokers. Among them 30.0% smoke 5-10 cigarettes per day, 62.5% smoke 10-30 cigarettes per day and 7.5% were smoking more than 30 cigarettes per day. 12.5 % were smoking for 5 years, 23.8% were smoking for 5-10 years and 63.7 % smoking for more than 10 years.

Table No.1: Frequency of Risk Factors and Severity of Coronary Artery Disease.

Variables		Frequency	%age
Severity	Severe	78	65%
	Less severe	42	35%
Smoking	Smoker	80	66.7%
	Non-smoker	40	33.3%
Obesity	Obese	56	46.7%
	Non-obese	64	53.3%
Diabetes	Diabetic	46	38.3%
	Non-diabetic	74	61.7%
Hypertension	Hypertensive	82	68.3%
	Non-hypertensive	38	31.7%
Cholesterol	200-250mg/dl	99	82.5%
	>250mg/dl	21	17.5%
Family history	Yes	59	49.2%
	No	61	50.8%
Age	<45	35	29.2%
	>45	85	70.8%
Gender	Male	92	76.7%
	Female	28	23.3%
Number of cigarettes	<10-10/day	24	30%
	>10/day	56	70%
Duration of smoking	<10-10 yr	29	36.2%
	>10 yr	51	63.8%

Among patients who showed a severe pattern of disease on angiography 37.25 were diabetics and 62.8% were non diabetics. 74.4% were smokers and 25.65 were non smokers. 67.9% were hypertensive and 32.1% were non hypertensive. 44.9% were obese and 55.1% were non obese. 79.5% had high cholesterol level and 20.5% had normal levels. Severity of coronary blockage is found to be associated with smoking history, number of cigarettes smoked per day, duration of smoking and obesity. 72.5% of patients who smoked for more than 10 yrs showed severe disease as compared to 27.5% of patients who smoked for less than 10 yrs and developed severe disease (table 2). Among those who developed severe disease 18.4% were moderate smokers (<10 cigarettes/day) whereas 81.1% were heavy smokers

(>10 cigarettes/day) (table 2). 55.1% of patients with severe disease were obese and 44.9% were non-obese. Cross tabulation was performed with dependent variable, severity of coronary artery disease and risk factors like familial tendency, smoking, Diabetes, hypertension, obesity and high cholesterol level. Chi square test was applied to assess association. The

association of severity of coronary artery disease with smoking, duration of smoking, number of cigarettes smoked per day and obesity is found to be statistically significant ($P < .05$) (table 2). While high cholesterol level, diabetes and Hypertension had a non-significant relationship in our study.

Table No.2: Statistical Analysis of Risk Factors and Severity of Coronary Artery Disease.

Risk factors	Count & %	Severity		Total	P value for chi-square/ Fisher exact and Odd's Ratio
		Less Severe	Severe		
Smoker	Count	22	58	80	P =0.015 OR=2.64
	%	52.4%	74.4%	66.7%	
Obese	Count	13	43	56	P=0.01 OR=2.74
	%	31.0%	55.1%	46.7%	
Diabetic	Count	17	29	46	P=0.72 OR= 0.87
	%	40.5%	37.2%	38.3%	
Hypertensive	Count	29	53	82	P= 0.902 OR=0.95
	%	69.0%	67.9%	68.3%	
Hypercholesterolemia	Count	37	62	99	P=0.237 OR=1.91
	%	88.1%	79.5%	82.5%	
Age>45	Count	26	59	85	P=0.114
	%	61.9%	75.6%	70.8%	
Family history positive	Count	21	38	59	P=0.893
	%	50.0%	48.7%	49.2%	
Number of cigarettes >10/day	Count	9	47	56	P=0.001
	%	41.0%	81.1%	70.0%	
Duration of smoking >10 Yrs	Count	9	47	56	P=0.001

DISCUSSION

Our research is related to the comparison of severity of risk factors to severity of coronary blockage in patients undergoing angiography, the risk factors were familial tendency, smoking history, DM, HTN, obesity and cholesterol level. Researchers have shown that lifestyle change, including Physical activity, a healthy diet, and smoking cessation, alters the course of CHD severity⁸. In a meta analysis, fifteen studies reported diet as an outcome, with a total of 51 outcomes. Of these, 39 showed significant benefits for intervention patients compared to controls in relation to dietary consumption. These included significant improvement in specific food intake, such as fat, fibre, sugar, and cholesterol, diet score, diet knowledge, and habits, and for concern about dietary habits.⁹ These studies are consistent with our finding that obesity is positively associated with CAD. Obesity can be well controlled through life style modifications and dietary changes. In our study smoking, duration of smoking and number of cigarettes smoked per day show strong association with severity

of coronary artery disease. While all studies reported proportions of the study populations that smoked, only 13 studies reported smoking as an outcome and five of these reported significant reductions in smoking behaviors in the intervention groups¹⁰. Few studies reported a non-significant difference between intervention and control groups at one year, but significant at two and three years.¹⁰⁻¹³ Thirteen studies reported BP as an outcome, and five reported significant benefits for intervention compared to control patients. Giallauria et al reported significant improvements in SBP and DBP at 12 months and 24 months.¹⁴ Redfern et al reported significant difference in SBP among intervention compared to control patients at three months and 12 months.¹⁵ Campbell et al collected BP data from medical records and classified it as being managed according to British Hypertension Society recommendations if the last recorded measurement was less than 160/90 mmHg or receiving attention. The significant difference between intervention and control groups at one year was no longer observed at four-year follow-up.¹⁶ Total

Cholesterol and/or Lipid Levels outcomes were reported by 19 studies and 12 demonstrated significant benefits for intervention patients. Seven of these 12

studies reported significant improvements in total cholesterol for intervention patients compared to control.¹²⁻

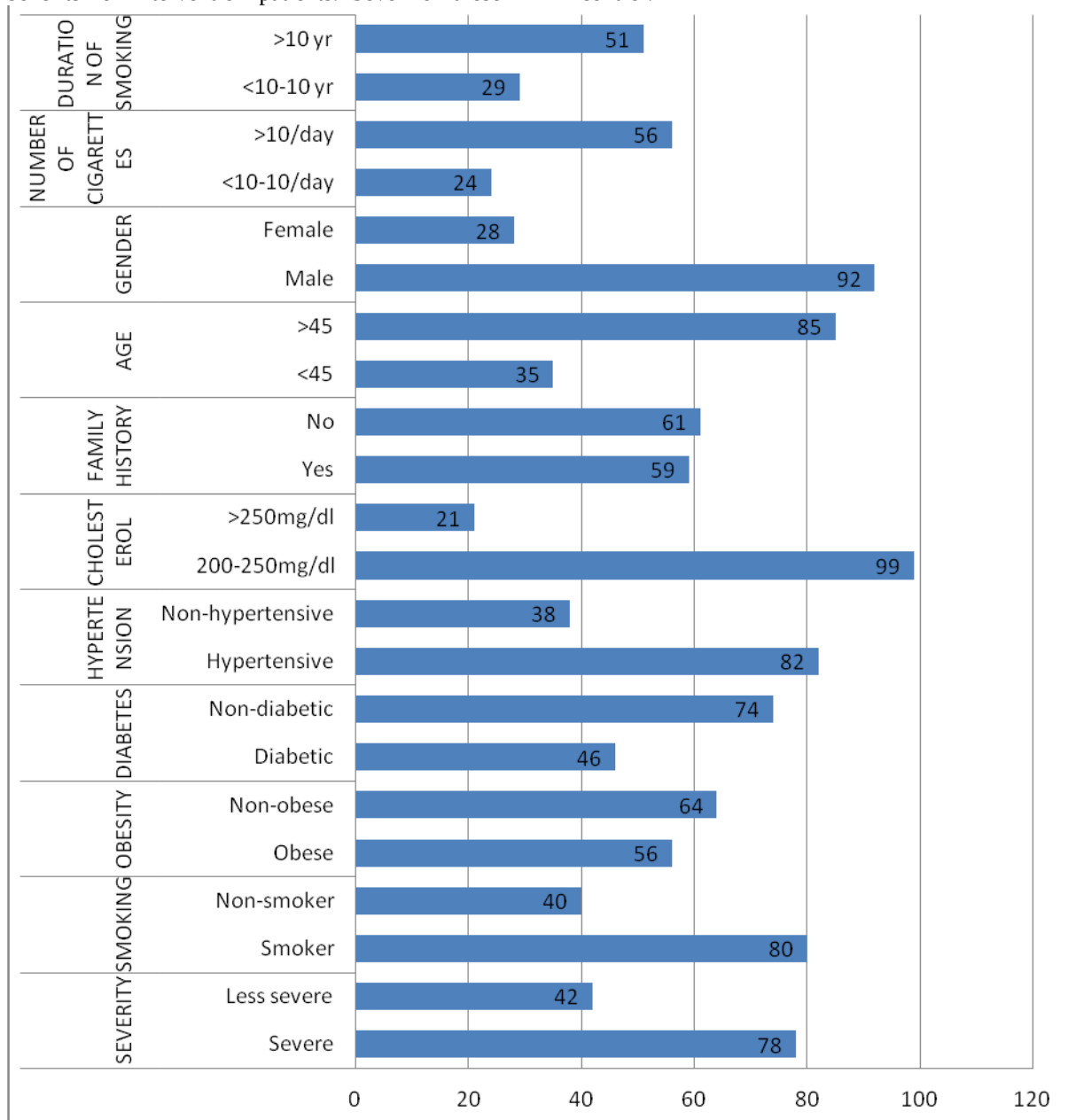


Figure: Percentage of Severity and Risk Factor

In our study association of hypertension, diabetes and high cholesterol levels has not come out to be significant though many studies have shown them to be positively associated. This deviation can be attributed to limited sample size. Thus, this area requires further exploration.

CONCLUSION

The conclusion of this study is that there is a significant association between the severity of risk factors and the severity of coronary artery disease. Patients having

multiple risk factors have severe coronary artery disease. Smoking, duration of smoking, number of cigarettes smoked per day and obesity have significant effect in severity of coronary artery disease as individual factors.

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