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FREQUENCY OF RISK FACTORS IN PATIENTS OF CORONARY ARTERY DISEASE UNDERGOING CORONARY ARTERY BYPASS GRAFT SURGERY AT A TERTIARY CARE CARDIAC UNIT

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ABSTRACT

Objective: To evaluate the frequency of risk factors with respect to age and gender in patients presenting for Coronary Artery Bypass Graft Surgery at a tertiary care cardiac facility.

Study Design: Descriptive cross sectional study.

Place and Duration of Study: Armed Forces Institute of Cardiology from February 2016 to October 2016.

Material and Methods: One hundred and seventy two individuals were enrolled in the study through purposive convenience sampling. All adult males and females undergoing elective coronary artery bypass graft (CABG) aged 18 and above were included in the study after informed consent. A structured questionnaire regarding the risk profile of patients was designed to collect the data from the history given by patients and their biochemical and radiological reports.

Results: The frequencies of male and female genders are 128 (74.4%) and 44 (25.6%) respectively. The age varies from 27 yrs to 77 yrs with a mean age of 57.29 ± 8.9. Maximum number of patients i.e. 73 (42.2%) lie within 56-65 years however we had a significant number of patients below the age of 55 years i.e. 67 (41.1%). Hypertension was the most common risk factor with 50 (28.9%) having stage II hypertension and 41 (23.7%) with Stage I hypertension. The second in line was diabetes with a frequency of 44 (25.4%). The prevalence of other risk factors like current smokers was 31 (17.9%), obesity 35 (20.2%), physical inactivity 92 (53.2%) with 112 (64.7%) having desk jobs and high salt and fat consumption 45 (26.0%) whereas the frequency of alcohol consumption was only 1 (0.6%). Among non modifiable risk factors 36 (20.8%) of the participants had a strong family history of coronary artery disease.

Conclusion: Our findings highlighted prevalence of CAD risk factors in younger age group. Modifiable risk factors like diabetes, hypertension, obesity and smoking need better control. Preventive screening programs and healthy lifestyle behaviors need to be emphasized upon in the Pakistani population.

Keywords: Coronary Artery disease, Coronary artery bypass graft (CABG), Risk factors.

INTRODUCTION

Coronary artery disease is the leading cause of death worldwide[1]. An estimated 17.5 million people died from CVDs in 2012, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease making it the most common public health problem which accounts for the greatest expenditure in most healthcare budgets[2]. In developing countries, CVD accounts for 86% of the global burden of disease[3]. There is a high prevalence of CAD risk factors in Pakistan with more than 30% of population over 45 years of age affected by the disease. There is no Pakistani study which cites prevalence of CAD except for one conducted in 1998. Although comparison of prevalence of cad risk factors between South Asians and other countries has been conducted in 2007 showing higher frequency of risk factors in South Asians[4].

Increased prevalence of CAD in Pakistan has led to an increase in number of coronary artery bypass grafting (CABG). CABG surgery is recommended to improve survival in high-risk

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patients based on evidence of prognostic benefit. It is also recommended to improve symptoms in patients with limiting angina despite medical therapy, or in whom medical therapy cannot be implemented because of contraindications or adverse effects to medications[5].

Risk factors for coronary artery disease are classified into modifiable and non modifiable. Non modifiable are age, family history and gender. Modifiable risk factors are high blood pressure, obesity, tobacco use, lack of physical activity, low fruit and vegetables intake, and heavy alcohol intake[6]. Conventional risk factors for the development of CAD include hypertension, diabetes, sedentary lifestyle, obesity, smoking, and a family history. These all have an adverse influence on prognosis in those with established disease, presumably through their effect on the progression of atherosclerotic disease processes[7]. Since the risk factors are present in the cultural and economic conditions context so it is somewhat difficult to control

Table-I: Demographic features of the subjects (n=172).

	Variables	N (%)
1.	**Gender**	
	Male	128 (74.4)
	Female	44 (25.6)
2.	**Marital status**	
	Married	17 (99.4)
	Single	1 (0.6)
3.	**Ethnicity**	
	Punjabi	91 (52.9)
	Pathan	48 (27.9)
	Sindhi	4 (2.3)
	Others	29 (16.9)
4.	**Occupation**	
	Armed forces	62 (36)
	Govt. sector	12 (7)
	Private	38 (22)
	Unemployed	60 (35)

Table-II: Clinical characteristics of patients n=172.

S.No.	Variables	N (%)
1	**No. of lesions**	
	Single vessel	3(1.8)
	Double vessel	30(17.4)
	Triple vessel	135(78.5)
	Multi vessel	4(2.3)
2	**Prior MI**	69(40.1)
3	**Prior PCI**	21(12.2)
4	**LV function**	
	Good	130(75.6)
	Moderate	37(21.5)
	Poor	5(2.9)
5	**Chest pain(CCS scale)**	
	I	24(13.9)
	II	84(48.8)
	III	27(15.6)
	IV	14(8.1)
6	**Dyspnea(NYHA scale)**	
	I	26(15.1)
	II	59(34.3)
	III	37(21.5)
	IV	9(5.2)
7	**Palpitation**	107(62.2)
8	**Sweating**	101(58.7)
9	**Nausea/Vomiting**	44(25.6)
10	**Fainting**	63(36.6)

them, but it is believed that there is a possibility to decrease mortality in at least 50% by controlling those risks[8].

Differences have been observed in the prevalence of risk variables between Indians, Pakistanis and Bangladeshis and the various ethnic and religious groups within the subcontinent. Numerous studies have attempted to identify risk factors for patients undergoing CABG surgery; however the data for their frequency in patients in our population undergoing CABG is inadequate. This data will contribute to assess the strength of these risk factors in specific association with CABG. In addition, the knowledge of these risk factors would help in policymaking for its effective control in the community. Thus, risk assessment becomes quite important in the prevention and management of CAD.

Table-III: Frequencies of risk factors with respect to age n=172.

S. No	Risk Factors	Age (years)				
1.		<45	46-55	56-65	>65	Total
	Gender					
	Males	15 (11.7%)	36 (28.1%)	54 (42.1%)	23 (17.9%)	128 (74.4%)
	Females	5 (11.3%)	15 (34.0%)	19 (43.18%)	5 (11.3%)	44 (25.5%)
2.	**Hypertension**					
	Normal	9 (12.16)	24 (32.43)	25(33.78)	16 (21.62)	74 (43.0%)
	Pre hypertensive	2 (25)	0	5(62.5)	1 (12.5)	8 (4.6%)
	Stage I	7 (17.5%)	12 (30%)	17 (42.5%)	4 (10%)	40 (23.2%)
	Stage II	2 (4%)	15 (30%)	26 (52%)	7 (14%)	50 (29.0%)
3.	**Diabetes mellitus**	3 (6.28%)	12 (12.2%)	22 (50%)	7 (15.9%)	44 (25.5%)
4.	**Smoking**					
	Active smoker	8 (25.8%)	7 (22.5%)	13 (41.9%)	3 (9.68%)	31 (18.0%)
	Ex-smoker	1 (2.9%)	10 (29.4%)	17 (50%)	6 (17.6%)	34 (19.7%)
5.	**Obesity(BMI)**					
	Normal	7 (11.4%)	15 (24.5%)	29 (47.5%)	10 (16.3%)	61 (35.4%)
	Overweight	9 (11.8%)	25 (32.8%)	31 (40.7%)	11 (14.4%)	76 (44.1%)
	Obese	4 ((11.4%)	11 (31.4%)	13 (37.1%)	7 (20%)	35 (20.3%)
6.	**Alcohol Intake**	0	0	1 (100%)	0	1 (0.5%)
7.	**Dietary intake**					
	High lipid	5 (15.6%)	14 (43.7%)	10 (31.2%)	3 (9.38%)	32 (18.6%)
	High sugar	0	0	4 (66.6%)	2 (33.3%)	6 (3.4%)
	High salt	0	0	2 (40%)	3 (60%)	5 (2.9%)
	Combined	8 (18.1%)	10 (22.7%)	20 (45.4%)	6 (13.6%)	44 (25.5%)
	Normal	7 (8.24%)	27 (31.7%)	37 (43.5%)	14 (16.4%)	85 (49.4%)
	Total	20 (11.6%)	51 (29.6%)	73 (42.4%)	28 (16.2%)	172
8.	**Physical activity**					
	Yes	8 (9.8%)	22 (27.1%)	28 (34.5%)	21 (25.9%)	81 (47.0%)
	No	12 (13.1%)	27 (29.6%)	45 (49.4%)	7 (7.6%)	91 (52.9%)
9.	**Type of job**					
	Desk job	10 (9.0%)	34 (30.6%)	50 (45.0%)	17 (15.3%)	111 (64.5%)
	Ambulatory	10 (16.3%)	17 (27.8%)	23 (37.7%)	11 (18.0%)	61 (35.4%)
10.	**Family history of CAD**					
	Death of either parent	5 (16.6%)	6 (20%)	14 (46.6%)	5 (16.6%)	30 (17.4%)
	CAD in close relatives	2 (6.25%)	8 (25%)	17 (53.1%)	5 (15.6%)	32 (18.6%)
	Both	6 (16.22%)	11 (29.7%)	14 (37.8%)	6 (16.2%)	37 (21.5%)

MATERIAL AND METHODS

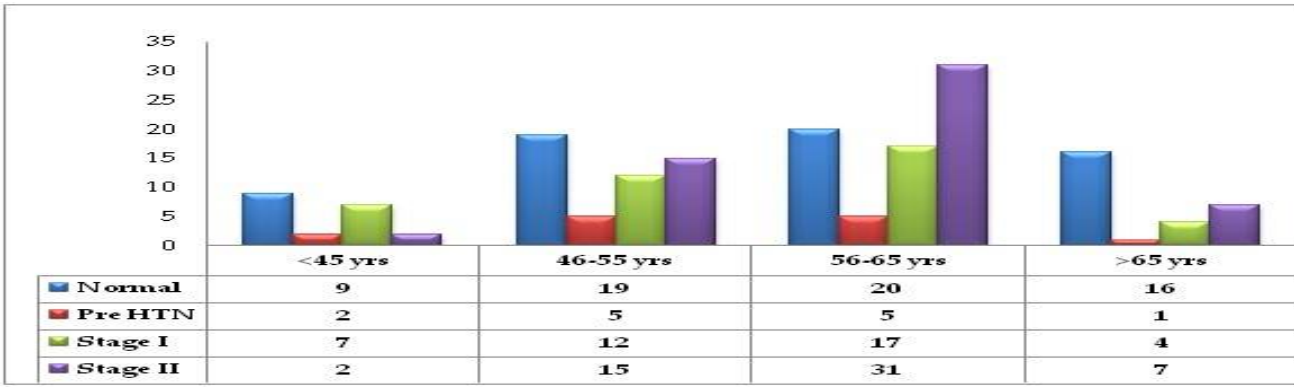
A descriptive cross sectional study was conducted at Armed Forces Institute of Cardiology & National Institute of Heart Disease from February 2016 to October 2016 after approval from institutional ethical review board. A total number of 173 individuals were enrolled in the study through purposive convenience sampling and informed consent was taken individually from all participants. All the adult males and females undergoing elective CABG,

CABG + concomitant surgery and aged 18 and above were included in the study. Patients who underwent emergency CABG surgery were excluded from the study. A structured questionnaire was designed to collect the data from the history given by patients and their biochemical and radiological reports.

Sixty years or more at the time of presentation was considered as advanced age as described by the American Heart Association to be the first cutoff limit for CAD. Hypertension was defined as systolic pressure of more than 140mmHg and diastolic pressure of 90mmHg using WHO criteria Hypertension was categorized into Normal (SBP 90-119mmHg and DBP 60-79mmHg), Pre-hypertensive(SBP 120-139mmHg and DBP 80-89mmHg), Stage I (SBP 140-159mmHg and DBP 90-99mmHg) and Stage II (SBP >160mmHg and DBP>100mmHg) as per the standard classification. Data on hypertension was taken through patient's history and confirmed by patients documents. Diabetics were defined as having a fasting blood glucose level >7.0 mmol/L on or on oral anti diabetic drugs or insulin therapy. Those who quit smoking a year ago were considered ex smokers while those who currently smoked or quit in less than a year were considered active smokers. Obesity was assessed by measuring Body Mass Index (BMI) as per following criteria:

Height was measured via measuring tape and weight via weighing machine. Patients taking more than 5 drinks per week were considered alcoholic. Those patients who were not in habit of brisk walk for 30 minutes five days a week were labeled physically inactive. Nature of the job (desk job or ambulatory) was also investigated. History of regular intake (twice a week) of large amounts of meat, dairy products, trans fatty acids (oil and ghee) was considered unhealthy diet since exact measurements were not possible. CRP was measures via ELISA method. LVH was determined by measuring width of left ventricular wall on echocardiography. Carotid artery disease was assessed by viewing carotid Doppler ultrasonography.

Data were analyzed by using SPSS 22 version. Frequency tables for all the risk factors were made and occurrence of risk factors between different age groups was compared.



	<45 yrs	46-55 yrs	56-65 yrs	>65 yrs
Normal	9	19	20	16
Pre HTN	2	5	5	1
Stage I	7	12	17	4
Stage II	2	15	31	7

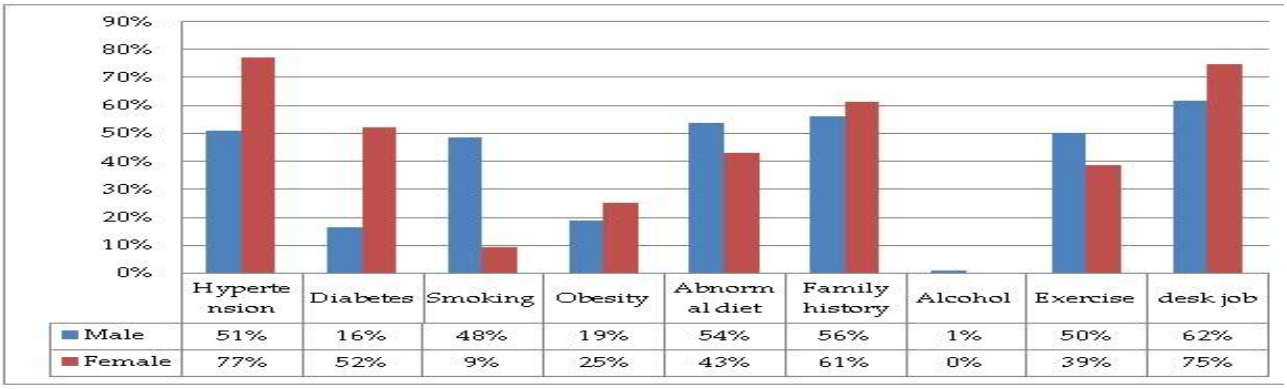
Figure-1: Frequency of hypertension at different ages.

RESULTS

In the present study a total of 172 patients undergoing CABG surgery were included according to inclusion criteria, with a preponderance of male gender 128 (74.4%) as compared to females 44 (25.6%). Majority of our study population belonged to Punjab 91 (52.9%). The age varies from 27 yrs to 77 yrs with a mean age of 57.29 ± 8.9. The number of patients in the 56-65 years of age group was maximum 73 (42.2%) however we had a significant number of patients below the age of 55 years 67 (41.1%). Among all the modifiable risk factors hypertension was the most common risk factor

coming for CABG surgery with 50 (28.9%) having stage II hypertension and 41 (23.7%) with Stage I hypertension. Fig-1 shows the prevalence of hypertension in various age groups. The second

as its main manifestation, is a major cause of death in the country. There is a high prevalence of CAD risk factors in Pakistan with more than 30% of population over 45 years of age affected



	Hypertension	Diabetes	Smoking	Obesity	Abnormal diet	Family history	Alcohol	Exercise	desk job
Male	51%	16%	48%	19%	54%	56%	1%	50%	62%
Female	77%	52%	9%	25%	43%	61%	0%	39%	75%

Figure-2: Distribution of risk factors with respect to gender.

most common risk factor was diabetes with a frequency of 44 (25.4%). The prevalence of other risk factors like current smokers was 31 (17.9%), obesity 35 (20.2%), physical inactivity 92 (53.2%) with 112 (64.7%) having desk jobs and high salt and fat consumption 45 (26.0%) whereas the frequency of alcohol consumption was only 1 (0.6%) table I, II and III. Of all the non modifiable risk factors 36 (20.8%) of the participants had a strong family history of coronary artery disease. Majority of the patients presented with triple vessel coronary artery disease 135 (78.5%) with a history of prior MI 69 (40.1%) and prior Primary percutaneous coronary intervention 21 (12.2%). Most of the patients had good LV function 130 (75.6%). 59 (34.3%) of the patients reported dyspnea NYHA class II and CCS II score of 84 (48.8%). Fig-2 depicts the frequency of various risk factors with respect to gender in our study population.

DISCUSSION

This study helped us to evaluate the prevalence of various risk factors for CAD leading to CABG surgery in our local population. During recent decades, Pakistan has undergone epidemiological transition from communicable to non-communicable diseases. Coronary heart disease (CHD), with myocardial infarction (MI)

by the disease[9,10].

Among the non modifiable risk factors age was an important entity as almost half of the patients 67 (41.1%) were below the age of 55 constituting young adults in our study. This finding is in line with the published literature[11-13] suggesting younger age group in South East Asian countries presenting for CABG surgery. Male gender is another important risk factor in our study 128 (74.4) with a male to female ratio of 2.9 reflecting male gender as a significant risk factor for CAD.

Among modifiable risk factors hypertension was the most frequent in our study and similar findings have been reported by Kulkarni et al depicting a prevalence of hypertension in Indian population[14]. This study shows the prevalence of diabetes as 44 (25.4%) coming for CABG surgery. This finding is in accordance with Hayashi et al that states that the elderly patients with type 2 diabetes mellitus (T2DM) have much higher risks of ischemic heart disease (IHD) and Cerebrovascular accident (CVA) compared to younger diabetic patients[15,16].

Active smoking was reported in 31 (17.9%) and there were 35 (20.2%) ex smokers in our study population. This finding is further validated by Abbas et al documenting higher

prevalence of smoking in male gender in Pakistani population.

The present study also highlights obesity as one of the important risk factors in patients presenting for CABG surgery. Various studies have stated that both increasing body mass index and waist circumference are associated with increased risk of developing coronary artery disease. Moreover, those with abdominal obesity had a higher risk of developing CAD in next 6 years as compared to those with generalized obesity. Dietary risk factors were reported from 45 (26.0%) of the patients, this is in line with various studies documenting a complex association between dyslipidemia and dietary factors predisposing to CAD[17,18]. The risk of family history was found in 36 (20.8%) of the participants. Prashanth K et al found that positive family history of premature CAD was present in 32% of Indian population[19,20].

CONCLUSION

Our findings highlight a high prevalence of CAD risk factors in patients undergoing CABG surgery affecting female gender predominantly. Modifiable risk factors like diabetes, hypertension and smoking and dietary intake need better control. Preventive screening programs and healthy life style behaviors need to be emphasized upon in the Pakistani population.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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