



GENDER DIFFERENCE IN CORONARY ARTERY DISEASE- DEMOGRAPHIC AND CLINICAL CHARACTERISTICS-EVIDENCE FROM A HOSPITAL BASED STUDY

Cardiovascular

Indira Rani

PhD Scholar-IIHMR University, Prabhu Dayal Marg, Maruti Nagar, Jaipur, Rajasthan 302029, India.

Mohit Goel

Associate Director-Neurology, Max Smart Super Specialty Hospital, Saket, New Delhi

Diksha Sharma

Senior Executive Nurse, Jaypee Hospital, Sector-128, Noida - 201304

ABSTRACT

Background. Globally Cardiovascular diseases (CVDs) remain as a leading cause of mortality and morbidity and accounts for one third of all total deaths. Coronary artery disease is emerging as a major health problem in India. CVD mortality risk factors varies as per the region and gender. Obesity being highest risk factors in females. Hypertension, diabetes, smoking, physical inactivity higher in males in comparison to females. **Aim:** The aim of this study is to explore the gender difference in specific risk factors and clinical presentation of coronary artery disease among population who underwent CABG surgery in Northern part of India. **Methods.** This is a retrospective cohort study. Secondary data of patients who had undergone CABG surgeries from September 2014 to December 2019. used to find out gender differences in coronary artery disease (CAD) at a tertiary level hospital, situated in the National Capital Region, Delhi, India. A total of 539 patients were included in the study after inclusion and exclusion criteria. Data on demographic profile, comorbidities and clinical presentation, diagnostic reports and operative factors analysed. **Results.** CAD is prevalent in the most productive age of both gender. Female gender experience CAD mostly after 50 years of age. Hypertension and Diabetes were the leading risk factors in this group of patients. Active smoking in males was more at 30.82% (135) in comparison to females 2.97%. Female Obesity (19.80%) and overweight (40.59%) prevalent more in females and Triple vessel block presented in 400 males (91.32%) and in 88 females (87.13%).

KEYWORDS

Gender difference, CAD, CVD, CABG Surgery, Risk Factors,

INTRODUCTION:

On Confronting the world's number one killer- The Cardio vascular diseases, World Heart Federation has published a report in 2023. The report evidenced that CVDs remain as leading cause of mortality and morbidity globally accounts for one third of all total deaths.

20.5 million people died related to CVD in 2012 globally.[1]. The report states that Global burden of CVD mortality has risen in low and middle-income regions and a clear correlation between lower expenditure on health and higher CVD mortality. Risk factors varies as per the region and gender. Obesity being highest risk factors in females. Hypertension, diabetes, smoking, physical inactivity higher in males in comparison to females. [1,2]

By the year 2030, the ischemic heart diseases may exceed 1,845 per 100,000 population. Cardiovascular risk varies from high income, low income and middle-income countries. Substantial variation in risk factors found in the risk prediction model derived by the WHO CVD Risk Chart Working Group [3]

The GBD Study estimates, the rate of decline in CVD mortality has slowed considerably in most countries in recent years for both males and females, particularly at ages 35-74 years. In North America (US males and females, Canada females), the CVD-mortality rate even increased in the most recent year. [4]

As per the Atherosclerosis Risk in Communities (ARIC) Surveillance study in 4 US communities between 1995-2014 younger age group of 35 years to 54 years had increased incidence of hospitalizations due to Myocardial infarction [5], Demographic and Health Surveys by International diabetes federation (2021) found that - Diabetes is more prevalent in Indian women (12%) than global average of 9% in other countries.(6) CAD increased in Indian women by 300% over past 20 years. Indian women mean age of heart attack is 59 years, when compared to women in developed countries (7). In 2016, India has the percentage of total deaths in Males 29.2% and females 26.7% and Disability adjusted life Years (DALYs) 15.8% in males and 12.2% in females. The leading risk factors were dietary (45%), Hypertension (54.6%) other important factor as air pollution.[8]

Cardio vascular diseases risk factors and symptoms vary as per the gender and age groups. Active Smoking women experience CAD symptoms 9 years later than men(9,10). The differences are usually caused due to genetic structure and life style. Identifying the specific risk factors in both gender is necessary for bringing awareness in the community for prevention of CVD.s by adapting a holistic health approach. Atypical symptoms, incidence of diabetes, hypertension and

Obesity or over weight present in north Indian women later in their age.(10,11)

The aim of this study is to explore the gender difference in specific risk factors and clinical presentation of coronary artery disease among population who underwent CABG surgery in Northern part of India. Region wise studies are important to understand CVD risk factors and bring awareness in the public about preventive health screening, to adapt a healthy, happy life style and thus contribute towards a safe environment to prevent Cardio vascular diseases.

METHODOLOGY:

This is a retrospective cohort study using secondary data of patients who had undergone CABG surgeries from 2014 to December 2019. (Five years data) at a tertiary level hospital, situated in National Capital Region, Delhi, India. Permission obtained from Institutional Review Board (IRB) of the hospital and a total of 539 patients were included in the study after inclusion and exclusion criteria. Indian patients age 18 years and above, who underwent first time isolated CABG surgery were included. Data on demographic profile, comorbidities and clinical presentation, diagnostic reports and operative factors extracted from hospital information electronic base and from patient files. Nurse educators and Cardiac unit nurse supervisor assisted in data extraction. Confidentiality of data maintained throughout the study. The study was a part of PhD thesis, approved by the hospital ethics committee.

Statistical Analysis:

All variables in the study are categorical and applied STATA version 12.1 for analysis, to assess the association between categorical variables Chi square test was used. Statistical significant defined at $p < 0.05$ level of significance.

RESULTS:

Of the 539 patients, 101 (18.74%) were female and 438 (81.26%) were male. The age distribution of male and female presented in fig 1. The mean age of male was 61.04 years and female were 60.38 years. The youngest female was 29 years and oldest 89 years. In males the youngest was 28 years and oldest at 85 years. The distribution of gender as per productive age (59) years for males was 188 (42.9%) and female was 44 (43.56%)

Table :1 Demographic of details -Age

Gender	Male	Female	Total
N	438	101	539

Mean	61.03	60.37	60.91
sd	9.35	9.14	9.3
min	61	29	28
max	85	89	89

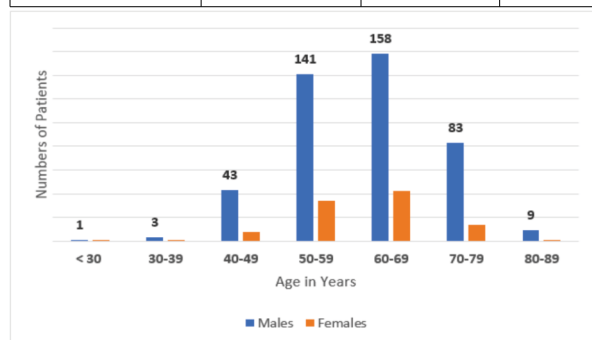


Fig: 1 Age Distribution among Gender

Table: 2- Health Care Finance for Treatment of CAD

Gender	No health Insurance	Government financed	Commercial health Insurance
Male	336(76.71%)	17(3.88 %)	85(19.41%)
Female	83(82.18 %)	4(3.96%)	14(13.86%)
Total	419(77.73%)	21 (3.89%)	99(18.36%)

77.73% (419) of the study sample is devoid of health insurance, their hospitalization bills were self-paid. Private or commercial health insurance covered by 18.36% (99), whereas government finance availed by very less 21 (3.89%) of patients. Health insurance coverage was very poor in females 14 (13.86%) in compared to males 85(19.41%), showing gender inequality for health insurance.

Table 3: Distribution Of Risk Factors Among Study Population

Diabetes Mellitus	Male	Female	P value
Non-diabetic	215(49.09%)	46(45.54%)	0.521
Diabetic	223(50.91%)	55(54.46%)	
Hypertension			
Non-hypertensive	183(41.78%)	36(35.64%)	0.258
Hypertensive	255(58.22%)	65(64.36%)	
Body Mass Index			
Under weight	6 (1.37%)	1(0.99%)	0.069
Healthy weight	210(47.95%)	39(38.62%)	
Over weight	175(39.95 %)	41(40.59%)	
Obese	47(10.73%)	20(19.80%)	

Hypertension and Diabetes are the leading CVD risk factors in this group of patients.

The percentage of hypertension in females 65(64.36%) and in males 255(58.22%). And other predominant risk factor diabetes present in 54.46% (55) of females and 223(50.91%) in males.

Active smoking in males were more at 30.82% (135) in comparison to females 2.97% (3)

Male obesity was less (8.71%) in comparison to female patients (19.80%) and females over weight at 40.59% and males at 32.76%.

Table 4: Disease Characteristics of Study Population

Coronary Artery Blockage	Male	Female	P value
Number of Vessels blocked			
Single vessel	2(0.46%)	2(1.98%)	0.183
Double vessel	36(8.22%)	11(10.89 %)	
Triple vessel	400(91.32%)	88(87.13%)	
Left Main Artery Stenosis			
No	282(64.38%)	69(68.32%)	0.455
Yes	156 (35.62)	32(31.68%)	
Ejection Fraction			
Severe Dysfunction	23(5.25%)	1(0.99%)	0.007
Moderate dysfunction	100(22.83%)	11(10.89%)	
Mild dysfunction	99(22.60%)	26(25.74%)	

Normal	216(49.32%)	63(62.38%)	
History of Myocardial Infarction			
No	236(53.88%)	71(70.30%)	0.011
Yes (old)	134(30.59%)	20(19.80%)	
Recent (< 3 weeks)	68(15.53%)	10(9.90%)	
Heart failure (NYHA Classification)			
I	0	0	0.542
II	3 (0.68%)	0	
III	395 (90.18%)	94 (93.07%)	
IV	40(9.13%)	7(6.93%)	

Table:4 describes disease characteristics of patients. Single vessel block is equally prevalent in both male and female very low in both, males **2(0.46%)** and females 2(1.98%). Triple vessel blocked present in **400 males (91.32%)** and in females 88(87.13%), p value of 0.183 is not significant.

Left main coronary artery stenosis present in 156 (35.62%) males and in 32(31.68%) females which is statistically not significant at $p < 0.05$ level of significance.

Normal Ejection fraction seen in 216(49.32%) males and in 63(62.38%) females. 22.60% males and (25.74%) females had mild dysfunction. Moderate dysfunction 22.83% and severe in 5.25% males, a significant difference seen in ejection fraction between male and female with a p value of 0.007

No previous history of Myocardial Infarction in 236(53.88%) of males and 71(70.30%) of females.

MI less than 3 weeks duration seen in 68(15.53%) of males and 10(9.90%) in females. Old MI (more than 3 weeks) seen in 134(30.59%) of males and in 20(19.80%) females.

Severe symptoms of heart failure as per New York Heart Association (NYHA) classification present in 40(9.13%) males and 6.93% of females. Moderate symptoms of heart failure in 90.18% of males and 93.07% of females which is statistically not significant.

DISCUSSION:

Coronary artery disease is emerging as a major health problem in National Capital region of India, affecting most productive age group between 40-59 years of age, The distribution of gender as per productive age males was 42.9% and female 43.56. But the prevalence of CAD in females were more significant after 50 years of age, Insights from InterHeart study conducted by Sonia S Anand(8) stated that Men were likely to get heart attack before 60 years of age than women and women experience first heart attack 9 years later than men.

CAD treatment has a financial burden on families, in this study 419(77.73%) of patients did not have any type of health financing. National Family Health survey 5 (NFHS 5) of India data revealed that health insurance coverage of age group 15-49 years showed 30% of women and 33% of men were with health financing schemes. Study did not find significant difference in predominant risk factors like Diabetes, and Hypertension but female patients found to be overweight and obese in comparison to male patients.

In Disease characteristics, triple vessel block with left main stenosis is common in both genders, first time MI experienced in 70.30% of females, Moderate heart failure (NYHA) seen in both gender with no significance of difference.

CONCLUSION:

Finding in the study conclude that CAD is prevalent in most productive age of both gender, Female gender experience CAD mostly after 50 years of age. There was no significant gender difference predominant CAD risk factors like Hypertension, diabetes, Body mass index (Obesity, overweight). There was no significant difference in presentation of clinical symptoms in both gender except for Heart failure which is significant in male patients. Awareness to the community is necessary to prevent premature mortality and morbidity in the productive age group.

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