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Original Research Article

A Hospital Based Epidemiological Assessment of Coronary Artery Disease (CAD) at Tertiary Care Hospital in Darbhanga Region

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Abstract

Background: Coronary artery disease (CAD) among CVDs is the largest killer in the developed world and is rapidly becoming one in developing countries. CAD is a leading cause of mortality, morbidity and disability with high healthcare costs.

Material & Methods: It was a hospital-based cross-sectional study, conducted at Darbhanga Medical College & Hospital, Darbhanga, Bihar, India over a period of one year. Study subjects consisted of old and newly diagnosed CAD cases attending the hospital. Information was collected on a pre-structured, well designed scheduled questionnaire. A total of 200 study subjects were included in the study.

Results: The gender influence when studied separately, it was observed that the mean age of the study subjects among females 54.71 ± 1.006 was slightly lower than males 55.63 ± 1.182. Only 17 of the CAD subjects had post graduate education, while only 8 had professional degrees. The majority of smokers and Ex-smoker were males as compared to females.

Conclusions: The findings of the present study suggest that several modifiable risk factors and non-modifiable risk factors are responsible for Coronary artery disease like age, past history of diseases and education level.

Keywords: Coronary heart disease, risk factors, hypertension, diabetes, waist-hip ratio

Introduction

Coronary Artery Disease (CAD) is characterized by the presence of atherosclerosis in coronary arteries and it can be asymptomatic. Coronary Heart Disease (CHD)/Ischaemic Heart Disease (IHD) include the diagnosis of Stable angina, Acute Coronary Syndrome (ACS) and silent myocardial ischaemia. ACS almost always presents with a symptom and includes unstable angina and myocardial infarction. For simplicity, herein we will refer to CHD as CAD.

Coronary artery disease is the foremost single cause of mortality globally. A large number of this burden falls on low and middle income countries accounting for nearly 7 million deaths and 129 million DALYs annually [1–5]. In 2015 CAD accounted for 8.9 million deaths and 164.0

million DALYs [6]. The survivors of Myocardial Infarction (MI) are at high risk from recurrent infarction and have at least five to six fold higher annual mortality rate compared to individuals who do not have CAD [7–11].

CAD among Indian population differ in three aspects: relatively earlier occurrence (Indians acquire CAD at least 10 years earlier than their western counterparts), higher case fatality (a comparatively higher proportion die after a heart attack as compared to the western counterparts) and the occurrence of disease at lower risk factor threshold particularly overweight and obesity. [12]

The need for CVD surveillance arises from the demographic transition being accompanied by a "risk transition. There is emerging evidence that the Indian are at highest risk of acquiring NCDs owing to high rates of smoking and tobacco use, occupational risks, and living conditions which has further exacerbated the financial concerns. [13]

Preventing coronary artery disease is mainly about controlling the risk factors. Ideally, prevention habits start early, but they remain essential throughout life. It is never too late to effect change, though the earlier in life you do so, the greater the advantage [14].

The purpose of this study was to review epidemiological data of CAD in Bihar. This will help in making strategies for primary and secondary prevention of CAD according to the risk factors present and to availability of resources within the region.

Material & Methods:

After obtaining Ethical Clearance from the Institutional Ethical Committee of Darbhanga Medical College & Hospital, a hospital based cross sectional study, conducted at Darbhanga Medical College & Hospital, Darbhanga, Bihar, India, over a period of one year. Study subjects consisted of old and newly diagnosed CAD cases attending the hospital. Information was collected on a pre-structured, well-designed, scheduled questionnaire. New and old cases of CAD were included in the study, and patients who were unconscious and did not give consent were not included in the study.

The subjects were explained about the purpose of the study and assured of secrecy and confidentiality of the information they provided us.

A total of 200 study subjects were included in the study. The first case was selected randomly then further every case was selected till 200 study subjects were covered. If any patient did not agree, then the next case was included in the study. After obtaining the written consent, the socio demographic data, personal habits and history of past and family history of illnesses was recorded. Physical measurements i.e., weight and height, were recorded. Data were entered into Microsoft excel sheet and analyzed using Epi-info software. Descriptive statistics and inferential statistical tests were analyzed.

Results:

Table 1: Gender wise distribution of the study subjects

Gender	No.
Male	161
Female	39

Table no. 1 shows that out of 200 study subjects, majority of the study subjects were 161 males and 39 were females.

Table 2: Mean age of the study subjects

Gender	Mean Age ± SD
Male	55.63 ± 1.182
Female	54.71 ± 1.006
Total	53.48 ± 1.162

Table no. 2 shows that the mean age of the study subjects of coronary artery disease (CAD) was found to be 53.48 ± 1.162, when the data for male and female subjects were pooled together. The gender influence when studied separately, it was observed that the mean age of the study subjects among females 54.71 ± 1.006 was slightly lower than males 55.63 ± 1.182.

Table 3: Distribution according to Educational status

Education status	Male	Female	Total
	N	N	N
Illiterate	41	15	56
Primary	52	10	62
Secondary	27	3	30
Graduate	22	5	27
Post Graduate	14	3	17
Professional	5	3	8
Total	161	39	200
$\chi 2 = 11.582$		P value = 0.05	

Table no. 3 shows that study subjects of coronary artery disease (CAD) in the present study, the highest number found was illiterate 56 followed by primary education 62, secondary education 30 and graduation 27. Only 17 of the CAD subjects had post-graduate education, while only 8 had professional degrees.

Table 4: Distribution according to Gender and their Past H/o of HTN, DM

Past history	Male	Female	Total
	N	N	N
Only HTN	25	10	35
Only DM	9	4	13
HTN + DM	38	12	50
No H/o HTN / DM	89	13	102
Total	161	39	200
$\chi 2 = 11.182$		P value = 0.05	

Table no. 4 shows that overall 35 subjects of CAD had hypertension. There were 38 males and 18 females those who had both the co-morbid disease (HTN + DM). On the other side 102 patients had no history of co-morbid disease.

Table 5: Distribution according to Gender and Smoking Tobacco

Status of the Smoking	Male	Female	Total
	N	N	N
Current	118	2	120
Ex – Smoker	20	1	21
Non - Smoker	23	36	59
Total	161	39	200
$\chi 2 = 133.7221$		P value = 0.01	

Table no. 5 shows that the majority 120 of study subjects of coronary artery disease were current smokers, followed by 21 Ex-smokers and 59 nonsmokers. the majority

of smokers and Ex-smoker were males as compared to females.

Discussion:

In the present study the mean age of the study population was 53.48 years and majority of them are males. The age and sex-wise distribution of study subjects was similar to the study carried out by Shahadat et al. i.e. males 53.2% and female 46.85%. [15] A study done in Nepal also showed a strong association with male (75.7%) [16]. This male preponderance is seen in the INTERHEART study (overall male 76%) and its South Asian cohort (85%) [17].

A community-based cross-sectional study carried out by Joshi et al. showed that the prevalence of coronary heart disease in rural area (3.8%) was less than urban area (8.8%) with significant difference ($p < 0.01$) similar to the present study findings. [18]

Smoking is an established risk factor for IHD and nearly 30% of all deaths from ACS were found to be attributed to smoking [19]. Alcohol abuse is a risk factor for occurrence of early ACS and patients with a combination of alcohol abuse and smoking had an even higher risk of developing very early ACS than those with the two individual risk factors alone [20].

Majority 120 of study subjects of coronary artery disease were current smokers, followed by 21 Ex-smokers and 59 nonsmokers. the majority of smokers and Ex-smoker were males as compared to females. Current smoking is an independent predictor of atherosclerotic plaque burden. Smoking causes plaque instability with a thin plaque cap leading to increased plaque rupture and superadded thrombosis due to the prothrombotic effect of smoking, which can explain the likely presentation of STEMI than of NSTEMI in smokers [21, 22].

In the present investigation overall 35 subjects of CAD had hypertension. There were 38 males and 18 females those who had both the co-morbid disease (HTN + DM). On the other side 102 patients had no history of co-morbid disease.

According to the INTERHEART study the prevalence of hypertension in the South Asian cohort was 31.1% which is much lower than our study. However, a study done in India [23] reported 48.8% HT and another study showed 40.2% [24] of Indians with ACS to be hypertensive similar to our study. However the ACCESS group of investigators reported a higher prevalence of HT (STEMI 78%, NSTEACS 87%) in ACS patients in other developing countries compared to Sri Lanka and India [14].

Diabetes is another important risk factor which was found in 29.3% of the study population compared to a study in India reporting 35.5% having DM [23]. Interestingly, DM did not show a significant association with the type of ACS in our study in contrast to Sharma et al (showed DM to be significantly associated with NSTEMI) [24]. Hyperglycemia inhibits production of vasodilators like nitric oxide, and increases vasoconstrictors like endothelin-1. Impaired insulin mediated skeletal muscle uptake of free fatty acids increases synthesis of Very Low-Density Lipoprotein (VLDL) and cholesteryl esters in the liver. Diabetic patients with ACS commonly have a combination of elevated triglycerides and low HDL than elevated total and LDL cholesterol levels, and this frequently leads to multivessel coronary artery atherosclerosis. Procoagulability, impaired fibrinolysis and formation of advanced glycation end products are other mechanisms of DM being a risk factor for ACS [25]. Donahoe et al showed diabetics with STEMI to have higher one year mortality, and the one year mortality for non-diabetics with STEMI to be similar to

that of diabetics with NSTEMI/UA [26,27].

Conclusion:

Several modifiable risk factors and non-modifiable risk factors are responsible for Coronary artery disease like age, past history of diseases, education level. More studies are required to understand epidemiology, presentation and risk factors particularly in regional levels as they can differ from one region to the other. This understanding would help to implement preventive measures including lifestyle modification and drug treatment optimizing risk factors.

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