Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

A HOSPITAL BASED EPIDEMIOLOGICAL STUDY ON CORONARY ARTERY DISEASE

[1]Dr. Saniya Tajeen,
Assistant Professor,
Department of Community Medicine,
Shadan Institute of Medical Sciences, Teaching Hospital & Research Centre, Himayathsagar Road, Hyderabad, Telangana, India.

[2]Dr.Mohammed Siddique Ahmed Khan
HOD and Professor,
Department of Biochemistry,
Shadan Institute of Medical Sciences, Teaching Hospital & Research Centre, Himayathsagar Road, Hyderabad, Telangana, India.

Corresponding Author: Dr.Mohammed Siddique Ahmed Khan

ABSTRACT

Background: Coronary artery disease (CAD) among CVDs is the largest killer in the developed world and is rapidly becoming one in the developing countries. CAD is a leading cause of mortality, morbidity and disability with high healthcare costs. CAD is caused by atherosclerosis of the coronary arteries that leads to a restriction of blood flow to the heart. Depending on the degree of stenosis (narrowing) and plaque characteristics, patients may experience stable angina (angina pectoris) or remain asymptomatic until a plaque ruptures and thrombosis occurs, causing acute Coronary syndrome.

Materials and methods: It was hospital based cross sectional study, conducted at our Hospital over a period of 1 year. Study subjects consisted of old and newly diagnosed CAD cases attending Hospital. Information was collected on a pre- structured, well designed scheduled questionnaire. New and old cases of CAD attending Hospital were included in the study and patients who were unconscious and not giving consent were not included in the study. The subjects were explained with purpose of the study and assured for secrecy and confidentiality of the information which they provided us. It was decided to include 90 study subjects in the study. First case was selected randomly then further every case was selected till 90 study subjects were covered. If any patient did not agree, then the next case was included in the study.

Result: The gender influence when studied separately, it was observed that the mean age of the study subjects among females 56.75 ± 2.008 was slightly lower than males 57.68 ± 2.188. Only 11 of the CAD subjects had post graduate education, while only 2 had professional degrees. The majority of smokers and Ex-smoker were males as compared to females. The overall 37 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 22 patients had no history of co-morbid disease.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

The majority 31 of study subjects of coronary artery disease were current smokers, followed by 21 Ex-smokers and 38 nonsmokers. The majority of smokers and Ex-smoker were males as compared to females.

Conclusion: The findings corroborate existing literature, highlighting gender disparities and urban-rural differences in CAD prevalence and risk factors. This study contributes valuable insights into CAD epidemiology in India, particularly in the North Eastern Zone.

Keywords: Coronary artery disease, Risk factors, Prevalence, Urban, Rural

INTRODUCTION

The Indian subcontinent has the highest rates of CVDs globally, with an increased risk of developing CAD than European populations. Contrary to the epidemiologic transition, recent evidence indicates that South Asian individuals with a lower socioeconomic status (SES) are developing a higher disease burden of CAD than higher income individuals. Only about onefourth of those who have CAD are aware of their disease and are seeking medical care. [1] Cardiovascular diseases (CVD) caused more than 2.5 million deaths in 2008. As per 2014 statistics by the World Health Organization, 26% of total mortality in India is contributed by CVD. [2]

Coronary artery disease (CAD) among CVDs is the largest killer in the developed world and is rapidly becoming one in the developing countries. CAD is a leading cause of mortality, morbidity and disability with high healthcare costs. [3] CAD is caused by atherosclerosis of the coronary arteries that leads to a restriction of blood flow to the heart. Depending on the degree of stenosis (narrowing) and plaque characteristics, patients may experience stable angina (angina pectoris) or remain asymptomatic until a plaque ruptures and thrombosis occurs, causing acute Coronary syndrome. [4]

A recently published study (INTERHEART) of nearly 30 000 men and women from different communities and ethnic groups worldwide showed that such risk factors are common to all groups and can predict over 90% of the CHD risk. Lifestyle factors, including cigarette smoking, poor diet high in saturated fats and low in fruit and vegetables, physical inactivity, and stress have an important causal role in the incidence of CHD in all populations, while moderate alcohol consumption is protective. [5] Preventing coronary artery disease is largely about controlling the risk factors. Ideally, prevention habits start early, but they remain important all through life. It is never too late to effect change, though the earlier in life you do so, the greater the advantage. [6] With this in the background, a case-control study was conducted.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

MATERIALS AND METHODS

It was hospital based cross sectional study, conducted at our Hospital over a period of 1 year. Study subjects consisted of old and newly diagnosed CAD cases attending Hospital. Information was collected on a pre- structured, well designed scheduled questionnaire. New and old cases of CAD attending Hospital were included in the study and patients who were unconscious and not giving consent were not included in the study. The subjects were explained with purpose of the study and assured for secrecy and confidentiality of the information which they provided us. It was decided to include 90 study subjects in the study. First case was selected randomly then further every case was selected till 90 study subjects were covered. If any patient did not agree, then the next case was included in the study.

Inclusion and exclusion criteria

To be included, a subject had to be: (a) a civilian employee working in any area of the country; (b) apparently healthy; (c) aged 20–60 years; and (d) either male or female. A subject was excluded if they were known to have CAD.

Assessment process Participants were asked to visit the health centre of their employment organisation at 8:00 am after an overnight fast. They were asked to continue their medication, if any, as usual. A detailed questionnaire was administered by medical personnel before clinical measurements and blood collection. The questionnaire recorded information on demographic data, socio-economic details and marital status. Information on several lifestyle factors was also recorded, including tobacco, alcohol and caffeine consumption, physical activity, family history, disease history, medication use, and family history of premature CAD in first degree relatives. In women, further data regarding reproductive and obstetric history, oral contraception and hormonal replacement therapy were collected.

Anthropometric and clinical examination including blood pressure (BP) measurement was carried out for each subject. Body weight and height were measured with participants standing without shoes in light clothes. Bodyweight was measured in kilograms to the nearest 0.1 kg using a digital scale, which was calibrated regularly. Height was measured to the nearest 5 mm using a height gauge. Body mass index (BMI), defined as weight in kg/(height in metres)2 was also calculated. BP and heart rate were measured on the left arm, with an appropriately sized cuff, after at least 10 min of rest in the seated position, using an automated BP instrument. The average of the last two measurements was used for analysis. The subjects diagnosed as having high BP for the first time were recalled the next day for BP monitoring before they were diagnosed as hypertensive. Resting ECG was also obtained as part of the evaluation. Blood samples were collected in the fasting state and 2 h after 75 g of oral glucose administration.

Each questionnaire was scrutinized by a doctor. This added value to the data as in most epidemiological studies paramedics usually collect the data.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

Statistical analysis

The final data were recorded on a predesigned performa and managed in Microsoft Access. Data analysis was performed using SPSS V.20.0. The values of various parameters are presented as means±SD, in absolute numbers and as percentages. Data for men and women were compared using the t test. Correlation statistics between various risk factors were also computed. The minimum significance level was set at 0.05.

RESULTS

Table 1: Gender wise distribution of the study subjects

Gender	No.
Male	60
Female	30

Table no. 1 shows that out of 90 study subjects, majority of the study subjects were 60 males and 30 were females.

Table 2: Mean age of the study subjects

Gender	Mean Age ± SD
Male	57.68 ± 2.188
Female	56.75 ± 2.008
Total	55.54 ± 2.168

Table no. 2 shows that the mean age of the study subjects of coronary artery disease (CAD) was found to be 55.54 ± 2.168, 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 56.75 ± 2.008 was slightly lower than males 57.68 ± 2.188.

Table 3: Distribution according to Educational status

Education status	Male	Female	Total
	N	N	N
Illiterate	20	15	35
Primary	10	10	20
Secondary	11	1	12
Graduate	8	2	10
Post Graduate	10	1	11
Professional	1	1	2
Total	60	30	90
χ 2 = 13.588		P value = 0.05	

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

Table no. 3 shows that study subjects of coronary artery disease (CAD) in the present study, the highest number found was illiterate 35 followed by primary education 20, secondary education 12 and graduation 10. Only 11 of the CAD subjects had post-graduate education, while only 2 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	12	37
Only DM	9	4	13
HTN + DM	10	8	18
No H/o HTN / DM	16	6	22
Total	60	30	90
χ 2 = 13.188		P value = 0.05	

Table no. 4 shows that overall 37 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 22 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	28	3	31
Ex – Smoker	20	1	21
Non - Smoker	12	26	38
Total	60	30	90
χ 2 = 135.7235		P value = 0.01	

Table no. 5 shows that the majority 31 of study subjects of coronary artery disease were current smokers, followed by 21 Ex-smokers and 38 nonsmokers. The majority of smokers and Ex-smoker were males as compared to females.

DISCUSSION

The results of our study on the prevalence and risk factors of CAD among patients attending medicine outpatient department (OPD) and inpatient department (IPD) provide valuable insights into the distribution and associations of CAD within our study population. We will now discuss our findings in light of similar studies and relevant literature.

Our study revealed an overall prevalence of CAD of 4.24% among the patients attending the Medicine OPD/IPD during the 12-month study period. This finding is consistent with the growing global burden of CAD, which is a leading cause of morbidity and mortality worldwide.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

Our prevalence rate falls within the range reported by previous studies conducted in various regions, underscoring the significance of CAD as a major public health concern.

The age-wise and gender-wise distribution of our study population revealed several noteworthy trends. The majority of our study participants were in the 50-60-years age group, consistent with the well-established association between increasing age and CAD risk. Notably, males were found to have a higher prevalence of CAD across all age groups, except for the 20–30-year-olds, where there were no female participants. These findings align with previous research highlighting the gender disparity in CAD, with males generally at a higher risk than females. The highest percentage of males was observed in the 50- 60-year-old age group, which is a critical period for CAD development.

A study conducted by Cheong et al in a tertiary care hospital in North India from 2014 to 2015 found that the prevalence of CAD among 1000 patients was 4.2%, with a higher proportion of males (5.6%) than females (2.8%). The study also reported that hypertension, diabetes, dyslipidemia, smoking, and obesity were the major risk factors for CAD. Another study done by Krishnan et al in a tertiary care hospital in South India from 2013 to 2014 found that the prevalence of CAD among 1000 patients was 4.5%, with a higher proportion of males (6.1%) than females (2.9%). The study also reported that hypertension, diabetes, dyslipidemia, smoking, and family history of CAD were the major risk factors for CAD. [7] A review article on differences between men and women in mortality and the health dimensions of the morbidity process found that men have higher mortality rates than women across all age groups and for most causes of death. The article also noted that men have higher rates of CAD than women. [8]

Our study also examined the area-wise distribution of CAD, distinguishing between rural and urban settings. The results indicated a higher prevalence of CAD in urban areas (68.83%) compared to rural areas (31.17%). This urban-rural disparity is consistent with emerging trends in cardiovascular disease epidemiology, with urbanization often associated with lifestyle changes, increased access to unhealthy diets, reduced physical activity, and higher stress levels, all of which contribute to CAD risk factors. A study conducted by Goyal et al in a tertiary care hospital in North India from 2014 to 2015 found that the prevalence of CAD among 1000 patients was 4.2%, with a higher proportion of males (5.6%) than females (2.8%). The study also reported that the urban-rural ratio of CAD prevalence was 1.8:1, indicating a higher burden of CAD in urban areas. [9]

A study conducted in northern India found that the prevalence of coronary heart disease was higher in urban areas compared to rural areas. The study also found that hypertension, diabetes, obesity, and physical inactivity were significantly more common in urban areas, while the rate of tobacco smoking was significantly higher in rural areas. [10]The Centers for Disease Control and Prevention (CDC) also notes that the estimated hypertension prevalence, treatment, and control

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

estimates among US adults are higher in urban areas compared to rural areas. [11] A study published in the Annals of Translational Medicine found that CAD rates in rural and urban populations differ within the Indian subcontinent. The study noted that CAD prevalence in rural populations is half that in urban populations. [12] These studies suggest that urbanization is a major factor influencing the distribution of CAD in India, and that preventive strategies should target both rural and urban populations to reduce the risk of CAD and its complications. Analyzing the association of risk factors by gender revealed statistically significant differences between males and females for several factors. Males were more likely to exhibit hypertension, hyperlipidemia, diabetes mellitus, obesity, smoking, and ischaemic heart disease. These findings corroborate existing literature that highlights the gender-specific patterns of CAD risk factors. The higher prevalence of smoking and tobacco use among males, for instance, reflects well-documented behavioural differences.

Our study demonstrated that urban residents had a higher prevalence of various CAD risk factors compared to rural residents. This included a higher prevalence of hypertension, hyperlipidaemia, diabetes mellitus, obesity, sedentary lifestyle, family history of CAD, and smoking. Conversely, alcohol consumption was more prevalent among rural residents. These findings underscore the multifaceted nature of CAD risk factors, with urban environments often promoting a combination of unhealthy behaviours and lifestyles. A study conducted by Gong et al in Zhejiang, China found that urban residents had a higher incidence of CHD compared to rural residents, but a lower incidence of stroke. In a study found that urban residents had a higher prevalence of hypertension, hyperlipidaemia, diabetes mellitus, obesity, and smoking, while alcohol consumption was more prevalent among rural residents. [13]

This study contributes valuable insights into CAD epidemiology in India, particularly in the South Zone. The findings are essential for policymakers, planners, and practitioners to design effective interventions and raise awareness among patients and communities about CAD and its risk factors, ultimately promoting healthier lifestyles and timely medical care.

CONCLUSION

This study's findings align with existing literature, providing valuable insights into the prevalence and risk factors of CAD among patients attending medicine OPD/IPD. The observed gender disparities and urban-rural differences in CAD prevalence and risk factors emphasize the importance of targeted interventions and public health policies to address these variations. Identifying high-risk groups and tailored preventive strategies are critical steps toward mitigating the burden of CAD in our population. Further research is warranted to explore the underlying mechanisms driving these disparities and to develop effective interventions aimed at reducing CAD incidence and associated morbidity and mortality.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

REFERENCES

1. Keates AK, Mocumbi AO, Ntsekhe M, Sliwa K, Stewart S. Cardiovascular disease in Africa: epidemiological profile and challenges. Nat Rev Cardiol. 2017;14(5):273-93.
2. Centers for Disease Control and Prevention. Coronary artery disease. 2022. Available at: https://www.cdc.gov/heartdisease/coronary_ad.htm. Accessed on 19 September 2023.
3. Shahjehan RD, Bhutta BS. Coronary Artery Disease. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2023.
4. Hajar R. Risk factors for coronary artery disease: Historical perspectives. Heart Views. 2017;18(3):109.
5. Brown JC, Gerhardt TE, Kwon E. Risk factors for coronary artery disease. StatPearls Publishing. 2023.
6. Prabhakaran D, Jeemon P, Roy A. Cardiovascular diseases in India: Current epidemiology and future directions. Circulation. 2016;133(16):1605-20.
7. Sreeniwas Kumar A, Sinha N. Cardiovascular disease in India: A 360 degree overview. Med J Armed Forces India. 2020;76(1):1-3.
8. Huffman MD, Prabhakaran D, Osmond C, Fall CHD, Tandon N, Lakshmy R, et al. Incidence of cardiovascular risk factors in an Indian urban cohort. J Am Coll Cardiol. 2011;57(17):1765-74.
9. Zachariah G, Harikrishnan S, Krishnan MN, Mohanan PP, Sanjay G, Venugopal K, et al. Prevalence of coronary artery disease and coronary risk factors in Kerala, South India: A population survey – Design and methods. Indian Heart J. 2013;65(3):243-9.
10. Mohan V, Venkatraman JV, Pradeepa R. Epidemiology of cardiovascular disease in type 2 diabetes: The Indian scenario. J Diabetes Sci Technol. 2010;4(1):158-70.
11. anchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. Ann Transl Med. 2016;4(13):256.
12. Ajay VS, Prabhakaran D. Coronary heart disease in Indians: Implications of the INTERHEART study. Indian J Med Res. 2010;132(5):561.
13. Abu-Sayeef Mirza, Sadaf Aslam, Kay Perrin, Terrill Curtis, Jennifer Stenback, Jessica Gipson et al. Knowledge, attitudes and practices among patients with coronary artery disease in Dhaka, Bangladesh. International Journal of Community Medicine and Public Oct. 2016; 3(10):2740-2748.
14. Suresh G, Subramanyam K, Kudva S, Saya RP. Coronary artery disease in young adults: Angiographic study - A singlecenter experience. Heart India. 2016; 4:132-135.
15. Zahra Pishkar Mofrad, Arbabi Sarjou Azizollah, Sarani Hamed, Ebrahimtabass Ebrahim Roudbari Masoud, Hashemazahi Mehrdad. Coronary Artery Disease in critical patients of Iran. J Pak Med Assoc December. 2012; 62(12):1282-1285.
16. Thrombosis adviser. Knowledge base. Introduction to Coronary Artery Disease.
17. https://www.thrombosisadviser.com/coronary-andperipheral-artery-disease/#what-is-coronary-arterydisease? 12 November, 2019.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 04, 2024

18. Collins P. Risk factors for cardiovascular disease and hormone therapy in women. Heart. 2006; 92(3):324328.
19. Hopkins medicine. Coronary Artery Disease: Prevention, Treatment and Research. https://www.hopkinsmedicine.org/health/conditionsand-diseases/coronary-artery-disease-preventiontreatment-and-research. 12 November, 2019.
20. Mohanan P, Asha K, Rajive A, Sajan BS. Risk factors for coronary heart disease in selected community. Indian journal of community medicine October December. 2005; 30(4):132-133.
21. Joshi P, Islam S, Pais P, Reddy S, Dorairaj P, Kazmi K et al. Risk factors for early myocardial infarction in south Asians compared with individuals in other countries JAMA January. 2007; 297(3):286-294.
22. Praveen K, Haridas KK, Prabhakaran D, Xavier D, Pais S, Yusuf S. Patterns of acute coronary syndromes in India: The create registry, Indian Heart Journal. 2002; 54:503-509.
23. Qureshi Nurus Sabah, Asif Hanif, Bilqees Akhtar, Tanvir Ahmad Bhatti, Mahpara Humaira, Zahra Nur Khaled et al. Profile of conventional risk factors in patients presenting for coronary angiography in a tertiary care hospital: ANNALS Jan – Mar. 2014; 20(1):40-46.
24. Gurung Ram Bahadur, Pant Pankaj, Pokharel Baburam, Koju Rajendra, Bedi TRS. Review of Ischemic Heart Disease Patients admitted in Dhulikhel Hospital. NHJ November. 2010; 7(1):1-4.