Research Paper

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An Epidemiological Study of Coronary Heart Disease in Adult Population of Western Uttar Pradesh.

MEDICAL SCIENCE

KEYWORDS : Coronary heart disease risk factors, Smoking, Alcohol, Physical activity, Obesity

Bachu N Singh	Assistant Professor,Dept of Community Medicine, SGT Medical Gollege, Budhera, Gurgaon-122505. Haryana Corresponding author
Vijay K Singhal	Assistant Professor, Dept of community Medicine, SGT Medical College, Budhera, Gurgaon-122505. Haryana
Balbir S Deswal	Professor & Head, Dept of Community Medicine, SGT Medical Gollege, Budhera, Gurgaon-122505.Haryana.

ABSTRACT

Background: Coronary heart disease (CHD)is a major cause of morbidity and mortality worldwide. In Indian urban population , CHD has shown a nine fold increase. Various studies regarding the risk factors in adult population had been carried out in at various places India, but community based approach in urban & rural area is quite recent. Thus keeping in view the need for such a community based data regarding coronary artery disease & its risk factors, the study has been under taken in urban & rural areas of a district of Western Uttar Pradesh.

Objectives: (1) To find out the prevalence of coronary artery disease among population of 25 years and above age group. (2) To study associated risk factors & epidemiological determinants of coronary artery disease.

Material & Methods: A cross- sectional study carried out among 25years and above age in rural & urban population of Western Uttar Pradesh. Data was collected after informed consent by house to house visit using pretested questionnaire. Case definition of coronary heart disease was taken as recommended for coronary heart diseases in developing country by American Heart Association (AHA) [3] which has been accepted worldwide. The cases were labeled by combination of three facts- cardiac symptoms & signs, biomarkers, and ECG and /or autopsy.

Results: Prevalence of coronary heat diseases was found to be 17.09% in rural, 21.08% in urban and overall prevalence 19.08% in the study. Use of Tobacco, Alcohol, Lack of physical exercise, obesity and other risk conditions viz- hypertension, diabetes, family history of CHD and mental stress were found significant risk factors in rural as well as urban population. Conclusion: High incidence of CHD in India warrants an urgent action in terms of expanding public education, control of primordial and primary risk factors by population based ands high risk interventions as part of effective preventive strategies.

Introduction:

Coronary Heart Disease is now a leading cause of deaths worldwide. It is on the rise & has become a pandemic that respects no borders. Incidence of coronary heart disease in India is advancing rapidly. In last two decades in India population surveys has reported a 9 fold increase of coronary heart disease in urban areas. It has been estimated by World Bank that there will be doubling of deaths due to coronary heart disease in India from 1985 to 2015.[.1]

In India Coronary heart disease is the leading cause of death. It is also observed that this disease in India affects people at rather young age with fatal consequences compared with developed countries. Global status on Non Communicable Diseases(NCD),has reported that there were more than 2.5 million deaths from cardiovascular diseases in India in 2008, of which two third were due to coronary heart disease & one third due to strokes.[1, 2]

Coronary heart disease is a condition in which a plaque builds up inside the coronary arteries, which is made up of fats, cholesterol, calcium & other substances found in blood. Build up to the plaque occurs over many years, which hardens over time & narrow the arteries. If clot become large enough, it can mostly or completely block blood flow leading to angina or Acute Myocardial Infarction (heart attack) with or without ST segment elevation & unstable angina, which may lead to serious problem & even death.[3]

Coronary heart disease is a multifactorial diseases involving the interplay of genetic and environmental factors.. The risk factors such as age, genetic/heredity factors, Familial Hypercholesterolemia, ethnicity, individual personality are non modifiable. Lifestyle risk factors such as smoking, sedentary life, obesity, emotional stress , high blood pressure, diabetes, increased C-reactive protein, dietary factors etc play a great role in coronary diseases which can be modifiable with public health interventions. [4,5]

Rationale of Study:

Various studies regarding the risk factors in adult population had been carried out in at various places India, but community based approach in urban & rural area is quite recent. Factors related to place of residence & socioeconomic status may account for variation in coronary artery disease & its risk factors. Thus keeping in view the need for such a community based data regarding coronary artery disease & its risk factors, the study has been under taken in urban & rural areas of a district of Western Uttar Pradesh, India.

Objectives:

1. To find out the prevalence of coronary artery disease among population of 25 years and above age group.
2. To study associated risk factors & epidemiological determinants of coronary artery disease.

Material & Methods

Study was carried out in urban and rural population of district Ghaziabad (Uttar Pradesh).

Sample Size: Sample size was estimated using standard procedure[6]. According to previous studies the prevalence of coronary artery disease in India was 15%.

n =z.z.p.q/L.L

n is desired sample size.
Z at 95% confidence level & 10% precision= 1.96.
p = 15 %(prevalence)
Q = 100-p= 100-85 = 85.
n = 2178. (L= 10% of prevalence, relative precision) = 1.5.

So minimum sample size required was 2170 adult population, half of the sample was covered in urban areas & half in rural areas.

Sampling Technique:
Multistage sampling technique was used for this study. **For rural areas:** Village Kanujia in sub center Kanujia in Dasna community development block by random sampling method

Foe urban areas: Vasundhera Sector –V in ward no 39 was selected by simple random sampling**.**

All individuals aged 25 years & above of selected colony in urban area & village in rural area. Family as well as individual schedule was used in this study. Both males & females above 25 years of age who were willing to participate were included. Individuals with renal failure, bronchial asthma were excluded. Data was coded & correlated tables were prepared & analyzed.

Methods:
Data was collected after informed consent by house to house visit using pretested questionnaire. In addition to data on identification & socioeconomic status, following information was collected.

Case definition of coronary heart disease was taken as recommended for coronary heart diseases in developing country by American Heart Association (AHA) [3] which has been accepted worldwide. The cases were labeled by combination of three facts- symptoms & signs, biomarkers, and ECG and /or autopsy finding. Cases were classified as definite, probable and possible cases of fatal and non-fatal MI, and angina pectoris as per AHA definition.

Cardiac symptoms included Acute Chest Pain,epigastric, jaw or arm pain or discomfort or pressure without apparent non cardiac source. Cardiac sign included acute congestive failure or cardiogenic shock in absence of non cardiac causes.

ECG was classified as positive for CHD evolving ST elevation, Q wave plus ST-T depression/ inversion, New left bundle branch block with increased QRS interval by at least 20ms.

Cardiac biomarkers taken [3] -CK.

Body Mass Index: Body weight was taken by the help of weighing machine & BMI is calculated as (weight in kilograms/ height in meter^2).Individuals were grouped as follows:

>30kg/m2	Obese.
25-30kg/m2	Overweight
18-25kg/m2	Normal.
<18kg/m2	underweight.

Physical Exercise[7]**:** Graded as recommended for epidemiological study [4]

Very Good:- Physical exercise like manual work or sports activity or exercise more than 3 hours.
Moderate : 1-3 hours/day.
Mild : less than 1 hour per day.

Smoking Habits[8]**:**
Light : up to 5 cigarettes per day.
Moderate : 6-10 cigarettes per day.
Heavy : More than10 cigarettes per day.

Alcohol Consumption [9] **:**
Occasional: once or twice per month.
Frequent: once or twice per week.
Always; More than twice a week.
Amount & Concentration: A half or full standard glass of wine concentrated.

Mental stress was measured using standard stress measuring scale. [10,11]

Observations & Results:
Table1: Prevalence of CHD:

Category	Non- CHD	CHD	Total	Prevalence of CHD %
Rural	902	186	1088	17.09
Urban	854	234	1088	21.08
Total	902	420	2176	19.08

Prevalence of coronary heat diseases was found to be 17.09% in rural, 21.08% in urban and overall prevalence 19.08% in the study (Table1).

Table 2: Comparative distribution of CHD & Non-CHD cases according to Smoking Habits:

Smoking Habits	Rural (n=1088)		Urban (n=1088)		Total (n=2176)	
	Non- CHD No (%)	CHD No (%)	Non-CHD No (%)	CHD No (%)	Non-CHD No (%)	CHD No (%)
Non Users	361 (40.02)	86 (46.24)	354 (51.45)	50 (21.35)	717 (40.72)	136 (32.28)
Tobacco Smokers	326 (36.14)	68 (36.56)	254 (29.74)	119 (50.85)	580 (33.02)	187 (44.52)
Tobacco (Chewing)	215 (23.84)	32 (17.20)	246 (28.81)	65 (27.78)	461 (26.25)	(7 (23.10)
Total	902 (100.0)	186 (100.0)	854 (100.0)	234 (100.0)	1756 (100.0)	420 (100.0)

(χ^2= 10.0, df= 2, p < .005)

Table 2 showed that 44.52% smokers & 23.10% tobacco chewers were suffering from CHD, the difference between tobacco user and tobacco nonusers was found to be statistically significant.

Table 3: Comparative distribution of CHD &Non- CHD as per alcohol use.

Drinking Habit	Rural		Urban		Total	
	Non-CHD N0.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)
Non-drinkers	641 (71.06)	73 (39.25)	506 (59.25)	106 (45.30)	1147 (65.32)	179 (46.62)
Drinkers	261 (28.94)	113 (60.75)	348 (40.75)	128 (54.70)	609 (34.68)	241 (57.38)
Total	902	186	854	234	1756	420

(χ^2=22.82, df= 3, p< .001)

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Table 3 depicted that in comparative study among rural population out of 186 cases of CHD, 113(60.75%) were alcohol drinkers, and 73(39.25%) of CHD cases were non-drinkers. In urban population out of 234 cases of CHD, 128 (54.70%) were alcohol drinkers, and 106 (45.30%) were non-drinkers. This difference was found to be statistically significant.

Table 4: Comparative distribution of CHD and Non-CHD cases according to Body Mass Index

BMI	Rural		Urban		Total	
	Non-CHD No.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)
>30kg/m2	58 (6.43)	34 (18.28)	98 (11.48)	39 (16.67)	156 (8.88)	73 (17.38)
25-29.9kg/m2	122 (13.53)	87 (46.77)	200 (23.42)	104 (44.44)	322 (18.34)	191 (45.48)
18-24.9kg/m2	251 (27.83)	43 (23.12)	316 (37.00)	61 (26.07)	567 (32.29)	104 (24.76)
<17.9kg/m2	471 (52.22)	22 (11.83)	240 (28.10)	30 (12.82)	711 (40.49)	52 (12.38)
Total	902	186	854	234	1756	420

(χ^2 = 101.86, df =3, p<.001)

In present study (Table 4) out of total 420 cases of CHD, 73(17.38%) were obese, 191(45.48%) were over weight. This means (17.38 +45.48) = 62.86% of CHD cases were overweight, this difference was found to be statistically significant.

Table 5: Comparative distribution of CHD and Non- CHD cases according to physical exercise

Physical Exercise	Rural		Urban		Total	
	Non-CHD No.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)	Non-CHD No.(%)	CHD No.(%)
No Exercise	261 (28.94)	85 (45.70)	165 (19.32)	132 (56.41)	426 (24.26)	217 (51.67)
Exercise	641 (71.06)	101 (54.30)	689 (80.680	102 (43.59)	1330 (75.74)	203 (48.33)
Total	902	186	854	234	1756	420

(χ^2= 9.34, df = 3, p< .025)

In this study population 45.70% of rural CHD cases were not doing any physical exercise, 54.30% were doing physical exercise. In urban CHD cases 56.41% were not doing any physical exercise and 43.59% were doing physical exercise. This difference was found to be statistically significant.

Table 6: Comparative distribution of CHD and Non-CHD cases according to Other Risk Factors.

Risk Factors	Rural		Urban		Total	
	Non-CHD No.(%)	CHD (%)	Non-CHD No.(%)	CHD No.(%)	Non-CHD (%)	CHD (%)
Hypertension	83 (38.25)	134 (61.75)	110 (39.57)	168 (60.43)	193 (38.99)	302 (61.01)
Diabetes Mellitus	51 (45.54)	61 (54.46)	89 (44.28)	112 (55.72)	140 (44.73)	173 (55.27)
Family H/O CHD	264 (70.02)	113 (29.97)	215 (54.98)	176)45.06)	470 (62.37)	289 (37.63)
Depression	167 (83.08)	34 (16.92)	316 (86.10)	51 (13.90)	483 (85.04)	85 (14.96)

(χ^2 = 31.53, df = 3, p<.001)

In present study (Table6) out of total 395 cases of hypertension,302 (61.01%) were suffering from CHD,out of total 213 cases of diabetes mellitus, 173(55.27%) were suffering from CHD, out of total 768 individuals having family history of CHD, 289(37.63%) were having CHD and out of total 568 individuals having depression 85(14.96%) were having CHD. This difference was found to be statistically significant.

Discussion:

In the present study, Prevalence of coronary heat diseases was found to be 17.09% in rural, 21.08% in urban and overall prevalence 19.08% in the study (Table1).Pooled estimates from various studies in India showed prevalence rate of CHD in urban areas as 6.4% and in rural areas as 2.5%. the difference in rates is probably due to the facts that the present study was conducted among adults over 25 yaers or more age , when age specific prevalence rate was analysed for comparison the rate were found to be almost similar.

67.62% of the persons suffering from CHD were either smokers or tobacco chewers and this was found to be statistically significant. In a study by Achari V. et al[9]found the prevalence of smoking was the second most important factor in causing CHD. Study also reveals that 57.38% out of total CHD patients were consuming alcohol & this was found to be statistically significant. The Framingham Heart Study[10] found the lowest risk of intermittent claudicating at the levels of 13-24 g of alcohol per day in men and 7-12 g in females as compared to nondrinkers According to data from National Institute on Alcohol Abuse, in their survey [11] done in 20 countries shows a 20-40% lower incidence of heart disease among drinkers compared to non-drinkers. Study also shows that 62.86% of CHD patients were having more BMI than normal, 51.67% were not doing any physical exercise, these were found be statistically significant. Similar results were reported from their studies by Hayes et al [12] among males and females of various countries. In present study (table 5), lack of physical exercise was found as a significant risk factor of CHD, similar to results reported by Gothanker [13] out of the total cases of hypertension 61.01% were having CHD, out of total cases of diabetes mellitus 55.27% were having CHD, out of total having family History of CHD 37.63% were having CHD, and out of total cases of depression 14.96% were having CHD. These were statistically significant.Achri et al[14] hypertension was noted more often in subjects with CAD as compared to without CAD(18.02% vs. 13.9%, p<0.005) and similar data were true of diabetes mellitus(13.28% vs 7.89%, p< 0.001). In a recent study M.Sriharibabu et al [14] found 65.7% of those diagnosed CHD had hypertension, 33.2% had diabetes, 42.4% were smokers.

Recommendations:

High prevalence of CHD in India warrants an urgent action in terms of expanding public education, control of primordial and primary risk factors by population based ands high risk interventions as part of effective preventive strategies.

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