ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 02 | February - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

STUDY OF A RISK FACTORS OF CARDIOVASCULAR DISEASES AMONG ADULTS >40 YEARS OF AGE RESIDING IN URBAN HEATH PRACTICE AREA OF TERTIARY CARE CENTRE

Public Health

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ABSTRACT

Background: Cardiovascular diseases (CVD) comprise of a group of diseases of the heart and cardiovascular system. The major conditions are ischemic heart disease (IHD), hypertension, cerebro-vascular disease (stroke) and congenital heart disease. An understanding of the risk factors that will lead to the development of CVD in multiple populations is required to develop global strategies for prevention. Today's risk factors are tomorrow's disease. Thus, primary and secondary prevention of CVDs and their common risk factors provide the most sustainable and cost-effective approach to CVDs prevention and control. **Material and methods:** The present study was a community based, descriptive, cross-sectional study conducted from January 2018 to December 2019 in urban field practice area of Darbhanga medical college and Hospital, Laheriasarai, Bihar on 404 cases. The area comes under Darbhanga Municipal corporation. **Results:** Based on age distribution, most i.e., 38.4% of total subject were in age-group of 40-49 years with mean age with standard deviation of the study subjects were 54.31±10.04 years. Out of 404 study subjects, there were 215 i.e., 53.22% male and 189 i.e., 46.78% female. Based on physical activity, 188 (46.51%) study subjects out of 404 had inadequate physical activity and 216 (53.49%) had adequate physical activity. Only 95 i.e., 23.59% study subjects were pure vegetarian and 309 i.e., 76.41% were on mix diet. Out of 404 study subjects 176 i.e., 43.69% study subjects were using tobacco or having history of long-time tobacco use in any form either smoking, chewing gutkha, pan masala, hukkah etc and 96 i.e., 23.71% were either consuming alcohol or having long time history of alcohol consumption. Out of 404 study subjects, 160 i.e., 39.69% had BMI > 25 kg/m2 while 244 i.e., 60.33% subjects had BMI < 25 kg/m2 and 292 i.e., 72.36% had normal WHR and 112 i.e., 27.64% subjects had high WHR (waist- hip ratio). Out of 404 study subjects, 14 i.e., 3.46% had complain of chest pain, 21 i.e., 5.20% had complain of palpitation, 15 i.e., 3.71% had complain of dyspnoea on exertion, 14 i.e., 3.46% had complain of weakness of limb and 9 i.e., 2.23% had complain of paralysis. Table 3 & 4 shown that 16 i.e., 3.87% subjects had IHD and 17 i.e., 4.32% subjects had Stroke out of 404 study subjects. **Conclusion:** Commonest modifiable risk factors for CVDs are hypertension, smoking or tobacco in any form, diabetes mellitus, obesity, truncal obesity, sedentary life style, stress. Commonest non-modifiable risk factors are increasing age and family history of CVDs. Most of the significant risk factors in the present study are potentially modifiable and increased awareness about the primordial prevention of these risk factors may be beneficial to the population at risk.

KEYWORDS

cardiovascular diseases (CVD), ischemic heart disease (IHD), hypertension, Obesity

INTRODUCTION:

Cardiovascular diseases (CVD) comprise of a group of diseases of the heart and cardiovascular system. The major conditions are ischemic heart disease (IHD), hypertension, cerebro-vascular disease (stroke) and congenital heart disease[1]. Cardiovascular diseases are the largest cause of mortality, accounting for around half of all deaths resulting from non-communicable diseases (NCDs). WHO has drawn attention to the fact that CVD is our "modern epidemic" – a disease that affects population, not an unavoidable attribute of ageing[2]. The latter half of the last century witnessed advances in modern science with the acute communicable diseases being brought under control. This has brought sharp focus on the so-called modern disease, that is the non-communicable diseases. These diseases have defied "cure" and are currently the major causes of mortality and morbidity both in the developed and developing countries. These trends are expected to continue, with the developing countries experiencing the double burden of the pre and post transitional diseases[3].

Cardiovascular diseases are the leading cause of disease burden and deaths globally i.e., more people die annually from CVDs than from any other cause[4]. Specially, younger generations will be more affected in developing countries: for example, about 52% of deaths from CVDs in India occur before 70 yrs. of age[5-6]. The prevalence of CVD is reported to be 2-3 times higher in the urban population as compared to the rural population. A total of 57 million deaths occurred worldwide during 2016, out of which 41 million were due to NCDs which was 71% of all deaths globally. Nearly ¾th of these NCDs deaths occurred in low- and middle-income countries. Each year 15 million people die from cardiovascular diseases between the ages of 30 to 69 year, over 85% of these are premature deaths occurring in low- and middle-income countries.

The leading cause of deaths due to NCD in 2016 was - cardiovascular disease (17.9 million deaths or 44% of NCD deaths annually)[1]. At least 82% of the world's deaths from CVDs occur in low- and middle-income countries, where people do not have the benefit of integrated primary health care programmes for early detection and treatment of risk factors compared to people in high-income countries[1].

Cardiovascular diseases (CVD) have been the leading cause of morbidity and mortality in India. The prevalence of CVD is constantly rising in India and is higher in urban areas. The epidemic has reached its advanced stage even in rural India[7]. It has a significant presence in males and females in both urban and rural population[8]. This predilection to CVD is attributed to a clustering of various traditional and non-traditional risk factors which are believed to constitute the Atherogenic or phenotypic characteristics of Indians. The overall prevalence of CVD in South Indian population is estimated to be 11%[8]. A more worrying fact is that the incidences of CVDs have gone up significantly for people between the age 25 and 69 to 24.8%, which means we are losing more productive people to these diseases. In India NCDs estimated to account for 63% of all deaths. Cardiovascular disease accounts for 27 % death annually followed by cancer (9%), chronic respiratory disease (11%), diabetes (3%), other non-communicable diseases (13%) communicable, maternal, perinatal and nutritional conditions (26%)[1].

According to WHO, India suffers the highest loss in potentially productive year of life, due to death from CVD in people aged 35-64 years. The load of communicable and non-communicable diseases (NCDs) is projected to get reversed in 2020 from its distribution in 1990[1]. CVD is preventable and people need not to get CVD[9]. However, its complete etiology and mechanisms are yet to be understood. Common risk factors for CVD include raised blood pressure, tobacco use, lack of physical activity, obesity, and diet high in saturated fats and sodium (e.g., fast food) and low in fruits and vegetables. An understanding of the risk factors that will lead to the development of CVD in multiple populations is required to develop global strategies for prevention[9-10]. In India, significant transformations are taking place in the lifestyle such as acquiring care and consuming increased amounts of alcohol and tobacco[11]. Eating patterns are also changing rapidly with greater use of fast food, meat and fat. These changes are

leading to sedentary habits and increased consumption of unhealthy food. An epidemic of CVD is already underway in India and many other developing countries because of these factors[12]. The burden of death and disability due to CVD continues to increase and in the absence of suitable preventive efforts, is not being controlled[12].

Many adult health problems like diabetes and hypertension have their origin in childhood, because this is the time when lifestyles (tobacco use, eating patterns, and physical exercise) are formed. The main intervention in primordial prevention is through individual and mass education. Today's risk factors are tomorrow's disease. Thus, primary and secondary prevention of CVDs and their common risk factors provide the most sustainable and cost-effective approach to CVDs prevention and control[13]. Thus, the following study was carried out with the objective of evaluating a few risk factors of cardiovascular diseases among adults >40years of age residing in urban field practice area of DMCH and to suggest preventive measures for cardiovascular diseases, and in order to formulate strategy for its prevention.

AIM & OBJECTIVES:

To know a few risk factors associated with cardiovascular diseases among adults > 40 years of age residing in urban field practice area of DMCH and suggest preventive measures for cardiovascular diseases in order to formulate strategy for its prevention.

MATERIALAND METHODS:

The present study was a community based, descriptive, cross-sectional study conducted from January 2018 to December 2019 in urban field practice area of Darbhanga medical college and Hospital, Laheriasarai, Bihar. The area comes under Darbhanga Municipal corporation.

Demography of urban field practice area / municipal corporation of Darbhanga:

The Darbhanga city is divided into 48 wards. The Darbhanga Municipal corporation has population of 2,96,039 of which 1,55,637 (53%) are males and 1,40,402(47%) are females as per census India 2011. Darbhanga ward no 17 is most populous ward with population of 8,904 and Darbhanga ward no 44 is the least populous ward with population of 2,411.

There are over 56,492 households in the city and an average 5 persons live in each family. Hindu contributes 72% of the total population and are the largest community in the city followed by Muslims contribute 28% of the total population. Female sex ratio per 1000 male is 893 in Hindus and 926 in Muslims. Literacy rate of Darbhanga city is 79.40%, higher than state average of 61.80%. Male literacy is around 85.08% while female literacy rate is 73.08%[14].

Study population:

The study population included adults >40 years of age group residing in urban field practice area of Darbhanga Medical College. For the study, peoples either diagnosed for CVD or normal healthy person age more than 40 years, willing to participate in the study.

Inclusion criteria:

All subjects of either sex aged 40 years and above, subjects willing to participate in this study and resident of the study area for past 1 year.

Exclusion criteria:

Pre-existing severe physical disorder, participants who were on long term steroids, had a suspected cardiac illness, seriously-ill patients, person unwilling to participate and people not residing in Urban field practice area of DMCH.

Sample size:

Sample size was calculated by using the Cochran formula

$n = z^2pq/l^2$ where z is the confidence coefficient, p is the proportion/prevalence of variables, q is $1-p$ and l are allowable error or precision (5%,10%, or 20% of p).

Taking the prevalence from this data as p in the Cochran formula (prevalence of raised blood pressure/hypertension a strong risk factor for CVD is 21.4%, according to WHO NCD country profile 2014[15]), with 95% confidence interval and relative precision 20% of p, sample size was calculated.

$n = 1.96^2 \times 21.4 \times 78.6 / (21.4 \times 20/100)^2 = 367$, Adding 10% non-response rate to above adjusted sample size final sample size came out to be 404.

Sampling method:

Cluster sampling was used to identify the subject. In 1st stage 9 wards were selected by simple random sampling (lottery method) out of total 48 wards. Sample size=404, number of ward=48 and total no of ward selected for study, (cluster)=404/48=9

In 2nd stage, systematic random sampling was used to select 50 houses. A total of 9×50=450 subjects were selected under inclusion criteria. From each house one individual were selected, having age >40 years. Total number of houses in each ward was about 1000, Sampling interval was=1000/50=20. Next a random number was taken as the 6. Therefore, the first house for the study was taken as the sixth house in the voters list. For the selection of the subsequent houses, the sampling interval was added to the random number, i.e. 6+20=26th house in the voters list was taken as the 2nd house for the study.

26+20=46th house in the voters list was taken as the 3rd house for the study and so on. In this way every 20th house was selected till the total 50 subject were selected. A pre-tested questionnaire was administered to the participants in face-to-face interview after informed consent.

Method of Data collection:

Before commencing the study, the ward parshad was informed about the objectives and importance of this study. Training of female and male Interns was done for their co-operation in obtaining history of the study subjects. A team of researcher, fellow PG student, intern and MSW was prepared for data collection. All the selected households in the study area were visited and a household folder was prepared. 4 houses were visited in a day on the schedule of 2 days per week. Study participants satisfying the eligibility criteria of the study were interviewed using a structured interview schedule. It involved getting the information on age, educational status, occupation, habits, diet, and any non-communicable diseases like hypertension, diabetes. Height and weight were recorded for BMI calculation of each individual. Help and co-ordination were solicited from the relatives of study subjects to complete the schedule as and when needed. Total 450 sample were selected out of which drop out were 46 and finally 404 sample were obtained. Informed written consent was obtained by explaining to the subjects about the method of study, outcome and possible intervention. An assurance to the subject about confidentiality of the subject's data was ensured.

Body mass index (BMI)[16] was calculated based on physical measurements. BMI= weight in kg / (Height in meter)^2. BMI <18.5 kg/m^2 was classified as under-nutrition, 18.5-24.99 kg/m^2 as normal, 25-29.99 kg/m^2 as overweight and > 30 kg/m^2 as obese.

History of Diabetes mellitus was confirmed either by a self-reported history or history of receiving anti-diabetic medications or fasting plasma glucose more than 126 mg%. Blood sugar level was checked in all subjects by Glucometer. If fasting blood sugar was more than normal (126mg/dl), then postprandial blood sugar was checked after giving 75grams of glucose at the end of two hours. All Lab investigations within 1 month were also taken into consideration.

Sedentary life-style was defined according to International Physical Activity Questionnaire (IPAQ). Subjects were classified as smokers if they were smoking at present or ex-smokers[18]. Similarly, subjects were classified as alcoholic if they were taking any kind of liquor at present or ex-alcoholic and family history of CVDs in the first-degree relatives was noted[19].

The questionnaire consisted of 3 parts: Part I contained the personal details of the individual study subjects and family details of the study populations included information on demographic and socio-economic variables like age, sex, occupation, area of living, socioeconomic status, education. **Part II** contained the profile of the risk factors for CVD/ variables like, smoking, smokeless tobacco use, hypertension, alcohol use, diabetes, obesity, lifestyle, dietary habit, family history of CVD among the study subjects. **Part III** contained clinical examination and biochemical investigation.

Socioeconomic class was calculated using Modified Kuppuswami scale Classification for the year 2019[20]. **World Health Organization (WHO) Classification of adults according to Body Mass Index (BMI)** (WHO 2000)[21]. **Non-communicable diseases:** Known

Hypertensive and known diabetics in the study subjects were identified.

Physical activity:
Physical activity level of the individual was assessed using International Physical Activity Questionnaire.

Diet: Individuals were classified in Vegetarian & Mixed.

Diabetes Mellitus: The criteria for diagnosing DM, as defined by the World Health Organization in 2019.

Data analysis:
Data collected in the form of questionnaire were entered into Microsoft office excel and SPSS v 26.0 software was used for statistical analysis. Data was presented in the form of %. P value was obtained using chi-square test and *p<0.05* was considered to be statistically significant. The findings were presented as tables and graphs/figures.

Ethical consideration:
Ethical clearance was taken from Ethical Committee, Darbhanga Medical College & Hospital. Informed and written consent was taken from the participants before conducting the study. The sample of 404 subjects was considered to be sufficient for this study, which adhered to the principles of declaration of Helsinki, and was approved by independent ethics committee of Darbhanga Medical College.

RESULTS:
The present study was a community based, descriptive, cross-sectional study conducted from January 2018 to December 2019 in urban field practice area of Darbhanga medical college and Hospital, Laheriasarai, Bihar on 404 subjects.

Table 1: Socio-demographic profile of study population

Age in years	Frequency (%)	CVDs		p-value
		Present	Absent	
40-49	155 (38.4%)	6	149	The chi square statistic is 11.3565. The p-value is 0.009946. The result is significant at p < 0.05.
50-59	136 (33.7%)	10	126	
60-69	78 (19.3%)	11	67	
>70	35 (8.6%)	6	29	
Total	404 (100%)	33	371	
Mean age± SD	54.31 ± 10.04 years			
Gender	Frequency (%)	CVDs		p-value
		Present	Absent	
Male	215 (53.22%)	17	198	The chi-square=0.0418. The p-value is 0.837. The result is not significant at p < 0.05.
Female	189 (46.78%)	16	173	
Total	404 (100%)	33	371	
Type Of Family	Frequency (%)	CVDs		p-value
		Present	Absent	
Nuclear	268 (66.43%)	22	246	p-value is 0.965. Result is not significant at p < 0.05.
Non-nuclear	136 (33.57%)	11	125	
Marital Status	Frequency (%)	CVDs		p-value
		Present	Absent	
Single	04 (01%)	00	04	The chi-square statistic is 0.1148. The p-value is 0.73473. The result is not significant at p < 0.05.
Married	358 (88.60%)	29	329	
Separate/ widowed/ divorced	42 (10.40%)	04	38	
Socio-economic class	Frequency (%)	CVDs		
		Present	Absent	p-value
Class I	18 (04.48%)	04	14	The chi-square statistic is 7.1182. The p-value is 0.129772. The result is not significant at p < 0.05.
Class II	49 (12.26%)	04	45	
Class III	94 (23.15%)	10	84	
Class IV	110 (27.16%)	8	102	
Class V	133 (32.95%)	7	126	

Figure 1: Distribution of study population according to occupation

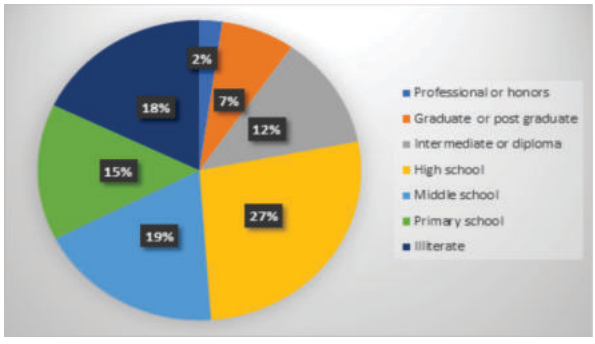

Figure 2: Distribution of the study population according to educational status

Based on age distribution, most i.e., 38.4% of total subject were in age-group of 40-49 years with mean age with standard deviation of the study subjects were **54.31±10.04 years.** Out of 404 study subjects, there were 215 i.e., 53.22% male and 189 i.e., 46.78% female. Majority of the studied cases were from nuclear family which was 268 or 66.43% and 358 (88.6%) belonged to Married Group and Separated/Widowed/ Divorced Group constituted only 42 (8.4%). most of the subjects belonged to socioeconomic class IV and V. 133 i.e., 32.95% subjects were from class V, 110 i.e., 27.16% were from class IV, 94 i.e., 23.15% were from class III, 49 i.e., 12.26% were from class II and only 18 i.e., 4.48% were from class I as per Kuppuswami socioeconomic classification(updated) (Table 1). Out of 404 cases majority 90 i.e., 22.32% were unemployed, 17 i.e., 4.21% were professional, 54 i.e., 13.36% were semi-professional, 85 i.e., 21.04% were skilled worker, 59 i.e., 14.60% were semi-skilled worker and 52 i.e., 12.87% were unskilled worker (Figure 1) and 72 i.e., 17.85% were illiterate, 30 i.e.,7.37% were graduates/PGs, and only 9 i.e., 2.29% were professional or honors. Primary and middle school education was found in 59(14.68%) and 75(18.62%) subjects respectively. Most of the subjects had education up to high school they were 109 i.e., 26.92% (Figure 2).

Table 2: Distribution of risk profile in studied cases

Variable	No. of patients	%	CVDs		p-value
			Present	Absent	
Physical activity	-	-	-	-	-
Sedentary	188	46.51%	22	166	Chi-square = 5.8539. The p-value is 0.015542. Result is significant at p < 0.05.
Non-sedentary (moderate/ heavy work)	216	53.49%	11	205	

Dietary habit	-	-	-	-	-
Vegetarian	95	23.59%	8	87	Chi-square = 0.0106. p-value= 0.91. Result is not significant at p < 0.05.
Mixed diet	309	76.41%	25	284	
Tobacco use	-	-	-	-	-
Yes	176	43.69%	23	153	Chi-square= 9.9816. p-value= 0.001. Result is significant at p < 0.05.
No	228	56.31%	10	218	
Alcohol consumption	-	-	-	-	-
Present	96	23.71%	12	84	Chi-square= 3.14. p-value = 0.075. Result is not significant at p < 0.05.
Absent	308	76.29%	21	287	
Family history of Diabetes/ hypertension	-	-	-	-	-
Present	183	45.30%	18	165	Chi-square= 1.2404. p-value= 0.26. Result is not significant at p < 0.05.
Absent	221	54.70%	15	206	
Diabetes mellitus -	-	-	-	-	-
Present	51	12.64%	12	39	Chi-square= 18.36. p-value= 0.00001. Result is significant at p < 0.05.
Absent	353	87.36%	21	332	
Hypertension	-	-	-	-	-
Present	109	26.87%	19	90	Chi-square= 17.07. p-value= 0.000036. Result is significant at p < 0.05.
Absent	295	73.13%	14	281	
BMI	-	-	-	-	-
<25 kg/m2	244	60.33%	14	230	Chi-square= 4.85. p-value= 0.027. Result is significant at p < 0.05.
≥25 kg/m2	160	39.69%	19	141	
Waist -Hip ratio	-	-	-	-	-
Normal	292	72.36%	18	274	Chi-square= 5.63. p-value= 0.017. Result is significant at p < 0.05.
Abnormal	112	27.64%	15	97	
Family history of IHD/Stroke	-	-	-	-	-
Present	54	13.46%	14	40	Chi-square= 26.203. p-value= 0.00001. Result is significant at p < 0.05.
Absent	350	86.54%	19	331	

Based on physical activity, 188 (46.51%) study subjects out of 404 had inadequate physical activity and 216 (53.49%) had adequate physical activity. Only 95 i.e., 23.59% study subjects were pure vegetarian and 309 i.e., 76.41% were on mix diet. Out of 404 study subjects 176 i.e., 43.69% study subjects were using tobacco or having history of long-time tobacco use in any form either smoking, chewing gutkha, pan masala, hukkah etc and 96 i.e., 23.71% were either consuming alcohol or having long time history of alcohol consumption. Based on family history of diabetes/ hypertension 183 i.e., 45.3% subjects had family history of either Diabetes mellitus, Hypertension or both. Similarly, 51 i.e., 12.64% subjects had Diabetes mellitus and 109 i.e., 26.87% study subject had Hypertension. Out of 404 study subjects, 160 i.e., 39.69% had BMI > 25 kg/m2 while 244 i.e., 60.33% subjects had BMI < 25 kg/m2 and 292 i.e., 72.36% had normal WHR and 112 i.e., 27.64% subjects had high WHR (waist- hip ratio). Based on family history of IHD/ Stroke 54 i.e., 13.46% subjects had positive history of either IHD or Stroke out of 404 study subjects (Table 2). Out of 404 study subjects, 14 i.e., 3.46% had complain of chest pain, 21 i.e., 5.20% had complain of palpitation, 15 i.e., 3.71% had complain of dyspnoea on exertion, 14 i.e., 3.46% had complain of weakness of limb and 9 i.e., 2.23% had complain of paralysis (Figure 3). Table 3 & 4 shown that **16 i.e., 3.87%** subjects had IHD and 17 i.e., 4.32% subjects had Stroke out of 404 study subjects.

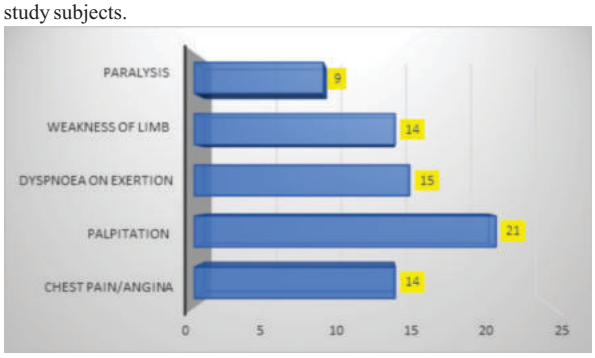

Figure 3: Distribution of study population according to the presence of symptoms related with CVDs.

Table 3: Distribution of study population according to IHD

Ischemic Herat Disease	Number of patients	Percentage
Present	16	3.87
Absent	388	96.13
Total	404	100

Table 4: Distribution of study population according to Stroke

Stroke	Number of patients	Percentage
Present	17	4.32
Absent	387	95.68
Total	404	100

DISCUSSION:

CVDs is a common clinical problem. Current treatment for patients with established CVDs is relatively not much effective. Approximately 50% of patients are left with permanent disability in case of Stroke. Effective risk factor intervention offers a real hope of reducing morbidity and mortality. Certain risk factors have been consistently identified as significant predictor of CVDs outcome, while some are less consistent. Consistent with the findings of other studies, this study showed that Hypertension, Smoking, diabetes, sedentary lifestyle, family history of CVDs, alcohol consumption and stress have strong correlations and association with CVDs and are the major risk factors of CVDs.

Age and male sex are important non-modifiable risk factors for CVDs. The mean age of subjects in this study was 54.31 years. These observations are affirmed in the present study as most subjects were between the age of 40-59 years (n=291 i.e., 72.1%) and male preponderance was observed in CVDs (male: female ratio, 1.14:1).

In the AHA 2019 heart disease and Stroke Statistical Update, the incidence of CVD was reported to be 77.2% in males and 78.2% in females, from ages 60–79 years89. Furthermore, the incidence of CVD was reported to be 89.3% in males, and 91.8% in females, in adults above 80 years of age[22].

In the present study, significantly more subjects had non-sedentary life-style. Protective effect of physical activity on CVDs incidence in men and women has been observed in previous studies also (Kiely et al., 1994)[23]. There was no difference in the pattern of physical activity in both the sexes. Similar results were observed in a study done by Gupta R, Gupta VP, Ahluvalia NS in rural Rajasthan observed where 85% of the people had inadequate physical activity. In a study done in South India by Abraham RA and Jagannathan D it was observed that 80%of the patients with diagnosed cardiovascular disease attending a private hospital were involved had sedentary lifestyle[25]. Frank. H. Fu et

al[26] done a study in 2003 in Hong Kong among secondary school students about coronary artery disease risk factors found that 15.1% were physically inactive. In a study carried out in Thiruvanathapuram city, out of a total 206 subjects over 19 years Joseph et al in the year 2000 reported sedentary habits among 20% of males and 14.6% of females[27]. Surprisingly, Gupta et al in 1994 in a study in rural Rajasthan reported an absent leisure time activity in 64% out of 2212 subjects[24]. Rustagi N et al done a study on cardiovascular risk behaviour among students of a Medical College in Delhi in November 2009 to February 2010 found that occasional or nil physical activity was reported by 42.6% of students[28].

Family history of CVDs was present in 54 subjects. Frank. H. Fu et al done a study in year 2003 in Hong Kong among secondary school students about coronary artery disease risk factors found that 8.9% of students had family history of CHD[26]. Latheef SA, Subramanyam G in their study in year 2007, the prevalence of coronary artery disease and coronary risk factors in an urban population of Tirupati they found that 1.98% in males and 3.84% in females had family history of CHD in the age group of 20-30 years of the study population[29]. Gopinath N et al carried out a study for CHD risk factors among individuals aged 25-64 years, in urban areas of Delhi, 54% of the subjects were females. The prevalence of family history of CHD was observed to be 20% of subjects without CHD. There is no difference between males and females[30].

When familial risk of stroke was studied, a strong association of stroke between siblings was observed and genetic factors were suggested as predictors of stroke (Sundquinst et al., 2006[31]). Similarly, Tentschert et al.[32] demonstrated correlation between maternal history of stroke and prevalence of hypertension and left ventricular hypertrophy in female patients with ischemic stroke (Tentschert et al., 2003[32]). In the Framingham Study, paternal as well as maternal history of stroke was found to be associated with an increased risk (Kiely et al., 1993[23]). Furthermore, many classical risk factors like Hypertension, Diabetes mellitus also have a common genetic basis and thus can be seen in families.

The International Clinical Epidemiology Network (INCLEN) study showed that the prevalence of hypertension was more than 20% among six of the 12 community studies in different parts of Asia and Latin America101. In the study on cardiovascular risk factors by Gupta R, Gupta VP, Ahluvalia NS, it was observed that the prevalence of hypertension in rural Rajasthan was 21%.In another study by the same author, the prevalence of hypertension was13.2%[24]. In a study done by Yajnik CS, in rural India in adults above 40 years of age 14% were hypertensive[33]. In a study by Chadha SL, Gopinath N, Shekhavat S, the prevalence of hypertension in Delhi was 29%[34]. Latheef SA, Subramanyam G in their study prevalence of coronary artery disease and coronary risk factors in an urban population of Tirupati they found that prevalence of Hypertension in males 8.9%% and females 7.69% in age group of 20-30 years of age[29].

Smoking and other forms of tobacco use was observed to be the significant risk factor for CVDs in the present study. Frank.H.Fu et al done a study on study in 2003 in Hong Kong among secondary school students about coronary artery disease risk factors reported that 7.7% of students were smoking cigarettes[26]. Rajeev Gupta et al done a study in north India in 1999-2002 and evaluated major coronary risk factors in 2051 subjects aged 15-39 years of age. They found that the prevalence of smoking was 11.8% in males and 1.4% in females[35]. Smoking contributes to 12% to 14% of all stroke-related deaths. Among nearly 40,000 US women in the Women's Health Study, those who smoked more than 15 cigarettes a day had a 4-fold increased risk of hemorrhagic stroke compared with non-smokers[36]. Findings of this study are in the near range of other studies.

Alcohol consumption was observed to be not significant risk factor for CVDs in the present study. Rustagi N et al done a study on cardiovascular risk behaviour among students of a Medical College in Delhi in November 2009 to February 2010 found that alcohol consumption was 28.8% among students (boys 33.5% and in girls 21.2%)[28].

Diabetes mellitus is another important modifiable risk factor for stroke. This study showed that n = 51 i.e., 12.62% subjects were diabetic. Our study findings in perspective of Diabetes Mellitus are in near range of other studies. Both type 1 and type 2 diabetes increase risk of CVDs. In addition to the stroke/IHD risk caused by diabetes itself, many diabetics also have high blood pressure, high cholesterol and are overweight, all additional risk factors for CVDs. Data from the Framingham Heart Study indicate that diabetes may have a greater impact on stroke risk in older women compared with men[37]. In another study held in Acute Stroke unit, university department of medicine and therapeutics, Gardiner institute, western infirmary & faculty of Medicine, University of Glasgow, UK, they Selected 29,500 ischemic stroke patient: 5411 (18.5%) had Diabetes Mellitus, 5019 had a prior stroke (17.1%), and 1,141 (5.5%) had both[38]. According to a study done by Gupta R, Gupta VP, Ahluvalia NS, the prevalence of diabetes mellitus in rural Rajasthan was 0.2%[24].

Rajeev Gupta et al done a study in north India in 1999-2002 and evaluated major coronary risk factors in 2051 subjects aged 15-39 years of age. They found that at age 15- 19 years the prevalence of diabetes mellitus was nil and impaired fasting blood glucose in males 14.2% and in females 8.3%. But in the age group of 20-29 years prevalence of DM and impaired fasting blood glucose (IFG) in males and females 0.6% ,0.0% (DM); 5.7%, 6.4% (IFG) and 30-39 years 6.8%, 2.9% (DM); 19.5% ,11.4% (IFG) in males and females respectively[39].

Obesity is a common risk factor for CVDs. In our study, n=160 i.e., 39.69% subject were BMI > 25 kg/m2. Study done by Chadha SL, Gopinath N, Shekhavat S. in Delhi revealed that 21% Urban men, 33%Urban women, 10% Rural men and 10% Rural women were obese[34]. Latheef SA, Subramanyam G in their study prevalence of coronary artery disease and coronary risk factors in an urban population of Tirupati found that prevalence of overweight/obesity in males 30.69% and females 26.22% in age group of 20-30 years of age[29]. In the study done in Thiruvanthpuram city Joseph A et al in the year 2000 reported a prevalence of obesity (BMI>_30) 2.3% among men and 9.2% among women[27].

Truncal obesity is also a common risk factor for CVDs. In our study n=112 i.e., 27.64% subject had abnormal waist-hip ratio. In a study by Gupta R, Gupta VP, Ahluvalia NS, 48% of the people had truncal obesity (abnormal waist-hip ratio)[39]. Rajeev Gupta et al done a study in north India in 1999-2002 and evaluated major coronary risk factors in 2051 subjects aged 15-39 years of age reported truncal obesity in 15% of males and 32.3% in females. They found that at age 15-19 years the prevalence of truncal obesity 4.9% in males and 14.4% in females. Similarly in the age group of 20-29 years 18.9% in males, 34.4% in females and 30-39years 51.9% in males, 74.3% in females respectively[35].

CONCLUSION:

Commonest modifiable risk factors for CVDs are hypertension, smoking or tobacco in any form, diabetes mellitus, obesity, truncal obesity, sedentary life style, stress. Commonest non-modifiable risk factors are increasing age and family history of CVDs. Most of the significant risk factors in the present study are potentially modifiable and increased awareness about the primordial prevention of these risk factors may be beneficial to the population at risk. Due to the sheer magnitude, devastating consequences and residual sequelae of CVDs, early intervention in the form of patient education, lifestyle modification and non-pharmacological as well as pharmacological interventions for the modifiable risk factors should form an integral aspect of patient care. This could be helpful in early identification of subjects at risk for CVDs and formulating public health strategy.

Conflicts of interest: Authors declare no conflicts of interest

Acknowledgement:
We sincerely thank all the subjects who participated in the study and the Department of Community Medicine, Darbhanga medical college and Hospital, Laheriasarai, Bihar.

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