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A PRELIMINARY STUDY ON PREVALENCE OF CARDIOVASCULAR DISEASES AND ASSOCIATED RISK FACTORS IN INPATIENT DEPARTMENT OF CARDIAC-CARE HOSPITAL AT TIRUPATHI

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ABSTRACT

Cardiovascular disorders (CVD's) are estimated to be the leading cause of mortality worldwide. A prospective observational study was carried out at inpatient department of cardiology in tertiary care hospital, Tirupathi from December 2012 – May 2013 during regular ward rounds. This study was aimed to identify the CVD prevalence, assessment various risk factors related to CVD. The demographic details of the patient, disease prevalence, risk factors and socioeconomic factors of 180 inpatients with CVD were collected in a specially designed proforma. The average age of study population was found to be 59.06±1.8 years. Subjects of age groups > 40 years (92.77%) were found to be more susceptible to CVD and majority of them were males 51.66%. Prevalence of coronary artery diseases (CAD's) was highest 73.33% among the CVD inpatients. Prevalence of CVD was more in urban population 60.66% than the rural population 33.33%. Prevalence of CVD was highest in illiterate 51.11% and occupation status of cooli and house wife patients 59.99 %. CVD were highest in patients of smoking associated with dietary habits of non-vegetarian 36.11%. Medium income status population is more prone to CVD 51.11%. CVD risk factors provided the basis for the prevention, our present study also observed the modifiable and non-modifiable risk factors in the patients. As it is a preliminary study, used as a basement for the further studies of prevalence in Indian population it may reduce the incidence of CVD morbidity and mortality.

KEY WORDS: Prevalence, CVD, risk factors, socioeconomic status.

INTRODUCTION

Rate of mortality from coronary vascular disease (CVD), stroke, cancer and diabetes are currently increasing in most industrialized countries and in developed regions they account for almost 5.5 million deaths annually. Most common causes of death among worldwide are cardiovascular diseases. Prevalence studies are used to determine the all current cases (old / new) existing at a given point in time over a period of time in given population and these are used to estimate the disease progression and other factors in the particular region.[1] According to the World Health day -7 April 2013, an estimated 17.3 million people died from CVD in 2008, Over 80 % of CVD deaths take place in low- and middle-income countries and by 2030 more than 23 million people will die annually from CVD. According to the World Health Report 2002, CVD will be the largest cause of death and disability in India by 2020.[2] In developed nations the rise in the burden of CVD occurred over several decades due a long period of epidemiological transition. In India, perhaps because of the rapid pace of economic development, epidemiological changes have spanned a much shorter time. As a consequence, CVD has emerged as the leading cause of death all over India, with coronary heart disease (CHD) affecting Indians at least 5-6 years earlier than their western counterparts. Current estimates from disparate cross-sectional studies indicate the prevalence of CHD to be between 7-13 % in urban and 2-7 % in rural India. The spiraling rates of modifiable risk factors for CHD across the spectrum of rural to urban segments of our population have been demonstrated by several studies across India. In addition, migration and urbanization have resulted in an increase in the prevalence of risk factors such as diabetes, overweight.[3,4] Developing countries particularly India must carry out studies of the risk factors, which operate in their countries as this provides the basis for prevention. Indeed, the risk factor concept is 50 years old and the list of factors keep on increasing with our improved understanding of the processes. These risk factors are commonly observed in most of the population and most of the common people are unaware of these matters and finally lead to increased morbidity and mortality. CVD always include multiple drugs in the treatment and required lifelong medication depending on

the disease severity. These factors lead to increased cost of the treatment and also patient often experiences emotions such as fear, anger and anxiety. Finally sometimes these factors are leads to non-adherence to treatment which may cause treatment failure and worse conditions. The modifiable cardiovascular (CV) risk factors may manage effectively through lifestyle changes and pharmaceutical treatment is therefore essential if the incidence of CVD morbidity and mortality is to be reduced. Present study aim is the prevalence of cardiovascular diseases and associated risk factors in inpatient cardiology unit. As it is a preliminary study used as a basement for the further studies of CVD prevalence in inpatients.

MATERIALS AND METHODS

An observational & prospective study of 6 months duration was carried out from December 2012 - May 2013. The study site was cardiac inpatient department of Sri Venkata Sai Hrudayalaya, Tirupathi. The study was conducted with the approval of the human ethical committee, Sri Padmavathi School of Pharmacy, Tiruchanoor. Patients who have been diagnosed with CVD as per Newyork Hear Association (NYHA) guidelines and hospitalized for the treatment were included. Total sample size was 180. During the study, patient's case records were observed and the data was recorded in the designed Patient Data Recording Form. Patient characteristics such as age, sex, body weight, cases with previous medical history, diagnosis, various risk factors, Laboratory Data were collected. All the data has to be collected to overview the prevalence of cardiovascular disease patients with presence or absence of co-morbidities. Correlate the laboratory data with clinical conditions. Patient characteristics and other relevant data were computed using MS Excel and SPSS statistical package. The results were presented as percentage and mean ± Standard deviation (SD). Here we have to apply Chi-square test for data by using Graph Pad Prism Version 6.01 software to calculate P value. We considered Null hypothesis & Alternate hypothesis for statistical purpose. P value should be <0.05.

RESULTS

The period prevalence (i.e., December 2012 - May 2013) in 180 patients was observed for different types of CVD, the prevalence of CAD was 73.33 % (132) were found to be more, followed by CHF 12.22 % (22) and Dilated Cardiac Myopathy (DCM) 6.66 % (12), A very few were accounted for the Chronic rheumatic heart disease (CRHD) 5% (9), Systemic tachycardia & corpulmonale (ST & CP) 1.66 % (3) and Hypertensive heart disease (HHD) 1.11 % (2) (figure -1).

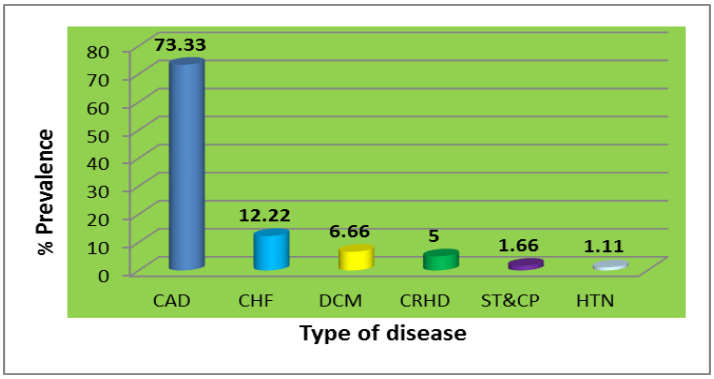

Figure 1 - Prevalence of cardiovascular diseases.

Prevalence of CVD were found to be more in the male 51.66 % (93) than the female 48.33 % (87), in this CAD were found more in female patients 39.44 % (71) than the male patients 38.88 % (61), in CHF - 8.8 % (16), DCM - 3.88 % (7) and CRHD - 3.33 % (6) male patients were more than the female patients CHF - 3.33 % (6), DCM- 2.77 % (5) and CRHD - 3.33 % (6). ST & CP was found only in males 1.66 % (3) and only HHD was observed in female patients 1.11% (figure -2).

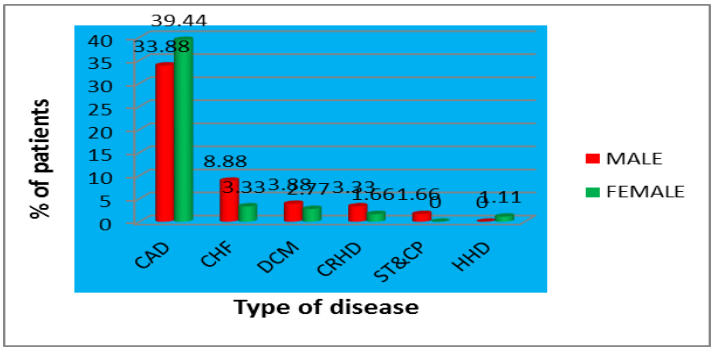

Figure 2 - Gender specific Prevalence of CVD

The gender /age specific prevalence of cardiovascular diseases increased with age, Prevalence of CVD were more 29.44 % (53) in (60-69) age group, followed by 20.55% (37) in > 70 years and 25 % (45) in (50-59) years age group. Remaining age specific prevalence were 17.77 % (32), 5 % (9) and 2.22 % (4) in (40-49), < 30 and (30-39) age groups respectively. Female patients were found to be more 52.83 % (28) in the age group of (60-69) than the male patients 47.16 % (25), followed by 62.5 % (20) in the age group of (40-49) than the male patients 37.5 % (12), but the male patients were found to be more 59.45 % (22) than the female patients 40.50 % (15) in the age group of ≥ 70 years (figure – 3).

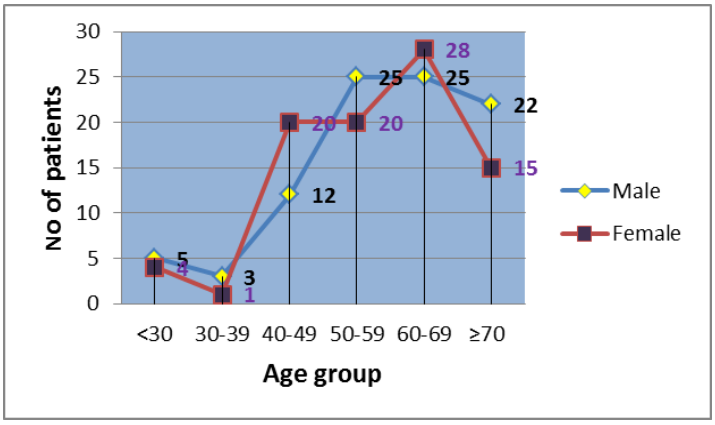

Figure 3 - Age/Gender specific prevalence of cardiovascular diseases

The prevalence of CVD was more in the urban population 60.66 % (120) than the rural population 33.33 % (60). Among the urban population CAD were found to be more prevalent 47.22 % (85), followed by CHF in 10.55 % (19), DCM in 5 % (9), CRHD in 2.22 % (4) and ST & CP 1.66 % (3). Among the rural population prevalence of CAD were more 26.11 % (47), followed by CRHD 2.77 % (5), CHF & DCM 1.66 % (3) and HHD 1.11% (2) .We also observed that the there is no prevalence of ST & CP in rural population and HHD (only) in urban population (table - 1).

Table No. 1: Prevalence of CVD in Urban and Rural population

Type of CVD	Urban	Rural	P value (<0.05)
	Number of patients (%)	Number of patients (%)	
CAD	85 (47.22)	47 (26.11)	0.0345[s]
CHF	19 (10.55)	3 (1.66)	
DCM	9 (5)	3 (1.66)	
CRHD	4 (2.22)	5 (2.77)	
ST & CP	3 (1.66)	0	
HHD	0	2 (1.11)	
Crude prevalence	120 (60.66)	60 (33.33)	

Illiterate were found more in CVD 51.11% (92), followed by primary education patients 33.88 % (61). The secondary, graduate, post graduate are 1.66 % (3), 8.88 % (16) and 4.44 % (6) respectively (figure – 4).

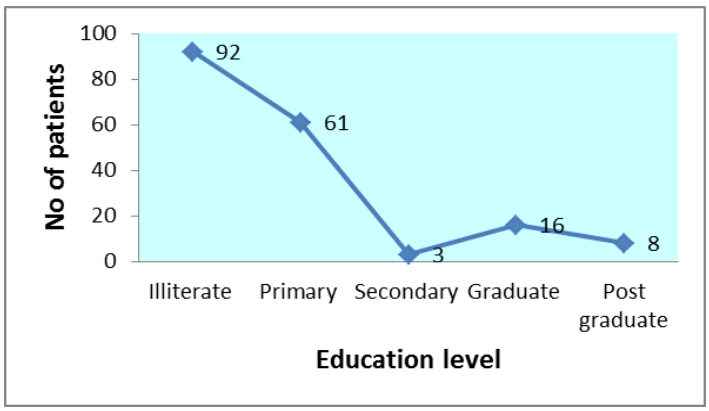

Figure 4 - Education level in the study population

We observed that the occupation level in the study population, in that house wife were found to be more 32.22 % (58), followed by cooli 27.77 % (50), business 24.44 % (44), employees 10.55 % (19) and finally our results suggest that the prevalence of CVD were found to be less 2.77 % (5) in farmers and retired employee (figure – 5).

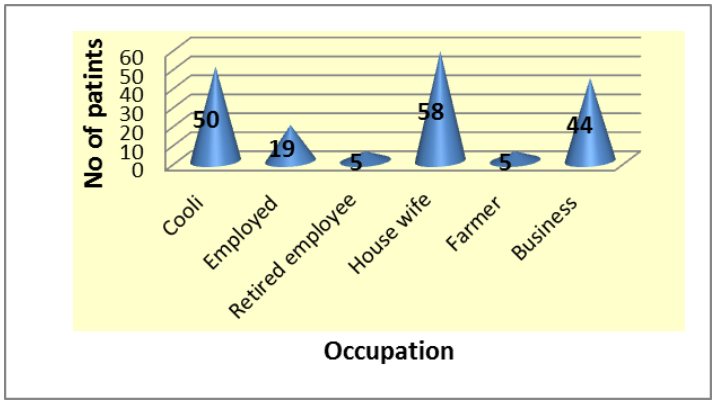

Figure 5 - Occupation status in the study population

We observed the prevalence of CVD were found to be more in the middle income status 51.11 % (92), followed by high income 37.22 % (67) and low income 11.66 % (11) (figure - 6).

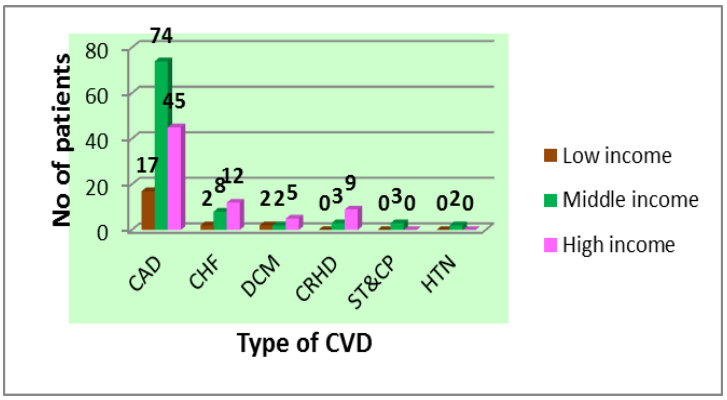

Figure 6 - Annual income status in the study population

We are classified the Social and Dietary habits into 3 groups in the CVD patients.

Group-I

Indicates the Non-smoking associated with social and dietary habits, among this Non-smoking, Alcoholic & Non-vegetarian combination is more 6.11 % (11) and no combinations of Non Smoking, ex-alcoholic & vegetarian were observed.

Group-II indicates the Ex-smoking associated with social and dietary habits, among this Ex-smoking & Non-vegetarian 4.44 % (8) social and dietary habits are more and there is no combination of ex-smoking, ex-alcoholic and non-vegetarian were observed.

Group-III indicates the Smoking associated with social and dietary habits, among this Smoking and non-vegetarian were found to be more 36.11 % (65), followed by Smoking, alcoholic and non-vegetarian observed in 27.77 % (50) cases and Smoking, ex-alcoholic and vegetarian observed in 1.66 % (3). Finally our results suggest that the Prevalence of CVD were more in the smoking patients (Table - 2).

Table No. 2: Social and dietary habits grouping in the CVD patients

SL. NO.	Social Dietary habits	No. of Patients (%)
A.	**Group – I**	**35 (19.44)**
1.	Non-Smoking + Alcoholic + Vegetarian	3 (1.66)
2.	Non-Smoking + Alcoholic + Non-vegetarian	11 (6.11)
3.	Non-Smoking + Ex-alcoholic + Vegetarian	0
4.	Non-Smoking + Ex-alcoholic + Non-vegetarian	3 (1.66)
5.	Non-Smoking + Non-alcoholic + Vegetarian	9 (5)
6.	Non-Smoking + Non-alcoholic + Non-Vegetarian	9 (5)

B.	**Group-II**	**23 (12.77)**
7.	Ex-smoking + Ex-alcoholic + Vegetarian	2 (1.11)
8.	Ex-smoking + Ex-alcoholic+ Non-vegetarian	0
9.	Ex-smoking + Alcoholic + Vegetarian	3 (1.66)
10.	Ex-Smoking + Alcoholic + Non-vegetarian	5 (2.77)
11.	Ex-smoking + Vegetarian	5 (2.77)
12.	Ex-smoking + Non-vegetarian	8 (4.44)
C.	**Group-III**	**46 (81.11)**
13.	Smoking + Ex-alcoholic + Vegetarian	3 (1.66)
14.	Smoking + Ex-alcoholic + Non-vegetarian	13 (7.22)
15.	Smoking + Alcoholic + Vegetarian	6 (3.33)
16.	Smoking + Alcoholic + Non-vegetarian	50 (27.77)
17.	Smoking + Vegetarian	9 (5)
18.	Smoking + Non-vegetarian	65 (36.11)
Total		**180 (100)**

We observed the social and dietary habits in the different types of CVD patients.

Group-III Social and dietary habits patients were found to be more 81.11 % (146) than the other groups like **Group-I** 19.44 % (35) & **Group-II** 12.77 % (23). CAD patients was presented with **Group-III** Social and Dietary habits 58.88 % (106), than in **Group-I** 7.77 % (14) and **Group-II** 6.66 % (12). The CHF patients **Group-III** Social and dietary habits were more 6.66 % (12) than **Group-I** 3.33 % (6) and **Group-II** 2.22 % (4). In DCM patients **Group-III** habits were higher 3.33 % (6) than other two group, **Group-I** 2.22 % (4) and **Group-II** 1.11 % (2). The CRHD were more in **Group-I** 2.77 % (5), than group **II** and **III**, 1.11 % (2) and 2.22 % (4). ST & CP patients presented with **Group-III** 1.11 % (2) and **Group-II** 0.55 % (1). The HHD observed in the **Group-II** patients 1.11 % (2) (figure -7).

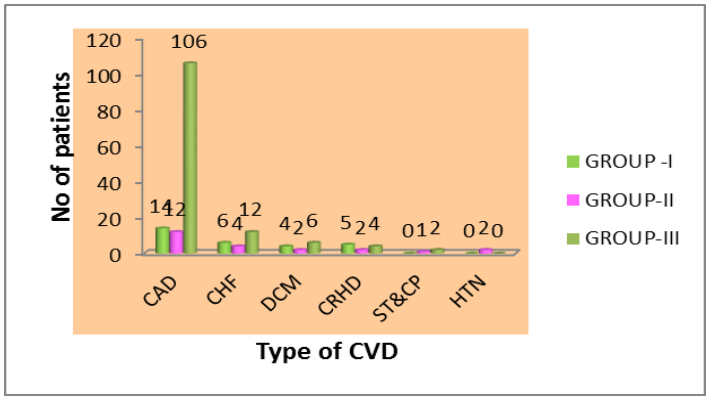

Figure 7 - Social and Dietary habits in the CVD patients.

We observed the modifiable and non-modifiable risk factors in the study population.

Non-modifiable risk factors include age, gender and family history. We observed that the family history was found to be more in the CAD patients (41), followed by CHF (7), DCM (4), ST & CP (3) and there is no family history of CVD in the CRHD & HTN patients.

Modifiable risk factors include alcohol consumption, smoking, blood pressure levels, BMI (Body mass index), lipid profile, hypertension, diabetes mellitus, hypothyroidism. The results show the CAD was prevaled especially in diabetic patients (36.11 %) and HTN patients (50 %).

Table No. 3: Prevalence of risk factors in the study population

Risk factors	CAD	CHF	DCM	CRHD	ST & CP	HTN	TOTAL (n= %)
NON-MODIFIABLE RISK FACTORS							
Age	60.96±13.67	52.81±18.06	60.77±20.85	87.77±22.25	55±18.52	69.6±0.7	59.06±1.8
Gender							
Male	61 (33.88)	16 (8.88)	07 (3.88)	06 (3.33)	3 (1.66)	0()	93 (51.66)
Female	71 (39.44)	06 (3.33)	05 (2.77)	03 (1.66)	0()	2 (1.11)	87 (48.33)
Family history	41 (22.77)	07 (3.88)	04 (2.22)	0()	3 (1.66)	0()	55 (30.55)

MODIFIABLE RISK FACTORS							
Alcoholic	53 (29.44)	09 (5)	5 (2.77)	8 (4.44)	3 (1.66)	0	78 (43.34)
Non-alcoholic	64 (35.55)	09 (5)	5 (2.77)	1 (0.55)	0	02 (2.77)	81(45)
Past alcoholic	15 (8.33)	04 (2.22)	2 (2.77)	0()	0	0	21 (11.66)
Smokers	52 (28.88)	02 (1.11)	12 (6.66)	4 (2.22)	2 (2.77)	02 (2.77)	74 (41.11)
Non-smokers	70 (38.88)	10 (5.55)	8 (4.44)	3 (1.66)	0	02 (2.77)	93 (51.66)
Ex-smokers	10 (5.55)	0	0	3 (1.66)	0	0	13 (7.22)
SBP (mm/Hg)	138.64	133.86	129.16	132.22	150	160	144.44
DBP (mm/Hg)	90.22	89.54	85	87.77	94	100	92.11
BMI							
<18.5	7 (3.88)	1 (0.55)	1 (0.55)	1 (0.55)	1 (0.55)	1 (0.55)	12 (6.66)
18.5 - 22.9	25 (13.88)	8 (4.44)	2 (1.11)	3 (1.66)	0	1 (0.55)	39 (21.66)
23.0 - 27.49	76 (42.22)	8 (4.44)	7 (3.88)	4 (2.22)	0	0	95 (52.77)
≥27.5	24 (13.33)	5 (2.77)	2 (1.11)	1 (0.55)	2 (1.11)	0	34 (18.88)
Lipid Profile (mg/dl)							
TC (100 – 150)	155.81	200	200	136	183	0	144.67
TG (80 - 180)	96.53	179	115	80	127	0	93.00
HDL (30 – 70)	32.86	38	38.86	40	34.66	0	71.00
LDL (70 - 130)	86.42	89.23	84	70	18.44	0	90.00
HTN	90(50)	09 (5)	04 (2.22)	7 (3.88)	3 (1.66)	2 (1.11)	115 (63.88)
DM	65 (36.11)	11 (6.11)	01 (0.55)	4 (2.22)	0	0	81 (45)
THYROID	13 (7.22)	0	0	0	0	0	13 (7.22)

DISCUSSION

The study results revealed an overall CAD prevalence of 73.33 % (132) in the study population, followed by prevalence of CHF 12.22 % (22), DCM 6.66 % (12), CRHD 1.66 % (3) and 1.11% (2) of hypertensive heart disease, which shows the similarity with ***Dakshina Murthy. P et al.,*** study in which overall prevalence of CAD was 5.4 %.[5]

Present study showed that the predominance of male 51.66 % with early onset of CVD than female 48.33% and there is a significant difference between them (51.66 % vs 48.33 %, p=0.0004).

In the CAD prevalence of female (39.44%) were slightly more than male (33.88 %) which is contrasted to the studies by ***Faizal P et al.,*** which showed predominance of male (80%)[6], this fact is may be due to lose the cardiovascular protection after the menopause, presumably because of hormonal changes[7] and more female admissions during our study period.

Present study showed the predominance of male (8.88 %) with early onset of CHF as compared to females (3.33%) indicating that men are more prone to heart failure than females. This fact is supported by other studies ***Mitu Baskota et al.,*** which says that the risk of developing HF in males (53 %) is slightly greater than in female (47 %).[8] our study also showed the predominance of males in DCM (3.88% vs 2.77 %), CRHD (3.33 % vs 1.66 %) and ST & CP (1.66 % vs 0), this shows the severity of risk in the males. But our study showed the predominance of females in the hypertensive heart diseases (1.11 %).

Heart diseases progresses with the advancing age. There is a greater prevalence, which increases with the higher age. When categorized age-wise, maximum number of patients (29.44 %) were from the age group 60-69 years, followed by (20.55 %) in more than 70 years of age. There were significantly lower number of patients in the younger ages, (2.22 %) in the age group 30-39 and (5 %) in the age group <30 which is comparable to studies by ***Cheah Whye Lian et al., & Mitu Baskota et al .,*** which shows (38.6 %) in more than 60 years and (45 %) in 46-65 years.[8,9]

The above result is possibly due to the fact that as the age progress, the person becomes old and weak and there are possible chances for him to get associated diseases. It tends to affect the elderly subjects and often leads to prolonged disability [10] it may be due to general changes in the cardiovascular system (CVS) with aging decreased compliance of aorta, reduction in the cardiac muscle fiber size & reduced cardiac output.[11]

The present work showed, the CAD were more in the female patients than the male patients in the age group of 50-59 years (10.55% vs 8.33%) and 60-69 years (13.88% vs 11.11%) and in other diseases male were more in all age groups. The female predominance might be due to increased proportion of them in the total population or endothelial dysfunction, cardiovascular risk was increase in women as endogenous estrogen declines due to premature ovarian failure, oophorectomy, or menopause.[7] But male patients were more than the female patients in ≥ 70 years (12.22 vs 8.33 %), this is possibly due to female patients have more complications in lesser age and their average life span will be less than the male patients.[12]

Among the total study population most of them from urban area than the rural area (60.66 % vs 33.33 %) which shows the similarity with other studies ***Bela Shah et al.,*** **and** ***Kanala Reddy et al.,*** shows CVD and risk factors were more in urban area (10 vs 5%) than rural area.[13,14] This may be due to adopted life style and industrialization.

The educational status play an important role in the health conditions among many factors, such as access to health system, level of information, and treatment comprehension in the socioeconomic characteristics.[15] The population of the present study had a predominance of lower education level like illiterate (51.11 %), followed by primary education (33.88 %) which is comparable with ***Ruylyra et. al.,*** studies shows 73.9 % from illiterate and 67 % from basic education.[16]

Occupation of the patient was used as a parameter to understand the sedentary life style.[6] Housewife and cooli occupy around 32.22 % and 27.7 % respectively in present study, but in general as we know that they are not sedentary, their predominance might be due to increased proportions of them in the total population of this area, which shows similarity with ***Faizal et al.,*** studies in which majority of the patients were house wife 22.53 %.[6] Apart from that business people were 24.44 % which may be due to sedentary life style they have more tensions in occupation. Finally our study shows, the farmers were very less 2.77 %.

Present study showed predominance of medium income status 51.11 %, followed by high income status 39.44 % and low income status 11.66 % which may be due to unawareness of the healthy life style which is contrasted to studies by ***Ruylyra et al.,*** which shows the 81.3 % were low income level.[16]

Social and dietary habits predicted as major risk factors in CVD. In our study shows that the presence of combination of social and dietary habits. So, the Social and dietary habits were divided into 3 groups based on smoking. Group –III social and dietary habits were more 81.11 % smoking is associated with other social and dietary habits, followed by group – I 19.44% non-smoking with others and group – II 12.77 % ex-smoking with others. In our total study population smoking and non–vegetarian combination of social and dietary habits were more 36.11 % followed by smoking, alcoholic and non-vegetarian were 27.77 % but all other studies showed individual dietary habits of 9.63 % alcoholic & 46.7 % smokers by ***Mitu Baskota et al .,.***[8]

Smoking causes decrease in the pumping action of the heart, excess of alcohol can cause weakening of the heart muscle and non –vegetarian causes increased in the lipid profiles.[8]

Modifiable risk factors include average age of the total population was 59.06 years and gender difference include male 51.66% & female 48.33%. In CAD average age of study population was 60.96 ± 13.67 which is comparable to studies by ***Faizal et al.,*** CAD average age ***(***61.07±11.38 years) and ***Jose et al*** and ***Lundberg V et al.*** ***[8,17,18]***

Family history as a risk factor for CAD was 22.77 % which is comparable to ***Jose et al., (13.77%) and Faizal et al., (13.1%)*** studies.[6, 16] Overall family history includes 30.55 %.

Modifiable risk factors observed in our study include usage of alcohol, smoking, BMI, lipid profile and associated risk factors like con-cominnent illness.

Alcohol users constitute 43.34 % of the population. Although alcohol is 1 of the risk factors 45% have never taken alcohol. This group mainly consists of females. Which show similarity with ***Mitu Baskota et al.,*** in which 57.78 % were non –alcoholic.[8]

Smoking is 1 of risk factors for CVD but about 41.11% of the patients are non-smokers. About 7.22 % used to smoke but have left after being diagnosed, on advice of the physician. The patients who smoke constitute 42.22%.

Mean systolic blood pressure include 133.93 and mean diastolic blood pressure include 95.55 which was higher ***Cheah Whye Lian et al.,*** study which shows systolic blood pressure 125.28 and diastolic blood pressure 80.92.[9]

BMI, a risk factor for CVD include obese patients were 71.65 % & Dyslipidaemia prevalence observed in our study was 38.88 % which was higher than ***Cheah Whye Lian et al., study*** was 49 % & cholesterol at risk was 21.6%.[10]

In the CAD, Mean TC 155.81, TG 96.5, HDL 32.86 and LDL 86.42 observed in our study was lower than ***Dakshina Murthy Pet al.,*** study shows TC-162.2, TG-154.8, HDL- 46.1 and LDL- 87.5.[4]

Hypertension prevalence reported in this study was 63.88 % and Diabetes mellitus prevalence was 45 % which are higher than ***Dakshina Murthy. P et al.,*** study shows 39.66 % of HTN and 16.3 % of DM patients.[4] Hypertension and diabetes when together increased the risk of lesions in the target organs, incidence of CVD and mortality.[19] Hypothyroidism levels causes hardening of arteries [20], in our study 7.22% were observed.

CONCLUSION

In our study more than 50 years age group patients with both genders are more prevalent for CVD in that CAD has occupied the major portion (73.33 %). Smoking, Alcoholic, Non-vegetarian, HTN and DM are found to be risk factors for CVD.

There are some limitations to our study. First it was a single center study with limited sample size and limited period of time. Second limitations of the study could be restricted to only for few cardiovascular diseases.

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