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PREVALENCE OF RISK FACTORS OF CARDIOVASCULAR DISEASE AMONG THE ADULT FEMALE POPULATION OF ANAND CITY (GUJARAT)

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ABSTRACT

The prevalence of risk factors of cardiovascular disease is increasing globally. The objective of this study was to determine the prevalence rate of risk factors of CVD and its association with the socio-economic, lifestyle and genetic factors among the adult female population of Anand. A survey was conducted among a total of 1072 female subjects (18 years and above) using a pretested questionnaire and their background information, medical history and dietary habits were collected. Anthropometric parameters, blood pressure and lipid profile of the subjects were studied using standard methods. The prevalence rate of risk factors of CVD among the adult female population of Anand was found to be as follows: systolic blood pressure - 46.6%, diastolic blood pressure - 37.7%, overweight - 30.6%, obesity - 1.3%, type I diabetes - 1.5%, type II diabetes- 4.5%, low HDL-c - 63.5%, high triglyceride level- 6.5% , high LDL-c 6.7% and hypercholesterolemia- 8.4%. Among all the variables, age was strongly associated with systolic blood pressure, diastolic blood pressure, cholesterol and HDL-c. The other socioeconomic factors like occupation, religion, level of education, type of exercise, sleeping pattern and consumption of outside food were significantly ($p<0.05$) related with systolic as well as diastolic blood pressure. Level of education and occupation showed a significant impact on total cholesterol, triglycerides and LDL-c. Type of diet also had an impact on the total cholesterol and LDL-c. The present study concludes that even though the prevalence rate of CVD is lower, the risk factors are more prevalent in the studied female subjects of Anand.

Key Words: Cardiovascular disease prevalence, risk factors, adult female population , Anand city

INTRODUCTION

Cardiovascular disease is one of the causes of death in developing countries of the world [1]. In 1920, about 28% of deaths were contributed to CVD which was estimated to increase up to 34% by 2020 [3]. Cardiovascular Disease (CVD) refers to conditions and diseases of heart and blood vessels, including coronary heart disease (CHD), heart attack, stroke, high blood pressure, congestive heart failure (CHF) and congenital heart disease. These diseases can be interrelated and usually have similar risk factors [4,5]. Various risk factors leading to CVD are divided into lifestyle factors, biophysical parameters, lipid profile and other co morbidities. Use of tobacco, smoking, alcohol consumption, type of exercise, body mass index, hypertension, hypercholestremia, hypertriglyceridemia, diabetes are risk factors of CVD [6]. CVD has shown higher mortality rates among the lower socio-economic groups and those with a lower level of education [7]. [Gu et al (2005)] have reported that 34.2 % and 33.2% of Chinese men had more than one or two different risk factors of CVD respectively while 35.1% and 24.0% of Chinese women were suffering from at least one and two different risk factors of CVD, respectively. Among the adult Nigerian population, a significant number of modifiable CVD risk factors were present in the rural and urban migrants. Central obesity, hypercholestremia, hypertension and hypertriglyceridemia were prevalent in more than 20% of the population. Low levels of HDL and obesity were prevalent in less than 20% of the population while the prevalence of prediabetes and diabetes was below 10% in the general population [1]. Another study in Chennai (India) reported 12.1% of diabetes prevalence in the population [2]. Therefore, the present study was planned to determine the prevalence rate of risk factors of cardiovascular disease among the female population of Anand city, Gujarat.

METHODOLOGY

Subject selection

The study was carried out during the period of December-2012 to April-2013 for finding the

prevalence rate of risk factors of CVD in adult females of Anand city. Census list of Anand city of the year 2011 was procured from the Anand Municipality Office. From a total of 14 wards, 6 wards were randomly chosen. From each of these wards, 6 blocks were randomly selected by using Microsoft excel. Nearly 1072 females above 18 years of age were selected as study subjects. Written consent was taken from all the enrolled subjects.

Data collection

Background information like age, occupation, religion, level of education, type of family, average family income and information on medical history such as obesity, diabetes, family history, illness frequency, medication, type of surgery done, presence of signs and symptoms pertaining to CVD were collected using a pretested questionnaire.

Anthropometric measurements

Height, weight, waist circumference and hip circumference were measured using standard tools and methods. BMI and waist to hip ratio was calculated using the formula given below.

$$\text{BMI} = \frac{\text{Weight(kg)}}{\text{Height(m2)}}$$

$$\text{WHR} = \frac{waistcircumference}{hipcircumference}$$

Blood pressure was also measured using a sphygmomanometer by a registered physician. The cut off values of various categories of BMI, waist to hip ratio and blood pressure are mentioned in Tables 1, 2 and 3, respectively.

Table 1 : Categories of BMI:

Presumptive diagnosis	Cut off points of BMI kg/m^2
Under weight	<18.50
Normal	18.50-24.99
Preobese	25.00-29.99
Obese class I	30.00-34.99
Obese class II	35.00-39.99
Obese class III	≥40.00

Source: The Asian Pacific Criteria (WHO 2004) [9]

Table 2: Standard Values for Waist:Hip ratio

	Acceptable		Unacceptable		
	Excellent	**Good**	**Average**	**High**	**Extreme**
Male	< 0.85	0.85 - 0.90	0.90 - 0.95	0.95 - 1.00	> 1.00
Female	< 0.75	0.75 - 0.80	0.80 - 0.85	0.85 - 0.90	> 0.90

Source : The Asian Pacific Criteria (WHO 2004) [9]

Table 3 The classification of blood pressure

Category	Systolic B.P. (mmHg)	Diastolic B.P. mmHg)
Hypotension	<90	<60
Desirable	90-119	60-79
Pre hypertension	120-139	or 80-89
Stage 1 hypertension	140-159	or 90-99
Stage 2 hypertension	160-179	or 100-109
Hypertensive crisis	≥180	or ≥110

Source: AHA, (2011) [10]

Blood collection and Bio-chemical estimation

Fasting blood was collected by a trained laboratory technician (Devasya Laboratory, Vallabh Vidyanagar) serum was separated and analyzed for lipid profile which included total cholesterol, triglyceride and HDL-c cholesterol using COBAS INTEGRA 400 PLUS, while VLDL, LDL and TC:HDL ratio were obtained by calculation using the values of total cholesterol, triglyceride and HDL-c using the formula below:

VLDL = Triglyceride / 5
LDL = Total Cholesterol–(HDL+VLDL)
TC: HDL = Total Cholesterol/HDL

The reference ranges [11] for the lipid profile is shown in **table 4**.

Statistical analysis

Analysis such as univariate, bivariate, ANOVA and regression was conducted by SPSS version 15.0. Variables included for the analysis were age, family income, level of education, occupation, religion, type of diet, type of exercise, BMI, total cholesterol, triglycerides, HDL-c, LDL-c and TC/HDL.

Table: 4 Reference Range for Lipid Profile

Lipid Profile	Range	Diagnosis
Total Cholesterol (mg/dl)	below 200mg/dl	Normal
	200-239mg/dl	Borderline
	≥239mg/dl	High
Triglycerides (mg/dl)	Below 150mg/dl	Normal
	150-199mg/dl	Borderline
	199-499mg/dl	High
	≥499mg/dl	Very High
HDL (mg/dl)	<40 mg/dl	Best
	40-59mg/dl(M)	Better
	≥59mg/dl	Poor
LDL (mg/dl)	100-129mg/dl	Ideal
	129-159mg/dl	Borderline
	159-189mg/dl	High
	≥189mg/dl	Very High

Source: Mayoclinic, (2012) [12]

RESULTS AND DISCUSSION

In the female population studied, majority of the subjects belonged to 18-30 years. More than 50% of the population fell in the age category of 40 years and above as shown in **Table 5**. The mean age of the respondents was found to be 42 years.

Table 5 depicts the distribution of the female subjects according to their BMI categories namely underweight, normal, preobese, obese class I, class II, and class III. Around 36.9 % of females were normal, 30.6% of females were preobese and had chances of obesity. Only 1.3% of subjects belonged to the category of class III obesity which would further increase the risk of CVD and Diabetes. As per Ahmad et al. (2006), the number of obese and non-obese persons in Lahore (Pakistan), were 162 (27.93%) and 418 (72.07%) respectively [13].

Majority of females in the present were in systolic pre hypertension (46.6 %) and diastolic prehypertension (37.7%) categories. About 2.6% and 2.5% subjects were found to be in systolic and diastolic hypertensive crisis respectively. Among the symptoms related to CVD, it was noticed that maximum subjects (16.3 %) were suffering from hypertension. An African (Gabon) study reported a high prevalence of 53.7% of hypertension among females aged between 50-60 years [14]. The prevalence of hypertension in Nigeria was 3.4% in the study population from which 0.89% were females [15].

Majority of the subjects (93.8%) responded that they were not suffering from any kind of chronic diseases. However, about

Table 5: Distribution of the female subjects as per various risk factors of CVD

	Category	%	
Age	18-30	31.5	
	30-40	13.8	
	40-50	19.9	
	50-60	18.8	
	60-70	13.7	
	70 and above	2.3	
BMI (Kg/m^2)	Under Weight	12.9	
	Normal	36.9	
	Pre Obese	30.6	
	Obese Class I	14.7	
	Obese Class II	3.6	
Systolic Blood pressure	Hypotension	0.0	
	Normal	24.5	
	Pre Hypertension	46.6	
	HT-Stage 1	19.2	
	HT- Stage 2	7.0	
	Hypertensive crisis	2.6	
Diastolic Blood pressure	Hypotension	0.3	
	Normal	25.5	
	Pre Hypertension	37.7	
	HT-Stage 1	25.9	
	HT- Stage 2	8.1	
	Hypertensive crisis	2.5	
Medical History	No chronic disease	93.8	
	Type I DM	1.5	
	Type II DM	4.5	
	CVD	0.2	
Symptoms experienced by the subjects	Chest Pain	Yes	8.1
		No	91.9
	Shortness of breath	Yes	5.7
		No	94.3
	Hypertension	Yes	16.3
		No	83.7
	Hypotension	Yes	9.2
		No	90.8
	Dizziness	Yes	2.3
		No	97.7
	Headache	Yes	12.9
		No	87.1

1.5% and 4.5% females were suffering from type I diabetes mellitus and type II diabetes mellitus, respectively. About 0.2% subjects were suffering from CVD. Zafar et al (2011) have reported that among 798 females in Punjab, 12.31% were suffering from diabetes mellitus [16]. As per Edgar et al. (2012), CVD prevalence rates were in Gabon (Africa) 14.7% and 11.5% for rural and urban men respectively and 14.9% and 8.9% for rural and urban women respectively [14].

Pertaining to the symptoms experienced related to CVD, about 12.9%, 9.2% and 8.1% of subjects have experienced headache, hypotension and chest pain, respectively. Very few female subjects have experienced dizziness and shortness of breath as shown in Table 5.

Table 6 depicts the data on lipid profile of the subjects studied. About 68.9% of the females showed normal cholesterol levels, while 31.1% of the female subjects showed cholesterol levels beyond the normal level. About 73.7% showed normal levels of triglyceride whereas 19.6% of the females showed borderline triglyceride levels, also 6.5% and 0.2% of female subjects showed high and very high levels of triglyceride, respectively. Pertaining to HDL-c levels of the subjects, majority of the subjects (63.5%) showed poor HDL levels which could increase the risk of CVD. It was also noticed that majority of the subjects (70.3%) showed ideal LDL levels (below 100-129mg/dl). Moreover, about 8.8% of the female subjects showed higher levels of LDL-c.

A study conducted in Vallabh Vidyanagar showed that the prevalence of major CVD risk factors were systolic blood pressure (32.1%), diastolic blood pressure (22.7%), overweight (30.23%), obesity (6.9%), diabetes (14.7%), low HDL-c (58.9%), high triglyceride level (15.6%), high LDL-c (7.4%), hypercholesterolemia (5.7%) [6]. Table -7 and 8 shows the association of the various socio-economic factors and lifestyle factors with systolic blood pressure and diastolic blood pressure, respectively. Among the socio-economic factors age, occupation and level of education showed a significant ($p < 0.01$) association with systolic blood pressure (Table-7). Systolic hypertension was more prevalent in the subjects belonging to 50-60 years (17.3%) followed by the subjects of 18-30 years (17.1%) and 40-50 years of age

Table 6: Serum Lipid profile of the female subjects

Lipid Profile	%
Total Cholesterol	
Normal	68.9
Borderline	22.7
High	8.4
Triglycerides	
Normal	73.7
Borderline	19.6
High	6.5
Very High	0.2
HDL	
Poor	63.5
Better	20.3
Best	16.2
LDL	
Ideal	70.3
Borderline	20.9
High	6.7
Very high	2.1

(17.1%). A study by Lloyd-jones et al (2010) in America stated that the subjects with favorable levels of risk factors in middle age can survive and have a better quality of life 25 years later. As risk factors related to CVD can begin decades before the disease is detected, it is important to take preventive measures as early in life as possible [17].

Pertaining to occupation, systolic hypertension was found to be more prevalent (28.0%) in the subjects busy with other kind of work such as baby sitting or vendors, while, the least number of housewives (0.3%) had systolic hypertension. As far as level of education is concerned, higher percentage of the subjects with elementary education (24.6%) had systolic hypertension.

Sleeping pattern and outside food consumption pattern of the subjects also showed a positive and significant ($p<0.01$) relation with systolic blood pressure (Table 7). However, type of diet and meal timings did not show any significant association with systolic blood pressure.

The subjects who were doing meditation (0.3%) and playing badminton

(0.7%) had normal systolic blood pressure. Whelton et al. (2008) reported that regular aerobic exercise could decrease systolic blood pressure by 3.8 mm Hg (95% CI 2.7 to 5.0 mm Hg, p <0.001) in sedentary adults [18]. Aerobic exercise showed a positive effect in overweight children in an 8-week period. They were more fit, had higher HDL-cholesterol levels, and better endothelial function [19].

Table 8 represents that the socio-economic risk factors like age, occupation, and level of education which showed a significant (p<0.01) association with diastolic blood pressure. Diastolic hypertension was more prevalent in the subjects belonging to 50-60 years (17.3%) followed by the subjects of 40-50 years of age (16.7%). in the subjects doing other kind of work (28.1%) such as baby sitting or vendors. While, the least percentage (0.3%) of diastolic hypertension was seen in housewives. Sleeping pattern of the subjects and frequency of consuming outside food also showed a positive and significant (p<0.01) relation with diastolic blood pressure. Maximum hypertensive respondents (25.4%) consumed outside food only occasionally.

Looking at the type of exercise, cycling (0.7%), dancing (0.0%), yoga (4.7%), meditation (0.4%) and stretches (0.1%) showed a significant (P<0.05) relation with diastolic blood pressure (Table-8). As per Whelton et al. (2008), regular aerobic exercise could decrease diastolic blood pressure by 2.6 mm Hg (95% CI 1.8 to 3.4 mm Hg, p < 0.001) in sedentary adults [18].

Pertaining to occupation, diastolic hypertension was found to be more prevalent
ANOVA was done to study the impact of level of education, occupation, family income, type of exercise and type of diet on systolic and diastolic blood pressure. The data in Table- 9 revealed that level of education, occupation, family income and type of exercise had a significant (p<0.05) impact on systolic blood pressure. Observing the level of education, the subjects with elementary education showed the highest systolic blood pressure levels (132.55 mmHg). As far as occupation is concerned, housewives showed the highest systolic blood pressure (133.40 mmHg) among all the occupational categories and the lowest value of systolic blood pressure was observed in subjects involved in other activities like maid servants, baby sitting and vendors (119.49mmHg).

Table: 7 Association of various socio-economic factors and life style factors with systolic blood pressure

Variable		Percentage (%)		χ^2
		Normal	Hypertension	
Age(years)	18-30	14.4%	17.1%	142.74*
	30-40	4.1%	9.7%	
	40-50	2.7%	17.1%	
	50-60	1.6%	17.3%	
	60-70	1.4%	12.3%	
	70 and above	0.3%	2.1%	
	Total	24.5%	75.5%	
Occupation	Professional	2.8%	13.2%	21.478*
	Private			
	Government			
	Business	1.8%	16.4%	
	Retired	2.1%	23.7%	
	Housewife	0.0%	0.3%	
	Laborer	0.4%	2.5%	
	Farmers	0.4%	1.0%	
	Others	7.5%	28.0%	
	Total	14.9%	85.1%	
Level of education	Elementary	4.7%	24.6%	66.64*
	High School	4.5%	17.8%	
	Diploma	2.3%	1.6%	
	Graduate	9.8%	18.7%	
	Post graduate	2.2%	6.4%	
	PhD	0.2%	0.2%	
	Total	24.6%	75.4%	
Sleeping pattern	Peaceful	19.9%	53.3%	10.615*
	Disturbed	4.7%	22.1%	
Outside food	Never	1.9%	6.2%	46.83*
	Once in a week	3.2%	10.2%	
	Once in 15 days	6.6%	7.0%	
	Once in a month	4.5%	9.9%	
	Twice in a month	0.6%	2.2%	
	Occasionally	8.0%	25.4%	
	Rarely	2.2%	11.9%	
	Total	27.2%	72.8%	
Type of Exercise	Badminton	0.3%	0.1%	5.523*
	Meditation	0.7%	0.6%	6.107*

* Indicates significance (P<0.05)

Table: 8 Association of various socio-economic factors and life style factors with diastolic blood Pressure

Variable		Percentage (%)		χ^2
		Normal	Hypertension	
Age (years)	18-30	15.6%	15.9%	157.6*
	30-40	3.3%	10.5%	
	40-50	3.1%	16.7%	
	50-60	1.6%	17.3%	
	60-70	1.6%	12.1%	
	70 and above	0.6%	1.8%	
	Total	25.7%	74.3%	
Occupation	Professional	2.9%	13.0%	20.372*
	Private			
	Government			
	Business	1.3%	16.9%	
	Retired	2.6%	23.2%	
	Housewife	0.0%	0.3%	
	Laborer	0.5%	2.4%	
	Farmers	0.3%	1.1%	
	Others	7.4%	28.1%	
	Total	15.0%	85.0%	
Sleeping patte	Peaceful	21.1%	52.1%	14.117*
	Disturbed	4.7%	22.1%	
Outside food	Never	1.9%	6.2%	46.83*
	Once in a week	3.2%	10.2%	
	Once in 15 days	6.6%	7.0%	
	Once in a month	4.5%	9.9%	
	Twice in a month	0.8%	2.2%	
	Occasionally	8.0%	25.4%	
	Rarely	2.2%	11.9%	
	Total	27.2%	72.8%	
Type of Exercise	Cycling	0.7%	0.7%	4.365*
	Dancing	0.3%	0.0%	9.018*
	Yoga	3.5%	4.7%	14.567*
	Meditation	0.8%	0.4%	13.016*
	Stretches	0.3%	0.1%	5.095*

* Indicates significance (P<0.05)

Table: 9 Influence of socio-economic and life style factors on systolic blood pressure of female respondents

Variable	Category	Systolic Blood Pressure (mmHg)	Homogeneity of Variance	F Value
Level of Education	Elementary	132.55 ± 17.591	5.255	19.808*
	High school	130.98 ± 19.974		
	Diploma	116.14 ± 16.642		
	Graduate	123.65 ± 16.305		
	Post graduate	125.18 ± 15.311		
	PhD	127.50 ± 23.629		
Occupation	Professional	125.54 ± 18.542	12.234	24.019*
	Business	129.67 ± 13.904		
	Retired	132.22 ± 19.316		
	House wife	133.40 ± 19.582		
	Laborer	123.88 ± 18.132		
	Others	119.49 ± 12.870		
Family Income (Rs)	Up to 10,000	130.9 ± 19.701	2.732	2.761*
	10,000–20,000	128.1 ± 18.947		
	25,000–50,000	126.6 ± 15.001		
	50,000 and more	127.4 ± 129.1		
Type of Exercise	Sedentary	127.5 ± 17.127	2.637	4.559*
	Light	133.6 ± 22.177		
	Heavy	123.2 ± 14.736		

* Statistically significant (P<0.05)
Values in column 3 are Mean±**SD**

Regarding family income, the highest systolic blood pressure was observed in the subjects having monthly income of Rs. 10,000/- (130.9 mmHg) and the lowest was found in the subjects having monthly income of Rs. 25,000-50,000/- (126.6 mmHg). It may be attributed to the fact that people with higher income may be on medication if they have been diagnosed with blood pressure while, in the lower income strata, subjects may not have been diagnosed for high blood pressure. As

per Oguoma et al. (2015), more than 80% of the global burden of CVD could occur in low and middle-income countries [1]. Pertaining to the type of exercise, the highest systolic blood pressure was seen in the subjects involved in light exercise (133.6 mmHg) while the lowest systolic blood pressure was observed in the subjects occupied with heavy exercise (123.2 mmHg).

Table 10 depicts that among the socioeconomic factors, level of education and occupation showed a significant (P<0.05) impact on diastolic blood pressure. Looking at the level of education, subjects with elementary education showed the highest (87.59 mmHg) diastolic blood pressure levels. Pertaining to occupation, housewives showed the highest diastolic blood pressure (86.34 mmHg) and the respondents involved in other activities such as baby-sitting and vendors showed the lowest value of diastolic blood pressure (77.62 mmHg).

Table: 10 Influence of socio-economic factors on diastolic blood pressure of female respondents

Variable	Category	Diastolic Blood Pressure (mmHg)	Homogeneity of Variance	F Value
Level of Education	Elementary	87.59 ± 46.661	0.691	4.034*
	High school	83.76 ± 10.281		
	Diploma	72.38 ± 12.362		
	Graduate	79.81 ± 9.613		
	Post graduate	83.13 ± 8.800		
	PhD	77.50 ± 17.078		
Occupation	Professional	80.00 ± 8.971	0.304	4.343*
	Business	85.67 ± 12.558		
	Retired	81.67 ± 9.707		
	Housewife	86.34 ± 32.415		
	Laborer	81.00 ± 10.066		
	Others	77.62 ± 9.877		

* Indicates significance (P<0.05). Values in column 3 are Mean±SD

The impact of socio economic factors was also evaluated on other risk factors of CVD namely serum total cholesterol, serum triglyceride, high density lipo-protein, low density lipo-protein and very low density lipo-protein. The data showed that the level of education and occupation had a significant (P<0.05) impact on serum total cholesterol (Table-11), triglycerides (Table-12) and LDL-c levels (Table-13) whereas the type of diet showed a significant relationship with cholesterol and LDL-C-c but not with the triglyceride levels.

Table: 11 Influence of socio-economic and life style factors on serum total cholesterol levels of female respondents

Variable	Category	Total cholesterol (mg/dl)	Homogeneity of Variance	F Value
Level of Education	Elementary	191.4427 ± 35.23061	3.138*	8.604*
	High school	188.7211 ± 35.61410		
	Diploma	166.6405 ± 22.09571		
	Graduate	181.6097 ± 32.95217		
	Post graduate	174.4292 ± 29.81455		
	PhD	203.4050 ± 36.88825		
Occupation	Professional	184.7179 ± 31.76571	17.984*	26.489*
	Business	183.7550 ± 33.18529		
	Retired	209.3411 ± 44.24798		
	Housewife	192. 9394 ± 35.21438		
	Laborer	176.0225 ± 29.25768		
	Others	167.3527 ± 22.13247		
Type of Diet	Vegetarian	184.9639 ± 33.82357	3.927*	4.297*
	Ovo vegetarian	179.5448 ± 27.63574		
	Non vegetarian	191.7008 ± 37.34346		

* Indicates significance (P<0.05). Values in column 3 are Mean±SD

The type of diet had an impact on cholesterol and LDL-c levels. The subjects who were non-vegetarians in habit showed the highest cholesterol levels (191.70mg/dl) and the ovo-vegetarian respondents showed the lowest cholesterol values (179.54mg/dl) as expressed in Table-11. Similarly, the data in Table-13 also depicts that the non vegetarian subjects showed the highest values of LDL-C (121.58mg/dl) and ovo-vegetarians showed the least value of LDL-c (108.55mg/dl).

According to Table-11, the highest cholesterol levels were observed in the subjects who were highly qualified (Ph.D)

(203.40 mg/dl) and the lowest values of cholesterol was found in the subjects with diploma (166.64mg/dl). A similar trend was observed for serum triglyceride levels (Table-12) and LDL-c levels (Table-13) pertaining to the level of education of the subjects.

In the occupation category, the highest and lowest values of serum cholesterol was noticed for the retired respondents (209.34 mg/dl) and subjects busy in doing other kinds of work (167.35 mg/dl), respectively. A similar pattern was noticed for LDL-c with regard to occupation of the subjects (Table-13). However, for triglyceride levels, the highest and the lowest levels of triglycerides were noted for subjects doing business (131.05mg/dl) and laborers (96.10 mg/dl), respectively (Table-12).

Table: 12 Influence of socio-economic factors on serum triglyceride levels of female respondents

Variable	Category	Triglycerides (mg/dl)	Homogeneity of Variance	F Value
Level of Education	Elementary	120.8190 ± 56.13822	2.8	4.907*
	High school	127.6503 ± 77.16312		
	Diploma	91.7119 ± 34.79145		
	Graduate	114.3178 ± 52.14037		
	Post graduate	104.6873 ± 45.64284		
	PhD	149.4675 ± 82.21562		
Occupation	Professional	120.9828 ± 66.14789	1.611	8.371*
	Business	131.0525 ± 56.54683		
	Retired	120.5678 ± 59.50000		
	Housewife	126.4933 ± 63.76309		
	Laborer	96.1006 ± 42.89551		
	Others	100.0726 ± 43.06867		

* Indicates significance (P<0.05)
Values in column 3 are Mean±SD

The risk of developing CVD increases exponentially as LDL-C levels rise. It is also reported that the subjects with a controlled LDL-C cholesterol level below the recommended guidelines, if the HDL level is lower than the recommended level, the risk of developing CVD increases [20].

Table: 13 Influence of socio-economic and life style factors on serum LDL-C levels of female respondents

Variable	Category	LDL-c (mg/dl)	Homogeneity of Variance	F Value
Level of Education	Elementary	120.54 ± 29.654	3.588	6.67*
	High school	116.26 ± 29.760		
	Diploma	103.46 ± 16.387		
	Graduate	111.33 ± 28.606		
	Post graduate	106.08 ± 26.913		
	PhD	129.70 ± 29.224		
Occupation	Professional	116.91 ± 26.768	15.25	21.997*
	Business	112.98 ± 31.094		
	Retired	137.82 ± 36.404		
	Housewife	120.10 ± 29.692		
	Laborer	114.53 ± 27.202		
	Others	100.62 ± 19.836		
Type of Diet	Vegetarian	113.87 ± 28.580	2.174	7.554*
	Ovo vegetarian	108.55 ± 24.160		
	Non vegetarian	121.58 ± 31.105		

* Indicates significance (P<0.05)
Values in column 3 are Mean±SD

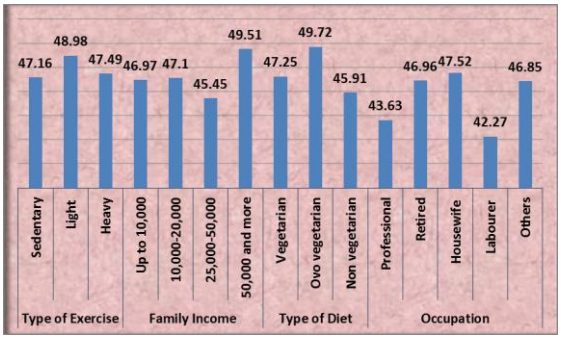

Figure 1: Influence of socio-economic factors and life style on HDL-c of female respondents

Figure 1 depicts the influence of socio-economic and life style factors on serum HDL- C levels of the female subjects. However, none of the socio-economic factors have shown a significant impact on the HDL-c levels.

In the regression analysis, the relationship between the dependent variables such as systolic blood pressure, diastolic blood pressure, total cholesterol, serum triglycerides, HDL-c, TC: HDL-c and independent variables such as age, occupation, level of education type of family income, BMI were studied.

According to this age and BMI showed a positive and significant ($P<0.05$) relationship with systolic blood pressure (R^2=0.208, F=139.015*, P-0.000). Similarly, age and BMI also showed a significant ($P<0.05$) relationship with HDL-c (R^2-0.065, F-16.425, P-0.000).

Equation-1: **Systolic Blood Pressure** = **100.867+0.462*Age+0.343*BMI**
Equation-2: **HDL = 52.575-0.394*BMI+0.107*Age**

As per equation 3, BMI showed a positive and significant ($P<0.05$) relation with diastolic blood pressure (R^2=0.022, F=23.911, P-0.000) and serum triglyceride (R^2-0.035, F-17.152, P-0.000).

Equation-3: **Diastolic Blood Pressure** = **73.385+0.241*BMI**
Equation-4: **Serum Triglyceride =57.235+0.842*BMI**

Age of the subjects showed a positive and significant ($P<0.05$) relationship with total cholesterol ($R^{2=}$0.164, F=206.959, P-0.007).

Equation-5: **Total cholesterol = 150.500+0.842*Age**

CONCLUSION

In the female population studied, the prevalence of selected risk factors of CVD namely obesity, systolic and diastolic prehypertension, poor HDL-c levels were high. Age, occupation, sleeping pattern, type of exercise and frequency of outside food consumption showed a significant association with systolic and diastolic blood pressure. Level of education, occupation and type of diet showed a significant impact on cholesterol and LDL-c levels of the female subjects. Along with socioeconomic factors, a significant relatioship of age and BMI with the lipid profile could be helpful to plan preventive strategies for reducing the risk factors related to cardiovascular disease

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