Research Article

Prevalence of dyslipidemia in South Indian adults: an urban-rural comparison

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ABSTRACT

Background: Coronary artery disease (CAD) is a major cause of morbidity and mortality in industrialized countries, and is one of the major public health problems globally. There is an emerging evidence of premature CAD occurring in Asian Indians, at least 10 years earlier as compared to other ethnic groups. Dyslipidemia is a consequence of modernization because the prevalence of dyslipidemia is higher in urban than rural areas. In this context, the present study was aimed to determine lipid levels and to compare the lipid levels and prevalence of dyslipidemia in a rural and urban community in Tamil Nadu.
Methods: This is a descriptive cross-sectional study done on Adults ≥ 30 years of age residing in the Field practice area of Rural Health Centre and Urban Health Centre, Division of Community medicine, Rajah Muthiah Medical College, Annamalai University. This study included Interview schedule, Anthropometry, Blood pressure measurement and Fasting lipid profile on 325 subjects of whom 165 and 160 belong to urban and rural population respectively.
Results: The study revealed higher prevalence of dyslipidemia, which was marginally higher in the urban (74.5%) than the rural (68.8%) area but the difference was statistically not significant (p value=0.246). The extents of high total cholesterol, LDL cholesterol, triglycerides were marginally higher in the urban area but the difference was statistically not significant. There is a linear association between the prevalence of dyslipidemia, age and body mass index.
Conclusions: Our study concluded the higher percentage of dyslipidemia both in the urban and rural population. Hence, awareness programmes on desirable diet and regular screening of population on periodic basis should be incorporated at the primary health care level.

Keywords: Urbanisation, Risk factors, Coronary artery disease, Dyslipidemia

INTRODUCTION

Fast industrialization and Globalization, with rapid progress on all fronts, has lead to the economic prosperity and modern way of life in India. This in turn is reflected as an increased prevalence of lifestyle-related diseases in the country.[1] Coronary artery disease (CAD) is a major cause of morbidity and mortality in industrialized countries, and is one of the major public health problems globally. There is an emerging evidence of premature CAD occurring in Asian Indians, at least 10 years earlier as compared to other ethnic groups.[2] According to National Commission on Macroeconomics and Health,

there would be around 62 million patients with CAD by 2015 in India and of these, 23 million would be patients younger than 40 years of age. Dyslipidemia is a recognized, major modifiable risk factor for the development and progression of CAD where early diagnosis and therapy can reduce the incidence of cardiovascular disease events. This currently causes 4.3 million deaths per year world-wide and 39 million disability-adjusted life years lost.[3] The National Cholesterol Education Program (NCEP), therefore, developed guidelines for the detection, evaluation and treatment of high blood cholesterol in adults.[4] Effective control of the blood lipid levels reduced cardiovascular morbidity and mortality both in patients with established CHD and in those at risk of developing CHD. Hence knowledge of the various aspects of the lipid profile and the significance of each of the parameters is vital and is essential part of management of CHD and people at risk of CHD.

Dyslipidemia is sometimes considered as a consequence of modernization, because the prevalence of dyslipidemia in developed countries is often higher than in developing countries. Furthermore, within both the developed and developing countries, the prevalence of dyslipidemia is higher in urban areas. While trends indicate that improvement in the rates of CAD in many industrialized countries, the burden is projected to rise considerably in developing countries over the next decade.[5] Several epidemiological studies in this country found that serum lipid concentration was higher in a significant part of the population and that an increasing proportion of the population had dyslipidemia. In developing countries, as the pace of urbanization increases, the population is more dependent on diets considered unhealthy exacerbated by low physical activity. In this context, the present study was designed to determine lipid levels and to compare the lipid levels and prevalence of dyslipidemia in a rural and urban community in Tamil Nadu.

Objectives of the study was to determine the fasting lipid profile in the selected urban and rural population and to compare and correlate the lipid profile of urban and rural population with selected socio-demographic factors such as age, sex, socioeconomic status and lifestyle related factors such as dietary pattern, physical activity, smoking, alcohol consumption and body mass index.

METHODS

This study was designed to assess the lipid levels and the effect of urbanisation on dyslipidemia by comparing the lipid levels as well as prevalence of dyslipidemia in rural and urban population.

Study design

Descriptive cross-sectional study

Study area

Field practice area of Rural Health Centre and Urban Health Centre, Division of Community medicine, Rajah Muthiah Medical College, Annamalai University.

Rural area includes Pichavaram, a village in Cuddalore district, the field practice area of the division of Community Medicine. Located at South Pichavaram, 12 km east of Chidambaram town, it belongs to the Parangipettai panchayat union of Chidambaram taluk. This study area has a total population of 6,089 and ≥ 30 years of age is 2,237.

Urban area includes Chidambaram, a municipality in Cuddalore distict, comprising of 33 wards and 146 streets with a population of 82,458(2011 census). The Urban Health Centre has its service area spread over four areas of Chidambaram Municipality namely Old Bhuvanagiri area and Mantakkarai, Omakulam, and Sengattan areas with a total of 23 streets comprising 12,525 population and 4,457 aged ≥ 30 years.

Study population

Adults ≥ 30 years of age.

Exclusion criteria:

- Adults with known history of coronary heart disease
- Terminally ill patients
- Recent acute illness

Study tool

Interview schedule, Anthropometry, Blood pressure measurement and Fasting lipid profile.

Sample size

In the pilot study on 40 subjects, the prevalence of dyslipidemia was found to be 70% in urban area and 55% in rural area. Alpha Error of 5 % and Power of 80 %, and an attrition rate of 20%

Using the formula, the calculated minimum sample size was 160 each in the urban and rural area.

Sample technique

Probability proportional to size technique

$$n = \frac{z_1 \alpha/2 \sqrt{2\bar{p}(1-\bar{p})} + 2_{1_\beta}\sqrt{p_1(1-p_1) + p_2(1-P_2)}}{(p_1 - p_2)^2}$$

The calculated minimum sample size was 160 each in the urban and rural area.

Urban area

- 23 service units.

- 3 service units, namely Anantheeswaran Koil Street, Sivashanmugam Street and Ponnambalam Nagar were selected randomly.

- 165 samples has been selected using probability proportional to size technique.

Rural area

- 18 service units.

- 3 service units, namely Sethukollai street, Yadhava street and Aranmanai street were selected randomly.

- 160 samples has been selected using probability proportional to size technique.

Data collection

Detailed questionnaire including socio-demographic information, dietary pattern, physical activity, exercise, smoking & alcohol consumption was prepared. House to house survey was made and the fasting blood samples were collected from the adults $\geq$ 30 years of age for assessing the lipid profile after obtaining informed consent from all the study subjects.

Body mass index (BMI) was calculated by using the formula weight (kg)/height (m) ². Height was measured with a tape to the nearest centimetre. Subjects were requested to stand upright without footwear with their back against the wall, heels together, and eyes directed forward.

Weight was measured with a bathroom weighing machine that was kept on a firm horizontal surface. Subjects were asked to wear light clothing, and then the weight was recorded to the nearest kg.

Estimation of Fasting lipid profile: After an overnight fasting, 5 ml of venous blood was withdrawn and allowed to clot at room temperature. Plasma was obtained by centrifugation at 3000 revolutions per minute for 10 minutes and serum was collected.

The serum was processed within one hour of collection. Plasma lipids were estimated by standard enzymatic method in a semiautomatic analyzer (ERBA – CHEM PRO).

Data analysis

Data collected was entered in Microsoft 2007 excel spreadsheet, compiled and analysed using IBM SPSS Version 18 statistical package. Statistical analysis included descriptive statistics in proportions. Univariate analysis was carried out using Pearson Chi-square test and Independent sample T-test to identify the risk factors for dyslipidemia.

RESULTS

In this cross-sectional study, to determine the fasting lipid profile and compare the socio-demographic details and risk factors among rural and urban population of Tamil Nadu, 325 subjects were recruited. All of them were aged more than 30 years, with 190 (58.5%) males and 135 (41.5%) females. A majority of 45.3% males and 45.9% females were in the age group of 45-59 and 30-44 years respectively (Figure 1).

The Socio-demographic profile of the study subjects, including age, sex, marital status, education, occupation and total family income, and its association with study setting are shown in Table 1. Majority of the subjects (95.2% of urban and 91.3% of rural) were found to be married and more than 37% of the study population were illiterates. It was found that most of the participants (55.2% of urban and 64.4% of rural) were unskilled workers and (32.1% of urban and 33.1% of rural) had an annual family income of Rs. 24,001- Rs.36,000. As regards the association of socio-demographic factors with the study setting, significant difference was found for occupation alone.

A majority of the subjects (55.2% of urban and 64.4% of rural) were found to have no coexisting morbidities like Hypertension, Diabetes mellitus or hypothyroidism. In our study subjects, 24.8% of the urban and 21.3% of the rural subjects have reported to have hypertension. Menopause was attained by 67% of urban and 54% of rural female subjects. Overweight and obesity constitute 58.8 % and 63.1% of urban and rural subjects respectively. There was no significant association between the study setting and presence of co-morbid illness as shown in Table 2.

Dietary pattern studied included the type of diet consumed and estimation of dietary risk score. About 80% of the urban study subjects and 90.6% of the rural study subjects are reportedly consuming mixed diet and difference in the consumption of diet between the settings was found to be significant. Majority of the study subjects, 72.1% in urban and 82.5% in rural areas, have reported that they never exercised. Among those who exercise regularly, walking was found to be higher in both urban (84.8%) and rural (67.9%) areas.

Table 1: Distribution of socio-demographic profile of study subjects according to study setting.

Age	Urban		Rural		X²	P value
	N	%	N	%	2.6	0.597
30-44	75	23.08	68	20.92		
45-59	70	21.54	69	21.23		
≥60	20	6.15	23	7.08		
Sex	**Urban**		**Rural**		**X²**	**P value**
	N	%	N	%		
Male	93	28.62	97	29.85	2.25	0.556
Female	72	22.15	63	19.38		
Marital status	**Urban**		**Rural**		**X²**	**P value**
	N	%	N	%		
Married	157	95.2	146	91.3		
Divorced	2	1.2	3	1.9		
Separated	0	0	1	0.6	2.85	0.582
Single	5	3.0	7	4.4		
Widow/widower	1	0.6	3	1.9		
Educational status	**Urban**		**Rural**		**X²**	**P value**
	N	%	N	%		
Illiterate	64	38.8	59	36.9		
Primary	23	13.9	28	17.5		
Middle	28	17.1	30	18.8		
Secondary	8	4.8	5	3.1		
Higher Secondary	17	10.3	25	15.6	4.51	0.480
Diploma	5	3.0	2	1.3		
Graduate	3	1.8	1	0.6		
Postgraduate	9	5.5	6	3.7		
Professional	8	4.8	4	2.5		
Occupation	**Urban**		**Rural**		**X²**	**P value**
	N	%	N	%		
Skilled	23	13.9	11	6.9		
Semiskilled	46	27.9	55	34.3	4.98	0.08
Unskilled	96	58.2	94	58.8		
Annual family income	**Urban**		**Rural**		**X²**	**P value**
	N	%	N	%		
≤12,000	22	13.3	19	11.9		
12,001-24,000	31	18.8	33	20.6		
24,001-36,000	53	32.1	53	33.1		
36,001-48,000	12	7.3	10	6.2	3.44	0.631
48,001-60,000	10	6.1	17	10.6		
>60,000	37	22.4	28	17.6		

In our setting, 31 (18.8%) of the urban study subjects and 35 (21.9%) of the rural study subjects are current smokers. Out of the current smokers in the urban area, 96.8% smoke daily, 77.4% smoke less than 6/day, 67.7% smoke for >10 years and 64.5% smoke cigarettes followed by 35.5% who smoke beedi. Out of 35 current smokers from rural area, 93.9% smoke daily, 63.6% smoke <6 no./day, 60.6% smoke cigarettes and 54.6% are smoking for >10 years and slightly higher proportion use beedi than cigarettes (39.4% vs 35.5%) in rural area. Of the 48 (29.1%) urban study subjects who consume alcohol currently, 39.6% have reportedly consume

alcohol for 5-10 years, 43.8% consume alcohol at least once in a week and 66.7% reportedly consume 5-10 drinks of alcohol. Out of the 50 (31.2 %) rural current alcoholics, 54% reportedly consume alcohol for the last 5-10 years, 46% at least once weekly and 54% reportedly had 5-10 drinks each time.

Lipid profile of all the study subjects was estimated and the results are shown in Table 3. The overall prevalence of dyslipidemia in urban population, aged more than 30 years, was found to be 74.5% and that among rural population was 68.8%. The prevalence of

hypercholesterolemia was marginally higher in the urban area (30.9%) with a mean value of 186.36±37.40 than rural area (25.1%) a mean value of 177.76±35.32. HDL Cholesterol of less than 40 mg/dl was found in 69.1% of urban and 63.1% of rural subjects. LDL cholesterol was significantly higher in urban (33.4%) than in rural (23.1%) study population and the difference was statistically significant (Chi-square value = 10.38; df=2; p-value = 0.035). The extent of hypertriglyceridemia was also higher in the urban (47.9%) than in the rural (40%) study population and the difference was statistically

significant (Chi-square value = 9.059; df=1; p-value = 0.011). With the BMI of above 27.5, the chance of having dyslipidemia is 2.26 times higher than the normal BMI range of 18.5-22.99. Similarly, for the BMI between 23-27.49, there is 1.85 times higher risk of dyslipidemia than normal BMI. The chance of having dyslipidemia is 0.6 times for the individuals with BMI<18.5., but however they are not statistically significant at 95% confidence. It indicates that BMI is highly associated with lipid profile (Figure 2).

Table 2: Selected coexisting morbidity profile of the subjects and their association with setting.

| Coexisting morbidities	Urban		Rural		X²	p value
	N	%	N	%	3.11	0.538
Hypertension	41	24.8	34	21.3		
Diabetes mellitus	21	12.7	15	9.4		
Diabetes mellitus with Hypertension	6	3.6	4	2.5		
Hypothyroidism	6	3.6	4	2.5		
No coexisting morbidities	91	55.2	103	64.4		
	Urban		**Rural**		**X²**	**p value**
Menopausal status	N	%	N	%	2.27	0.132
Not attained menopause	24	33	29	46.0		
Attained menopause	48	67	34	54.0		
Body mass index	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%	2.89	0.716
<18.50	17	10.3	15	9.4		
18.5-22.99	51	30.9	44	27.5		
23.0-27.49	55	33.3	62	38.8		
≥27.50	42	25.5	39	24.3		
Diet	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%		0.007
Pure Vegetarian	33	20.0	15	9.4	7.28	
Mixed diet	132	80.0	145	90.6		
Dietary risk score	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%	2.27	0.329
Mild risk	60	36.4	46	28.8		
Moderate risk	85	51.5	90	56.3		
High risk	20	12.1	24	15.0		
	Urban		**Rural**		**X²**	**p value**
Exercise	N	%	N	%	6.129	0.047
Never	119	72.1	132	82.5		
Occasional	3	1.8	4	2.5		
Regular	43	26.1	24	15.0		
	Urban		**Rural**		**X²**	**p value**
Smoking	N	%	N	%	0.483	0.785
Never	132	80.0	123	76.9		
Past Smoker	2	1.2	2	1.3		
Current smoker	31	18.8	35	21.9		
	Urban		**Rural**		**X²**	**p value**
Alcohol Consumption	N	%	N	%	0.21	0.90
Never	99	60.0	94	58.8		
Past alcoholic	18	10.9	16	10.0		
Yes	48	29.1	50	31.2		

Table 3: Distribution of study subjects according to lipid profile and its association with study setting.

Total cholesterol	Urban		Rural		X²	p value
	N	%	N	%		
<200	114	69.1	120	74.9		
≥200	51	30.9	40			
Mean	186.36±37.40		177.76±35.32		3.404	0.182
HDL	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%		
<40	114	69.1	101	63.1		
40-60	49	29.7	57	35.6		
>60	2	1.2	2	1.3	1.313	0.519
Mean	38.41±7.98		40.07±7.55			
LDL	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%		
<100	55	33.3	73	45.6		
100-129	55	33.3	50	31.3		
≥130	55	33.4	37	23.1		
Mean	118.14±34.16		107.99±30.92		10.377	0.035
Triglycerides	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%		
<150	86	52.1	96	60.0		
≥150	79	47.9	64	40.0		
Mean	144.58±45.54		146.73±54.16		9.059	0.011
Lipid Profile	**Urban**		**Rural**		**X²**	**p value**
	N	%	N	%		
Dyslipidemia	123	74.5	110	68.8		
Normal lipid profile	42	25.5	50	31.3	1.344	0.246
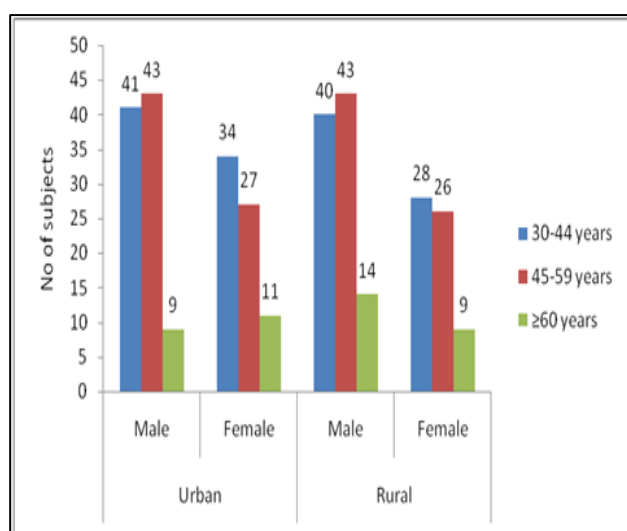
*Total Subjects: Male: 190 (58.5%), Female 135 (41.5%) = 325.

Figure 1: Age and sex wise distribution of the study subjects (n=325).
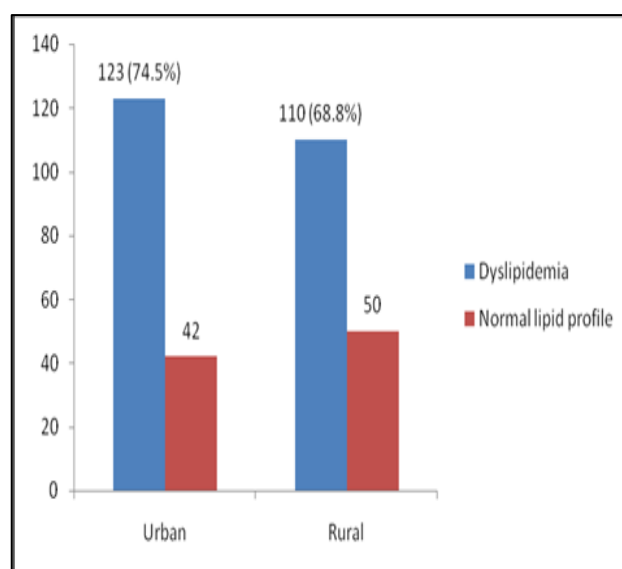
Figure 2: Distribution of subjects according to prevalence of dyslipidemia with study setting.

In multiple logistic regression model, the dyslipidemia is considered as dependent variable and independent variables are age, sex, educational status and occupation of the person, annual income of family, dietary practices, physical exercise undergoing, habit of smoking and alcohol, coexisting non communicable diseases, physical activity and body mass index. Results indicate that body mass index and age of the person were associated with dyslipidemia. All the other variables have no significant association with dyslipidemia. Odd's ratio of the independent variable age indicates that chance of having dyslipidemia is 1.83 times higher for the 45-59 age group compared to the persons in the age group 30-44 years. Chance of having dyslipidemia is 3.21 times higher for the persons > 60 years old compared to the persons in the age group of 30-44 years. Chance of having dyslipidemia is 2.61 times higher for the person with body mass index with 23.00-27.49 compared to the persons with body mass index of 18.50-22.99. With the BMI above 27.5, the chance of having dyslipidemia is 2.99 times higher than compared with the person with BMI of 18.50-22.99. Multiple regression model highlights that as age and body mass index increases, the chance of dyslipidemia also increases (Table 4).

Table 4: Association between socio-demographic profile and risk factors with lipid profile.

Age	Dyslipidemia		Normal lipid profile		X^2	p value
	N	%	N	%		
30-44	96	67.13	47	32.87	3.655	0.161
45-59	102	73.38	37	26.62		
≥60	35	81.39	8	18.61		
Sex	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
Male	135	71.05	55	28.95	3.655	0.161
Female	98	72.59	37	27.41		
Educational status	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
Illiterate	88	71.54	35	28.46	10.211	0.069
Primary	34	66.67	17	33.33		
Middle	39	67.24	19	32.76		
High	12	92.31	1	7.69		
Hsc/Diploma	32	65.31	17	34.69		
Graduate	28	90.32	3	9.68		
Occupational class	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
Skilled	29	85.29	5	14.71	4.543	0.103
Semiskilled	67	66.34	34	33.66		
Unskilled	137	72.11	53	27.89		
Annual income	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
≤12,000	29	70.73	12	29.27	6.146	0.292
12,001-24,000	49	76.56	15	23.44		
24,001-36,000	69	65.09	37	34.91		
36,001-48,000	19	86.36	3	13.64		
48,001-60,000	18	66.67	9	33.33		
>60,000	49	75.38	16	24.62		
Diet	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
Pure Vegetarian	10	20.83	38	79.16	0.45	0.502
Mixed Diet	82	29.61	195	70.39		
Physical activity	**Dyslipidemia**		**Normal lipid profile**		X^2	p value
	N	%	N	%		
Sedentary	139	74.33	48	25.67	1.940	0.379
Moderate	71	69.61	31	30.39		
Heavy	23	63.89	13	36.11		
Exercise	**Dyslipidemia**		**Normal lipid profile**		X^2	p value

	N	%	N	%		
Irregular/No exercise	180	69.77	78	30.23	2.285	0.131
Regular	53	79.10	14	20.90		
Smoking	**Dyslipidemia**		**Normal lipid profile**		X²	p value
	N	%	N	%		
Current smoker	43	65.15	23	34.85	1.712	0.191
Non smokers	92	74.19	32	25.89		
Alcohol consumption	**Dyslipidemia**		**Normal lipid profile**		X²	p value
	N	%	N	%		
Current alcoholics	66	67.35	32	32.65	1.351	0.245
Non alcoholics	69	75.00	23	25.00		
Menopausal status	**Dyslipidemia**		**Normal lipid profile**		X²	p value
	N	%	N	%		
Menopause not attained	35	66.04	18	33.96	1.884	0.170
Menopause attained	63	76.83	19	23.17		
Body mass index	**Dyslipidemia**		**Normal lipid profile**		X²	p value
	N	%	N	%		
<18.50	17	53.13	15	46.87		
18.5-22.99	61	64.21	34	35.79	12.554	0.006
23.0-27.49	90	76.92	27	23.08		
≥27.5	65	80.25	16	19.75		

DISCUSSION

This study addressed the issue of dyslipidemia among subjects ≥ 30 years of age, wherein cardiovascular diseases are most likely, and for whom dyslipidemia is the most important modifiable risk factor. The prevalence of dyslipidemia was very high, i.e. 74.8% in the urban area and 68% in the rural area compared to other major studies in India and abroad. Yamwong et al[5] found the extent of dyslipidemia to be 70% among elderly rural Thai adults. Prevalence of dyslipidemia in urban adult population was found to be 56% to 75.9%.[6-8]

The prevalence of hypercholesterolemia (≥200 mg/dl), LDL cholesterol (>130 mg/dl), triglycerides >150 mg/dl and HDL<40 mg/dl in the present study was marginally higher in the urban area as compared to that of rural area but the difference was not statistically significant. This coincides with studies done by Anushka Patel et al on 5,305 subjects in Thailand, Meng LP et al on 48,299 subjects in China, Wen-Hua Zhao et al in Chinese adults on 14,252 subjects and Chadha et al in Delhi on 13,723 urban subjects and 3,375 rural subjects, Yousefinia Mahsa and Amani A in their study on 4,303 individuals and Wen-Hua Zhao et al in Chinese adults on 14,252 subjects.[9-14]

There is a linear association between the extent of dyslipidemia and advancing age, as was also observed in studies done by Choowong P et al in rural Thai adults, Baridalyne et al in Haryana, Rajeev Gupta et al in North India and Sanjay Kinra et al in rural India and Shuang Wang et al in China.[2,15-18] There is no significant difference between the prevalence of dyslipidemia in males and females. This could have been due to the similar socio-demographic factors and as there was no significant difference between the physiological attributes like body mass index of males and females in the study population. Similar result was observed in study done by Reddy KK et al in Tirupati.[19] The extent of dyslipidemia was significantly higher in males in studies conducted by Sawant et al in North India and Estari et al in Warangal.[20,21] However, it was significantly associated with female gender in the study carried out by Shuang Wang et al in China which could have been due to the effect of menopause as the population studied was ≥ 45 years.[18]

There was no significant difference between the extent of dyslipidemia among the various income groups (p value= 0.292). This could be due to the fact that there was no significant difference in the annual family income of urban and rural study population (p value=0.631). Dyslipidemia is significantly associated with increasing income in the studies done by Shuang Wang et al in China, Rajendra Pradeepa et al on 1,399 subjects in Chennai and negatively associated with annual family income in the study conducted by Erem C et al on 4,809 subjects in Turkey.[18,22,23] There was no significant association between dyslipidemia and dietary pattern in the present study, which was similar to the study conducted by M. A. Delavar et al.[24] This could be explained by the fact that methodology followed for assessment of dietary pattern was subjective. But significant association was found between dyslipidemia and levels of calorie intake was observed in the study conducted by Uma Chita et al.[25] This could have been due to the fact that dietary assessment was more objective

compared to the present study. There was no significant association between dyslipidemia and physical activity. Similar results were found in studies conducted by Ilhan Cetin et al and M. A. Delavar et al.[24,26] The physical activity was assessed by verbal statement. Objective assessment could not be done. The present study revealed a significant increase in the extent of dyslipidemia with increasing body mass index (p value= 0.006). Similar results were obtained in studies carried out by Choowong P et al, Clarisse et al, M Deepa et al and Nitin Nahar et al.[15,27-29] One of the reasons which could explain the similarity of the results obtained in both urban and rural settings in most of the parameters may be due to the rural and urban continuum of the study area wherein the lifestyle tends to remain more or less similar.

Dietary consumption of high fat and calorie intake, lack of physical activity would be the major cause of dyslipidemia in the study population. Deep frying and refrying in same oil leads to transfatty acid formation which probably could have contributed as one of the additional factor for increased prevalence of dyslipidemia observed in the study. The present study included all the components of dyslipidemia together for comparison whereas the earlier studies have compared the individual parameters separately, i.e. the summary measures and methodologies were different.

CONCLUSION

Our study concluded the higher percentage of dyslipidemia both in the urban and rural population and its significant association with age and Body mass index. Hence, awareness programmes on desirable diet and regular screening of population on periodic basis should be incorporated at the primary health care level.

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