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The Prevelence of Dyslipidemia among Postmenopausal Women in Bangalore (Urban Area)

(Original Research Paper)

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Abstract

Objectives: *Dyslipidemia is a key independent modifiable risk factor for Cardiovascular Disease. This study was designed to investigate the current epidemiological features of dyslipidemia among postmenopausal women in Bangalore.*

Methods: *A cross-sectional study was conducted among 250 healthy postmenopausal women, fasting blood obtained for testing lipid levels. Serum total cholesterol, triglycerides and high-density lipoprotein (HDL) cholesterol were measured using enzymatic procedures. Low-density lipoprotein (LDL) cholesterol concentration was estimated by Friedewald formula. Questionnaire -cum- interview method was used to obtain relevant information. Dyslipidemia was identified based on serum lipids levels following the standards proposed by the NCEP ATP III.*

Results: *The results showed that 47.6% had high TC (=200mg/dl), 54.8% had low HDL-C(<50mg/dl), 56.4% had high LDL-C(=130mg/dl), and 24.4% had high TG(=150mg/dl) concentrations. Prevalence of lipid abnormality (including borderline dyslipidemia and dyslipidemia) was 47.2%, 50.8%, 54.8% and 20.4% for TC, HDL-C, LDL-C and TG, respectively. Thus, this study observed an alarmingly higher prevalence of lipid abnormality in a large number of postmenopausal women.*

Conclusions: *The prevalence of dyslipidemia, based primarily on the presence of high cholesterol and high LDL-C, was observed in the study population. Intervention will help in management of dyslipidemia, which is a cornerstone in the prevention of both primary and secondary cardiovascular events.*

Keywords: *Dyslipidemia, Cardiovascular disease, Postmenopausal women, Prevalence.*

Introduction

Dyslipidemia is a major cause of cardiovascular disease, which inturn is the most common cause of male and female morbidity and mortality [(1)]. The incidence of cardiovascular disease (CVD) increases after menopause. This may be due to, in part, to changes in the plasma lipid-lipoprotein levels that occur following menopausal transition. Elevated total cholesterol, LDL-cholesterol and triglycerides are more common in post- than premenopausal women [(2-4)]. There are very few studies on the effects of menopause and related lipoproteins. Despite this, it is commonly believed that surgical menopause are associated with altered lipoprotein changes as well as with increase vascular risk [(5)]. In two prospective studies women who became postmenopausal

showed a slight but significant reduction in the high-density lipoprotein (HDL) – cholesterol and an increase in triglycerides and low-density (LDL)–cholesterol as compared with premenopausal women [2,6]. So it is important to study lipid abnormalities in postmenopausal women. The aim of this study is to explore the prevalence of serum lipid abnormality in postmenopausal women, and to compare the lipid status with BMI, W/H ratio, dietary habits of postmenopausal women.

Method

Two hundred and fifty postmenopausal women between the age 45-60 years were participated in this cross sectional study. All women with a cardiovascular, renal, liver, and other endocrine or metabolic disorders that might affect lipid metabolism were excluded from the study. None of them were on hormonal contraception, or taking medications which are known to interfere with lipid metabolism at the time of participation. Informed consent was taken from the study population. Women were evaluated in the morning after 12-14 hours fast. The investigator performed all evaluations. Fasting blood was drawn by a trained nurse and samples were sent to laboratory for testing lipid profile. The blood samples were measured for metabolic lipid parameters. The serum concentrations of total cholesterol, triglycerides and high-density lipoprotein (HDL) cholesterol were measured using enzymatic procedures. Low density lipoprotein cholesterol (LDL-C) was calculated by use of the formula of Friedewald et al. [7] [{TC} – {HDL-C} – {TG}/5]. In the evaluation the investigator used a pre coded questionnaire including a full clinical history, socio-economic and personal information, habitual or current drug use, careful recording of principle gynecological events, a complete history of weight variations during the subject life. Anthropometric measurements were obtained. Height (in cm.) and weight (in kg.) were recorded and body mass index was calculated. waist (in cm), hip (in cm) were recorded and waist hip ratio was calculated. Dyslipidemia was identified based on serum lipids levels following the standards proposed by the NCEP ATP III. Results were expressed as mean +SD or as percentage, as suitable. The significance of comparisons was tested using chi-square test as appropriate.

Results and Discussions

TABLE – 1 Anthropometric status of Respondents and Lipid profile of Respondents

Characteristics	Scores	Category	Respondents	
			Number	Percent
Body mass index (BMI)	l (18.5-24.9)	Normal	26	10.4
	(25.0-29.9)	Over weight	105	42.0
	(30.0-34.9)	Obese -I	96	38.4
	(35.0-39.9)	Obese -II	23	9.2
Waist/Hip ratio	<0.85	Normal	82	32.8
	>0.85	Obese	168	67.2
Total cholesterol (mg/dL)	< 200	Desirable	131	52.4
	200-239	Borderline high	119	47.6
Triglycerides (mg/dL)	< 150	Normal	189	75.6
	150-199	Borderline high	61	24.4
LDL cholesterol (mg/dL)	Near optimal	100-129	109	43.6
	Border line high	130-159	141	56.4
HDL cholesterol (mg/dL)	Low	< 50	137	54.8
	Medium	50-60	113	45.2
Total			250	100.0

*NCEP ATP III classification for dyslipidemia

General Profile of Respondents

Mean age of study population was found to be 53.66 years whereas mean age at menopause was 50.84 years, and mean duration since menopause was (MDSM = 2.82 years). Majority of postmenopausal women were in the age group of 53 to 53.9 years and they attained menopause at the age of 51 to 51.9 years. Higher percentage of study population were graduates and their income was found to be between 40 to 49 thousand rupees per month. Almost equal percentage of the respondents were Muslims (37%) and Hindus (36%), nuclear family trend was observed in the study population. Higher percentage of respondents were non-vegetarians. Overweight and obese I was found in majority of study population indicating positive energy balance. Higher percentage of respondents had Truncal obesity which was depicted in table 1. This findings was compatible with certain previous studies[17,18]. Lipid profile of respondents indicating majority of study population had high LDL-C followed by low HDL-C, Total cholesterol and Triglycerides were found in desirable level. Detailed analysis indicated that forty eight percent of the population had at least one type of dyslipidemia and fifty six percent had at least one type of abnormal lipid concentration. These findings was compatible with studies conducted by Wakatsuki and Fukami K.

TABLE –2 Association between relative risk factors and Lipid profile

Characteristics	Category	Sample (N)	Total cholesterol				χ^2 Test
			Desirable		Borderline high		
			N	%	n	%	
Age group (years)	51-52.9	48	28	58.3	20	41.7	6.53*
	53-53.9	105	62	59.1	43	40.9	
	54-56.0	97	41	42.3	56	57.7	
Age at Menopause (years)	49-50.9	117	63	53.9	54	46.1	0.19 NS
	51-51.9	119	61	51.3	58	48.7	
	52+	14	7	50.0	7	50.0	
Dietary habit	Vegetarian	89	55	61.8	34	38.2	4.89*
	Non-vegetarian	161	76	47.2	85	52.8	
Body mass index (BMI)	Normal	26	23	88.5	3	11.5	132.65 *
	Over weight	105	91	76.7	14	13.3	
	Obese-I	96	15	15.6	81	84.4	
	Obese-II	23	2	8.7	21	91.3	
Waist/Hip ratio	Normal	82	65	79.3	17	20.7	36.62*
	Obese	168	66	39.3	102	60.7	

*Significant at 5% Level, NS: Non-significant

Table 2 shows that Association between Total cholesterol and relative risk factors like age of the respondents, age at menopause, dietary habits, BMI, W/H ratio, Significant increase in Total cholesterol is observed as increase in age of the respondent irrespective of age at menopause. Higher percentage of non-vegetarian respondents had high total cholesterol compare to vegetarians. Obesity and Truncal obesity has significant association with total cholesterol at 5% level observed in eighty four percent and sixty percent respectively. Higher BMI is directly associated with Total cholesterol, same effect is seen with respect to W/H ratio.

TABLE – 3 Association between risk factors and Triglycerides

Characteristics	Category	Sample (N)	Triglycerides				χ^2 Test
			Normal		Borderline high		
			N	%	n	%	
Age group (years)	51-52.9	48	40	83.3	8	16.7	6.54*
	53-53.9	105	84	80.0	21	20.0	
	54-56.0	97	65	67.0	32	33.0	
Age at Menopause (years)	49-50.9	117	94	80.3	23	19.7	9.61*
	51-51.9	119	89	74.8	30	25.2	
	52+	14	6	42.9	8	57.1	
Dietary habit	Vegetarian	89	74	83.2	15	16.8	4.27*
	Non-vegetarian	161	115	71.4	46	28.6	
Body mass index (BMI)	Normal	26	25	96.2	1	3.9	60.30*
	Over weight	105	99	94.3	6	5.7	
	Obese-I	96	57	59.4	39	40.6	
	Obese-II	23	8	34.8	15	65.2	
Waist/Hip ratio	Normal	82	77	93.9	5	6.1	22.16*
	Obese	168	112	66.7	56	33.3	

*Significant at 5% Level, NS: Non-significant

Association between serum triglyceride level and relative risk factors is seen in table 3, Age and age at menopause has significant association with triglycerides level. Majority of non-vegetarian had borderline high in triglycerides compare to vegetarians. Significant increase in triglycerides is seen with increase in BMI and W/H ratio. Higher BMI was inversely associated with HDL and directly associated with TG, the association between BMI and both HDL and TG may be explained by insulin resistance [(15)]. It was hypothesized that estrogen lack after menopause increased the level of lipoprotein lipase enzyme that hydrolysis chylomicrones and TG this in turn, may cause CVD [(16)]. In the present study it was found that TG levels were significantly higher in postmenopausal women. This result is compatible with some previous studies [(16, 17)]. Table 4 indicates Association between LDL cholesterol and relative risk factors, LDL cholesterol increased significantly as increase in the age of the respondents. 61.5% of non vegetarians had high LDL cholesterol compare to vegetarian (47.2%) population which was significant at 5% level this indicates dietary habits has impact in increasing LDL cholesterol. BMI and W/H ratio has significant increase in LDL cholesterol at 5% level.

TABLE –4 Association between risk factors and LDL cholesterol

Characteristics	Category	Sample (N)	LDL cholesterol				χ^2 Test
			Near optimal		Border line high		
			N	%	N	%	
Age group (years)	51-52.9	48	24	50.0	24	50.0	8.76*
	53-53.9	105	54	51.4	51	48.6	
	54-56.0	97	31	32.0	66	68.0	
Age at Menopause (years)	49-50.9	117	52	44.4	65	55.6	0.39 NS
	51-51.9	119	52	43.7	67	56.3	
	52+	14	5	35.7	9	64.3	
Dietary habit	Vegetarian	89	47	52.8	42	47.2	4.77*
	Non-vegetarian	161	62	38.5	99	61.5	
Body mass index (BMI)	Normal	26	20	76.9	6	23.1	120.06 *
	Over weight	105	80	76.2	25	23.8	
	Obese-I	96	8	8.3	88	91.7	
	Obese-II	23	1	4.4	22	95.6	
Waist/Hip ratio	Normal	82	56	68.3	26	31.7	30.26*
	Obese	168	53	31.6	115	69.4	

*Significant at 5% Level, NS: Non-significant

TABLE – 5 Association between risk factors and HDL cholesterol

Characteristics	Category	Sample (N)	HDL cholesterol				χ^2 Test
			Low		Medium		
			N	%	N	%	
Age group (years)	51-52.9	48	16	33.3	32	66.7	22.38*
	53-53.9	105	51	48.6	54	51.4	
	54-56.0	97	70	72.2	27	27.8	
Age at Menopause (years)	49-50.9	117	53	45.3	64	54.7	13.59*
	51-51.9	119	71	59.7	48	40.3	
	52+	14	13	92.9	1	7.1	
Dietary habit	Vegetarian	89	35	39.3	54	60.7	13.36*
	Non-vegetarian	161	102	63.4	59	36.6	
Body mass index (BMI)	Normal	26	3	11.5	23	88.5	95.17*
	Over weight	105	31	29.5	74	70.5	
	Obese-I	96	83	86.5	13	13.5	
	Obese-II	23	20	97.0	3	13.0	
Waist/Hip ratio	Normal	82	30	36.6	52	63.4	16.34*
	Obese	168	107	63.7	61	36.3	

*Significant at 5% Level, NS: Non-significant

Table 5 reveals that HDL-C has lowered with increased age of the respondents as well as age at menopause has significantly reduces HDL-C. Significant decrease of HDL-C is noticed in the respondents with increase in BMI, W/H ratio. Non-vegetarian respondents has low HDL-C (63.4%) compare to vegetarians (39.3%). It is commonly accepted that altered lipid profile may help to explain why postmenopausal women appear to be more susceptible to atherosclerotic cardiovascular events regardless of the effect of age [8]. Few studies, worldwide, examined changes in serum lipid in more than two groups of women of different menopausal status [9,10]. In this aspect, the present study indicates that menopausal status per se may have adverse effects on lipid profile in

middle aged women. It was found that postmenopausal women had significantly higher concentrations of total cholesterol, LDL-C, which was compatible with many earlier studies [11- 13] and incompatible with others [14]. BMI and the duration of menopause were associated with LDL/HDL-C; this indicates their relative importance in predicting CVD which is more common among obese and postmenopausal women [16].

Summery and Conclusion

The prevalence of dyslipidemia, based primarily on the presence of low HDL-C and high LDL-C, was observed in the study population. The association of lipids with age, dietary habits, BMI,W/H ratio predicting these factors may help in adopting a strategy to control these mechanisms through modifying relative risk factors. Awareness/effective intervention is necessary to prevent or at least improve the adverse lipid profile during menopausal transition, or during postmenopausal period which inturn improve the cardiovascular risk profile in this stage of life.

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