

Assessment of Lipid Profile in Pre and Post-Menopausal Women At a Tertiary Care Centre

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ABSTRACT

Background: Atherosclerotic cardiovascular and cerebrovascular diseases are the most common causes of human death worldwide. Studies have shown that women are at a lesser risk of developing cardiovascular disease than their male counterparts before menopause, but this advantage is abolished after menopause.

Aim of the study: To assess lipid profile in pre and post-menopausal women.

Materials and Methods: The present study was conducted Department of Physiology, Krishna Mohan Medical College and Hospital, Mathura, Uttar Pradesh, India. For the study, 100 premenopausal women and 100 postmenopausal women were randomly selected. The postmenopausal women who were studied were those with a history of natural menopause, who had cessation of menstruation for a minimum of one year, and premenopausal women who were studied were those who had regular menstruation. This however, was done on the 7th day of the last menstrual period for the premenopausal group.

Results: It was observed that TC, TGL, VLDL and LDL were significantly elevated in post-menopausal women as compared to pre-menopausal women. Similarly, the HDL level

in premenopausal level was higher as compared to post-menopausal women.

Conclusion: Within the limitations of the present study, it can be concluded that post-menopausal women are at more risk of cardiovascular diseases as compared to premenopausal women.

Keywords: Lipid, Cardiac, Pre-Menopause, Post-Menopause.

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INTRODUCTION

Atherosclerotic cardiovascular and cerebrovascular diseases are the most common causes of human death worldwide. Many risks have been identified, and among them, dyslipidemia, especially increased serum level of cholesterol is believed to be the most important one.¹ Hyperlipidemia causes atherosclerosis of vessels by inducing endothelial injury and smooth muscle cell proliferation via various ways.² Once feeding vessels of the heart and brain are involved, the risks of myocardial infarction and cerebral infarction, respectively, will greatly increase. Studies have shown that women are at a lesser risk of developing cardiovascular disease than their male counterparts before menopause, but this advantage is abolished after menopause.^{3,4} Data from the Framingham Study suggest that female coronary heart disease (CHD) morbidity rates accelerate more quickly than do those of males after the age of 45 years.⁵ Menopause is the permanent cessation of menstruation; it occurs at a mean age of 51 years.

Menopause literally refers to the last menstrual period. The exact time of menopause is usually made in retrospect; that is, 1 year without menses.⁶ A woman today, will live approximately for about a third of her life, beyond the menopause. After menopause, the ovaries cease to produce significant amounts of oestrogen; therefore, symptoms and diseases which are associated with oestrogen deficiency are of increasing importance to women's health.⁷ Hence, the present study was conducted to assess lipid profile in pre and post-menopausal women.

MATERIALS AND METHODS

The present study was conducted Department of Physiology, Krishna Mohan Medical College and Hospital, Mathura, Uttar Pradesh, India. For the study, 100 premenopausal women and 100 postmenopausal women were randomly selected. The postmenopausal women who were studied were those with a

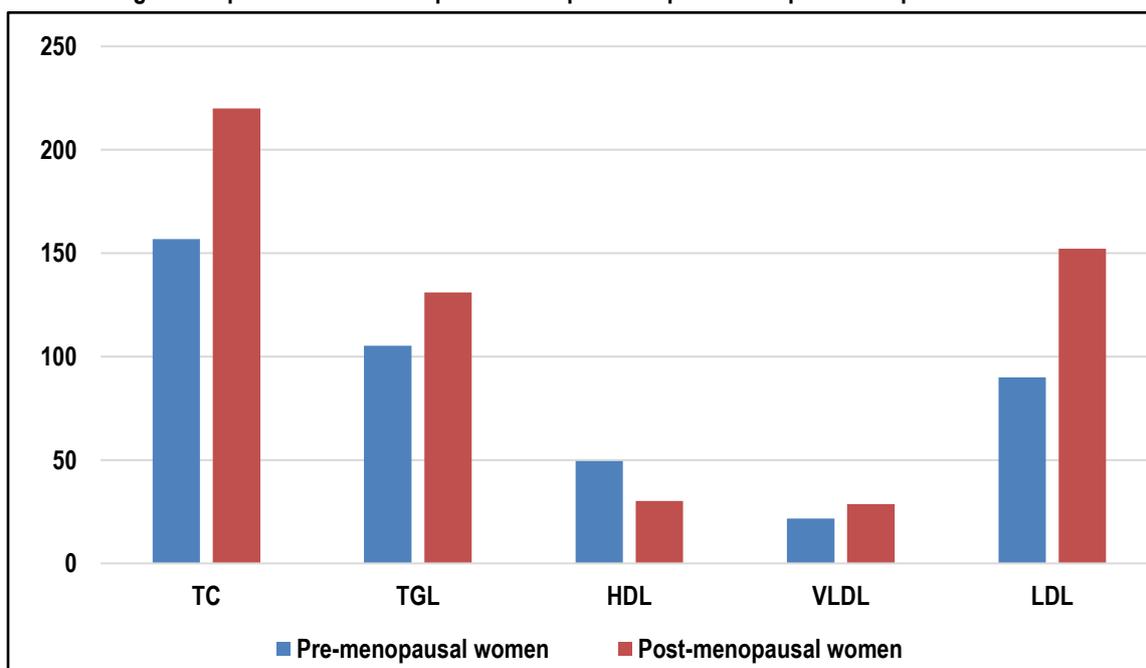
history of natural menopause, who had cessation of menstruation for a minimum of one year, and premenopausal women who were studied were those who had regular menstruation. A written informed consent was taken from each patient before participating in the study. venous blood samples were collected from subjects after an overnight fasting of 12-14 hours. This however, was done on the 7th day of the last menstrual period for the premenopausal

group. The total cholesterol, triglyceride and HDL were estimated by an enzymatic method and serum LDL and VLDL were calculated by using Friedewald's formula $LDL = TC - HDL - TG/5.0$ (mg/dL). The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

Table 1: Comparison of Plasma lipid levels in pre-menopausal and post-menopausal women

Plasma lipids	Pre-menopausal women	Post-menopausal women	p-value
TC	156.85	219.98	0.02
TGL	105.26	130.98	0.01
HDL	49.54	30.26	0.04
VLDL	21.65	28.68	0.05
LDL	89.98	152.14	0.02

Fig 1: Comparison of Plasma lipid levels in pre-menopausal and post-menopausal women



RESULTS

Table 1 and Fig 1 depicts the comparison of plasma lipid levels in pre-menopausal and post-menopausal women. It was observed that TC, TGL, VLDL and LDL were significantly elevated in post-menopausal women as compared to pre-menopausal women. Similarly, the HDL level in premenopausal level was higher as compared to post-menopausal women. The results were observed to be statistically significant. This suggests that the lipid profile of post-menopausal women is more on the unhealthy side as compared to pre-menopausal women.

DISCUSSION

In the present study, it was observed that the various parameters of lipid profile were healthier in pre-menopausal women as compared to post-menopausal women. This has been suggested that increased lipid profile in post-menopause occurs due to elevated oestrogen levels after post menopause. The results were statistically significant. Jeong IK et al investigated the association between lipid profile and BMD in premenopausal and

postmenopausal women in a large Korean population. This study considered 10,402 women who underwent measurements of lipid profile and BMD from October 2003 to October 2005 at Healthcare System Gangnam Center, Seoul National University Hospital. Participants with potential confounding factors affecting BMD were excluded. The associations between lipid profiles (total cholesterol [TC], low-density lipoprotein [LDL-C] and high-density lipoprotein [HDL-C] cholesterol, and triglyceride [TG]) and BMD at various skeletal sites were explored by Pearson's correlation and partial correlation, adjusting for age, body mass index, and menarche age. Multiple linear regression analyses adjusting for all other covariates were also performed. Data on 4,613 premenopausal and 2,661 postmenopausal women aged 20-91 years were finally included in the analysis. In multivariate analyses, there was no significant relationship between lipid profiles and BMD, except that HDL-C was positively associated with BMD at only the lumbar spine in postmenopausal women and that the quartiles of TG were negatively associated with BMD at the total hip and trochanter in only premenopausal women. They

concluded that although there were some weak associations between lipid profiles and BMD, the results of their study hardly support the hypothesis that an atherogenic lipid profile is associated with osteoporosis.⁸ Fernandez ML et al. evaluated plasma lipids, fasting glucose, anthropometrics and BP in 88 post and 100 pre-menopausal women diagnosed with metabolic syndrome. No differences were observed in plasma low-density lipoprotein-cholesterol, triglycerides, fasting glucose or systolic and diastolic BP between groups. However, plasma HDL-C was higher in postmenopausal women and the percentage of women who had low HDL was higher among premenopausal women. In addition, negative correlations were found between WC and HDL-C and BMI and HDL-C for all subjects indicating that increases in weight and abdominal fat have a deleterious effect on plasma HDL-C. Interestingly, there was a positive correlation between age and plasma HDL-C. The results from their study suggested that although HDL is decreased by visceral fat and overall weight, low HDL is not a main characteristic of metabolic syndrome in postmenopausal women. Further, HDL appears to increase, not decrease, with age.⁹

Derby CA et al. examined lipid changes in relation to changes in menopausal status and in levels of estradiol and follicle-stimulating hormone in 2,659 women followed in the Study of Women's Health Across the Nation. Baseline age was 42–52 years, and all were initially pre- or perimenopausal. Women were followed annually for up to 7 years. Lipid changes occurred primarily during the later phases of menopause, with menopause-related changes similar in magnitude to changes attributable to aging. Total cholesterol, low density lipoprotein cholesterol, triglycerides, and lipoprotein(a) peaked during late peri- and early postmenopause, while changes in the early stages of menopause were minimal. The relative odds of low density lipoprotein cholesterol for early postmenopausal, compared with premenopausal, women were 2.1. High density lipoprotein cholesterol also peaked in late peri- and early postmenopause. Results for estradiol and follicle-stimulating hormone confirmed the results based on status defined by bleeding patterns. Increases in lipids were smallest in women who were heaviest at baseline.¹⁰ Mesalić L et al. analyzed the influence of menopause on the concentrations of lipids, lipoproteins and, the influence of estradiol, progesterone, FSH, LH on lipid profile in menopausal women as well. The menopausal women had higher but non-significant concentrations of total cholesterol, VLDL, LDL, and triglycerides than women with regular menstruation. The concentration of HDL was significantly lower in menopausal women than in women with regular menstruation. Also, the concentration of apolipoprotein B was significantly higher in menopausal women, but the concentrations of apolipoprotein and lipoprotein (a) were lower but without significance. Estrogen concentration has significant negative correlation with VLDL and triglycerides and significant positive correlation with HDL in menopausal women. Progesterone concentration has shown no correlation with concentrations of lipids and lipoproteins in menopause. They concluded that menopause leads to changes in lipid profile by reducing HDL, and elevating apolipoprotein B levels, thus increasing the risk for cardiovascular disease. These changes were caused by reduction of estrogen concentrations in menopause.¹¹

CONCLUSION

Within the limitations of the present study, it can be concluded that post-menopausal women are at more risk of cardiovascular diseases as compared to premenopausal women.

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