COMPARATIVE ASSESSMENT OF LIPID PROFILE IN PRE AND POST-MENOPAUSAL WOMEN IN TUTICORIN DISTRICT – A PILOT STUDY

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ABSTRACT

Dyslipidemia in menopause is a known feature in women, which may lead to significant increase in the development of cardiovascular disease. The present study was aimed at comparing the lipid profile in premenopausal women with that of the postmenopausal women. Twenty-five apparently healthy premenopausal women and twenty-five apparently healthy postmenopausal women were recruited for the study. Fasting serum lipid profile were estimated using automatic analyser. There was significant difference in the lipid profile between the two groups. There was a significant increase in total cholesterol, triglycerides, low density lipoprotein, very low density lipoprotein in the postmenopausal group. Also there was a significant reduction of high density lipoprotein in the postmenopausal group. The elevated TC, LDL, TG, VLDL and the reduction in cardio-protective HDL is an indication that menopause is an independent risk factor for developing cardiovascular disease.

KEYWORDS: Lipid profile, premenopause, postmenopause, cardiovascular disease.

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INTRODUCTION

Menopause is the natural process of ageing during which a woman passes from reproductive to non-reproductive phase with cessation of cyclic ovarian function as manifested by cyclic menstruation. The transition from reproductive to non-reproductive phase is the result of a major reduction in female hormonal production by the ovaries. The average age of menopause is 51 years and less than 1% women experience it before the age of 40 years, while some undergo premature menopause at a very early age. The hormonal changes associated with menopause e.g., low plasma levels of estrogen and marked increase in follicle stimulating hormone levels exert a significant effect on metabolism of plasma lipids and lipoproteins. A number of changes that occur in the lipid profile after menopause are associated with increased cardiovascular disease risk. Lack of estrogen is an essential factor in this mechanism. After menopause, there is loss of ovarian function. This results in adverse changes in glucose and insulin metabolism, body fat distribution, coagulation, fibrinolysis and vascular endothelial dysfunction. Apart from maintaining friendly lipid profile, estrogen changes the vascular tone by increasing nitrous oxide production. It stabilizes the endothelial cells, enhances antioxidant effects and alters fibrinolytic protein. All these are cardio-protective mechanisms which are lost in menopause. Up to the age of 50 years, the prevalence of coronary artery disease (CAD) among women is lower than among men, but the incidence rises significantly after the menopause and become similar to that of men. The cardiovascular diseases account for 50% of all deaths in women over 50 years of age. Coronary artery disease (CAD) is the most important cause of death and disability among older women. Variations in the distribution of serum lipids and lipoproteins have been implicated in the etiology of atherosclerosis and cardiovascular disease. The modification of lipid profile may be important both in the prevention and control of coronary artery disease. High circulating serum cholesterol, high levels of low-density lipoprotein cholesterol (LDL), high levels of serum triglyceride (TG) and low levels of high density lipoprotein cholesterol (HDL) are major risk factors of this disease. In order to contribute to the better understanding of lipid profile status in postmenopausal women, the present study was conducted to estimate the serum levels of total cholesterol (TC), triglyceride (TG), high density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL), very low density lipoprotein cholesterol (VLDL) and compare it with premenopausal women.

MATERIALS AND METHODS

Fifty apparently healthy subjects in the age group of 30-60 years from Tuticorin district are included in the study. Necessary approval from institutional ethical committee were obtained (human ethical committee. They were grouped into two groups.

Group - 1: Twenty-five premenopausal women in the age group of 30-45 years.
Group - 2: Twenty-five postmenopausal women in the age group of 45-60 years.

Inclusion Criteria
1. Apparently healthy women in the age group of 30-60 years
2. Postmenopausal women in the age group of 45-60 years with natural menopause

Exclusion Criteria
1. Age less than 30 years and more than 60 years
2. Pregnancy
3. Abnormal uterine bleeding
4. Surgical menopause
5. Hypertension, Diabetes Mellitus, Thyroid disorders
6. Hepatic disease
7. Acute illness
8. Patients on lipid lowering medication, patients on HRT.

After an overnight fast of 12 hours, 5 ml of blood was collected to estimate serum lipid profile. Serum lipid profile comprising of total Cholesterol, LDL-C, triglyceride, HDL-C, VLDL-C were estimated. Serum total Cholesterol and serum triglycerides were estimated by enzymatic method with automatic analysers. VLDL was calculated by dividing triglycerides by five. LDL was calculated by Friedewald’s Formula.

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\text{LDL-C} = \text{TC} - (\text{HDL} + \text{Triglycerides}/5)
\]

STATISTICAL ANALYSIS

Statistical analysis was done using Excel, showing the mean and standard deviation. Comparison of mean was analysed using students t-test. P-values less than 0.05 (<0.05) were considered to be statistically significant.

RESULTS

The mean, standard deviation and p-values for Total Cholesterol, Triglycerides, HDL-C, LDL-C and VLDL-C are shown in Table 1. The mean age for premenopausal women was 36.8±4.13 and that for postmenopausal women was 54.96±4.33. There was significant increase in Total Cholesterol, LDL-C, VLDL-C and Triglycerides in postmenopausal women when compared to premenopausal women (P<0.05). HDL-C was significantly decreased in postmenopausal women when compared to premenopausal women (P<0.05).
### Table 1

**Showing Total Cholesterol and its sub-fractions in pre and postmenopausal women.**

<table>
<thead>
<tr>
<th></th>
<th>TC</th>
<th>TG</th>
<th>HDL-C</th>
<th>LDL-C</th>
<th>VLDL-C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-menopausal women (n=25)</strong></td>
<td>172.88±11.07</td>
<td>99.56±12.50</td>
<td>44±1.94</td>
<td>110.16±14.13</td>
<td>19.92±2.50</td>
</tr>
<tr>
<td><strong>Post-menopausal women (n=25)</strong></td>
<td>214.20±25.56</td>
<td>121.28±19.51</td>
<td>40.80±1.94</td>
<td>149.24±23.52</td>
<td>24.16±3.91</td>
</tr>
<tr>
<td><strong>P values</strong></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
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</tbody>
</table>

### DISCUSSION

There are variations in lipid levels obtained in different individuals based on race, age, sex, obesity, exercise, smoking, alcohol, diet, diseases like hypertension, chronic liver and renal diseases. In the present study we found total cholesterol, low density lipoprotein, triglycerides, very low density lipoprotein were elevated in postmenopausal women. There was also significant reduction in high density lipoprotein in postmenopausal women. Our study is in accordance with Mesilac et al. (2008) who compared lipid profile in premenopausal and postmenopausal women. They concluded that TC, TG, LDL-C were significantly elevated in postmenopausal women when compared to premenopausal women. They also found significant reduction in HDL-C in postmenopausal women. Our study also correlates with Bonithan-Kopp who concluded that TC and LDL-C were significantly increased in postmenopausal women. Igweh et al (2005) compared the lipid profile between premenopausal and postmenopausal women. The result of his study also correlates with the findings of our study. Estrogen in premenopausal women has plasma cholesterol lowering action and hence premenopausal women are protected from coronary artery disease. This protective action of estrogen is lost in the post menopausal women, causing changes in lipid profile. Our study shows that postmenopausal women have unfriendly lipid profile. The elevated atherosclerotic risk factors such as total cholesterol, low density lipoprotein, triglycerides, very low density lipoprotein and reduction in cardio-protective high density lipoprotein in postmenopausal women is an indication that menopause is an independent risk factor for development of cardiovascular disease.

### CONCLUSION

It is evident from our study that menopause results in dyslipidemia. Dyslipidemia is one of the major risk factor for cardiovascular diseases. Screening for dyslipidemia along with lifestyle modifications would be helpful to prevent cardiovascular diseases in postmenopausal women.

### CONFLICT OF INTEREST

Conflict of interest declared as None.
REFERENCES