



## A Study of Correlation between Lipid Profile and Serum Oestradiol in Postmenopausal Women

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### Abstract

#### Background

Cardiovascular diseases are uncommon in women until their menopause. Changes in lipid and lipoprotein values in postmenopausal women towards atherogenicity are due to the deficiency of oestrogen. Alteration in lipid profile in relation to serum oestradiol level is to be correlated to assess the chance of developing cardiovascular diseases.

#### Aim and Objective

To study the correlation of lipid profile with serum oestradiol in postmenopausal women

#### Methods

After getting ethical committee approval, in this cross sectional study, postmenopausal women attending Government Rajaji Hospital for master health checkup were selected. Estimation of serum oestradiol level and lipid profile was done for all of them.

#### Results

The correlation of lipid profile which includes total cholesterol, high density lipoprotein, low density lipoprotein, very low density lipoprotein and triglycerides with serum oestradiol level was done by Pearson's correlation.

#### Conclusion

The long term deficiency of oestrogen results in abnormal lipid profile which is unfavourable in postmenopausal women so regular screening and specific health strategies regarding diet and physical activities are needed for every postmenopausal woman.

**Keywords:** Cardiovascular disease, Oestradiol, Lipid profile, Postmenopausal

### Introduction

In India, with the rise in life expectation in females, number of postmenopausal women is increasing. Menopause is a normal physiological change in which the permanent stoppage of menstruation takes place. This is due to loss of oocytes in the ovary with a consequent fall in the level of hormones like oestrogen and progesterone. Lipid metabolism is affected by the level of oestrogen.

Altered serum lipid profile associated with menopause is considered as a major predisposing

factor to cardiovascular disease. Framingham study states that morbidity due to coronary heart disease accelerate more quickly in females of age more than 45years than those of males. This makes the screening of postmenopausal women for abnormal lipid profile and to study its correlation with serum oestradiol level mandatory.

#### Aim

To correlate the lipid profile with serum oestradiol level in three groups of postmenopausal women who are divided based on the duration of menopause.

**Study Design** - Cross sectional study.

**Study Group** - Body mass index matched 90 postmenopausal women are divided into three groups. GROUP I consists of 30 postmenopausal women with duration of menopause is below 5 years, GROUP II consists of 30 postmenopausal women with duration of menopause between 5 years and 10 years and GROUP III consists of 30 postmenopausal women with duration of menopause is above 10 years.

#### **Inclusion Criteria**

1. Age between 45 - 60 years
2. Attained natural menopause
3. Not on hormone replacement therapy

#### **Exclusion Criteria**

1. Known congenital and acquired heart diseases
2. Systemic diseases - Hypertension, Diabetes mellitus, Hepatic and Metabolic diseases
3. Chronic drug intake like Rifampicin, Phenytoin, Anticoagulants, Statins etc
4. Thyroid dysfunction
5. Smoking

#### **Materials and Methodology**

After getting approval from the ethical committee, healthy postmenopausal women attending Government Rajaji Hospital for master health checkup were selected. Informed and written consent was obtained from them. Detailed medical history, general and systemic examination were carried out. Routine biochemical investigations were done. 90 eligible candidates for the study were selected and were divided into three groups with 30 in each group depending upon the duration of menopause. After 10-12 hours of fasting, under sterile precautions 3ml of venous blood sample was collected, quantitative determination of serum oestradiol by **chemiluminescence immunoassay method** and lipid profile estimation by **enzymatic method** was done.

#### **Results and Analysis**

Statistical correlative analysis of serum oestradiol and lipid profile values was done in group-I, group-II and group-III. The correlation of lipid profile which includes total cholesterol, high density lipoprotein, low density lipoprotein, very low density lipoprotein and triglycerides with serum oestradiol level was done by **Pearson's correlation**. By means of **SPSS software version 16**, analysis of statistics was performed.

From Pearson's correlation it is found that there exists negative correlation between serum oestradiol level and the values of

1. Total cholesterol
2. Low density lipoprotein
3. Very low density lipoprotein
4. Triglycerides

There is a positive correlation of serum oestradiol level with high density lipoprotein.

#### **Discussion**

A woman today has to live for about one third of her life beyond menopause. **American Heart Association report (2002)** states that 70% of women develop cardiovascular disease after menopause. In our present study, we have divided the postmenopausal women into three groups based on the duration of menopause. Serum lipid levels vary in every individuals and they depend on body mass index, level of exercise, history of smoking, dietary habits, systemic diseases like hypertension, diabetes mellitus, liver and metabolic diseases (**Gordon T et al., 1981**). So in our study, we excluded these confounding variables. Derangement in lipid profile after menopause is primarily due to oestrogen deficiency. Oestrogen increases the level of high density lipoproteins by decreasing the hepatic lipase activity which catabolizes the high density lipoproteins. Oestrogen decreases the oxidation of low density lipoproteins and increases the hepatic expression of low density lipoprotein receptors thereby decreasing the level of low density lipoproteins by accelerating the clearance.

As the duration of menopause increases, more derangement is seen in the lipid profile values. The elevated low density lipoprotein level and the reduction in high density lipoprotein level increases the risk of developing cardiovascular diseases.

#### **CONCLUSION**

Regular screening of lipid profile in postmenopausal women is mandatory which helps in the secondary prevention of cardiovascular diseases. Health strategies like diet modifications, physical activities and lipid lowering drugs could be useful. Hormone replacement therapy protects against cardiovascular disease in postmenopausal women mainly by lowering the lipid levels.

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## TABLES

**Correlation of Serum oestradiol with Lipid profile in Group I**

Group I (<5 years)	Correlation coefficient	
Oestradiol with Total cholesterol	-0.098	Negative correlation
Oestradiol with High Density Lipoprotein	0.240	Positive correlation
Oestradiol with Low Density Lipoprotein	-0.097	Negative correlation
Oestradiol with Very Low Density Lipoprotein	-0.060	Negative correlation
Oestradiol with Triglycerides	-0.070	Negative correlation

**Correlation of Serum oestradiol with Lipid profile in Group II**

Group II (5-10 years)	Correlation coefficient	
Oestradiol with Total cholesterol	-0.220	Negative correlation
Oestradiol with High Density Lipoprotein	0.330	Positive correlation
Oestradiol with Low Density Lipoprotein	-0.200	Negative correlation
Oestradiol with Very Low Density Lipoprotein	-0.060	Negative correlation
Oestradiol with Triglycerides	-0.110	Negative correlation

**Correlation of Serum oestradiol with Lipid profile in Group III**

<b>GroupIII (&gt;10 years)</b>	<b>Correlation coefficient</b>	
Oestradiol with Total cholesterol	-0.070	Negative correlation
Oestradiol with High Density Lipoprotein	0.270	Positive correlation
Oestradiol with Low Density Lipoprotein	-0.070	Negative correlation
Oestradiol with Very Low Density Lipoprotein	-0.200	Negative correlation
Oestradiol with Triglycerides	-0.140	Negative correlation