



A STUDY OF LIPID PROFILE IN POSTMENOPAUSAL WOMEN IN EASTERN U.P.

Dr Shweta Dubey	MBBS, Department of Physiology, BRD Medical College, Gorakhpur, Uttar Pradesh, 273013
Dr Vinay Singh	MD, Department of Physiology, BRD Medical College, Gorakhpur, Uttar Pradesh, 273013
Dr Anant Prakash Pandey	MD, Department of Physiology, BRD Medical College, Gorakhpur, Uttar Pradesh, 273013
Dr Shuchi Chaudhary	MD, Department of Physiology, BRD Medical College, Gorakhpur, Uttar Pradesh, 273013
Anup Kumar Dubey*	MD, Department of Dermatology, ASMC Kushinagar, Uttar Pradesh 274402 *Corresponding Author

ABSTRACT

Background & Objectives: The present study was conducted to evaluate the lipid profile in postmenopausal women in Eastern U.P. population. Menopause, a natural physiological event, brings about hormonal alterations, especially a decline in estrogen which contributes to various metabolic changes, including dyslipidemia. This cross-sectional study included postmenopausal women categorized into three groups based on the duration of menopause: 1–5 years, 6–10 years, and more than 10 years. Blood samples were analyzed for lipid parameters such as total cholesterol, HDL, LDL, VLDL, and triglycerides. The results indicated a statistically significant increase in LDL and a decrease in HDL levels with the increasing duration of menopause, suggesting a higher cardiovascular risk in women who are longer into the postmenopausal period. The study emphasizes the importance of regular monitoring of lipid profiles and hormonal levels in postmenopausal women for early intervention and prevention of cardiovascular diseases.

KEYWORDS : HDL, LDL, VLDL, Triglycerides, Total Cholesterol, CHD, CVD

INTRODUCTION

Data released by the Health and Family Welfare Ministry of India show that life expectancy for females is increased by five years, from 63.9 years in 2011-2015 to 69.6 years in 2018-2022. In India, with the rise in life expectancy in females, number of postmenopausal women is increasing. Approximately woman today will live for about one third of her life, beyond menopause.

Menopause is a normal physiological change wherein the permanent stoppage of menstruation takes place. Primarily menopause is due to loss of stocks of oocyte in ovary with a consequent fall in the level of hormones like oestrogen and progesterone. This results in the cessation of cyclical changes in the endometrium and hence menstruation. The loss of fertility and menstrual function that accompany menopause may have an impact on a woman's sense of wellbeing.

Women from fetal life till menopause experience different stages under the influence of female hormones. These hormones are secreted in very little quantity. According to different phases of her reproductive life, these hormones undergo a complex and ever changing trend.

During menopause, woman passes from fertile to infertile stage. The oestrogen production is grossly reduced in postmenopausal period. It is due to the peripheral conversion of adrenal androgens and this occurs mainly in adipose tissue, liver and brain.

Decrease in the level of oestrogen in postmenopausal period of females alter their general health by producing physiological, biochemical and structural changes. In a very significant way the body metabolism is affected.

Lipid metabolism is affected by the level of oestrogen. Changes in serum lipid and lipoprotein levels indirectly lead on to coronary heart disease which determine the life expectation among postmenopausal women.

According to Framingham study, morbidity rate due to coronary heart disease accelerate more quickly in females of age more than 45 years than in males. Before menopause, oestrogen protects females against coronary artery disease by its anti-atherogenic effect.

Altered serum lipid profile is associated with menopause and thus it is a

major determining factor predisposing to cardiovascular diseases. It makes the screening of postmenopausal women for abnormal lipid profile mandatory.

Significance of duration of menopause on serum oestradiol level and its correlation with lipid profile is to be investigated so that postmenopausal women can undergo further evaluation and earlier management.

Hormonal alteration and the associated changes in serum cholesterol and lipoproteins level in relation to the duration of menopause is aimed to study at present so that specific health strategies can be promoted and thereby emerging cardiovascular diseases can be prevented among the postmenopausal women

Aims and Objectives

1. Estimation of lipid profile in the postmenopausal women included in these groups.
2. Comparison of lipid profile values between the postmenopausal women of these three groups.

MATERIAL AND METHODS

Source Of Data

The study was conducted in the Department of Physiology and in collaboration with Obstetrics & Gynecology Department and Pathology Department, B.R.D. Medical College Gorakhpur, after taking written informed consent from the patients.

Type Of Study

Prospective cross sectional study

Sample Size

90 relevant female patients of age group 45-60 years

METHODOLOGY

The Method of Study Consists of:

- Informed written consent was obtained from all the selected patients
- A structured pre-prepared case proforma was used to enter the patient details
- Patients were selected by simple random method

Study Duration: 6 months

Statistical Test: Appropriate statistical test was applied at the time of data analysis.

Following Materials was Used for the Study:

- Physiology Lab
- Obstetrics & Gynecology OPD
- Department of pathology
- Age of Subjects (45-60 years)

Diagnostic Clinical Correlation

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 Used For Study

1. Proforma – to record the anthropometric measurements and the clinical findings of the subjects.
2. Portable weighing machine –to record the body weight in kilograms.
3. Stadiometer –to measure the standing height in centimeters.
4. Standardized mercury sphygmomanometer to record the blood pressure in mm of Hg.

Methodology

The study was initiated with the approval of Institutional ethical committee, BRD Medical College, Gorakhpur and was carried out after explaining the procedures in detail and getting written informed consent from the subjects.

The experimental protocol includes

- 1) Recording of a detailed history including type (natural/ surgical) and duration of menopause, history of cardiovascular disease, diabetes mellitus, hypertension, surgery or any drug intake and history of endocrine disorders.
- 2) General and systemic examination done and the subjects who are eligible for the study are selected.
- 3) Dividing in to three groups 90 postmenopausal women are selected and are divided in to three groups with 30 in each group based on the duration of menopause.
 - ❖ **First group-** Thirty postmenopausal women whose duration of menopause is below 5 years.
 - ❖ **Second group-** Thirty postmenopausal women whose duration of menopause is in between 5 years and 10 years.
 - ❖ **Third group-** Thirty postmenopausal women whose duration of menopause is above 10 years.
- 4) Measurement of Anthropometric Indices:
The subjects are asked to stand erect with their arms relaxed at their side and feet to get her.

The Following are Measured:

- Weight (in kilograms) was recorded using a portable standard weighing machine.
- Height (in centimeters) was recorded using a stadiometer.
- Body Mass Index was found out using Quetelet's Index.

Body Mass Index=Weight (Kg)/Height (sq.m).

1. Recording of vital signs viz. pulse rate, respiratory rate and measurement of blood pressure were done and documented.

1. Blood investigations:

Lipid profile includes parameters like Total cholesterol, Triglycerides, High density lipo proteins, Low density lipo proteins and Very low density lipo proteins.

After 10-12 hours of fasting, skin was sterilized with a spirit cotton swab and blood sample was collected from antecubital vein of front of forearm. About 3ml of blood was collected in a disposable syringe of 5ml capacity. For separation of serum, blood taken in a glass tube was first allowed to clot at room temperature and then centrifuged. This separated serum was used to estimate serum lipid profile.

Statistical Analysis: Carried out using SPSS 30.0 version software.

RESULTS

Table 01: Estimation of Lipid Profile in the Three Postmenopausal Groups Based on the Duration of Menopause.

GROUPS (Duration of menopause)	Total Cholesterol l (mg/dl) Mean+SD	HDL (mg/dl) Mean+ SD	LDL (mg/dl) Mean+ SD	VLDL (mg/dl) Mean+ SD	Triglycerides (mg/dl) Mean+SD
Group 1st (1-5 years)	164.87 ± 24.28	44.53 ± 7.86	94.72 ± 22.44	24.85 ± 5.42	123.47 ± 28.08
Group 2nd (6-10 years)	180.95 ± 26.61	35.00 ± 4.33	122.54 ± 28.74	25.95 ± 6.63	128.08 ± 33.87
Group 3rd (10+ years)	184.04 ± 22.01	32.77 ± 4.61	127.71 ± 23.43	23.51 ± 7.59	129.95 ± 32.08
P- value	0.183	0.001	0.001	0.337	0.1583

By using One way ANOVA test the above table shows that HDL cholesterol decreases ($p=0.001$) and LDL cholesterol increases ($p=0.001$) with increasing duration of menopause. Both values are statistically significant ($p < 0.05$).

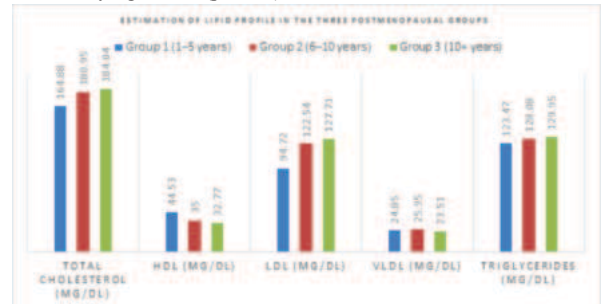


Table 02: Comparison of Lipid Profile Values in Three Postmenopausal Groups Based on the Duration of Menopause:

GROUPS (Duration of menopause)	Total Cholesterol (mg/dl) Mean+SD	HDL (mg/dl) Mean+SD	LDL (mg/dl) Mean+SD	VLDL (mg/dl) Mean+SD	Triglycerides (mg/dl) Mean+SD	p-value
Group 1st (1-5 years)	164.87 ± 24.28	44.53 ± 7.86	94.72 ± 22.44	24.85 ± 5.42	123.47 ± 28.08	0.098
Group 2nd (6-10 years)	180.95 ± 26.61	35.00 ± 4.33	122.54 ± 28.74	25.95 ± 6.63	128.08 ± 33.87	0.556
Group 3rd (10+ years)	184.04 ± 22.01	32.77 ± 4.61	127.71 ± 23.43	23.51 ± 7.59	129.95 ± 32.08	0.658

The lipid profile analysis reveals a progressive increase in total cholesterol, LDL (low-density lipoprotein), triglyceride levels, & VLDL while HDL increases with increasing duration of menopause.

By using one-way ANOVA analysis, demonstrates that on comparison between all the groups, the lipid profile values are not statistically significant across all three study groups as p -value is > 0.05 .

Lipid Profile Trends:

- There was a statistically significant decline in HDL cholesterol and a marked increase in LDL cholesterol as menopause duration increases (both $p=0.001$), indicating progression toward an atherogenic lipid profile, increasing risk of cardiovascular diseases.
- Total cholesterol and triglycerides showed increasing trends while VLDL showing fluctuations without statistical significance among all three study groups.

Comparison of Lipid Profiles Among the Three Postmenopausal Groups

The lipid profile analysis across different durations of menopause in The study reveals a progressive increase in total cholesterol, LDL (low-density lipoprotein), and triglyceride levels with the duration of menopause. Women in Group 1 (1-5 years post-menopause) had the most favorable lipid profile, showing the lowest total cholesterol (164.88 mg/dl), LDL (94.72 mg/dl), and triglycerides (123.47 mg/dl), alongside the highest HDL (44.53 mg/dl). As the duration of menopause increased, lipid levels tended to worsen, with Group 3 (10+ years post-menopause) recording the highest total cholesterol (184.04 mg/dl), LDL (127.71 mg/dl), and triglycerides (129.95 mg/dl), and the lowest HDL (32.77 mg/dl). ANOVA analysis demonstrates that there is no statistically significant difference in total cholesterol, HDL, LDL, VLDL, or triglycerides across the groups.

A study by Wang et al. (2020) supports The observations regarding the progressive worsening of lipid profiles with increasing duration of menopause. Their research found similar trends in lipid parameters, including increases in total cholesterol, LDL, and triglycerides, and a decrease in HDL levels over time post-menopause. However, their study reported statistically significant differences in total cholesterol and triglyceride levels across the groups, which were not observed in The study. This difference may be due to variations in study design, sample size, or population characteristics.

CONCLUSION

This study successfully elucidated the intricate relationship between lipid profiles, and the progression of menopause within a cohort of women from Eastern Uttar Pradesh. By categorizing participants based on the duration of menopause, a clear trend emerged: These patterns reflect the well-established endocrine changes associated with menopausal transition. In evaluating the lipid profile among the three groups of postmenopausal women, ANOVA indicated that HDL cholesterol and LDL cholesterol levels differed significantly with increasing duration of menopause. HDL levels, which are considered protective against heart disease, showed a marked decline with a p-value of less than 0.001.

Beyond hormonal trends, the study explored how these fluctuations influence lipid metabolism. While anthropometric factors remained relatively stable across groups, which future studies should address.

In summary, fluctuations on lipid profiles throughout the menopausal transition. The positive correlations of HDL on multiple lipid fractions, reinforce the notion that multiple hormonal pathways contribute to postmenopausal lipid changes. These insights deepen our understanding of cardiovascular risk in postmenopausal women and underscore the need for more nuanced, hormone-specific approaches in future lipid and metabolic health research.

Conflict of Interest - Nil



Photograph 1:- Setup for lipid profile estimation ; automated clinical chemistry analyzer

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