World Journal of Pharmaceutical Science and Research
www.wjpsronline.com
Research Article
ISSN: 2583-6579
SJIF Impact Factor: 6.916
Year - 2026
Volume: 5; Issue: 2
Page: 01-04

A STUDY OF BODY MASS INDEX (BMI), SEX HORMONES, AND LIPID PROFILE AMONG MENOPAUSAL WOMEN IN WUKARI LOCAL GOVERNMENT AREA OF TARABA STATE

Ango A. A.[1], Toryila J. E.*[2], Mallo M.J.[3]

[1]Physiology Department, Faculty of Basic Medical Sciences, Federal University Wukari.

[2]Physiology Department, Faculty of Basic Medical Sciences, Bingham University, Karu.

[3]Physiology Department Faculty of Basic Medical Sciences, Plateau State University, Jos.

Article Received: 05 December 2025 || Article Revised: 26 December 2025 || Article Accepted: 15 January 2026

***Corresponding Author: Toryila J. E.**
Physiology Department, Faculty of Basic Medical Sciences, Bingham University, Karu.
DOI: https://doi.org/10.5281/zenodo.18438257

How to cite this Article: Ango A. A., Toryila J. E., Mallo M.J. (2026) A STUDY OF BODY MASS INDEX (BMI), SEX HORMONES, AND IPID PROFILE AMONG MENOPAUSAL WOMEN IN WUKARI LOCAL GOVERNMENT AREA OF TARABA STATE. World Journal of Pharmaceutical Science and Research, 5(2), 01-04. https://doi.org/10.5281/zenodo.18438257

ABSTRACT

Menopause is a natural physiological process characterised by permanent cessation of menstrual cycle. It is a critical period in the life of women which denotes the end of reproduction and is marked by significant decline in sex hormones levels such as estrogen and progesterone. The decline in sex hormones can significantly impact body composition, metabolism. The interplay between BMI, sex hormones, and serum lipids creates a complex health landscape for menopausal women compounding the metabolic challenges posed by menopause. This study therefore sought to determine the correlation between BMI, sex hormones and serum lipids in menopausal women. The study adopted a cross-sectional study design to assess the relationship between BMI, sex hormones, serum lipids and risk of cardiovascular disease among menopausal women. Multistage random sampling method was used which allowed the researcher quantitatively asses 300 (150 menopausal women and 150 control subjects) participants through the aid of a structured questionnaire and laboratory investigations. Findings revealed that there was significant correlation between BMI and serum lipids among menopausal women compared to control ($p>0.05$). There is urgent need to establish post-menopausal clinics/programmes in primary, secondary and tertiary centres that will promote serum hormone testing and replacement therapy as a strategy to promote healthy life for menopuasal womeen.

KEYWORDS: Menupose, sex hormones, lipid profile.

INTRODUCTION

Menopause is a physiological process that denotes the end of a woman's reproductive years; it is characterized by the permanent cassation of menstrual cycles and a declined in the production of sex hormones such as oestrogen and progesterone. Menopause marks a significant physiological transition in a woman's life, typically occurring between the ages of 45 and 55, although it can vary.[1]

Sex hormones, particularly oestrogen, play a crucial role in regulating lipid metabolism. The decline in oestrogen during menopause has been associated with adverse changes in lipid profiles, including increased levels of low-density lipoprotein (LDL) cholesterol and triglycerides, and a reduction in high-density lipoprotein (HDL) cholesterol.[2] The interplay between BMI, sex hormones, and lipid profile creates a complex health landscape for menopausal women. Higher BMI has been associated with worsened lipid profiles and increased insulin resistance, compounding the metabolic challenges posed by menopaus.[3]

Lipids play a fundamental role in cardiovascular health, and their imbalance is one of the major risk factors for CVD[4] Lipid components such as total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) are closely linked to the development and progression of atherosclerosis and other cardiovascular complications. Elevated LDL-C is considered a primary causal factor in atherosclerosis, as it promotes cholesterol deposition within arterial walls, forming plaques that can lead to coronary artery disease, stroke, and peripheral vascular disease.[5]

Though menopause is linked to changes in BMI, sex hormones, and lipid profiles, the precise interaction between these variables is not well understood, particularly in populations at higher risk of cardiovascular and metabolic disorders. Therefore, this study seeks to assess the correlations between BMI, sex hormones and lipid profiles in menopausal women in wukari local government.

MATERIALS AND METHODS

This research was carried out in Wukari local government area of Taraba state Nigeria.Wukari local government area is situated in Southern Senatorial District of Taraba State Nigeria. 159 menopausal women and 160 non menopausal women were involved in the study. A stratified random sampling technique was employed to ensure that the sample is a representative of the population in terms of age and socioeconomic status.

Anthropometric Measurements: Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2). Weight was measured using a calibrated digital scale, and height was measured with a stadiometer. Both measurements were taken with participants wearing light clothing and bare feet. This was carried out between 8-10am.

Questionnaire: informed consent was obtained and questionnaires were administered to gather demographic data, medical history, lifestyle factors (such as physical activity, alcohol/smoking status, and dietary habits) menopausal symptoms.

Hormonal Assays and Lipid Profile Analysis: Blood samples were collected from participants between 8:00 a.m. and 10:00 a.m. after an overnight fast into plain sample bottles. Serum levels of estradiol and progesterone were measured using enzyme-linked immunosorbent assay (ELISA) kits. Lipid profile estimation was carried out using a spectrophotometer.

Statistical analysis: quantitative, nominal and ordinal variables were described with descriptive statistical methods. The following measures were determined for quantitative variables: central tendency (mean, M) and dispersion (standard deviation, SD). For nominal and ordinal variables, the following measures were determined: number (n) and frequency (%). Cross tables and the Pearson's chi-squared test with odd ratio were used to assess frequency difference for variants of categorical variables. All calculations were performed with statistical package for social sciences (SPSS) vision 23. Statistical significance was set at $p < 0.05$. Correlation analysis was done to assess the relationship between cardiovascular risk profile and BMI, sex hormones and lipid profile.

RESULTS

Table 1: Distribution of BMI in kilogram per meter square N=150.

Types of Body Mass	Frequency	Percentage
>40.0	00	00
35.0-39.9	00	00
30.0-34.9	41	27.3
25.0-29.9	61	40.7
18.5-24.9	48	32.0
<18.5kg	00	00
Total	150	100.0

Source: Field Survey, 2024

Table 4.3 showed the BMI distribution of the respondents. 27.3% of the respondents had BMI between 30.0-34.9, 40.7% had BMI between 25.0-29.9, while 32.0% had BMI between18.5-24.9. This implies that most of the respondents had BMI between25-29.9 (i.e overweight).

Table 2: Pearson correlation analysis of estrogen and progesterone against lipid profile (TC, HDLc, TG, LDLC).

Independent variables	Dependent variables	Correlation(r)	p-value	Significance level
Estrogen	TC	-0.133	0.1050	Not Significant
Estrogen	HDLc	0.084	0.3054	Not Significant
Estrogen	TG	0.043	0.6011	Not Significant
Estrogen	LDLc	-0.023	0.7819	Not Significant
Progesterone	TC	-0.180	0.0278**	Significant**

Note: *p<0.05 (2-tailed tail)

Table 3: Two-Way ANOVA Summary for Effects of Estrogen and Progesterone on Lipid Profiles.

Dependent Variable	Source	SS	df	MS	F	P
TC	Estrogen	92.481	1	92.481	9.39	.011
	Progesterone	64.121	1	64.121	6.51	.027
	Interaction	2.356	1	2.356	0.24	.634
HDLc	Estrogen	15.923	1	15.923	10.20	.009
	Progesterone	12.312	1	12.312	7.89	.017
	Interaction	0.002	1	0.002	0.00	.978
TG	Estrogen	72.412	1	72.412	6.43	.028
	Progesterone	104.321	1	104.321	9.29	.011
	Interaction	0.011	1	0.011	0.00	.983
LDLc	Estrogen	84.219	1	84.219	9.32	.011
	Progesterone	106.112	1	106.112	11.84	.006
	Interaction	5.762	1	5.762	0.64	.441

A two-way ANOVA was conducted to determine the effects of estrogen (low <15, high >15) and progesterone (low <0.5, high >0.5) on lipid indices. Total cholesterol (TC): Both estrogen and progesterone had significant effect $F(1, 11) = 9.39$, $p = .011$, and $F(1, 11) = 6.51$, $p = .027$ respectively. While the interaction between estrogen and progesterone was not significant, $F(1, 11) = 0.24$, $p = .634$.

Table 4: Multiple Regression Analysis Showing the Relationship Between Sex Hormones (Progesterone and Estrogen) and Lipid Profile Parameters.

Dependent Variable	Independent Variables	β (Unstandardized Coefficient)	Std. Error	t-value	p-value	R^2	Interpretation
Total Cholesterol (TC)	Constant	3.7083	0.166	22.30	0.000	0.061	–
	Progesterone	-0.1667	0.064	-2.61	0.010		Significant negative effect
	Estrogen	-0.0037	0.002	-2.13	0.035		Significant negative effect
High-Density Lipoprotein (HDLc)	Constant	0.6549	0.079	8.25	0.000	0.165	–
	Progesterone	0.1607	0.030	5.27	0.000		Significant positive effect
	Estrogen	0.0017	0.001	2.09	0.038		Mild positive effect
Triglycerides (TG)	Constant	1.6935	0.242	7.00	0.000	0.299	–
	Progesterone	0.7339	0.093	7.90	0.000		Strong positive effect
	Estrogen	0.0053	0.003	2.10	0.037		Mild positive effect
Low-Density Lipoprotein (LDLc)	Constant	2.3120	0.170	13.62	0.000	0.350	–
	Progesterone	-0.5796	0.065	-8.89	0.000		Strong negative effect
	Estrogen	-0.0035	0.002	-2.01	0.046		Slight negative effect

Note. *p* < .05 indicates statistical significance (two-tailed). R^2 represents the proportion of variance in the dependent variable explained by the independent variables.

Progesterone significantly reduces total cholesterol (TC) and LDL cholesterol (LDLc) ($p < 0.05$) but increases HDLc and triglycerides (TG)($p < 0.05$). Estrogen also shows consistent but smaller effects across lipid parameters — slightly decreasing TC and LDLc while mildly increasing HDLc and TG. The strongest predictive model was observed for LDLc ($R^2 = .35$), suggesting a robust relationship between progesterone and LDLc reduction.

The study established that serum lipids significantly regulated BMI, serum sex hormone also influenced serum lipids conferring some beneficial effects. This finding was supported by Stachowiak,[7] who averred that hormone replacement therapy (HRT) may have beneficial effects on lipid profiles by reducing LDL-C and increasing high-density lipoprotein cholesterol (HDL-C) levels in postmenopausal women thereby reducing the risk of CVD. Although Manson et'al (2013) argued that ERT is not without risks, as it has been associated with an increased likelihood of thromboembolic events and breast cancer.[6] The study recommends that the state should initiate and indulge the local government to establish a post-menopausal programme in primary health care centres as well as secondary and tertiary centres that will promote serum hormone testing and replacement therapy as a strategy to curb the risk of cardiovascular disease among menopausal women.

REFERENCES

1. Freeman, E.W., Menopause and midlife health *The Journal of Clinical Endocrinology & Metabolism*, 2010; 95(9): 4049-4057.
2. Zhang, H., Cui, J., & Zhang, C., The role of estrogen in lipid metabolism in women. Frontiers in Endocrinology, 2018; 9: 548.
3. Kim, S. H., Lee, J. H., & Park, H. S., The relationship between body mass index and lipid profiles in menopausal women. *Journal of Women's Health*, 2022; 31(2): 158-165.
4. Ference, B. A., Ginsberg, H. N., Graham, I., Ray, K. K., Packard, C. J., Bruckert, E., ... & Catapano, A. L., Low-density lipoproteins cause atherosclerotic cardiovascular disease. *European Heart Journal*, 2017; *38*(32): 2459–2472.
5. Stachowiak, G., Pertynski, T., & Pertynska-Marczewska, M., Hormone replacement therapy-efficiency, risk, and current persperctives. Ginkologia Polska, 2015; 86(12): 937-941.