A Study of Correlation between Body Mass Index and Lipid Profile in Postmenopausal Women in North Bihar

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Abstract

Background: Every woman experience menopause, a physiological phase of life marked by the end of menstruation brought on by hormonal changes. Between the late 40s and the early 50s, menopause takes place. Due to the decrease of estrogen's protective influence on the cardiovascular system, postmenopausal women are more at risk for cardiovascular problems. Progesterone and estrogen levels decrease throughout menopause. Following menopause, there is an increase in fat storage and concurrent lipid deposition in the body's central region. The body mass index (BMI), which has a significant impact on lipid profiles and blood pressure, is a reliable indicator of hypertension and hyperlipidemia. Women are more vulnerable to developing ischemic heart disease due to menopause.

Aims and Objectives: In this study, postmenopausal women from North Bihar were examined to determine the relationship between BMI, blood triglyceride levels, and low-density lipoprotein (LDL). 100 postmenopausal women who appeared healthy underwent this research on these factors.

Materials and Methods: Depending on how long they had been through menopause, the individuals were split into two groups: <5 years and >5 years. BMI, triglycerides, and LDL were among the variables examined.

Results: In our study, BMI values increased in both groups but were not statistically significant (P = 0.920); nonetheless, triglyceride levels increased and were statistically significant (P = 0.059) and LDL cholesterol increased (P = 0.307) in the lipid profile.

Conclusion: Because postmenopausal women lack estrogen's cardioprotective function, they are more susceptible to cardiovascular illnesses. Poor dietary and lifestyle choices further raise the risk of cardiovascular disease. It is important to raise awareness of menopause and cardiovascular health among perimenopausal women and to motivate them to adopt healthy lifestyles.

Keywords: Postmenopause, Estrogen, Lipid Profile, Body Mass Index.

Introduction

While women in today's culture are sufficiently aware of breast cancer, they are not yet aware of cardiovascular illnesses after menopause.

30% of postmenopausal women have osteoporosis, and 70% of women develop cardiovascular illnesses, according to an American Heart Association data from 2002. Due to the loss of estrogen's cardiovascular system protective actions, postmenopausal women are more at danger. Atherosclerosis, ischemic heart disease, and myocardial infarction are all brought on by oestrogen insufficiency.

Women who have not had a menstrual period for at least 12 months are said to be in menopause; typically, this occurs when they are around 50 years old.

Menopause, according to the WHO, is a permanent cessation of menstruation brought on by ovarian function decline. Postmenopause is the period that comes after menopause, which typically lasts for 50 years and occurs between the ages of 40 and 50 [1].

Menopause, a natural occurrence associated with age, marks the end of the reproductive years with the loss of ovarian cyclic function, which is exhibited by cyclic menstruation. Although menopause is an estrogen-deficient state, it is not an illness like other hormone-deficient states [2].

The levels of oestrogen and progesterone, which are produced and released by the ovaries, decrease. After menopause, there is a propensity to gain weight, which increases the risk of cardiovascular disease, hypertension, and other conditions. Following menopause, there is an increase in fat mass and a modification in the distribution of fat storage. The centre region of the body, which is the abdominal region, has a propensity to accumulate fat.

Body mass index (BMI) is a good predictor of hypertension and hyperlipidemia and has an impact on blood pressure and lipid profile [3].

The hormonal changes that occur after menopause lead to the development of metabolic syndrome, which is a collection of risk factors for the progression of cardiovascular diseases [4].

This study may also be helpful for postmenopausal women in the early detection and primary prevention of cardiovascular disease. Women's coronary risk increases after menopause. Other significant factors include the steady increase in sympathetic tone with ageing. Release of adrenaline in circulation results in lipolysis further boosting blood lipid content. We chose to explore this BMI because the lipid profile alters parameters in postmenopausal women because of the multifocal impacts.

Materials and Methods

This cross-sectional study was done at Department of Physiology collaboration with Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheraisarai, Bihar from June 2019 to December 2019. Total 100 postmenopausal apparently healthy women were selected from different district of North Bihar included in this study. Cases divided into two groups according to menopausal years 0–5 years and 6–10 years.

Before choosing the subjects, the volunteers were given an explanation in their native tongue of the study's purpose, methodology, and advantages. A brief history was gathered during motivation to determine their current state of health. Written consent was obtained. The investigation was conducted from 8:00 AM to 11:00 AM.

In this study, parameters studied were as follows:

- BMI

1. Height was measured in centimeter by stadiometer.
2. Weight.
3. BMI calculated by Karada Scan.

Lipid profile: A 5 ml sample of venous blood was taken from each patient after they had fasted for 12 hours the night before, and the lipid profile was calculated using an enzymatic approach using a semi-automated analyzer.

These lipids were examined:

a) Triglycerides and
b) low-density lipoprotein (LDL) cholesterol

Data collected were statistically analyzed by unpaired *t*-test and correlation coefficient was used to determine correlation.

Results

Results of the present study are presented in Tables 1 and 2.

Table 1: Descriptive statistical analysis of the mean value of age, height, weight, and BMI

Menopause	Age	Height	Weight	BMI
Up to 5 years				
• No. of cases	50	50	50	50
• Mean	46.78	151.34	56.86	24.82
• Standard deviation	3.62	5.99	9.52	3.84
>5 years				
• No. of cases	50	50	50	50
• Mean	54.16	152.29	57.86	24.90
• Standard deviation	3.45	5.96	11.08	4.29
Unpaired t value				
• t-value	10.427	0.795	0.484	0.101
• p-value	<0.001	0.429	0.629	0.920

BMI: Body mass index

Table 2: Descriptive statistical analysis of the mean value of BMI, triglyceride and LDL

Menopause	BMI	Triglyceride	LDL
Up to 5 years			
• No. of cases	50	50	50
• Mean	24.82	137.16	121.20
• Standard deviation	3.84	56.46	37.93
>5 years			
• No. of cases	50	50	50
• Mean	24.90	162.92	112.89
• Standard deviation	4.29	76.94	42.84
Unpaired t value			
• t-value	0.101	1.909	1.026
• p-value	0.920	0.059	0.307

BMI: Body mass index, LDL : Low density lipoprotein

Discussion

This cross-sectional comparison study was conducted in two groups of menopausal women: Group 1 consists of menopausal women who have had 5 years of menopause, while Group 2 consists of those who have undergone >5 years of menopause.

In postmenopausal women, the BMI and lipid profile changed. BMI and lipid profile levels increased. Less oestrogen, which plays a cardioprotective role in postmenopausal women, may be the cause of this.

In our study, Group 1 and Group 2 BMI values have increased. In contrast to the other two groups, it was not statistically significant (t = 0.101, P = 0.920). As the menopause phase lasted, the BMI mean values did not significantly alter.

In a rural Japanese population, BMI appeared to be a reliable predictor of hypertension and hyperlipidemia, and it has been shown to have an impact on lipid profiles and blood pressure. As a result, hypertension and hyperlipidemia are well predicted by BMI. The results of the current investigation are comparable to those of Carels and Darby [5,6].

Postmenopausal women have higher prevalence rates of obesity (BMI 30) and overweight (BMI 25). According to Walulkar and Sagdeo, the mean BMI in their study was 24.11 2.92 and 22.84 3.05 in the patients and controls, respectively, and it was highly significant [7].

Increased blood triglycerides, LDL cholesterol, and high-density cholesterol during perimenopause may be responsible for the rise in the risk of cardiovascular disease in menopausal women. After menopause, however, there is an increase in blood pressure, fasting blood glucose, weight, and waist circumference. There is a need for greater understanding of the significance of cardiovascular disease because the risk rises in postmenopausal women. In postmenopausal women, cardiovascular disease risk is high. Postmenopausal women's cardiovascular risk will be significantly decreased by altering their lifestyle and with the aid of exercise.

Menopause is a stage of transition in women that is connected with a constellation of physical changes, and our study places special emphasis on postmenopausal health in women and the possible dangers they are exposed to. This study aims to raise awareness of the potential changes and hazards associated with oestrogen deficiency.

Hormonal assays would have been more appropriate in our study.

According to our study, lipid profiles should be regularly checked on women in the premenopausal and postmenopausal stages of life in order to detect cardiovascular disease early and prevent it from developing. In postmenopausal women, there is a significant correlation between the percentage of fat and BMI. Robert et al. state that obesity in postmenopausal women is defined as a BMI greater than 25 kg/m^2 [8]. According to BMI, there are 52% obese people in our study.

In postmenopausal women, there is a rise in total cholesterol, an increase in triglycerides, an increase in LDL, and a decrease in HDL as compared to the reproductive age group. Since the same modifications were observed in both overweight and normal-weight women, these changes are independent of BMI. The results of the current investigation agreed with those of prior studies by Bade et al [9].

Serum triglycerides (t = 1.909, P = 0.059) and LDL (t = 1.026, P = 0.307) changed significantly in our study.

In our study, BMI values and lipid profile – triglyceride and LDL values were raised.

LDL and cholesterol did not differ much from one another. However, triglycerides, HDL, and VLDL showed a substantial difference. As shown by Latha et al., the decreased cardioprotective HDL is evidence that menopause is an independent risk factor for developing cardiovascular disease [10].

Postmenopausal women can practise preventive measures including daily exercise, yoga, meditation, and lifestyle changes to lessen these issues. These could lower postmenopausal women's chance of developing cardiovascular disease. If necessary, non-invasive and invasive cardiovascular system evaluation should also be carried out.

Conclusion

In this investigation, we found that postmenopausal women with high BMI, triglyceride, and LDL readings have an increased risk of cardiovascular disease. Women with higher BMIs were persuaded to embrace healthy lifestyle changes, such as regular exercise. They received counselling regarding their eating patterns and diet. Cardiovascular disease primary prevention is a well-established aspect of medical care. In practical practise, early diagnosis helps patients who have problems from chorionic villus sampling receive preventive medications. It also establishes which patients need to receive additional non-invasive and invasive cardiovascular system evaluations.

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