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Original Research Article

A Comparative Observational Assessment of Blood Pressure between Postmenopausal and Premenopausal Women

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Abstract

Aim: Research on the alterations in blood pressure between postmenopausal and premenopausal women.

Materials and Methods: The physiology department of SKMCH in Muzaffarpur, Bihar, India, conducted this cross-sectional research. Women of a comparable height and weight who were either postmenopausal or premenopausal were surveyed for this study. Fifty women who had gone through menopause and fifty women who were still in their menstrual periods were chosen after extensive medical histories were taken in accordance with the inclusion and exclusion criteria. A convenience sample was used. Fifty naturally menopausal women, ranging in age from 50 to 55, with a healthy weight (60 to 65 kg) and a height (155 to 157.5 cm), were chosen for the study. Fifty healthy, premenopausal women (35–40 years old) with normal weight and height were chosen for the study. All of the ladies had regular menstrual cycles.

Results: The postmenopausal group had a resting pulse rate of 83.16 ±1.45 beats/min, whereas the premenopausal group had 80.76 ± 2.32 beat Resting pulse rate differed more across groups statistically. The postmenopausal group had a systolic blood pressure of 120.54 ± 2.56 mm Hg, whereas the premenopausal group had 118.45 ± 3.23 The postmenopausal group had a diastolic blood pressure of 81.65 ± 2.23 mm Hg, whereas the premenopausal group had 80.34 ± 4.02 Systolic and diastolic blood pressure differences were higher between groups. Postmenopausal women had greater pulse rate (bpm) (83.16 ±1.45), systolic blood pressure (120.54 ± 2.56), and diastolic blood pressure (81.65 ± 2.23).

Conclusion: Systolic and diastolic blood pressure were significantly greater in postmenopausal women than in premenopausal women, perhaps owing to reduced oestrogen levels that upregulate the RAS and increase plasma renin activity.

Keywords: Hypertension, Post-Menopause, Pre-Menopause, Systolic Blood Pressure, Pulse Rate.

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Introduction

Women experience menopause when ovarian activity decreases and menstruation stops. This shift is connected to hormonal changes, including oestrogen reduction, which may affect cardiovascular health. Hormonal changes significantly affect blood pressure management. Understanding the differences in blood pressure between women who have not achieved menopause and those who have is important since high blood pressure is a major risk factor for cardiovascular disease. These diseases still kill and sicken women. [1]

Oestrogen reduces vascular resistance and improves endothelial function, reducing hypertension. Oestrogen decline during menopause may enhance arterial stiffness, sympathetic activity, and baroreceptor sensitivity. All of these may raise blood pressure. [2] Multiple studies have revealed that postmenopausal women had higher blood pressure than premenopausal women, indicating that hormonal changes affect cardiovascular regulation. [3]

Cross-sectional studies compare blood pressure across groups at one time, revealing menopause-related physiological changes. Previous study has shown substantial variations in premenopausal and postmenopausal systolic and diastolic blood pressure. Thurston et al. [4] found that postmenopausal women had higher systolic blood pressure and more hypertension than premenopausal women. Similar studies show that postmenopausal women had higher rates of hypertension and cardiovascular risk factors. [5]

Age, BMI, lifestyle, and genetics can affect blood pressure after menopause. Comparative studies on these measures may help explain menopause and

cardiovascular health. This study compares premenopausal and postmenopausal blood pressure changes, taking into account several blood pressure-controlling variables. This research seeks to understand blood pressure differences between these two groups to improve hypertension risk assessment and therapy in women, particularly those in menopause. These changes must be understood to develop effective menopausal cardiovascular risk treatments.

Materials and Methods

One year was spent on this cross-sectional research at the Department of Physiology, SKMCH, Muzaffarpur, Bihar, India. Postmenopausal and premenopausal women of average height and weight provided study data. Based on the following inclusion and exclusion criteria, 50 post- and pre-menopausal women were chosen after a complete medical history. We sampled conveniently. Non-probability sampling is used. Women with 12 months amenorrhoea were deemed postmenopausal.

Inclusion Criteria:

- Fifty post-menopausal women aged 50-55 years, weight 60 to 65 kgs, Height 155-157.5 cms with active physical life, who attained menopause naturally.
- Fifty pre-menopausal height and weight matched, healthy women aged 35 to 40 years with regular menstrual cycles were selected.

Exclusion Criteria:

- Participants with diseases like dyslipidaemia blood disorders, surgical menopause, hypertension, Diabetes Mellitus, thyroid disorders, renal diseases were excluded.
- Participants should not have received oestrogen therapy or supportive treatment for menopausal symptoms.

Stadiometers measured height. Lightly clothed participants were weighed on a clinical scale. In sitting posture, patients' BP was taken three times by palpation and auscultation using a Mercury Sphygmomanometer. Korotkoff sounds were considered systolic BP when they appeared (Phase I) and diastolic when they disappeared (Phase V).

Data Collection Methods: All participants received proforma. Written informed consents were acquired during the face-to-face questionnaire session. The respiratory, cardiovascular, central nervous system, and gynaecological systems were examined. Students' "t" test was used for statistical analysis.

Results

Table 1 shows healthy postmenopausal and premenopausal women.

The postmenopausal group had a mean resting pulse rate of 83.16 ±1.45 beats/min, whereas the premenopausal group had 80.76 ± 2.32 beats/min. Resting pulse rate differed more across groups statistically.

The postmenopausal group had a mean systolic blood pressure of 120.54 ± 2.56 mm Hg, whereas the premenopausal group had 118.45 ± 3.23 mm Hg. Diastolic blood pressure was 81.65 ± 2.23 mm Hg in postmenopausal group and 80.34 ± 4.02 mm Hg in premenopausal group. Systolic and diastolic blood pressure differences are greater across groups. High pulse rate (bpm) (83.16 ±1.45), systolic blood pressure (120.54 ± 2.56), and diastolic blood pressure (81.65 ± 2.23) were seen in postmenopausal women.

Table 1: Blood Pressure Changes in Post-menopausal Group and Pre-menopausal Group

Parameter	Postmenopausal Mean ± SD)	Premenopausal (Mean ± SD)	P value	Significance
Pulse (beats/min)	83.16 ±1.45	80.76 ± 2.32	<0.01	HS
Systolic Blood Pressure (mmHg)	120.54 ± 2.56	118.45 ± 3.23	<0.0001	HS
Diastolic Blood Pressure (mmHg)	81.65 ± 2.23	80.34 ± 4.02	<0.05	S

Discussion

The blood pressure rises during the transition from menopause to postmenopause as a result of the cumulative influence of various hormone-related variables. In the period around menopause, a decrease in oestrogen levels leads to an increase in plasma renin activity, which in turn induces an up-regulation of the Renin Angiotensin System (RAS). There is a significant difference in the level of sympathetic activity between postmenopausal women and males of the same age, particularly among women who are overweight. [6] Overactivity of the sympathetic nervous system is linked to visceral fat distribution in the abdominal region, which is closely linked to elevated inflammatory markers and oxidative stress. [7] It has been shown by Zanchetti A et al (2005) [8] that premenopausal women had lower blood pressure than postmenopausal women do. Additionally, postmenopausal women often have alterations in their lipid and glucose metabolism in addition to the development of arterial hypertension. [9] There is a distinct change

in the autonomic control towards a stronger sympathetic activity of the cardiovascular system, as well as an increase in the synthesis of catecholamines, according to a number of studies. Because it starts a few days after surgical oophorectomy and is reversed by oestrogens, this greater sympathetic drive is directly tied to the state of oestrogen shortage. Oestrogens are responsible for reversing this condition. Changes in metabolism, including an increase in sympathetic drive, that take place after menopause are a contributing factor in the development of metabolic syndrome. Physiological and anatomical changes that occur as a result of an increased sympathetic drive are what ultimately contribute to the development of hypertension. [10,11]

Conclusion

Postmenopausal women had significantly greater systolic and diastolic blood pressures. Lower oestrogen levels during menopause may upregulate the Renin Angiotensin System (RAS) and increase plasma renin activity. Oxidative stress from free radicals or reactive oxygen species (ROS) from oestrogen shortage causes hypertension and other diseases. Oxidative stress may damage cells in postmenopausal women, producing illness. Oestrogen insufficiency and age may not immediately worsen cardiac disease after natural menopause.

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