Effect of Dash Diet and Progressive Muscle Relaxation on Cardiovascular Risks in Postmenopausal Women.

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KEYWORDS

cardiovascular risks, DASH diet, postmenopausal women, progressive muscle relaxation.

ABSTRACT

Introduction: Hypertension is prevalent in postmenopausal women; therefore, lifestyle changes can help to manage cardiovascular diseases (CVDs).
Material and Methods: Ninety hypertensive postmenopausal women aged between 50 and 60 years, with a BMI varying from 30 to 35 kg/m2, were split randomly into three equal groups (n = 30 for each group). Group (A) was treated with a DASH diet weekly and antihypertensive medication (angiotensin-converting enzyme inhibitor (ACEI)), 1 tablet daily; group (B) was treated with progressive muscle relaxation (PMR), 3 times/week plus ACEI; and group (C) was treated with DASH diet weekly, PMR, 3 times/week plus ACEI. The treatment lasted for 3 months. Blood pressure was measured utilizing a sphygmomanometer, lipid profile was evaluated using blood testing, and stress level was evaluated utilizing the Perceived Stress Scale (PSS) before and after therapy.
Results: There was a significant lowering in systolic (SBP) and diastolic (DBP) blood pressure ($p < 0.05$), PSS, significant improvement in lipid profile across groups following therapy in favor of group C ($p < 0.01$). There was no significant change across groups A and B in SBP and DBP ($p > 0.05$). There was a significantly improvement in lipid profile in group A compared to that in group B after therapy ($p < 0.05$). There was a significantly reduction in PSS in group B compared to that in group A after therapy ($p < 0.01$).
Conclusion: The DASH diet and PMR were effective in reducing cardiovascular risks in postmenopausal women.

Introduction

Menopause, a natural phase of aging, signifies the termination of a woman's menstrual cycle, confirmed after 12 months without menses, generally occurring between the ages of 42 and 55[1]. Postmenopausal women are more susceptible to atherosclerosis and cardiovascular complications, potentially resulting from enhanced pro-inflammatory cytokine and adipokine production in the visceral fat tissue. This build-up of visceral fat may extend to other visceral tissues, including the heart. Importantly, women's blood lipid profiles shift towards a more atherogenic pattern within a year of their final menstrual period, characterized by significant rise in LDL cholesterol, total cholesterol, and apolipoprotein B [2].

Premenopausal women usually exhibit lower blood pressure levels than men, but this difference disappears around menopause, with women's blood pressure rising to match that of men in the same age bracket. Salt sensitivity becomes more prevalent in postmenopausal women, thereby increasing their susceptibility to hypertension (HTN) [3].

HTN is a primary contributor to death and the onset of cardiovascular and other health conditions [4]. HTN, classified as a systolic blood pressure (SBP) of≥ 140 mmHg and/or a diastolic blood pressure (DBP) of≥ 90 mmHg, is a widespread global issue [5] HTN management involves lifestyle modifications and pharmacological intervention. Various antihypertensive classes, either individually or in combination, comprise pharmacological treatments. These comprise angiotensin-converting enzyme inhibitors, calcium channel blockers, and diuretics (primarily, thiazides). For resistant HTN, additional medication classes may be incorporated [6].

As time passes, the advantages and disadvantages of a medication for an individual can change, making previously appropriate medications unsuitable, particularly when the harm surpasses the benefits or when the benefits no longer match the person's care objectives [6].

Non-pharmacological interventions are strongly supported by data on their efficacy in reducing blood pressure. Recommended dietary approaches involve high whole grains, fruit, and vegetable intake. It also recommends low non-tropical vegetable oil, legumes, fish, poultry, fatty dairy products, and nut intake. Simultaneously, it is advised to decrease the intake of red meat, sweet foods, and sugary beverages [7].

Dietary guidelines including the Dietary Approaches to Stop Hypertension (DASH) diet can aid achieving these nutritional goals. The DASH diet focuses on increasing fruit and vegetable consumption while limiting the intake of sweet foods, sugary beverages, dairy products, red meat, and saturated fats. Research has demonstrated that following the DASH diet can bring about a reduction of 5.5 mmHg and 3 mmHg in SBP and DBP, respectively [8].

The DASH dietary approach is designed to lower blood pressure by advocating nutrient-dense food intake with low levels of sodium; saturated and total fat; cholesterol; and high fiber, magnesium, potassium, calcium, and protein levels. In practical terms, this eating pattern emphasizes the inclusion of whole grains, various vegetables and fruits, low-fat or skim milk products, fish, poultry, and nuts in the diet. Conversely, it recommends limiting the intake of fat-dense meats and dairy, certain tropical oils, as well as sugary food and sweetened beverages [8].

Progressive Muscle Relaxation (PMR) is widely used in complementary and alternative medicine. Conceptualized by Edmund Jacobson during the 1920s, PMR aims to induce both physiological and psychological relaxation in individuals. This technique involves sequential tightening and release of numerous muscle groups, while the person focuses on proprioceptive and interceptive sensations. Research indicates that PMR can effectively lower blood pressure and alleviates anxiety associated with different medical conditions [9].

PMR aids in controlling of blood pressure, heart rate, and lipid profiles in healthy people. After undergoing PMR training, subjects exhibited a significantly lower resting heart rate (HR), SBP, and DBP [10]. This reduction is likely caused by a compound interaction between physiological and psychological factors that decreases anxiety in those practicing PMR. The training is recognized for enhancing parasympathetic activity, decreasing muscular tension, improving concentration, and fostering a sense of well-being [11].

Materials and Methods

Participants

Among the hundred and ten hypertensive women referred by a gynaecologist, rondomly selected from Suez General Hospital in Suez, 90 met the inclusion criteria. Twenty participants were excluded; eight opted out voluntarily, while 12 were deemed ineligible. Ninety postmenopausal women were randomly allocated into three groups. The inclusion criteria were an age range of 50 to 60 years and a body mass index range of 30 to 35 kg/m², hypertension at least one year post-menopause, and scores between 14 and 40 on the Perceived Stress Scale (PSS). Women were excluded if they had SBP >160 mmHg, DBP >100 mmHg, other causes of hypertension as renal diseases, and women taking sedatives or tranqulizers.

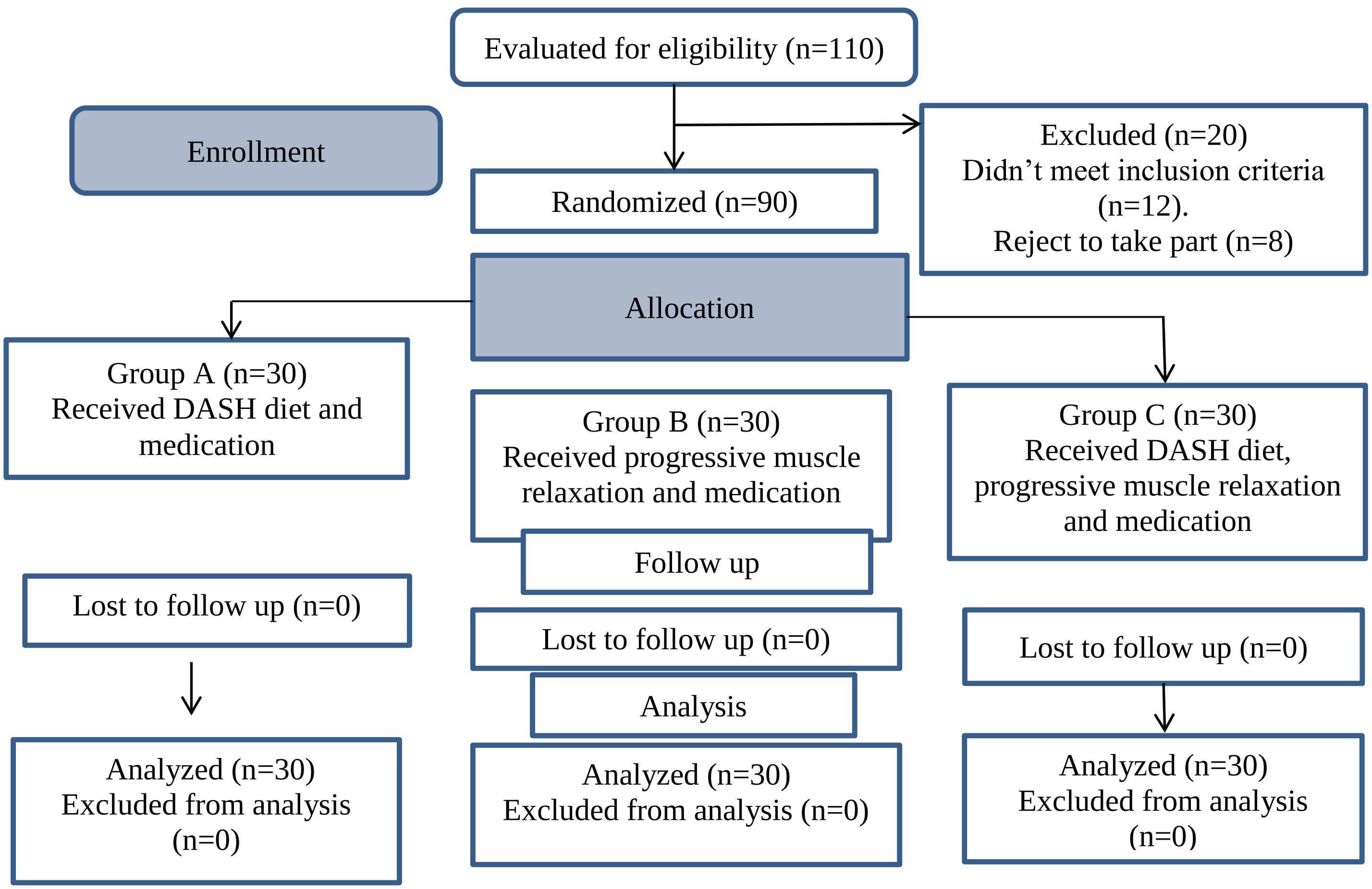

Fig.1. Study flow chart

This study utilized a randomized controlled design with three groups, employing a pre- and post-experimental design. All women were randomly distributed into three equal groups (n = 30 per group). For 3 months, Group (A) was treated with a DASH diet weekly and antihypertensive medication (angiotensin-converting enzyme inhibitor (ACEI)) 1 tablet daily, Group (B) was treated with progressive muscle relaxation (PMR) 3 times/week plus the same antihypertensive medication (ACEI), and Group (C) was treated with DASH diet weekly, PMR 3 times/week plus the same antihypertensive medication (ACEI). This trial was carried out at the outpatient clinic of Suez General Hospital, Egypt from June 2024 to November 2024.

Procedures

Simple randomization was achieved via the closed envelope technique. The participating women were randomly allocated to three groups, each consisting of 30 participants. Ninety sealed envelopes were prepared, consisting of thirty titled 'Group A,' thirty titled 'Group B,' and thirty titled 'Group C.' The participants selected an envelope and were allocated to their groups within. Prior to the commencement of the trial, all procedures were clarified to the participants who subsequently provided written informed consent. This study was approved by the Ethical Research Committee of the Faculty of Physical Therapy at Cairo University, Egypt. No: P.T.REC/012/004059. The study had been registered in ClinicalTrials.gov [NO: NCT06600347]. This study followed to the ethical principles delineated in the Declaration of Helsinki regarding research related to human subjects.

To avoid type II error, sample size estimation was executed utilizing G*POWER statistical software (version 3.1.9.2; Franz Faul, Universitat Kiel, Germany), informed by SBP data from a pilot study involving 5 subjects per group, which indicated that the requisite sample size for this research was N = 90. The calculation was conducted with $\alpha = 0.05$, a power of 80%, and an effect size of 0.34.

Outcome measures

Primary outcome measure

Blood pressure

A mercury sphygmomanometer was utilized to measure SBP and DBP for every woman in the three groups (A, B, and C) before and following therapy. The procedure involved placing a proper sized cuff snugly around the patient's arm while they were seated. Manual cuff inflation using a rubber bulb was performed to block the artery. A stethoscope was positioned over the pulse point at the elbow crease, and the pressure within the cuff was gradually decreased. The initial sound heard as blood began to flow through the artery was noted as the first Korotkoff sound, indicating the SBP. The cuff pressure was lowered until the fifth Korotkoff sound, signifying the DBP, became inaudible.

Lipid profile

Low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG), and total cholesterol (TC) were measured for every participant in the three groups before and after therapy. The lipid profile test necessitated a 9–12-hour fasting period, during which patients could only consume water. Blood was typically drawn from an arm vein in the morning, following overnight fasting. The procedure involved cleaning the antecubital area with antiseptic, applying an elastic band to the upper arm to distend the veins, and inserting a needle to collect blood in a vial or syringe. Once an adequate sample was obtained, the band was removed, the needle withdrawn, and the site covered with cotton.

Normal values: TC should be below 200 mg/dl, TG levels below 150 mg/dl, LDL below 100 mg/dl, and HDL range from 40 to over 60 mg/dl [12].

Secondary outcome measure

Stress measurement

The PSS was utilized to evaluate the stress degree for every participant in the three groups before and after therapy. The reliability of the perceived stress scale was supported by Satpathy's study, which assessed stress in menopausal women, and a reliability coefficient of 0.80 was found to be statistically significant [13]. Khalili et al.'s study also demonstrated the validity and reliability of the PSS. The study assessed stress-related disorders in patients with chronic headaches. This scale features an intuitive scored system, good validity and reliability [14]. The PSS questions enquire about emotions and thoughts experienced over the past month. Respondents indicate how frequently they experienced specific feelings. When scoring the PSS, answers to positive statements (items 4, 5, 7, and 8) are inverted (e.g., 0 becomes 4, 1 becomes 3, 2 becomes 2, 3 becomes 1, and 4 becomes 0). The overall score is then calculated by the summation of all scale items. Based on the scoring, stress was interpreted into: 0-13: low perceived stress, 14-26: moderate perceived stress and 27-40: high perceived stress [15] [16].

Interventions

a. Medication

All participants in all groups received the same antihypertensive drug (angiotensin-converting enzyme inhibitor) 1 tablet daily for 3 months.

b. DASH diet

Each participant in groups A and C was treated with the DASH diet (1600-1800 calories/day) for three months, as the DASH diet targets were tailored to each individual and included a high fruit intake (4–5 serves/day) and vegetables (4–5 serves/day). It consisted of a spectrum of veggies from every subgroup, including starchy, dark green, red, and orange, among others; reduced-fat dairy products (2–3 serves/day); lean meats, poultry, and fish (≤6 serves/day); nuts and legumes (4 serves/week); and whole grains (6 serves daily). The goal was to limit the consumption of sweets and extra sugars to (≤ 5 serves / week), fats and oils to (2-3serves daily), and to keep saturated fatty acids (SFA) at less than 7%, and sodium to a daily maximum of 2300 mg [17].

c. Progressive muscle relaxation (PMR)

Each participant in groups B and C was treated by PMR for 30 minutes, three times weekly for three months. Before the initial treatment, each participant received a brief overview of the procedure and instructions for home practice. Each woman was positioned comfortably, either sitting or semi-reclining, in a warm, quiet environment with her arms at her sides and restrictive clothing removed. The session was started with meditation connected with breathing exercises applied as follows:

The women were instructed to focus on their breathing, noting shallow or rapid breaths. She was then asked to visualize a simple, pleasant object. Then, the woman was guided to close her eyes, inhale deeply through the nose for a count of four, expanding her abdomen like a balloon, then exhale slowly through the mouth this pattern was repeated four times. Next, the woman was directed to breathe in for a four-count, hold for a four-count, and exhale for a four-count. The pattern of four-count inhalation, holding, and exhalation was repeated four times.

PMR was practiced for 30 minutes, involving several muscles as the following:

- Hands and arms: gripping her right and left hands into a strong fist and hold then tense her biceps by bringing her fists up to her shoulders.
- Shoulder: raising both shoulders towards her ears, causing tension in the shoulder.
- Forehead and eyes: frowning and raising her eyebrows, then tightly close her eyes to exercise the muscles around her eyes.
- Jaw and lips: clenching her jaw and holding, then engage the muscles around her mouth by pursing her lips and creating tension.
- Neck muscles: her head was tilted backward by pushing her head against her hands. After that, contracting the muscles at the front of her neck, creating tension in the front neck area.
- Back and chest: extending her back, pushing out her chest, and sensing upper back tension and then release. Then she was asked to inhale deeply, hold her breath, and feel the tension in her chest muscles. Following this, she was instructed to exhale slowly, relaxing her muscles.
- Abdomen: by contracting her abdominal muscles. She held this position briefly before relaxing.
- Legs: extending both legs forward. She held this position briefly before relaxing.
- Toes: toes curled upwards then hold.
- Each movement was repeated twice by contracting each muscle group without straining for 5 seconds while relaxing for 10 seconds, for three sets.

Statistical analysis

An ANOVA test was employed to compare subject characteristics across groups. Before analysis, data normality was assessed utilizing the Shapiro-Wilk test. Levene's test was utilized for testing homogeneity of variances among groups. Data were found to be normally distributed and homogenous. A mixed MANOVA was then done to examine both within-group and between-group effects on SBP, DBP, PSS, TG, LDL, HDL, and total cholesterol (TC). Post-hoc tests utilizing Bonferroni correction were employed for subsequent multiple comparisons. The significance level for all statistical analyses was set at $p < 0.05$. Statistical analyses were employed using IBM SPSS Statistics version 25 for Windows (IBM SPSS, Chicago, IL, USA).

Results

Subject characteristics

Table 1 illustrates the participant characteristics of all groups. There were insignificant differences across groups in age, weight, height, BMI, and time since menopause ($p > 0.05$).

Table 1. Basic characteristics of participants.

	Group A	Group B	Group C	p-value
	Mean ± SD	Mean ± SD	Mean ± SD	
Age (years)	53.93 ± 2.16	54.40 ± 2.25	54.37 ± 2.01	0.64
Weight (kg)	83.87 ± 4.78	83.11 ± 3.91	84.40 ± 3.23	0.46
Height (cm)	160.70 ± 5.27	159.97 ± 5.46	162.17 ± 3.44	0.20
BMI (kg/m²)	32.51 ± 1.84	32.54 ± 1.94	32.11 ± 1.41	0.58
Time since menopause (years)	2.43 ± 0.94	2.63 ± 0.96	2.47 ± 0.97	0.68

SD, standard deviation; p-value, level of significance

Efficacy of treatment on SBP and DBP, PSS, TG, LDL, HDL and TC

Mixed MANOVA indicated a significant interaction between treatment and time ($F = 21.88$, $p = 0.001$). A significant main effect of time was observed ($F = 384.01$, $p = 0.001$), in addition to a significant main effect of treatment ($F = 3.11$, $p = 0.001$).

Within group comparison

SBP, DBP, and PSS decreased significantly after therapy in all groups ($p < 0.001$) (Table 2).

After therapy, TG, LDL, and TC levels decreased while HDL increased significantly across all groups ($p < 0.001$) (Table 2).

Between group comparison

The before therapy values did not change significantly across groups (p > 0.05).Post-treatment, Group C indicated significantly lower SBP and DBP than Groups A and B (p < 0.05), with no change among groups A and B (p > 0.05). After therapy, group C indicated a significant lowering in PSS, TG, LDL, and TC levels and a significant elevation in HDL compared to groups A and B (p < 0.01). Group A exhibited a significant decrease in TG, LDL, and TC levels and a significant elevation in HDL compared to group B (p < 0.05). Furthermore, group B had a significant reduction in PSS compared to group A (p < 0.01). (Table 3-4).

Table 2. Mean SBP and DBP and PSS before and after therapy of all groups

	Group A	Group B	Group C	p-value		
	mean ± SD	mean ± SD	mean ± SD	A vs B	A vs C	B vs C
SBP (mm Hg)						
Pre treatment	143.50 ± 5.11	144.17 ± 5.27	145.67 ± 4.50	0.86	0.22	0.47
Post treatment	127.33 ± 5.98	129.83 ± 6.23	122.67 ± 4.09	0.2	0.004	0.001
MD	16.17	14.34	23			
% of change	11.27	9.95	15.79			
	p = 0.001	*p = 0.001*	*p = 0.001*			
DBP (mm Hg)						
Pre treatment	93.17 ± 4.82	92.33 ± 5.68	93.50 ± 3.97	0.78	0.96	0.62
Post treatment	84.83 ± 4.82	85.17 ± 5.49	81.83 ± 3.34	0.95	0.03	0.01
MD	8.34	7.16	11.67			
% of change	8.95	7.75	12.48			
	p = 0.001	*p = 0.001*	*p = 0.001*			
PSS						
Pre treatment	26.70 ± 4.61	28.20 ± 4.39	27.87 ± 3.73	0.36	0.54	0.95
Post treatment	20.73 ± 4.20	18.07 ± 3.14	15.33 ± 2.89	0.01	0.001	0.008
MD	5.97	10.13	12.54			
% of change	22.36	35.92	44.99			
	p = 0.001	*p = 0.001*	*p = 0.001*			

SD, Standard deviation; MD, Mean difference; p-value, Level of significance

Table 3. Mean TG, LDL, HDL and total cholesterol (TC) before and after therapy of all groups

	Group A	Group B	Group C	p-value		
	mean ± SD	mean ± SD	mean ± SD	A vs B	A vs C	B vs C
TG (mg/dl)						
Pre treatment	146.93 ± 16.67	143.37 ± 17.51	144.87 ± 22.28	0.75	0.91	0.95
Post treatment	96.37 ± 14.44	117.10 ± 15.91	83.80 ± 13.02	0.001	0.003	0.001
MD	50.56	26.27	61.07			
% of change	34.41	18.32	42.16			
	p = 0.001	*p = 0.001*	*p = 0.001*			
LDL (mg/dl)						
Pre treatment	127.37 ± 13.94	126.30 ± 11.27	129.90 ± 12.07	0.94	0.71	0.51
Post treatment	108.08 ± 11.65	119.73 ± 10.71	96.23 ± 10.45	0.001	0.001	0.001
MD	19.29	6.57	33.67			
% of change	15.14	5.20	25.92			
	p = 0.001	*p = 0.001*	*p = 0.001*			
HDL (mg/dl)						
Pre treatment	42.87 ± 5.48	41.67 ± 6.54	42.07 ± 6.07	0.72	0.86	0.96
Post treatment	47.70 ± 5.67	43.83 ± 6.91	52.20 ± 5.22	0.03	0.01	0.001
MD	-4.83	-2.16	-10.13			
% of change	11.27	5.18	24.08			
	p = 0.001	*p = 0.001*	*p = 0.001*			
TC (mg/dl)						
Pre treatment	187.17 ± 10.58	185.27 ± 9.58	189.70 ± 6.85	0.7	0.53	0.15
Post treatment	170.32 ± 13.11	179.40 ± 9.95	158.17 ± 10.12	0.006	0.001	0.001
MD	16.85	5.87	31.53			
% of change	9.00	3.17	16.62			
	p = 0.001	*p = 0.001*	*p = 0.001*			

SD, Standard deviation; MD, Mean difference; p-value, Level of significance

Discussion

Menopause represents a crucial period in women's reproductive health, marked by significant alterations in fat mass distribution, dyslipidemia, and an increased vulnerability to CVD, which exhibits a male-like pattern as women grow older [18]. Menopause-induced estrogen reduction increases CVD risk via multiple physiological changes, including vascular dysfunction, hypertension, abdominal fat redistribution, and hyperlipidemia [19].

CVD, a global health crisis, reduces quality of life and lifespan. The World Health Organization (WHO) links hypertension to over half of strokes (54%) and nearly half of ischemic heart cases (47%) [20].

The DASH diet is recommended for controlling hypertension because it incorporates antihypertensive food groups. It prioritizes fruit, vegetable, whole grain, legume, nut, lean protein, and low-fat dairy intake, with restricted amounts of sugar, salt, and saturated fats [21].

The PMR involves relaxing specific muscle groups while focusing on the sensations of tension and relaxation. By decreasing neural reflex function, PMR has been shown to reduce heart and respiratory rates, blood pressure, and anxiety, ultimately lowering stress levels in individuals with hypertension [22].

This trial aimed to identify the efficacy of the DASH diet and progressive muscle relaxation for cardiovascular risks in postmenopausal women. The current findings indicated a statistically significant drop in SBP and DBP, a decrease in PSS, TG, LDL, and TC, and a significant elevation in HDL after therapy compared to before therapy in all groups. Between groups, there was a significant reduction in SBP and DBP of group C compared to groups A and B after therapy, while there was no significant change across groups A and B. There was a significant reduction in PSS, TG, LDL, and cholesterol and a significant increase in HDL in group C compared to groups A and B after therapy. There was a significant reduction in TG, LDL, and TC and a significant rise in HDL in group A compared to group B after therapy. There was a significant reduction in PSS in group B compared to group A after therapy

The DASH diet results matched those of Saneei et al. [23], who revealed that a DASH-like diet has a beneficial blood pressure-lowering effect on both SBP and DBP in adult subjects. Moreover, Mario et al. [24] highlighted the DASH diet's potential in CVD prevention beyond its established benefits in reducing blood pressure. Furthermore, this study's results corroborate Monireh et al. [25], who suggested that a DASH-like diet improves TC, TG, LDL, LDL/HDL ratio, and HDL. Also, Shivappa et al. [26] highlighted the impact of cellular oxidative damage and inflammatory responses on psychiatric conditions, such as stress, anxiety, and depression, by affecting neurotransmitter function, the body's stress response system, and mitochondrial function. The study discovered that the low glycaemic index and nutrient profile of the DASH diet, which includes fibres, vitamins, and minerals, could potentially mitigate these effects. The results of this study aligned with Susan and Caryl [27], who affirmed that beyond its impact on hypertension and osteoporosis, a moderate-sodium DASH diet enhanced mood among women after menopause.

However, the current findings disagreed with those of Del Gobbo et al. [28], who demonstrated no link between DASH-style diet adherence and the incidence or death of CVD. Also, Amirhossein et al. [29] who indicated improvements in serum TG and LDL-C levels with DASH diet adherence yet reported insignificant alterations in serum TC and HDL-C levels. The current results opposed Ghazaleh et al. [30], who reported no significant correlation between DASH diet intake and improved psychological health.

Regarding progressive muscle relaxation, our findings linked with Pathan et al. [31], indicating that combining slow breathing exercises and progressive muscle relaxation techniques significantly lowered heart and respiratory rates, blood pressure, and anxious symptoms in subjects with essential hypertension. The trial findings aligned with Chaudhuri et al. [11], who demonstrated that lifestyle changes integrated with relaxation exercises improve stress levels, autonomic functions, cardiopulmonary health, and lipid profiles in postmenopausal women.

Additionally, the present findings corroborated with Shahnam M et al. [32], who found that stressed people have adverse lipid profiles in the form of lowered HDL-C levels and elevated LDL-C and TC levels. High LDL-C and TC reduce baroreceptor sensitivity and heart rate variability. They found that PMR may counteract these effects by normalizing lipid levels as well as enhancing baroreceptor sensitivity and heart rate variability.

Our results corroborated Arunima et al. [33], demonstrating PMR's efficacy in improving lipid profiles of PCOS patients with decreased cholesterol, triglycerides, and LDL and increased HDL. This study's findings contradict Ain et al [34], who reported that PMR only reduced SBP in hypertensive patients, with no significant effect on DBP.

Regarding the integrating effectiveness of the DASH diet and PMR, the study's results were similarly linked with Alexia et al. [35], who demonstrated the efficacy of integrated dietary and stress management approaches in reducing blood pressure for hypertension control, suggesting their potential as complementary or early interventions. This study's findings also matched Jinming et al. [36], who supported the efficacy of non-pharmacological approaches (DASH diet, meditation, yoga, progressive muscle relaxation) in reducing blood pressure, as validated by multiple randomized controlled trials and meta-analyses.

Strengths and limitation

There were no adverse outcomes throughout the study protocol. The DASH diet and PMR present a potentially effective treatment strategy for women with cardiovascular risks; however, this study has limitations. The absence of patient follow-up provides a significant limitation, highlighting the need for further research to evaluate the long-term effects of the interventions. Further research involving extended durations and a broader range of populations is essential to enhance these preliminary findings.

Clinical implications

The research presents strong evidence advocating for the integration of this combined dietary and exercise protocol into standard physiotherapy practices for hypertensive postmenopausal women. The notable enhancements in blood pressure, lipid profile, and PSS underscore the intervention's potential to alleviate the adverse impacts of hypertension and generally improve wellness in these patients.

Conclusions

The DASH diet and PMR significantly lowered both SBP and DBP, improved lipid profiles, and reduced stress in postmenopausal women. These interventions can serve as effective CVD prevention strategies and stress management tools.

Acknowledgments

The authors appreciated all participants who took part in this research.

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