



Role of Bhramari Pranayama in the management of hypertension among post-menopausal women

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Abstract

Hypertension is a common cardiovascular disorder among post-menopausal women due to hormonal imbalance, psychological stress, and reduced physical activity. The present study aimed to investigate the effect of Bhramari Pranayama on blood pressure among post-menopausal women suffering from hypertension. An experimental pre-test and post-test single group design was adopted. Thirty (N = 30) post-menopausal women aged between 45 and 60 years with mild to moderate hypertension were selected through purposive sampling. The subjects participated in an eight-week, five days per week Bhramari Pranayama training program with a daily session of 20 minutes. Systolic and diastolic blood pressure was measured before and after the intervention with the help of a standard sphygmomanometer. Mean, standard deviation, and paired t-test were applied for statistical analysis at 0.05 level of significance. The mean systolic blood pressure significantly reduced from 148.20 ± 6.45 mmHg to 136.10 ± 5.82 mmHg ($t = 6.32$), while the mean diastolic blood pressure decreased from 94.60 ± 4.80 mmHg to 86.40 ± 4.25 mmHg ($t = 5.41$). The findings revealed that Bhramari Pranayama significantly reduced blood pressure levels. It was concluded that Bhramari Pranayama is an effective, safe, and cost-effective complementary therapy for managing hypertension among post-menopausal women.

Keywords: Bhramari Pranayama, hypertension, post-menopausal women, yoga, physical education

Introduction

Menopause is a natural biological process marking the permanent cessation of menstruation in women, generally occurring between the ages of 45 and 55 years. The post-menopausal period is often associated with several physiological and a psychological change, among which hypertension is one of the most prevalent health problems. Menopause-related estrogen deficiency promotes vascular stiffness levels, increased vascular stiffness, impaired Vasodilatory mechanisms, and heightened sympathetic nervous system activity, thereby increasing the risk of hypertension. Stress hormone release increases blood pressure and heart rate [6]. In contrast, yoga and meditation help reduce psychological well-being, thereby indirectly supporting cardiovascular health [3]. Hypertension is the most important modifiable risk factor for coronary heart disease, stroke, congestive heart failure, end-stage renal disease and peripheral vascular disease. Relaxation and stress relieving methods like Pranayama, Meditation has been shown to be capable of lowering blood pressure [9].

Hypertension is a major risk factor for cardiovascular diseases, stroke, and kidney disorders. Although pharmacological management is effective, long-term drug therapy may result in side effects and dependency. Therefore, non-pharmacological approaches such as lifestyle modification, physical activity, and yogic practices have gained importance.

Physical education emphasizes holistic development through physical fitness, mental well-being, and preventive healthcare. Yoga is an ancient Indian practice that integrates physical postures (asanas), breathing exercises (pranayama), and meditation to enhance both physical and mental health. Evidence suggests that pranayama, through controlled breathing, influences autonomic regulation by increasing parasympathetic activity and decreasing sympathetic dominance [1]. Yogic practices, particularly pranayama, have been scientifically proven to regulate autonomic functions and reduce stress. Bhramari Pranayama, characterized by

slow inhalation and humming sound during exhalation, produces a calming effect on the nervous system and may help in regulating blood pressure. Pranayama breathing may enhance baroreflex sensitivity and vagal tone, contributing to cardiovascular stability [4]. Hence, this study aimed to assess the effectiveness of Bhramari Pranayama in controlling hypertension in post menopausal women.

Methodology

1. Research Design

The study adopted an experimental pre-test and post-test single group design.

2. Selection of Subjects

Thirty (N = 30) post-menopausal women suffering from mild to moderate hypertension were selected for sampling. The age of the subjects ranged from 45 to 60 years.

3. Inclusion Criteria

The study included postmenopausal women aged between 45 to 60 years who were clinically diagnosed with hypertension and were not involved in any regular yoga practice.

4. Exclusion Criteria

Women suffering from severe cardiovascular conditions, respiratory diseases, or those who were already participating in yoga practice were excluded from the study.

Variables of the Study

Type of Variable

Variables Independent- Variable Bhramari Pranayama
Dependent Variables- Systolic Blood Pressure, Diastolic Blood Pressure

Training Programme

The selected subjects received systematic training in Bhramri Pranayama for duration of eight week. The training session nwere conducted five days a week, with each

session lasting 20 minutes. Every session comprised ten rounds of Bhramari Pranayama, followed by relaxation in Shavasana.

Tools and Instruments

Blood pressure was assessed using a sphygmomanometer. A stopwatch was used to record time duration, and a yoga mat was provided for performing the practice comfortably.

Statistical Technique

The collection data were analyzed using descriptive statistics such as mean and standard deviation. A paired t-test was applied to determine the significance of difference, and the level of significance was fixed at 0.05.

Data Analysis and Tables

Table 1: Mean and Standard Deviation of Systolic Blood Pressure (mmHg)

Test	Mean	SD
Pre-Test	148.20	6.45
Post-Test	136.10	5.82

Table 2: Mean and Standard Deviation of Diastolic Blood Pressure (mmHg)

Test	Mean	SD
Pre-Test	94.60	4.80
Post-Test	86.40	4.25

Table 3: Paired 't' Test Result for Blood Pressure

Variable	Mean Difference	't' Value	Table Value (0.05)
Systolic BP	12.10	6.32	2.05
Diastolic BP	8.20	5.41	2.05

Results

The results of the study revealed a significant reduction in both systolic and diastolic blood pressure after eight weeks of Bhramari Pranayama practice. The calculated 't' values were greater than the table value at 0.05 level of significance, indicating that Bhramari Pranayama had a statistically significant effect on managing hypertension among post-menopausal women.

Conclusion

Cardiovascular diseases (CVDs) are a major cause of illness and death globally. Middle-aged women are especially vulnerable due to hormonal changes associated with menopause, along with lifestyle factors and stress. As women progress through perimenopause and menopause, declining estrogen levels significantly increase the risk of hypertension, coronary artery disease, and other cardiovascular disorders [2]. The findings of the present study clearly demonstrate that eight weeks of Bhramari Pranayama practice resulted in a statistically significant reduction in both systolic and diastolic blood pressure among post-menopausal women. The reduction observed in the present study supports the growing body of evidence that yogic breathing practices play a crucial role in the non-pharmacological management of hypertension. The significant decrease in systolic blood pressure may be attributed to improved autonomic nervous system regulation. Bhramari Pranayama involves slow, rhythmic breathing with prolonged exhalation accompanied by

humming vibration, which stimulates the vagus nerve and enhances parasympathetic activity. The systematic regulation and control of breathing through conscious inhalation and exhalation. It focuses on managing the flow of vital life energy by using controlled breathing techniques, thereby promoting physical, mental, and emotional balance [10]. pranayama is the art of controlling the life force through the disciplined practice of breathing. Increased parasympathetic dominance leads to reduced heart rate, decreased cardiac output, and relaxation of blood vessels, thereby lowering blood pressure. Similar physiological mechanisms have been reported by [7], who observed improved autonomic balance and reduced sympathetic activity following regular pranayama practice [9].

The results indicate that consistent engagement in yoga and pranayama promotes increased parasympathetic activity, attenuates sympathetic dominance, and supports overall cardiovascular stability [5]. The humming sound produced during Bhramari Pranayama creates vibratory sensations in the cranial region, which induce mental relaxation and reduce stress-induced vasoconstriction. Since stress is a major contributing factor to hypertension in post-menopausal women, the stress-reducing effect of Bhramari Pranayama plays a vital role in blood pressure regulation. During menopause, the level of estrogen hormone decreases. This causes the blood vessels to become stiff and reduces their ability to relax properly. As a result, blood pressure regulation is affected. Yogic breathing practices are known to improve the functioning of blood vessels and help the body control blood pressure more effectively. The present findings suggest that Bhramari Pranayama may partially counteract these post-menopausal physiological changes by promoting vascular relaxation and neuro-hormonal balance. Yoga plays an important role in achieving optimal health by positively influencing various psychophysiological processes and enhancing overall physical and mental well-being [11]. The present results are also in agreement with the observations of [12], who emphasized that pranayama practices reduce anxiety, improve emotional stability, and enhance overall cardiovascular efficiency. Psychological stress and anxiety are highly prevalent during the post-menopausal period and contribute significantly to elevated blood pressure levels. From the perspective of physical education, the findings of the present study highlight the importance of incorporating yogic breathing practices into regular physical activity and wellness programmes. Bhramari Pranayama is simple, safe, and suitable for middle-aged and elderly women. The observed significant improvement in heart rate variability (HRV) parameters in the intervention group indicates that yoga and pranayama improve autonomic adaptability and resilience to physiological stressors [2]. It can be easily integrated into physical education curricula, community fitness programmes, and women's health initiatives as a preventive and therapeutic strategy. Overall, the present study strengthens existing evidence that Bhramari Pranayama is an effective complementary intervention for managing hypertension among post-menopausal women. The consistency of the present findings with earlier research enhances the scientific credibility of pranayama-based interventions and supports their inclusion in holistic health promotion programmes.

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