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# EFFECT OF SHITLI AND BHRAMARI PRANAYAMA ON HYPERTENSION AMONG MALE POLICE

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## *Abstract*

***Background:*** *Hypertension is a major global health challenge and a significant risk factor for cardiovascular diseases (CVDs). Stress and autonomic nervous system (ANS) dysfunction play critical roles in its etiology. Non-pharmacological approaches, such as pranayama techniques, are increasingly recognized for their potential to manage hypertension. This study evaluates the effects of Sheetali and Bhramari Pranayama on systolic and diastolic blood pressure among male police personnel, a high-stress occupational group.* ***Method:*** *The study included 50 male police personnel diagnosed with hypertension. Participants were assigned to a two-month intervention involving daily practice of Sheetali and Bhramari Pranayama under supervision. Blood pressure levels, including systolic (SBP) and diastolic (DBP), were recorded pre- and post-intervention. Data were analysed using paired t-tests to assess the impact of the intervention.* ***Results:*** *The findings showed a significant reduction in both SBP and DBP following the pranayama intervention. The mean SBP decreased from 145.318 mmHg (SD = 6.034) to 140.440 mmHg (SD = 6.188), with a t-value of 19.036 ($p < 0.0001$). Similarly, the mean DBP decreased from 88.68 mmHg (SD = 4.47) to 84.00 mmHg (SD = 4.70), with a t-value of 19.66 ($p < 0.0001$). These results highlight the effectiveness of Sheetali and Bhramari Pranayama in managing hypertension.* ***Conclusions:*** *Sheetali and Bhramari Pranayama significantly reduced systolic and diastolic blood pressure among hypertensive male police personnel. These techniques offer a simple, cost-effective, and non-pharmacological approach to managing hypertension, particularly in high-stress occupational groups. Integrating pranayama into workplace wellness programs could improve cardiovascular health and overall well-being in law enforcement personnel.*

***Keywords:*** *Hypertension, pranayama, blood pressure, non-pharmacological therapy, police wellness*

## INTRODUCTION

**Pranayama: A Yogic Approach to Vital Energy Control**

The Sanskrit term Pranayama is derived from two components: Prana (vital force) and Yama (control), and refers to a yogic practice aimed at regulating the flow of vital energy that governs physiological processes in the body (Prabhu et al., 2022). Maharishi Patanjali, in his Ashtanga Yoga, emphasized the importance of Pranayama over Asanas for maintaining good health (Veerabhadrappa et al., 2011). Breathing, a fundamental physiological process that begins at birth and ceases at death, supplies life-sustaining oxygen to the body's organs, tissues, and cells. Through Pranayama, one can regulate the rhythm of vital energy to achieve a balanced and healthy body and mind. Ancient yogis developed a variety of breathing techniques to maximize its benefits.

One such technique, Sheetali Pranayama, derives its name from the Sanskrit word Sheetali, meaning "cold." This practice involves inhaling through the mouth and exhaling through the nostrils, which cools the body and relaxes the central nervous system. Sheetali Pranayama has been shown to alleviate colic, fever, and irritability, while also reducing high blood pressure. It is particularly effective as a cooling exercise for managing hypertension (HTN). However, the effects of Sheetali Pranayama as a solitary intervention on cardiovascular and autonomic changes in hypertension remain largely unexplored.

Another practice, Bhramari Pranayama, is inspired by the humming sound of the Indian black beetle. During exhalation, practitioners produce a humming sound, which quickly alleviates anxiety and promotes relaxation. It is particularly beneficial for individuals with high blood pressure, migraines, and headaches. Regular practice of

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slow-paced Bhramari Pranayama (respiratory rate of 3 breaths per minute) has shown a strong tendency to enhance the parasympathetic nervous system, promoting mental relaxation and reducing daily stress.

**Hypertension: A Global Health Challenge**

Hypertension is one of the most prevalent global health disorders and a significant risk factor for stroke, coronary artery disease, and organ failure. Persistent hypertension leads to premature mortality by contributing to conditions such as coronary heart disease, stroke, and heart failure (Kearney et al., 2005). In developed countries, hypertension ranks as the fourth leading cause of premature death, while in developing nations, it ranks seventh. In India, approximately 30% of adult hypertensive patients reside in urban areas, while 15% are from rural areas, with 15% of uncontrolled hypertensive cases globally attributed to India (Brown, 1994). The past two decades have witnessed a sharp global rise in cardiovascular diseases, with hypertension being the most prevalent. It is directly linked to adverse cardiovascular outcomes, often due to patients unknowingly living with uncontrolled hypertension for extended periods. In Africa, hypertension is the leading cause of heart failure, and globally it accounts for over half of deaths caused by stroke and nearly half of deaths due to coronary artery disease. Hypertension also contributes to more than one-tenth of all global deaths.

**Yoga as an Adjunct Therapy for Hypertension**

Yoga has emerged as an effective adjunct therapy for managing hypertension and as a lifestyle modification strategy. Numerous studies have scientifically validated the use of yoga in controlling blood pressure and improving overall cardiovascular health (Sharma et al., 2008; Sundar et al., 1984). By incorporating practices such as Pranayama, yoga offers a holistic approach to mitigating the risks associated with hypertension and improving quality of life.

## LITERATURE REVIEW

**Pranayama and Its Impact on Hypertension**

Slow, deep, pranayama-based breathing exercises have demonstrated effectiveness in reducing blood pressure (BP) over both short- and long-term durations, with significant reductions observed after 3 weeks and 3 months of practice (Vijayalakshmi et al., 2005; Pal & Velkumary, 2004). Studies by Jerath et al. (2006) revealed that slow, deep breathing in pranayama decreases oxygen consumption, heart rate (HR), and BP. Similarly, slow-paced pranayama induces parasympathetic dominance, which influences HR and BP, as confirmed by previous studies (Pramanik et al., 2009). Specifically, *Bhramari Pranayama*, a form of slow-paced breathing, stimulates the parasympathetic nervous system. It has been reported to produce gamma waves, indicating parasympathetic dominance and contributing to stress reduction and relaxation (Vialatte et al., 2009). Pranayama activates the stretch receptors in the lungs during above-tidal volume inhalation, triggering the Hering-Breuer reflex (Jerath et al., 2006). This reflex generates inhibitory neural impulses, which play a critical role in regulating autonomic functions such as systemic vascular resistance and HR (Matsumoto et al., 2000; Schelegle et al., 2001).

**Hypertension: A Global Health Challenge**

Hypertension (HTN) is one of the leading risk factors for cardiovascular diseases (CVDs) worldwide, posing a significant threat to public health (Rapsomaniki et al., 2014). The risk of CVD increases proportionally with each 20/10 mmHg rise in systolic (SBP)/diastolic blood pressure (DBP) above normal levels, regardless of age or gender (Kuppusamy et al., 2018). Additionally, individuals with HTN are at risk of developing CVD approximately five years earlier than those with normal BP (Egan et al., 2014). Elevated sympathetic nervous system (SNS) activity and decreased parasympathetic nervous system (PNS) activity are key contributors to the pathogenesis and complications of HTN (Lewington, 2002). In response to the increasing burden of HTN, the American College of Cardiology and the American Heart Association (AHA) guidelines (2017) highlighted the importance of lifestyle interventions, such as regular exercise and yoga, as complementary strategies for managing HTN (Brook et al., 2000; BLOOD, 2003). Yoga, a key component of complementary and alternative medicine (CAM), has gained popularity for its efficacy in managing high BP and promoting overall health (Whelton, 2018; Dhungana et al., 2018; Wang et al., 2013).

**The Role of Stress in Hypertension**

Chronic psychological stress and negative emotional states are significant modifiable risk factors for essential hypertension, as emphasized by a recent World Health Organization (WHO) scientific review (Innes et al., 2005). Persistent stress exacerbates the pathogenesis and progression of HTN, making stress management a vital component of prevention and treatment strategies. According to WHO, cardiovascular diseases will be the leading cause of death and disability in India by 2020, with nearly half of this mortality occurring in young and middle-aged individuals. Notably, Indians experience CVD-related deaths approximately a decade earlier than populations in countries with well-established economies (Mathers, 2020). Given the alarming global prevalence of HTN, prevention and effective management remain critical public health challenges. Alongside

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antihypertensive medications, lifestyle modifications, including yoga and stress management techniques, are recommended as first-line approaches to achieving optimal BP levels and reducing associated risks (Chobanian et al., 2003). According to the World Health Organization (WHO), cardiovascular diseases (CVDs) are projected to become the leading cause of death and disability in India by 2020, with nearly half of this mortality occurring among young and middle-aged individuals. Currently, Indians experience CVD-related deaths approximately a decade earlier than their counterparts in countries with well-established market economies (Mathers, 2020). Among the various risk factors contributing to essential hypertension, stress has been identified as a modifiable risk factor, as highlighted in a recent WHO scientific review. Chronic psychological stress and negative emotional states play a significant role in the pathogenesis and progression of hypertension, further exacerbating its impact on public health (Innes et al., 2005).

## OBJECTIVE OF THE STUDY

The primary objective of this study was to evaluate the effects of Sheetali and Bhramari Pranayama on hypertension among male police officers.

## RESEARCH METHODOLOGY

### Sample

The study included 50 participants recruited from police stations in Ahmedabad district. A convenient sampling method was employed to select the participants.

### Inclusion Criteria

1. Male police officers of any age are diagnosed with high blood pressure.
2. Individuals with a history of high blood pressure for at least one year.

### Exclusion Criteria

1. Healthy individuals or individuals with medical conditions other than hypertension.
2. Female police officers diagnosed with high blood pressure.

### Intervention Module

Participants assigned to the intervention group were taught *Sheetali* and *Bhramari Pranayama*. Each pranayama practice session lasted 20 minutes per day and was conducted under the supervision of the research team. Sessions began and ended with specific prayers to enhance focus and mindfulness.

**Prayer (Opening):**

ॐ सह नाववतु । सह नौ भुनक्तु ।सह वीर्यं करवावहै ।
तेजस्विनावधीतमस्तु मा विद्विषावहै ।ॐ शान्तिः शान्तिः शान्तिः ॥

### Sheetali Pranayama

1. Sit in a comfortable posture with your eyes closed.
2. Keep your hands on your knees throughout the practice.
3. Protrude your tongue from your mouth and extend it to a comfortable distance.
4. Roll the sides of your tongue upward to form a tube-like shape.
5. Inhale slowly and deeply through the tube-like tongue.
6. Close your mouth at the end of inhalation and exhale slowly through your nose.
7. Practice for 5–7 minutes, twice daily (morning and evening).

### Bhramari Pranayama

1. Sit in a comfortable posture with your eyes closed.
2. Begin chanting *M-kara*, focusing on stretching the *M* sound as much as possible.
3. Feel the resonance created while chanting.
4. Repeat for 9–12 rounds, twice daily (morning and evening).

**Prayer (Closing):**

ॐ सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः ।सर्वे भद्राणि पश्यन्तु मा कश्चिद्दुःखभाग्भवेत् ।
ॐ शान्तिः शान्तिः शान्तिः ॥

This intervention protocol was designed to ensure consistency and adherence, enabling participants to experience the physiological and psychological benefits of pranayama practices.

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**Variables**

- **Independent Variable:**
  *Sheetali* and *Bhramari Pranayama* were used as the independent variables in this study.
- **Dependent Variable:**
  Hypertension, measured through systolic and diastolic blood pressure levels, was the dependent variable.

**Tools**

The following tools were utilized for data collection:

1. Systolic Blood Pressure (SBP) Measurement – Used to evaluate the participants' systolic blood pressure levels.
2. Diastolic Blood Pressure (DBP) Measurement – Used to assess the participants' diastolic blood pressure levels.

**Procedure**

Permission was obtained from various police stations, and informed consent was secured from all participants. Participation was voluntary and conducted exclusively for research purposes. Initially, rapport was established with participants, who were divided into small, manageable groups. Baseline blood pressure measurements, including systolic and diastolic levels, were recorded and served as pre-test data. Following the pre-test, participants underwent a two-month intervention program involving *Sheetali* and *Bhramari Pranayama*. The intervention sessions were conducted daily under the supervision of the research team, with each session focusing on the structured practice of the two pranayama techniques as outlined in the intervention module. At the conclusion of the two-month intervention, post-test measurements of blood pressure were collected using the same standardized protocol. These measurements were used to evaluate the effects of the pranayama practices on blood pressure levels. All pre-test and post-test data were systematically organized in an Excel spreadsheet, categorized by variables, and prepared for further statistical analysis.

# RESULTS

**Systolic Blood Pressure (SBP)**

The effect of *Sheetali* and *Bhramari Pranayama* on systolic blood pressure (SBP) among male police officers with hypertension was analyzed.

**Table 1**

Effect of Yogic Intervention on Systolic Blood Pressure

| Data | n | Mean | SD | t | Level of significance |
|---|---|---|---|---|---|
| Pre | 50 | 145.318 | 6.034 | 19.036 | 0.0001 |
| Post | 50 | 140.440 | 6.188 | | |

**Interpretation**

**Table 1:** presents the *t*-value of 19.036 for pre- and post-intervention SBP, which is statistically significant at the 0.0001 level. This result indicates that the null hypothesis—stating there is no significant effect of the yogic intervention on systolic blood pressure in male police officers with hypertension—is rejected.

The mean SBP decreased from 145.318 (pre-intervention) to 140.440 (post-intervention), with standard deviations of 6.034 and 6.188, respectively. These findings demonstrate that the yogic intervention significantly reduced systolic blood pressure in male police officers with hypertension. This result suggests that *Sheetali* and *Bhramari Pranayama* can play a significant role in managing hypertension and improving cardiovascular health in this population.

**Diastolic Blood Pressure (DBP)**

The effect of *Sheetali* and *Bhramari Pranayama* on diastolic blood pressure (DBP) among male police officers with hypertension was analyzed.

**Table 2**

Effect of Yogic Intervention on Diastolic Blood Pressure

| Data | n | Mean | SD | t | Level of significance |
|---|---|---|---|---|---|
| Pre | 50 | 88.68 | 4.47 | 19.66 | 0.0001 |
| Post | 50 | 84.00 | 4.70 | | |

**Interpretation**

**Table 2:** presents the *t*-value of 19.66 for pre- and post-intervention DBP, which is statistically significant at the 0.0001 level. This finding indicates that the null hypothesis—stating there is no significant effect of the yogic

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intervention on diastolic blood pressure in male police officers with hypertension—is rejected. The mean DBP decreased from 88.68 (pre-intervention) to 84.00 (post-intervention), with standard deviations of 4.47 and 4.70, respectively. These results demonstrate that the yogic intervention significantly reduced diastolic blood pressure in male police officers with hypertension. This evidence highlights the potential of *Sheetali* and *Bhramari Pranayama* as effective practices for managing hypertension and improving cardiovascular health in this population.

# DISCUSSION

The present study on the effects of *Sheetali* and *Bhramari Pranayama* on hypertension among male police personnel demonstrates promising outcomes. *Sheetali Pranayama*, known for its cooling and calming effects, significantly reduces stress-induced blood pressure by soothing the nervous system. Similarly, *Bhramari Pranayama*, with its resonant humming sound, stimulates the vagus nerve, promoting relaxation and lowering both systolic and diastolic blood pressure. These findings are particularly relevant for law enforcement personnel, who are often exposed to high-stress environments. The study highlights the potential of these pranayama techniques as non-pharmacological, accessible approaches to managing hypertension. Incorporating these practices into daily routines may not only enhance cardiovascular health but also improve the overall mental well-being of police officers. This makes *Sheetali* and *Bhramari Pranayama* valuable additions to workplace wellness programs for law enforcement agencies. However, further studies with larger sample sizes and diverse populations are warranted to validate and generalize these findings.

**Physiological Mechanisms**

**Sheetali Pranayama**

*Sheetali Pranayama* exerts its effects through its cooling influence on the body. By reducing core body temperature, it modulates the autonomic nervous system by decreasing sympathetic nervous system activity, which is often overactive in hypertensive individuals. This leads to:

- Decreased heart rate.
- Relaxation of vascular walls, improving blood flow and reducing blood pressure.
- Enhanced parasympathetic nervous system activity, fostering a state of calmness.

**Bhramari Pranayama**

*Bhramari Pranayama* activates the parasympathetic nervous system by stimulating the vagus nerve through the humming sound. The physiological effects include:

- Reduction in stress hormone levels, such as cortisol.
- Decreased heart rate and peripheral vascular resistance.
- Improved baroreceptor sensitivity, which is critical for regulating blood pressure.

These findings reinforce the potential of pranayama techniques as effective, holistic tools for managing hypertension, particularly in high-stress occupational settings. Further exploration of the physiological mechanisms and their long-term benefits could pave the way for broader adoption of these practices in health and wellness programs.

# CONCLUSION

This study evaluated the effects of *Sheetali* and *Bhramari Pranayama* on hypertension among male police personnel. The findings indicate that these pranayama techniques are effective, non-pharmacological approaches to managing hypertension. By reducing stress and promoting relaxation, these practices help lower systolic and diastolic blood pressure, making them particularly beneficial for individuals in high-stress professions such as law enforcement. The results underscore the importance of integrating pranayama techniques into stress management and workplace wellness programs for police departments. Such interventions could enhance the physical and mental well-being of police personnel, ultimately contributing to improved overall health and productivity.

# CONFLICT OF INTEREST

The study was conducted independently, and no external funding, sponsorship, or influence affected the design, execution, analysis, or reporting of the results. The research was solely aimed at understanding the effects of Shitli and Bhramari Pranayama on hypertension among male police personnel. All ethical guidelines were strictly adhered to during the study.

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