

# A Review of Pranayama Practice and Its Effects on Blood Pressure and Heart Rate

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**Abstract:** *The purpose of the study was to conduct a review of the Bhramari Pranayama (Bhr. P) and Bhastrika Pranayama (Bhas. P) practice and Its Effects on BP and HR between clinical and non - clinical Subjects. We used a systematic search process to identify quantitative, English, peer reviewed articles published from 2009 to 2020 that included analyses of factors related to the Effect of Bhr. P and Bha. P practices on BP and HR. Relevant articles (n = 102) were reviewed and 3 articles met the selection criteria. Several lines of studies have provided compelling data showing that the Bhr. P and Bhas. P approach was effective in improving BP and HR. And other physiological variables can be favourable factors for demonstrated positive effects of Bhr. P and Bhas. P Practice. This paper presents a brief overview of clinical and Non - clinical outcomes & other complementary therapeutic approaches of Bhr. P and Bhas. P in BP and HR. In the future, well structured systematic reviews are essential to report the specificity of the Bhr. P and Bhas. P based approach on BP and HR, and Others Physiological risk factors in different types of people.*

**Keywords:** Bhramari Pranayama (Bhr. P), Bhastrika Pranayama (Bhas. P), Blood Pressure (BP) and Heart Rate (HR)

## 1. Introduction

Health and holistic health is closely related, which gives importance to physical, mental, social, spiritual and sexual health as whole [1]. Pranayama i. e., breathing exercises were practiced as part of ancient Indian yogic practices. Pranayam is the control of one's breath movement. Diverse varieties of Pranayamas elicit diverse physiological responses in people of different levels. And generally, eight types of pranayama among them are Nadisnddhi, Bhramari, Kapalbhati, Bhasrika Pranayama and others. Most studies reflect on the overall impact of different Pranayamas, yogic postures, meditation and so on as well as the effect of consistent practice of all of these over a period of time i. e., 1 month, 3 months, etc. [2, 7]. Pranayama is the science of controlled, conscious expansion of Prana the life force. It is known as the fourth limb of Classical Ashtanga Yoga. There are wide ranging benefits of Pranayama to the human body [3, 10]. Breathing is a vital process that starts at the time of birth and stops when a person dies. During breathing, the life sustaining oxygen is provided to all the parts, organs and cells of the body. One can control the rhythm of panic energy with Pranayama and attain a healthy body and mind. The ancient yogic developed many breathing techniques to maximize the benefits of Pranayama. It is also used in preparation and meditation of postures, to help maximize the benefit of the practice focus and mind. It is a systematic breathing practice that strengthens the lungs, increases blood circulation, makes the man healthier and bestows the blessing of long life upon him. The Pranayama practice makes use of the diaphragm fully by drawing into the lowest

and largest part of the lungs. Due to the regular practice of the Pranayama, with each inhale to bring oxygen into the body and each exhale purges the body of carbon dioxide [4, 8, and 9]. Effect of Pranayama as mentioned in the scriptures: The exercise enables us to eliminate a large quantity of the toxins contained in the body, by filling the body with oxygen and purifying the tissues and nerves [5] Hypertension is the main cause of death in both the elderly and the active population, and it can lead to cardiovascular disease. Yoga, Pranayama, and meditation all result in lower resting blood pressure as compared to whole body exercise, and a common feature of these practices is calm and regular breathing. Furthermore, a number of randomized controlled trials have demonstrated that slow breathing can help lower blood pressure [6, 11].

### The purpose of the study

The purpose of the study was to conduct a systematic review of the Effect of Bhr. P and Bhas. P practices on BP and HR between clinical and non - clinical Subjects. This review is shown the Eleven years of studies on the effect of Bhr. P and Bhas. P practices on BP and HR among different levels of people.

## 2. Methodology

The Items flow diagram criteria have been followed in doing this systematic review.

## 2.1 Searching technique

The information retrieval process included electronic databases such as Web of Science, PubMed and Google Scholar. Keywords search strategy specific to Title, Abstract, and Keywords i. e., Bhr. P and Bhas. P practices BP and HR only. The search was carried out between 2009 to 2020 years.

## 2.2 Selection Criteria

The above systematic searches retrieved a total number of 102 papers. 82 papers were removed as duplicates, and 17 were rejected. The final 3 papers were read in order to determine whether they were relevant to the search criteria and appropriate for assessing our research objective.

## 2.3 Selection of the study

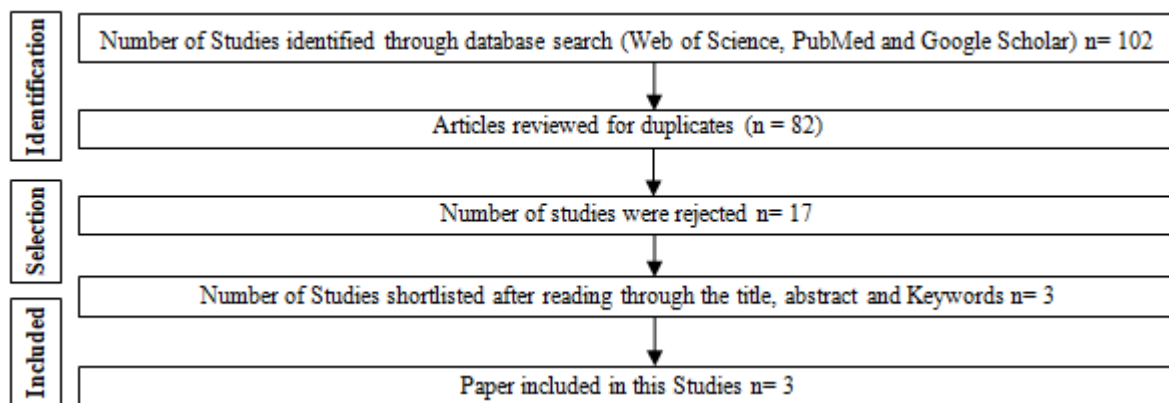
Based on the inclusion and exclusion criteria the studies were chosen.

**Inclusion:** The effects of Bhr. P and Bhas. P practices on BP and HR were specifically included in systematic review research.

**Exclusion:** Excluded were studies on Bhr. P and Bhas. P combined with any other practice.

## 3. Results

The selection of studies and the search procedure are shown in detail in a flow chart diagram. 102 papers were found after searching on different search engines. Total 82 studies were obtained the duplicates, and the titles and abstracts of these 17 papers which discussed the broad effects of pranayama, and other pranayama papers were rejected. And After eliminating the effects of Bhr. P and Bhas. P in Three studies met the inclusion criteria and were included in the evaluation when combined with additional practices. The final studies included describe the efficacy of Bhr. P and Bhas. P in BP and HR physiologic functions. The papers that are included are fully described. (Table 1) Of the included studies, two studies were done on the Bhr. P practice and Its Effects on BP and HR one is clinical studies<sup>[2, 3]</sup>. And one studies on Bhas. P practice and Its Effects on BP and HR<sup>[5]</sup>. As an outcome of their physiological effects they were generically classified as BP and HR.



**Figure 1:** Flow chart diagram showing the process of included studies

### 3.1 Effect of Bhr. P on BP and HR

The Bhr. P practice reduces practitioners BP and HR responses, two of the three included studies regarding the impact of Bhr. P on BP and HR<sup>[2,3]</sup>. Two studies were done by using the effect of Bhr. P on BP and HR, of which one was done on 40 Hypertensive Patients<sup>[3]</sup> while another on 50 Healthy, non - smokers, sedentary volunteers<sup>[2]</sup>. 40 hypertensive patients were found to show reduce in BP and HR as a response to the Bhr. P. The main aim of the study was to determine the immediate effect of Bhr. P on BP and HR in patients with hypertension. This study found that there was a statistically significant reduction in systolic blood pressure immediately after one session of Bhr. P performed for 5 minutes<sup>[3]</sup>. The findings of another study done by T Pramanik et al., in their study on 50 healthy individuals, concluded that slow Bhr. P breathing “respiratory rate 3 per minute” for 5 minutes caused a fall in the systolic blood pressure. They stated that slow pace Pranayama influences the BP and HR through parasympathetic dominance. As Bhr. P is a type of slow

pace breathing exercise, it stimulates the parasympathetic system<sup>[2]</sup>. So, these two studies observed significant differences in Bha. P practice on BP and HR.

### 3.2 Effect of Bhas. P on BP and HR

T. Paramanik et al., has shown that Bhas. P has an effect on BP and HR. Their studies, 39 Healthy and sedentary volunteers took part in this study. It was also found that after 5 minutes of slow Bha. P breathing “respiratory rate 6 per minute”, both systolic and diastolic blood pressure were significantly reduced, with a slight reduction in HR<sup>[5]</sup>.

### 3.3 Quality assessment of the included studies

The included studies were assessed for their quality using the Small sample size and small training schedule of the effect of Bhr. P and Bhas. P practice. The scoring for each study differs; nonetheless, they are all shown to be low in terms of methodological quality assessment.

**Table 1:** Shows the included studies specifics on Bhr. P & Bhas. P

Author name (years) <sup>Ref</sup>	Objective of the study	Methods	Equipment	Subjects (age limit)	Findings	Impact	Study Quality
Samiksha Sathe, et al., 2020 <sup>[3]</sup>	To determine the immediate effects of Bhr. P on hypertensive patients in terms of SBP and DBP and HR	Experimental study (1 months, 5 minute practice)	Digital BP apparatus and Pulse Oximeter	40 hypertensive patients, More than 40 years	There was a statistically significant reduction in SBP immediately after one session of Bhr. P performed for 5 minutes	BP - SA HR - NSA	weak
T Pramanik, et al., 2010 <sup>[2]</sup>	To evaluate the immediate effect Bhr. P, a slow breathing exercise on HR and BP	Experimental study (Respiratory rate 3 per minute for 5 minutes)	Mercury Sphygmomanometer, HR manually pulse count	50 Healthy, non-smoker, sedentary volunteers, 25 - 35 years	Both the SBP and DBP were found to be decreased with a slight fall in HR	BP - SA HR - NSA	weak
T Pramanik, et al., 2009 <sup>[5]</sup>	To evaluate the immediate effect of slow pace Bhas. P on HR and BP	Experimental study (Respiratory rate 6 per minute for 5 minutes)	Mercury Sphygmomanometer, HR manually pulse count	39 volunteers, 25 - 40 years	Slow Bhas. P breathing both the SBP and DBP decreased significantly with a slight fall in HR	BP - SA HR - NSA	weak

**Bhr. P**, Bhrumari Pranayam **HR**, Heart Rate

**Bhas. P**, Bhastrika Pranayam **BP**, Blood Pressure

**SBP**, Systolic Blood Pressure **SA**, Significant

**DBP**, Diastolic Blood Pressure **NSA**, No Significant

In addition, they neither fully satisfied the experimental Group. In most studies, the non - response rate was not measured. The positive aspect is that all three studies described were represented well. Although there was a significant difference in BP between the experimental groups, there was no significant difference in HR. So according to all these data, it can be said that the studies were weak in nature.

#### 4. Discussion

Overall, different types of Pranayama may be cautiously considered useful interventions to reduce BP and HR in healthy, clinical and non - clinical populations. Variations in intervention duration and style, as well as Bhr. P and Bhas. P practice time, make it difficult to draw robust conclusions regarding the efficacy of its practice. Generally, a large majority of studies indicate positive outcomes in some form or another. In studies that reported positive results, it is important to consider that every sample represented a clinical and non - clinical population, thus making it plausible that. Among the research studies conducted here, subjects of various ages and types were chosen, and each study looked at the effects of Bhr. P and Bhas. P practice on BP and HR in all populations. And positive effects were observed in every study. More sophisticated studies would be useful to further differentiate outcomes of various mind body interventions, and explore whether certain forms of Pranayama are more useful for certain populations over others. All studies make reference to the fact that Pranayama is a skill that requires expert instruction and time dedicated to practice, this is something that should be taken into consideration, both for future trials and for programs implemented in occupational settings.

#### 5. Conclusion

In summary, the findings suggest that the one and two months Bhr. P and Bhas. P training reduce similar BP and HR responses to traditional long term Pranayama styles. There is some evidence that Bhr. P and Bhas. P can improve BP and HR outcomes in general clinical and non - clinical subjects, however, this evidence is based on individual studies of high quality. As such, the efficacy of Bhr. P and Bhas. P as a mechanism provides decreased BP and HR. Despite the high quality of studies reviewed, positive trends are evident which suggests that such programs may have offered the general population and clinical and non - clinical an individual approach that avoids the side effects of Bhr. P and Bhas. P.

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