



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2024; 9(1): 122-127

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Received: 20-12-2023

Accepted: 29-01-2024

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## Breath of relief by Nadi Shodhan yoga for hay fever, exploring holistic health benefits and emotional well-being

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DOI: <https://doi.org/10.22271/yogic.2024.v9.i1b.1536>

### Abstract

This research investigates the transformative effects of Nadi Shodhan Yoga, an ancient yogic practice involving deliberate, mindful breathing, on overall health and well-being. Emphasizing its role in stress reduction, optimal cellular function, immune system support, and improved circulation, the study explores Nadi Shodhan's potential to address hay fever, a prevalent allergic condition impacting global populations. Twenty-two participants diagnosed with hay fever, aged 25 to 45, were randomly assigned to the Nadi Shodhan Yoga intervention group (Group-B) or the control group (Group-A). The 8-week intervention, involving daily 20-minute sessions, led to significant reductions in practical symptoms associated with hay fever and notable improvements in emotional distress for Group-B compared to the control group. Results align with existing research on breathing techniques, emphasizing Nadi Shodhan Yoga's potential as a complementary therapy. The study contributes valuable insights into the holistic impact of mindful breathing practices on hay fever management, advocating for further research with larger sample sizes to validate and generalize these promising findings. Nadi Shodhan Yoga emerges as a promising avenue for holistic healthcare approaches, promoting physical vitality, emotional equilibrium, and mental clarity.

**Keywords:** Nadi Shodhan yoga, hay fever relief, holistic health benefits, emotional well-being, mindful breathing

### Introduction

Respiration extends beyond being a mere physiological necessity; it stands as a foundational pillar for overall health and well-being. Deliberate, mindful breathing yields profound effects on both the body and the mind, ushering in an array of advantages that contribute to a more wholesome and balanced life. According to Noble and Hochman (2019) <sup>[21]</sup>, conscious breathing plays a pivotal role in reducing stress. Engaging in unhurried, purposeful breaths activates the parasympathetic nervous system, instigating a relaxation response. This not only helps alleviate immediate stress effects but also cultivates long-term resilience against its adverse impacts on mental and physical health. Moreover, intentional breathing optimizes oxygenation throughout the body, supporting optimal cellular function. Oxygen, crucial for energy production and organ health, becomes more efficiently distributed through deep breathing exercises like diaphragmatic or abdominal breathing, as outlined by Zaccaro *et al* (2018) <sup>[26]</sup>. The respiratory system's connection to the immune system is noteworthy, with deep breathing aiding in the efficient elimination of toxins and waste products, thereby supporting the body's natural detoxification processes (Hsia *et al*, 2013) <sup>[13]</sup>. Additionally, intentional breathing positively influences circulation, facilitating the transport of nutrients and the elimination of metabolic by-products (Pittman, 2011) <sup>[23]</sup>. In essence, breathing serves as a gateway to holistic health. Incorporating simple yet purposeful breathing exercises into daily life can yield transformative effects, fostering physical vitality, emotional equilibrium, and mental clarity. As we navigate the demands of modern living, let's not underestimate the

profound impact that mindful breathing can have on our journey toward a healthier and more fulfilling life, as highlighted by Zaccaro *et al* (2018) [26]. Allergic rhinitis, commonly known as hay fever, is a widespread allergic condition affecting a significant portion of the global population. Marked by symptoms like sneezing, nasal congestion, itching, and watery eyes, hay fever can considerably impact an individual's quality of life (Borish, 2003) [7]. While conventional medical treatments focus on symptom relief, recent research suggests that alternative approaches, such as Nadi Sodhan (alternate nostril breathing), may provide a unique and holistic perspective in managing hay fever. Hay fever often results from an immune system overreaction to common environmental allergens like pollen, dust mites, or pet dander. This heightened reactivity prompts the release of histamines, causing the uncomfortable symptoms associated with hay fever (Chellaa *et al*, 2019) [9].

Nadi Sodhan, a pranayama technique rooted in ancient yogic traditions, entails rhythmic and controlled breathing through alternate nostrils (Jahan *et al*, 2021) [14]. This practice is believed to align the flow of life force energy, or prana, within the body. Prana, the vital energy, permeates the entire body, following a pattern of flow through channels known as Nadis, which regulate individual cellular activities (Ravindranath, 2014) [24]. Nadi, translating to 'channel' or the flow of energy, combined with shodhana, meaning purification, encapsulates the practice that purifies the body. Also known as Alternate Nostril Breathing or Anuloma-Viloma Pranayama, Nadi Shodhana is inherently designed to purify and harmonize the body. The impact of Nadi Shodhana Pranayama on the respiratory system is comprehensive. It not only reduces the effort required for breathing but also strengthens and conditions the diaphragm, along with other respiratory and abdominal muscles. This practice enhances gas exchange and oxygenation, promoting improved breath control and facilitating effective coughing mechanisms (Jahan *et al*, 2021) [14]. Engaging in the Nadi Shodhana practice fosters voluntary control of breathing, encouraging rhythmic respiration and a calm mind. This art of breath control necessitates sustained focus on the act of breathing, leading to heightened concentration. Consequently, this heightened awareness serves as a pathway to stress reduction while simultaneously enhancing pulmonary functions. Nadi Shodhana, as a skillful technique, empowers individuals to navigate the intricate interplay between intentional breath regulation, mental serenity, and improved respiratory well-being (Parasar and Dalal, 2020) [22].

Fundamentally, breath functions as a pathway to comprehensive well-being. Integrating uncomplicated yet purposeful breathing exercises into daily routines can yield transformative effects, nurturing physical vitality, emotional equilibrium, and mental clarity (Zaccaro *et al*, 2018) [26]. Amid the challenges of contemporary living, it is imperative not to underestimate the profound influence that mindful breathing can wield on our pursuit of a healthier and more satisfying life. Turning attention to hay fever, a prevalent allergic condition affecting a substantial portion of the global population, traditional treatments primarily focus on alleviating symptoms (Ma *et al*, 2017) [18]. Nevertheless, a growing body of research proposes alternative approaches, such as Nadi Sodhan (alternate nostril breathing), offering a fresh and holistic outlook on hay fever management. Marked by symptoms like sneezing, nasal congestion, itching, and watery eyes, hay fever profoundly impacts an individual's quality of life. Nadi Sodhan, grounded in ancient yogic

practices, entails rhythmic and controlled breathing through alternate nostrils, with the goal of harmonizing the flow of life force energy or prana in the body.

In line with various scientific inquiries, it is suggested that a range of vitamins (Bhattacharjee *et al*, 2024; Bhattacharjee and Pal, 2022) [3, 4], antioxidants (Bhattacharjee, 2020) [5], and botanical compounds (Bhattacharjee, 2023) [6] might be associated with the alleviation of various complications. Building upon these findings, it is hypothesized that the practice of Nadi Sodhan Yoga could be linked to the relief of issues arising from hay fever. Notably, there is a lack of specific studies in the current literature addressing this correlation. Recognizing this gap, we have initiated a study to explore the potential impact of Nadi Sodhan Yoga on hay fever, as no dedicated research has been undertaken until now.

### Objectives

This study aims to evaluate how consistent practice of Nadi Shodhan Yoga affects the practical symptoms and emotional well-being of individuals diagnosed with allergic rhinitis, commonly known as hay fever.

### Participants

For this study, we enlisted twenty-two individuals ranging in age from 25 to 45, all diagnosed with hay fever. The persons who are taken part in this study were randomly allocated to either the Nadi Shodhan Yoga intervention group (n=11) or the control group (n=11). Prior to commencing the study, informed consent was obtained from all participants.

### Involvement

The control group (Group-A) comprises participants who did not consent to participate in Nadi Shodhan Yoga, while the experimental group (Group-B) includes those who agreed to engage in Nadi Shodhan practices. The intervention group (Group-B) engaged in a structured Nadi Shodhan Yoga program, involving 20 minutes of daily practice over eight consecutive weeks, with sessions held in both the morning and evening. A certified yoga instructor conducted these sessions voluntarily, ensuring participants adhered to the proper techniques.

### Estimation

Initial evaluations were carried out for all participants, encompassing comprehensive assessments of practical symptoms and emotional status (e.g., Rhinoconjunctivitis Quality of Life Questionnaire). Subsequent assessments occurred at the commencement and conclusion of the 8-week intervention period. To assess the participants' experiences with practical hay fever symptoms, questions regarding issues like itchy eyes, watery eyes, sore eyes, and swollen eyes were presented to them in printed form. Additionally, another set of questions gauged their emotional status in response to these symptoms, covering feelings of frustration, impatience, restlessness, and embarrassment. Participants provided their responses using a numerical scale ranging from 0 to 6, where each number corresponded to the following categories: not troubled, hardly troubled at all, somewhat troubled, moderately troubled, quite a bit troubled, very troubled, and extremely troubled.

### Methods

During commencement of the experiment, 22 individuals suffering from Hay fever and its associated symptoms were

selected. The severity of their condition was assessed individually using the "Rhinoconjunctivitis Quality of Life Questionnaire" (Brown *et al*, 2014) [8] and documented. To explore the perceived benefits of Nadi Shodhan yoga in an eight-week program, we enrolled all participants, evenly distributing them into two groups. Participants were selected from various areas in Agartala, Tripura, India, and willingly participated in the study by providing consent through consent letters obtained before the research commenced. Before commencing the study, all participants were initially provided with answers to the printed questions. Subsequently, they were equally divided into two groups: Group A served as the control group, with participants not receiving specific instructions to practice Nadi Shodhan yogasana. In contrast, Group B was designated as the experimental group, and participants in this group were encouraged to engage in the yogasana for 56 days, equivalent to eight weeks, both in the morning and evening, with each session lasting 20 minutes.

**Criteria for exclusion**

The study excluded individuals with congenital heart disease, epilepsy, recent injuries or immobilization, physical disabilities, and spinal deformities.

**Analysis of data**

The data were presented as mean ± standard deviation (STDEV). Statistical analysis involved the use of suitable tests to assess changes within the two groups. Continuous variables were analyzed using Student's t-tests.

Documentation and analysis of any adverse effects or participant withdrawals were conducted. A significance level of  $p < 0.05$  was considered statistically significant.

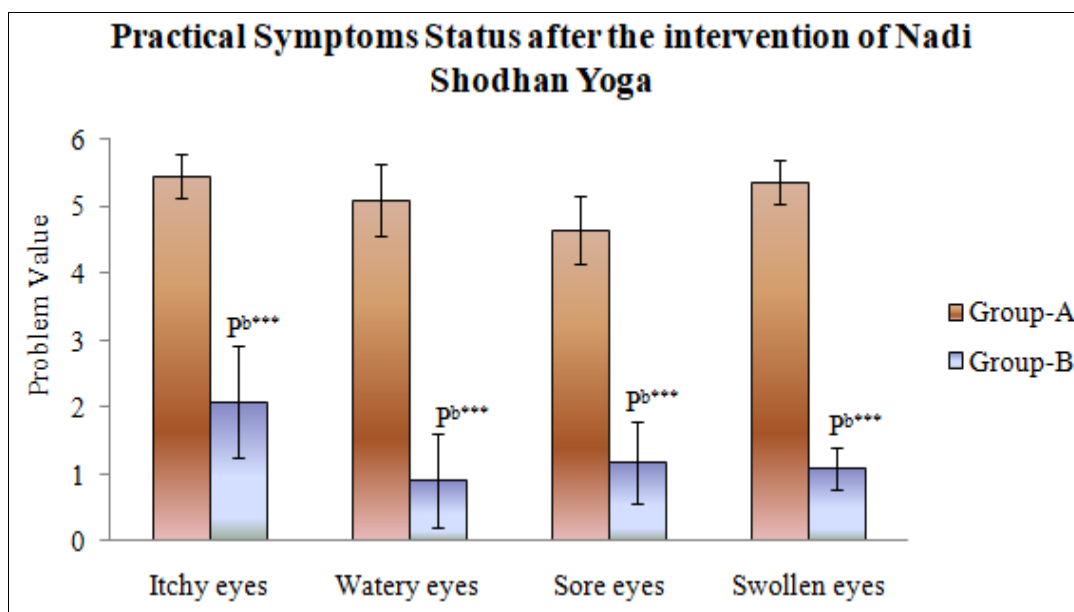
**Results**

**Table 1:** Status of the values of practical symptoms of hay fever of the participants before intervention of nadi shodhan yoga

Problems	Group-A	Group-B
Itchy eyes	5.27±0.65	5.18±0.4 P <sup>a#</sup>
Watery eyes	4.9±0.7	5.36±0.67 P <sup>a#</sup>
Sore eyes	4.82±0.75	5±0.45 P <sup>a#</sup>
Swollen eyes	5.09±0.83	4.73±0.65 P <sup>a#</sup>

Values are Means ± STDEV. P<sup>a</sup> compared with the control group i.e. group-I before the starting of the study. \*\*\* indicates  $p < 0.05$ . \*\*\*  $p < 0.001$ , \*\* indicates  $p < 0.01$ , \* indicates  $p < 0.05$ , and # indicates  $p > 0.05$ .

The presented table 1 displays the status of practical symptoms related to hay fever in two different groups, Group-A and Group-B, before the implementation of the Nadi Shodhan Yoga intervention for group-B. The symptoms measured include itchy eyes, watery eyes, sore eyes, and swollen eyes. For each symptom, the table 1 provides the mean value along with the standard deviation (STDEV) in both Group-A and Group-B. The results are presented in the format of "Means ± STDEV." Additionally, the statistical significance of the differences between the two groups is indicated by the symbols P<sup>a#</sup>.



**Fig 1:** Practical symptoms status after the intervention of Nadi Shodhan Yoga

Values are Means ± STDEV. P<sup>b</sup> compared with the control group i.e. group-A after the end of the yoga intervention. \*\*\* indicates  $p < 0.05$ . \*\*\*  $p < 0.001$ , \*\* indicates  $p < 0.01$ , \* indicates  $p < 0.05$ , and # indicates  $p > 0.05$ .

Figure 1 illustrates the post-yoga practical status after an 8-week period, comparing it to the control group. The reductions in itchy eyes, watery eyes, sore eyes, and swollen eyes are 61.67%, 82.14%, 74.51%, and 79.66%, respectively. These findings signify that engaging in nadi shodhan yoga involvement for eight weeks has a helpful impact on the mentioned nasal problems significantly ( $p < 0.001$ ), with Group-B showing more vital improvements compared to Group-A individuals.

**Table 2:** Emotional status of the participants of hay fever before intervention of nadi shodhan yoga

Problems	Group-A	Group-B
Frustrated	4.9±0.53	4.55±0.52 P <sup>a#</sup>
Impatient or Restless	4.81±0.75	5.09±0.7 P <sup>a#</sup>
Irritable	4.64±0.5	4.72±0.47 P <sup>a#</sup>
Embarrassed by your Symptoms	4.27±0.79	4.36±0.67 P <sup>a#</sup>

Values are Means ± STDEV. P<sup>a</sup> compared with the control group i.e. group-A before the starting of the study. \*\*\* indicates  $p < 0.05$ . \*\*\*  $p < 0.001$ , \*\* indicates  $p < 0.01$ , \* indicates  $p < 0.05$ , and # indicates  $p > 0.05$ .

The emotional status of hay fever participants in two distinct groups is shown in table: 2, namely Group-A and Group-B, prior to the introduction of Nadi Shodhan Yoga intervention for Group-B. The emotional status is assessed encompass condition of frustration, impatient or restless status, irritability and embarrassed by their symptoms of the individuals

participated. The mean values along with their standard deviations (STDEV) for each symptom are detailed in Table 1 for both Group-A and Group-B, formatted as "Means  $\pm$  STDEV." Moreover, symbols  $P^{a\#}$  denote the statistical significance of variations between the two groups.

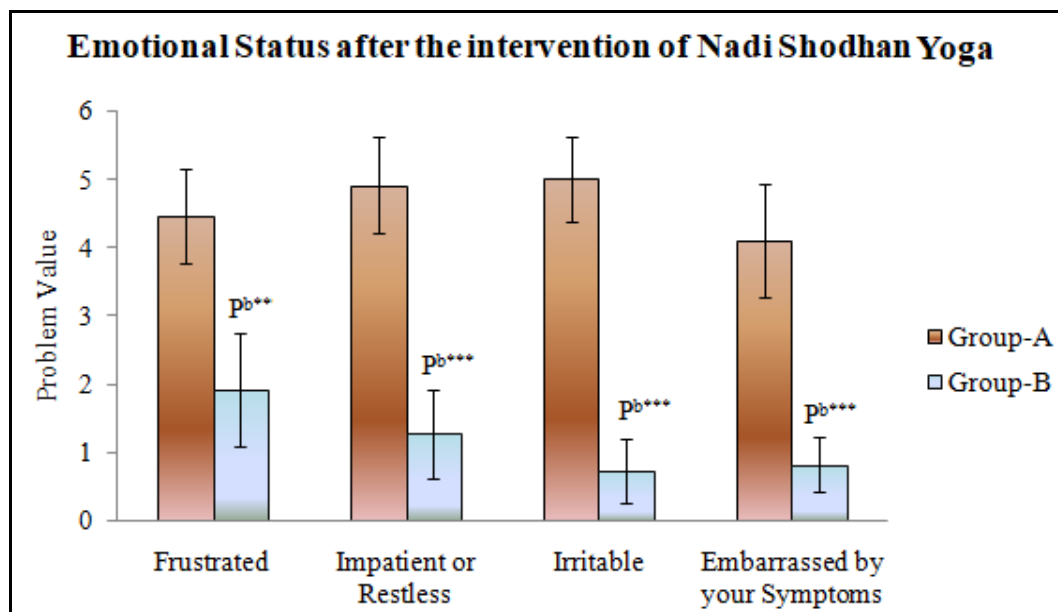


Fig 2: Emotional status after the intervention of Nadi Shodhan Yoga

Values are Means  $\pm$  STDEV.  $P^b$  compared with the control group i.e. group-A after the end of the yoga intervention. \*\*\* indicates  $p < 0.05$ . \*\*\*  $p < 0.001$ , \*\* indicates  $p < 0.01$ , \* indicates  $p < 0.05$ , and # indicates  $p > 0.05$ .

In Figure 2, the post-yoga emotional status outcomes are depicted following 8-week duration, juxtaposed with the control group-A. Marked decreases of 57.14%, 74.07%, 85.46%, and 80% are observed in condition of frustration, impatient or restless status, irritability and embarrassed by their symptoms of the individuals participated as group-B respectively. These results indicate that participating in Nadi Shodhan yoga for eight weeks has a substantial and beneficial influence on the mentioned emotional issues ( $p < 0.001$ ). Notably, Group-B exhibits more pronounced enhancements compared to individuals in Group-A.

### Discussion

The initial findings of this study indicate encouraging therapeutic effects of Nadi Shodhan Yoga on individuals experiencing hay fever. The noted decrease in practical symptoms and improvements in emotional well-being underscore the potential of this ancient yogic practice as a complementary therapy for allergic rhinitis. Participants utilized a numerical scale ranging from 0 to 6 to express their responses, representing varying degrees of distress. The findings, as outlined in Table 1 and Figure 1, reveal noteworthy insights into the effectiveness of the yoga intervention.

Table 1 presents the initial status of practical symptoms in two distinct groups, Group-A and Group-B, prior to the commencement of Nadi Shodhan Yoga for Group-B. It quantitatively illustrates the severity of symptoms in each group. The absence of statistical significance ( $P^{a\#}$ ) indicates no notable differences between Group-A and the control group (Group-I) before the study, with both groups reporting nearly the maximum score of 5, indicating that all participants

faced highly troublesome situations. Figure 1 illustrates the post-intervention status of practical symptoms, comparing Group-B to the control group (Group-A) after an 8-week period. Remarkable reductions are evident in various cases, including watery eyes, sore eyes, and swollen eyes, with a value close to 1, indicating minimal trouble. However, for itchy eyes, the value is approximately 2, signifying a somewhat troubled situation. These findings suggest that the 8-week Nadi Shodhan Yoga intervention significantly mitigated practical symptoms associated with hay fever. In alignment with these results, study of Kulkarni *et al* (2022)<sup>[17]</sup> posits that specific breathing techniques, such as right and left nostril breathing and alternate nostril breathing, are deemed safe and do not raise intraocular pressure in individuals with normal conditions. Furthermore, these techniques exhibit a positive impact by reducing intraocular pressure. Additionally, study of Gosewade *et al*, (2013)<sup>[12]</sup> supports the notion that incorporating basic eye exercises with pranayama contributes to the enhancement of visual reaction time. Together, these research findings underscore the potential benefits of integrating Nadi Shodhan Yoga, breathing techniques, and eye exercises in addressing various health concerns.

Regarding emotional status, Table 2 thoroughly examines various aspects such as frustration, impatience or restlessness, irritability, and embarrassment related to hay fever symptoms. All recorded values are approximately 5, with the exception of the embarrassment condition, which is around 4. A value of 5 indicates a very troubled situation, while 4 signifies a somewhat troubled situation for participants grappling with hay fever.

Figure 2 illustrates a notable reduction in the frustrated condition, dropping from 4 to 2 after the Nadi Shodhan intervention for Group-B participants. This transition suggests a shift from a somewhat troubled situation to a more manageable state. Restlessness is reduced by approximately 1,

indicating a situation where participants hardly experience any trouble following the yoga intervention. In orientation with our findings, the research conducted by Komariah *et al*, (2022) <sup>[16]</sup> revealed that mindfulness breathing meditation is associated with a decrease in stress, depression, and anxiety scores among university students in Indonesia. Particularly noteworthy is the significant reduction observed in stress and anxiety levels during the 4-week follow-up period. Similarly, the study of Maleki *et al*, (2022) <sup>[19]</sup> suggests that incorporating breathing exercises can enhance the effectiveness of pharmacotherapy and psychotherapy in treating generalized anxiety disorder. Their research findings align with the hypothesis that a longer follow-up duration, extended breathing periods, and increased exercise frequency correlate with better outcomes. Our study echoes these results, indicating that the 8-week Nadi Shodhan Yoga intervention significantly alleviated emotional distress associated with hay fever. These findings collectively underscore the potential benefits of integrating such interventions to address not only physical but also emotional aspects of health.

### Conclusion

The study demonstrates promising therapeutic effects of Nadi Shodhan Yoga in individuals with hay fever, highlighting its potential as a complementary therapy for allergic rhinitis. The eight-week intervention, involving daily 20-minute sessions, led to significant reductions in practical symptoms associated with hay fever, with intervention group showing more pronounced improvements compared to the control group. Noteworthy decreases were observed in itchy eyes, watery eyes, sore eyes, and swollen eyes, indicating the positive impact of Nadi Shodhan Yoga on nasal problems. These findings align with existing research on the benefits of specific breathing techniques in addressing health concerns. Emotionally, participants practiced the yoga exhibited substantial improvements in conditions such as frustration, impatience or restlessness, irritability, and embarrassment related to hay fever symptoms. The reductions in emotional distress further emphasize the holistic impact of Nadi Shodhan Yoga, aligning with studies linking mindfulness breathing meditation to decreased stress, depression, and anxiety.

This research contributes valuable insights into the potential of Nadi Shodhan Yoga in hay fever management, addressing a notable gap in current literature. The results underscore the need for further research with larger sample sizes to validate and generalize these promising findings. Nadi Shodhan Yoga emerges as a promising avenue for holistic healthcare approaches, offering benefits not only in alleviating practical symptoms but also in promoting emotional well-being. Integrating mindful breathing practices into daily life could provide transformative effects, fostering physical vitality, emotional equilibrium, and mental clarity in individuals with hay fever.

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