

## C E R T I F I C A T E

This certificate is to confirm that Ripudaman Singh Chauhan, who was granted Ph.D. registration on August 12, 2013, by Swami Vivekananda Yoga Anusandhana Samsthana University under the Division of Yoga and Life Sciences, has successfully completed the necessary training to acquire the relevant background knowledge. Furthermore, they have successfully completed the prescribed research program to submit their thesis, titled **"Effect of Suddhi Kriya-based Yoga Program on Allergic Rhinitis - A Randomized Controlled Study,"** in accordance with the university's regulations. I also affirm that the content of this thesis has not been previously used as the basis for the conferment of any degree, diploma, associate-ship, fellowship, or similar titles.



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## DECLARATION

I hereby declare that I conducted this study at Balwantray Mehta Arogya Bhavan, Vadodara, under the guidance of Rajesh S.K., Associate Professor in the Department of Yoga and Physical Sciences at S-VYASA University, Bengaluru.

Furthermore, I affirm that the content of my thesis, titled "**Effect of Suddhi Kriya-based Yoga Program on Allergic Rhinitis - A Randomized Controlled Study**," has not been previously used as the basis for the conferral of any degree, diploma, associate-ship, fellowship, or similar titles.



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# ABSTRACT

## BACKGROUND

Allergic Rhinitis (AR) is a common IgE (immunoglobulin-E) mediated upper respiratory tract inflammation, causing symptoms like runny nose, sneezing, and nasal obstruction, with a global prevalence of 20%-40%. While not life-threatening, AR significantly impairs daily functioning. Yoga interventions have shown promise in improving lung capacity, nasal airflow, and AR symptoms, potentially through anti-inflammatory mechanisms. *Yoga* can downregulate pro-inflammatory cytokines, upregulate anti-inflammatory cytokines, activate the HPA axis, and stimulate the vagus nerve, leading to reduced TNF-alpha, NF-κB, CRP, and cortisol levels. As a frequently used complementary and alternative therapy, yoga, particularly *Hatha yoga*, with its *Shuddhi Kriya* cleansing techniques and breathing exercises, appears to positively influence both the immune and respiratory systems, offering potential benefits for AR management.

## AIMS AND OBJECTIVES

Prevalence Study: The aim of this study was to assess the prevalence and impact of Allergic Rhinitis (AR) among college students in Vadodara city.

Intervention Study: The primary aim of this research is to evaluate the effectiveness of a *Shuddhi Kriya*-based *yoga* program in managing allergic rhinitis.

## METHODS

### SUBJECTS AND DESIGN

Prevalence Study: In a cross-sectional study conducted among college students in Vadodara city, Gujarat, a total of 1337 students were included through a cluster sampling method. Responses were recorded using the SFAR (Score for allergic rhinitis) scale in conjunction with a semi-

structured questionnaire.

Intervention Study: In a randomized controlled trial (RCT), the study involved 60 individuals who had been experiencing moderate to severe chronic allergic rhinitis for over a year. These participants were randomly assigned to either a yoga or a control group. Seven patients were later withdrawn from both the yoga and control groups, resulting in a final sample of 53 patients (27 in the yoga group and 26 in the control group). Over the course of eight weeks, the yoga group engaged in the SKYP module for approximately 60 minutes each day, four days a week. The protocol included a combination of *yogic Shuddhi Kriyas*, *asanas*, loosening exercises, breathing exercises, *pranayama*, along with yogic counseling and lectures. Measurements of the nasal symptom score (TNSS), the Mini-rhinoconjunctivitis quality of life questionnaire (mini-RQLQ), peak expiratory flow rate (PEFR), and peak nasal inspiratory flow (PNIF) were conducted both before and after the 8-week intervention period.

## **DATA EXTRACTION & DATA ANALYSIS**

Prevalence Study: In the cross-sectional study, data collection was facilitated through Google Forms, structured into three parts. The initial section captured demographic details, the second part consisted of the SFAR form, and the final section contained a semi-structured questionnaire. Diagnosis of AR was based on the SFAR scoring system, which comprises 8 questions and ranges from 0 to 16. A cut-off of  $SFAR \geq 7$  was utilized to define the presence of AR, with a sensitivity of 74% and specificity of 83% for  $SFAR \geq 7$ .

Intervention Study: For the RCT, data recorded on questionnaire sheets was transferred to an Excel spreadsheet, and various variables were analyzed across different domains. The statistical analysis was carried out using R statistical software, version 4.0.2. Normality tests were performed on both baseline and post-trial data. For normally distributed variables, a parametric

independent sample t-test was employed to assess significance, while the non-parametric Mann Whitney U test was utilized for non-parametric data. In cases where baseline matching between the yoga and control groups was lacking, difference scores were computed for the relevant variables.

## **RESULTS**

Prevalence Study: Based on the SFAR (Short Form for Allergic Rhinitis) scale, a total of 257 students, constituting 19.22% of the participants, scored  $SFAR \geq 7$ , meeting the criteria for diagnosing Allergic Rhinitis (AR). Among those diagnosed with AR, the mean age was  $20.37 \pm 2.04$  years. Within this group, 168 (65.37%) were female, with a mean age of  $20.29 \pm 1.86$  years, while 89 (34.63%) were male, with a mean age of  $20.51 \pm 2.33$  years. Notably, participants with an SFAR score of  $\geq 7$ , indicative of AR, exhibited common symptoms such as sneezing (84.05%), runny nose (71.98%), nasal congestion (71.21%), and eye itching or epiphora (78.21%), all of which showed significant differences when compared to the non-AR group ( $P < 0.01$ ). Among the AR-positive participants, 100 (38.91%) had Perennial Allergic Rhinitis (PAR), while 133 (51.75%) had Seasonal Allergic Rhinitis (SAR). Among the  $SFAR \geq 7$  (AR-positive) group, 227 (88.33%) identified house dust and pollen as triggering agents, while 30 (11.67%) couldn't identify specific allergens. Additionally, the questionnaire revealed that 209 (81.32%) participants in the AR-positive group were aware of their allergies, and 52 (20.62%) had undergone allergy testing (IgE or SPT), with 38 (73.08%) receiving positive results. Notably, among male participants, 13 (14.60%) reported no effect of AR on their academic activities, while 24 (27%) experienced a mild effect, 38 (42.70%) a moderate effect, and 14 (5.70%) a severe effect. In contrast, among female students, 32 (19%) reported no effect, 37 (22%) a mild effect, 75 (44.60%) a moderate effect, and 24 (14.30%) a severe effect on their

academic activities due to AR.

Intervention Study: The implementation of the Shuddhi Kriya-based yoga intervention resulted in significant improvements in the Total Nasal Symptom Score (TNSS) 12-hour morning rating. Notably, there was a substantial reduction in the score for nasal drainage ( $z = -2.67$ ,  $p = 0.007$ ) and the overall total symptom score ( $z = 3.16$ ,  $p = 0.002$ ) compared to the control group. However, no statistically significant differences were observed in other symptom categories, including nasal blockage, nasal itching, sneezing, and poor sleep (all  $p > 0.05$ ). In the two-week assessment of the Total Nasal Symptom Score (TNSS), the yoga group exhibited significant improvements in all domains of nasal symptoms when compared to the control group. Notably, there were substantial reductions in nasal congestion ( $z = -3.43$ ,  $p = 0.001$ ), nasal drainage ( $z = -3.39$ ,  $p = 0.001$ ), nasal itching ( $z = -3.51$ ,  $p = 0.001$ ), sneezing ( $z = -3.89$ ,  $p = 0.001$ ), and difficulty in sleeping ( $z = -2.13$ ,  $p = 0.033$ ). The overall total TNSS also showed significant improvement ( $z = -4.71$ ,  $p = 0.001$ ). The participants in the yoga group, experienced a significant reduction in symptom scores, as measured by the Mini Rhinoconjunctivitis Quality of Life Questionnaire (Mini RQLQ), across all five domains. Specifically, there were notable reductions in activity ( $z = -4.89$ ,  $p = 0.001$ ), practical problems ( $z = -4.18$ ,  $p = 0.001$ ), other symptoms ( $z = -3.21$ ,  $p = 0.001$ ), nose symptoms ( $t = -4.83$ ,  $p = 0.001$ ), and eye symptoms ( $t = -4.83$ ,  $p = 0.001$ ). The total score also demonstrated a considerable enhancement ( $t = -3.01$ ,  $p = 0.004$ ). Regarding symptom severity, both ocular and nasal symptoms improved significantly in the yoga group compared to the control group, as evidenced by the Visual Analog Scale (VAS) scores (ocular symptoms:  $z = -4.19$ ,  $p = 0.01$ ; nasal symptoms:  $z = 4.71$ ,  $p = 0.01$ ). In terms of respiratory function, the Peak Nasal Inspiratory Flow (PNIF) exhibited a substantial improvement in the yoga group compared to the control group ( $z = 2.76$ ,  $p = 0.006$ ), while the Peak Expiratory Flow

Rate (PEFR) did not show a significant improvement ( $t = 1.95$ ,  $p = 0.056$ ).

## **CONCLUSION**

**Prevalence Study:** In conclusion, our study found that allergic rhinitis (AR) is common among college students in Vadodara city, with Seasonal Allergic Rhinitis (SAR) being more prevalent than Perennial Allergic Rhinitis (PAR). Despite high awareness, only a minority had undergone allergy testing. Many students with AR experienced comorbidities, impacting their academic activities significantly. This highlights the need for public health policies addressing respiratory health and early diagnosis. Future research should identify risk factors to inform targeted interventions.

**Intervention Study:** In conclusion, the Shuddhi Kriya Yoga Program (SKYP) stands out as a promising integrative approach for managing allergic rhinitis, offering substantial improvements in both physical symptoms and overall quality of life. This comprehensive program, which includes a unique combination of Hatha Yoga's Shat Kriyas, asanas, pranayama, and relaxation techniques, has demonstrated significant efficacy in reducing nasal symptoms and enhancing the well-being of individuals dealing with moderate to severe allergic rhinitis. Its holistic approach, with a focus on stress reduction and non-invasive healthcare solutions, suggests its potential value in the treatment of this condition. This study provides a foundation for further research and the potential integration of yoga-based interventions into standard treatment protocols for allergic rhinitis.

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