



RESEARCH ARTICLE

“IMPACT OF SUTRA NETI ON ABSOLUTE EOSINOPHIL COUNT AND QUALITY OF LIFE IN INDIVIDUALS WITH ALLERGIC RHINITIS - A PROSPECTIVE RANDOMISED CONTROLLED TRIAL”

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Abstract

Background & Objective: Allergic rhinitis is a global health problem that contributes to missed or unproductive time at work. Inflammation associated with allergic rhinitis causes nasal venous sinusoids, swelling of the anterior and inferior nasal turbinate's, and obstruction of nasal airflow, ultimately contributing to nasal congestion. Sutra Neti Kriya and Kapalabhati are practiced for more than thousands of years as part of Hatha Yoga practice. It has been used as nasal cleansing technique to clear the nasal passage from obstructions, and to improve the health of Upper Respiratory Tract and preventing infections like Sinusitis, Rhino conjunctivitis and Allergic Rhinitis. Breath awareness helps in focusing on the respiratory health and free passage of air in and out through both nostrils.

Methods: Based on inclusion and exclusion criteria total 120 subjects were selected out of 200 subjects screened. 60 subjects are recruited for group 1 and 60 subjects for group 2. Group 1 subjects are given 11 sessions of Sutra Neti followed by Kapalabhati for 4 weeks, Group 2 undergo 20min of breath awareness on same sessions as group 1. Pre and post data were collected and analyzed using appropriate statistical methods for comparison.

Results: The result is suggestive that the impact of Sutra Neti Kriya followed by Kapalabhati on variables was significant. Significant change was noted in AEC, SNOT and RQLQ each domain and total score in Group-1. In contrast, group 2 showed no significant changes.

Conclusion: Practice of Sutra Neti Kriya followed by Kapalabhati helps to ward off common cold, coughs, allergic rhinitis and tonsillitis. Result of RQLQ and SNOT questionnaire in this study shows evidence to improvement of Quality of life and wellbeing. AEC decline is also observed, so the technique also reduces the inflammation.

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Introduction:-

Allergic rhinitis is defined as symptoms of sneezing, itching, nasal congestion, and rhinorrhea caused by immunoglobulin E (IgE) - mediated reactions against inhaled allergens and involving mucosal inflammation driven by type 2 helper T (Th2) cells. ¹ Allergens including pollen, house dust mites, and animal dander are the main causes of allergic reactions. ² By causing vasodilatation, increasing blood flow, and increasing vascular permeability, allergic rhinitis-related inflammation can shrink the physical size of the nasal passages. The result is engorgement of nasal venous sinusoids, swelling of the anterior and inferior turbinate's, and obstruction of nasal airflow, ultimately contributing to nasal congestion. ³ Antibiotic usage, self-reported air pollution, farm animal exposure (only in LMICs), cat and/or dog exposure, maternal and paternal smoking, and intense teenage physical activity are all risk factors for AR. ⁴ In Yoga, six cleansing practices are described in the Hatha Yoga tradition, it includes Neti (nasal cleansing), and is all about the cleansing of nasal passages, which in turn ensures that the frontal, ethmoid, maxillary, and sphenoid sinuses are also cleared. ⁵ It has a key role in rhinitis as it is helpful to rectify the vasomotor disturbances related to the nasal pathway. ⁶ Neti decreases the eosinophil count in asthma, ⁷ and thus, it has a plausible role in decreasing the eosinophil count in AR. By draining out dirt, heavy mucus, allergies, and air pollutants, Neti Kriya causes direct physical cleansing, according to earlier studies. ⁸ It reduces the symptoms of AR by the removal of inflammatory substances. In addition, it soothes the nasal airway. ⁹ Kapalabhati, also known as the breath of fire, is used as a "cleansing" breathing exercise. ^{10,11} Which clears congestion and provide symptomatic relief in the conditions of allergy. ¹²

Method:-

Total of 120 subjects were considered for the study after screening 200 members as per the demands of inclusion and exclusion criteria. Informed consent was obtained from the subjects by explaining the study objectives, methods, intervention, and all the rights of the subject pertaining to the study both orally and in writing. Subjects are recruited prospectively. Selected subjects are randomly allocated into two groups. Sutra Neti Kriya followed by Kapalabhati group (Group 1) subjects underwent Sutra Neti Kriya followed by Kapalabhati for 11 sessions in 4 weeks and Breath awareness group (Group 2) subjects underwent breath awareness for 20min in the same schedule of group 1.

Absolute eosinophil count (AEC)

Eosinophils are involved in the allergic reaction. Parasitic infestations also are capable of stimulating the production of these cells. These cells are capable of phagocytosis of antigen-antibody complexes. As the allergic response diminishes, the eosinophils count decreases.

The absolute count is calculated by multiplying the differential count (%) by the total WBC count. For example, the absolute eosinophil count (AEC) is helpful in determining the patient's real risk for infection. It is calculated by multiplying the WBC count by the percent of neutrophils and percent of bands; that is,

$$\text{AEC} = \times \text{WBC \% } (\% \text{eosinophils} + \% \text{bands}).^{13}$$

Sinonasal outcome test (SNOT 22)-Questionnaire

A standardized questionnaire called the SNOT-22 was created and validated to measure the severity of chronic rhinosinusitis (CRS) symptomatology. ^{14,15} It is an increasingly popular tool to describe patient burden and clinical effectiveness in sinonasal disease. ^{16,17}

It includes both classic nasal symptoms as well as extra-nasal symptoms such as poor sleep, ear/facial discomfort, and mood disturbance, features that have also been associated with AR. ¹⁸⁻²⁰

Rhino conjunctivitis quality of life (RQLQ)-Questionnaire

One of the most popular rhinitis-specific surveys is the RQLQ. Sleep, non-nasal symptoms, practical issues, nasal symptoms, ocular symptoms, particular activities restricted by symptoms in the previous week, and emotional function are the 7 components of health that are covered. On a scale of 0 (not troubled) to 6 (very troubled), patients rate each item. The mean value for each health dimension is calculated, and the overall Health-related quality of life (HRQL) is expressed as the mean of the 7-dimension scores. ²¹

Breath awareness - Group 2

During the 20min breath awareness session, the participants were asked to be attentive to their breath during inhalation and exhalation without trying to modify their breath. They assume the posture of crossed-legged (Sukhasana) with the spine erect and eyes closed.²² Practice will be done in the morning between 6am to 8am as per the schedule given to the subjects (Table 1).

Table 1:- Timing and day schedule of Group 2.

Week	No. of Times	Day of performing - Sutra Neti	Timings
1 st Week	2 Times	Tuesday & Friday	6am - 8am
2 nd Week	3 Times	Monday, Wednesday & Friday	6am - 8am
3 rd Week	3 Times	Monday, Wednesday & Friday	6am - 8am
4 th Week	3 Times	Monday, Wednesday & Friday	6am - 8am

Data Analysis

The data were represented in mean $\pm$ SD, distribution of the data was done by Shapiro-Wilk test for normality, based on the distribution paired t-test or Wilcoxon signed rank test was done for within-group comparison and Independent t-test or Mann-Whitney U test was done to compare between Group-1 and Group-2. Categorical variables were analysed using chi-square test. The jamovi project (2022). jamovi. (Version 2.3) software for statistical analysis was used for statistical analysis.

Results:-

The present study involves 120 subjects divided into 2 groups Group-1 (n = 60) and Group-2 (n = 60). No subjects were dropped out from the study, whereas all the subjects were adhere to the study protocol and no adverse events were noticed. The trial was conducted between April 2022 and April 2023 involved subject recruitment, randomization, evaluations, and intervention. The study was completed after the expected samples reached.

After 4 Weeks of intervention there was a significant ($p < 0.05$) change was noted in AEC, SNOT and RQLQ's each domain and total score in Group-1 but which was not observed in Group-2.

The mean age in Group-1 was 25.31 years while the mean age of Group-2 was 30.55 years compared to Group-2, which had 75% female and 25% male, the Group-1 had 70% female and 30% were female subjects.

When the comparison was done between Group-1 and Group-2 there was a statistical change was evident in AEC, SNOT and RQLQ questionnaire.

Discussion:-

Under normal conditions, the nasal mucosa effectively purifies and humidifies the inspired air. This is the outcome of well planned interactions between regional and humoral host defense mediators.²³ In AR, these mechanisms go away and contribute to the signs and symptoms of the disorder. Once the patient has become sensitized to allergens, subsequent exposures trigger a cascade of events that result in the symptoms of AR.²⁴ Allergens associated with AR include pollens (tree, grass, and weeds, including ragweed), molds, and indoor allergens (house dust mites and animal allergens) and have a large geographical variability within and between countries.²⁵

Sutra Neti assists in clearing the nasal passages, as well as the frontal, ethmoid, maxillary, and sphenoid sinuses. It also relieves anxiety and sinus heaviness.²⁶ Sutra Neti massages and strengthens the mucus membranes, enhancing their efficiency. The blood flow to the nose is increased and the blood supply to the nostrils is optimized. The moving sutra exerts pressure on the glandular lining of the nostrils, reducing swelling and inflammation. Any abnormal growth of polyps is reduced. This practice also relieves sinusitis and rhinitis.

Sutra Neti Kriya helps to keep nasal hygiene in check by eliminating the debris and bacteria that become stuck in the nostrils with the mucus. In the nose, it desensitizes the delicate tissues, easing rhinitis, allergies, and some forms of asthma. By performing Neti, you can lessen a number of different health issues like sinusitis, migraines, and headaches.²⁷ Numerous researches have supported all of these advantages. In addition to clearing debris from the throat and nasal passages, this procedure stimulates the blood vessels in the nose and eyes, strengthening them in the

process. Clears the nose and pharynx, controls the reflex sneezing and coughing, desensitizes to dust and pollutants, and provides relief from nasal allergies.

Being conscious of breath will help concentrate on maintaining good respiratory health and allowing air to freely enter and exit both nostrils. The current study provides us with a 48-hour optimum gap for the safe and healthy practice of Sutra Neti Kriya, and it is more beneficial when practiced along with Kapalabhati.

Strengths of the study:

1. No documented adverse effects.
2. Proves the ideal gap between the two Sutra Neti Kriya practices.

Limitations:

1. An objective variable like IgE could have been added.
2. Study could have been multicentric.
3. No follow up assessments done to understand the long-term benefits.
4. Only SFAR questionnaire is used for diagnostic criteria

Directions for future research:

1. Study can include more diagnostic criteria like Skin Prick Test.
2. More parameters can be included like IgE.
3. Assessments with longer follow up period might give good outcome.

Conclusion:-

1. The current study shows substantial differences between the groups when Sutra Neti Kriya followed by Kapalabhati and Breathe Awareness are compared. Sutra Neti Kriya followed by Kapalabhati exhibits a considerable increase in Quality of Life, which includes sleep, nasal symptoms, practical issues, activities, and emotional changes. However, breath awareness demonstrates no appreciable changes in quality of life.
2. The AEC count was used as an inflammatory measure, and a notable decline in the count is observed. Thus, this research supports the anti-allergic rhinitis benefits of Sutra Neti Kriya followed by Kapalabhati.

Figures and Table

Fig.1:- Illustration of Study plan

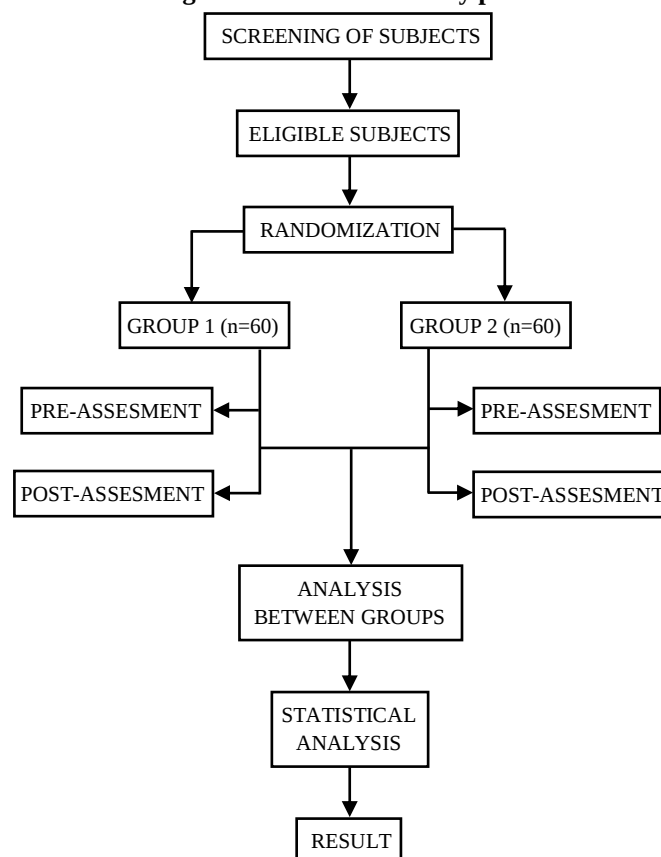
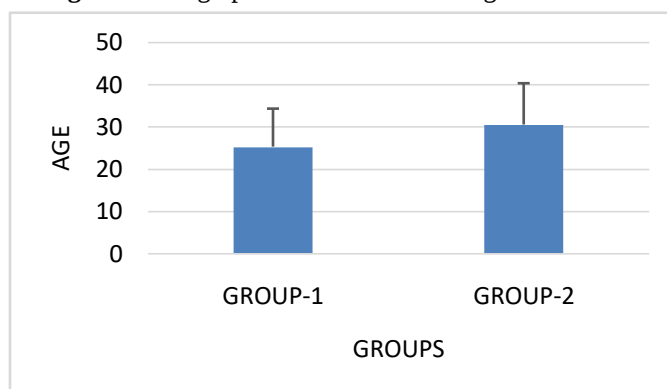
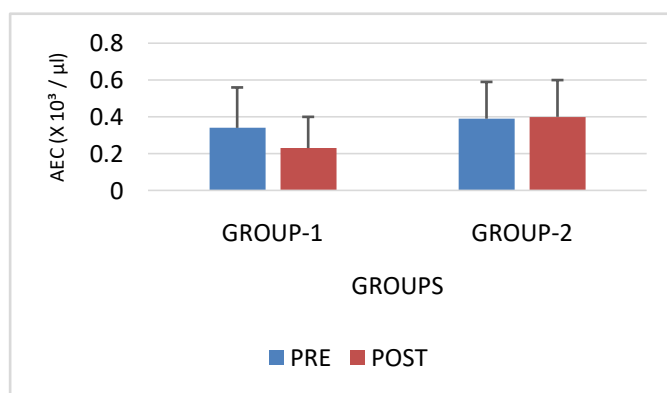


Fig. 2:- Demographic charecteristics of age and Gender**Table 2:-** Demographic charecteristics

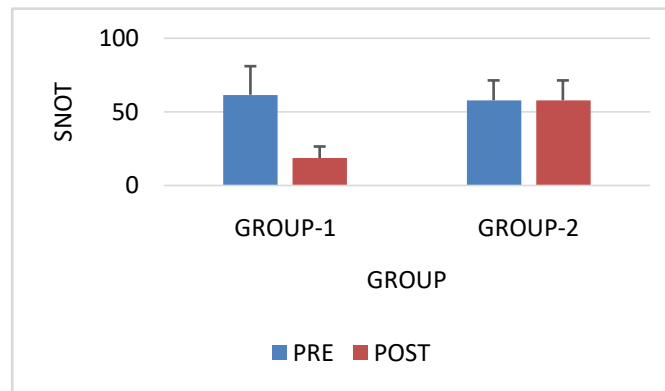
Sl. No.	Variables		Group-1	Group-2	p-value
1	Age (Years)		25.31±9	30.55±9.77	0.003 ^c
2	Gender	Female (%)	42 (70)	45 (75)	<0.001 [#]
		Male (%)	18 (30)	28 (25)	

*p<0.05 was considered significant. #: chi-square test, c: Independent samples t-test

Fig. 3:- Group comparision of AEC count**Table 3:-** Comparision of AEC count between Group 1 and Group 2

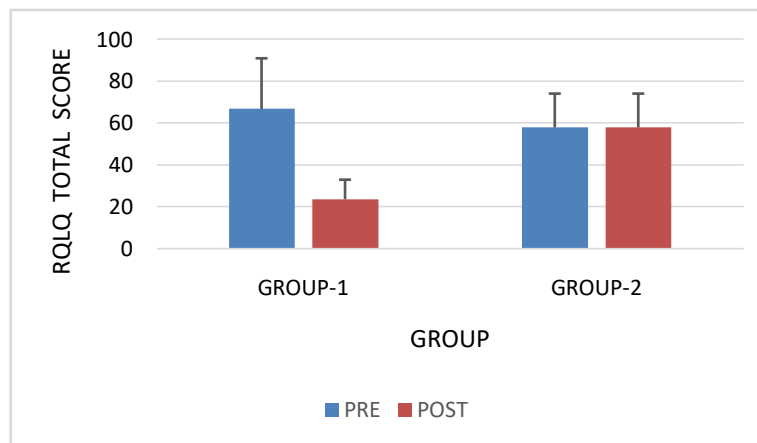
Variables	Group	Within-group				Between-group	
		Pre Mean±SD	Post Mean±SD	ES	p-value	ES	p-value
AEC (X 10³ / µl)	Group-1	0.34±0.22	0.23±0.17	1.03	<0.001 ^b	-0.881	<0.001 ^d
	Group-2	0.39±0.2	0.4±0.2	-0.41	0.002 ^b		

a: Paired t-test, b: Wilcoxon signed rank test, c: Independent t-test, d: Mann-Whitney U test, SD: Standard deviation, AEC: Absolute eosinophil count, NS: Non-significant.

Fig. 4:- Group comparison of Sinonasal outcome score**Table 4:-** Group comparison of Sinonasal outcome test score

Variables	Group	Within-group				Between-group	
		Pre Mean±SD	Post Mean±SD	ES	p-value	ES	p-value
SNOT	Group-1	61.55±19.46	18.51±7.88	3.11	<0.001 ^a	-3.55	<0.001 ^c
	Group-2	57.83±13.51	57.83±13.51	NS	NS		

a: Paired t-test, b: Wilcoxon signed rank test, c: Independent t-test, d: Mann-Whitney U test, SD: Standard deviation, SNOT: Sino nasal outcome test, NS: Non-significant.

Fig. 5:- Comparison of RQLQ score between Group 1 and Group 2**Table 5:-** Comparison of RQLQ Score between Group 1 and Group 2

Variables	Group	Within-group				Between-group	
		Pre Mean±SD	Post Mean±SD	ES	p-value	ES	p-value
RQLQ total score	Group-1	66.71±24.23	23.56±9.33	2.62	<0.001 ^a	-2.59	<0.001 ^c
	Group-2	57.85±16.2	57.85±16.2	NS	NS		

a: Paired t-test, b: Wilcoxon signed rank test, c: Independent t-test, d: Mann-Whitney U test, SD: Standard deviation, RQLQ: Rhinoconjunctivitis quality of life questionnaire, NS: Non-significant.

Credit To Authors

Sharath K P M: Data curation, writing-original draft preparation, **Shivaprasad Shetty:** Supervision, **Prashanth Shetty:** methodology, conceptualization.

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