

A CLINICAL STUDY OF ANULOM-VILOM PRANAYAMA IN THE IMPROVEMENT OF
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ABSTRACT

Respiratory efficiency is a key determinant of overall health. Yogic breathing techniques such as *Anulom-Vilom pranayama* also known as *Nadi Shodhana Pranayama*, also known as Alternate Nostril Breathing. *Anulom Vilom Pranayama* has a beneficial effect on pulmonary function by improving Forced Vital Capacity (FVC), Forced Expiratory Volume (FEV1), Maximum Voluntary Ventilation (MVV), and chest expansion. These improvements are attributed to the exercise's ability to strengthen respiratory muscles, such as the intercostal muscles & diaphragm, due to Controlled Inhalation & Exhalation, while also promoting parasympathetic nervous system activity. By enhancing lung volume and efficiency, *Anulom-Vilom* can lead to increased breath-holding times, and a higher overall quality of life for practitioners. Total of 30 healthy volunteers were instructed to practice *Anulom-Vilom*, 40 times daily over 30 days. Both before and after the operation, Spirometry was used to measure pulmonary function, General sensations & Subjective sensations with breathing were also recorded. Following the intervention, all individuals pulmonary function improved. Significant increases in SpO2, FVC & FEV1, levels suggested greater air flow, improved lung capacity, Strengthens Respiratory Muscles, Reduces stress and anxiety, Aids in detoxification and boosts the immune system by improving blood and oxygen flow. Thus the present study was conducted to elucidate the effect of *Anulom-Vilom Pranayama* in the Improvement on Pulmonary Functions.

Conclusion:- One-month *Anulom vilom pranayama* daily for 20 minutes improved the Pulmonary Functions According to the findings in healthy volunteers *Anulom-Vilom Pranayama* appears to significantly improvement in pulmonary function. In a daily routine we can did It has the potential to improve health. Although the results are encouraging, In long-term benefits in a variety of populations. it is recommended that large-scale studies and (RCT) Randomized controlled trials be conducted to investigate. Here is little study on how it affects healthy people.

KEYWORDS: *Anulom-Vilom, Pranayama*, Vital capacity, inspiratory capacity.

INTRODUCTION

Yoga is ancient heritage of India that has given man answers to his spiritual and holistic search for perfect health and well-being. The term "*Yoga*" and the English word "*yoke*" are derived from Sanskrit root "*yuj*" which means union. It is an ideal way of living, providing rhythm to the body, melody to the mind, harmony to the

soul and thereby symphony to life. It is an ancient Indian science which teaches man how to live in unity with in himself and with those around him. Patanjali has described eight-limbs of *yoga* (*Ashtang yog*). Role of different limbs of *yoga*. *Pranayama*, the fourth limb of *Ashtang yoga*, is a controlled and conscious breathing exercise which involves mental concentration. *Anulom*

Vilom is a specific *Pranayama*, an ancient *yogic* practice focused on breath control to regulate life force energy. It's also as alternate nostril breathing, is a *yogic* breathing technique involving alternating inhales and exhales between the left and right nostrils to promote balance, calm the mind, and energizes the body. According to *Hathyoga Pradipika*, *Pranayama* is of 3 Steps.

- A. *Rechaka*/Exhalation
- B. *Puraka*/Inhalation
- C. *Kumbhaka*/Retention

In general the ratio of *Puraka*, *Kumbhaka* & *Rechaka* is 1:4:2. The practice is believed to improve focus, reduce stress and anxiety, enhance respiratory and cardiovascular health, and cleanse the body's energy channels (*Nadis*).

- *Anulom*: means "in order," "with the grain," or "in the natural direction".
- *Vilom*: means "in the reverse order" or "against the natural course".
- *Pranayama*: refers to the control of breath, or life force energy.
- The technique involves slowly and alternately inhaling through one nostril while closing the other, leading to better oxygen and carbon dioxide balance, increased respiratory muscle function, and improved overall respiratory health. Very few studies are available in literature that studied the effect of *Anulom-Vilom pranayama*. So we planned to study the effect of *Anulom-Vilom pranayama*, practiced for 40 times daily over 30 days on pulmonary functions. Both before and after, for 20 Minutes.

MATERIALS AND METHODS

Subjects

- **Sample Size – 30** (Healthy volunteered)
- **Age Group 18 – 25**
- **Group – Single Group**
- **Place of Study –** Department of Swasthavritta & Yoga, Naiminath Ayurvedic Medical College Hospital & Research Centre, Agra (U.P), India.
- **Sample Allocation – Random**
- **Duration of study – 30 days**

Timing of Intervention – 40 round in one sitting (At morning & evening in empty stomach)

METHODOLOGY

Spirometer was used to measure vital capacity. The subject was made to sit and breathe normally through the mouthpiece of spirometer. Subjects filled their lung as much as possible. As soon as they had their lungs fully inflated, they blew all the air out as fast as they could. The procedure was repeated thrice every five hours. Maximal Ventilatory Volume was measured by a spirometer. The subject was made to sit and breathe through the mouthpiece. The bell was no more than half filled. The subject was instructed to take a series of deep breathes in and out for 10 - 20 sec. They breathe out and hold it for about 3 - 5 sec. The procedure was repeated

thrice every five hours. Correct the highest volume from 10 - 20 seconds to one minute. Differences were assessed using the Student's t-test for dependent data. The level of $p \leq 0.05$ was considered significant.

Inclusion Criteria

Individual age 18-25 years, were selected, irrespective of gender & religion. The individuals who are not suffering from any chronic illness were selected. The individual were note taking any medication since last month.

Exclusion Criteria

Individuals with Severe respiratory diseases with Bronchitis/Asthma/COPD/HTN/, and other medical conditions etc.

Intervention

The participants were trained in the Outpatient Department for *Anuloma-vilom Pranayama*.

The *Pranayama* was practiced 40 round daily in one sitting (At morning & evening in empty stomach) for 30 days, Each session of alternate nostril breathing began with inhalation (*Puraka*), breath holding (*Kumbhaka*), and exhalation (*Rechaka*). The pair of inhalations, breath holding, and exhalation made one round.

Methods

1. Sit in a Meditative Posture : Choose any meditative posture, Such as Sukhasana, Padmasana, Vajrasana

2. Maintain an Upright Spine : Ensure your spine is straight.

3. Block the Right Nostril : Using your right thumb, block your right nostril. Inhale through the left nostril for 1 seconds, hold for 4 second than exhale for 2 seconds for right nostril. (Note: Cardiac patients, blood pressure patients, and pregnant women should not hold their breath. Just keep inhaling and exhaling.) Now inhale through the right nostril for 1 seconds. hold the breath for 4 seconds and release the left nostril for 2 second.

4. Repeat the Cycle: Start the cycle again, this time inhaling from the right nostril. Repeat for a maximum of 40 times. With regular practice, try to increase the counts of inhalation and exhalation, maintaining the ratio of equal counts for inhalation, exhalation, and suspension of the breath while holding the breath for double the duration. Before and after intervention, Before intervention Baseline values of from a digital spirometer monitor, and SpO2 levels were measured with the help of a pulse Oximeter. Three repeated readings were taken, and the best value was noted down. Then the participants practiced *Anulom-Vilom pranayama*, for 40 repetitions for 30 days. After 30 days, the objective parameters to be assessed were again measured. Volunteer information, such as age, sex, address, occupation, height, weight, and food habits, was recorded. The normal value was calculated based on these parameters. Then the subject was asked to sit in an upright straight position and was suggested to take a deep breath as per strength, then

quickly place the mouthpiece into the mouth and discharge out the air as hard and as fast as possible. The entire procedure was repeated 3 times, taking the best value. The highest amount of air that is forcibly exhaled after inhaling as deeply as possible is measured as FVC, and the amount of air exhaled in 1 second after a deep inhalation is measured as FEV1. The expected value and the test score were then compared.

Statistical Analysis

Before and after carrying out *Anulom-Vilom Pranayama* All the values obtained were expressed as mean \pm standard deviation. The Student's paired t-test was used For statistical analysis, And $P < 0.05$ indicates a significant difference in the result section.

RESULTS

1. FEV1

- Increased from 74.6 to 77.05 • $t = 6.572$, $P < 0.0001$

This is extremely significant, showing that *Anulom Vilom Pranayama* strengthens airway patency, enhance lung elasticity, and respiratory muscle tone.

2. FVC

- Increased from 75.5 to 78.60 • $t = 5.280$, $P < 0.0001$

Significantly improved lung capacity shows that regular *Anulom Vilom Pranayama* expiratory function & Improve lung expansion.

3. SpO2

- Increased from 95.8% to 96.85% • $t = 5.688$, $P < 0.0001$ This increase is highly statistically significant, indicating that *Anulom Vilom Pranayama* significantly improves SpO2 levels.

4. FEV1/FVC ratio

- Slight decrease from 0.9520 to 0.9333 • $t = 0.9120$, $P = 0.1820 \rightarrow$ Not significant

The ratio change is negligible and not statistically significant, which is good because this ratio is usually used to detect obstructive or restrictive lung diseases; a stable ratio indicates balanced lung function, and no obstruction has developed. The study shows that *Anulom Vilom Pranayama* practiced for 30 days led to statistically and clinically significant improvements in: lung capacity (FVC). Expiratory volume (FEV1), and SpO2.

There was no negative impact on the FEV1/FVC ratio, indicating that the practice enhances respiratory efficiency without altering lung mechanics pathologically. Therefore, *Anulom-Vilom Pranayama* proves to be an effective, non-pharmacological intervention to improve lung function and lung oxygenation, & low cost.

DISCUSSION

The ancient science of yogic breathing practices pranayama brings harmony in mind and body One can

make respiration rhythmic by voluntarily controlling their breathing. Regular practice of *Anulom-Vilom Pranayama* respiratory muscle strength and lung compliance. Enhanced FVC indicates better lung expansion and alveolar recruitment. Increased FEV₁ reflects reduced airway resistance and better expiratory flow. Results support previous research showing yogic breathing improves parasympathetic activity, reduces stress, and enhances pulmonary efficiency. The statistical analysis reveals that after one month *Anulom-Vilom Pranayama* the level of Pulmonary Functions was effectively Increased. The result in our study showed a significant increase in FEV1, Spo2, FVC & FEV1/FVC after a period of 30 days Statistically better improvement was seen with *Anulom-Vilom pranayama* in FEV1, FVC, Spo2, & FEV1/FVC ($P < 0.05$) observed in FVC & FEV1 after intervention.

1. FEV1

- Increased from 74.6 to 77.05 • $t = 6.572$, $P < 0.0001$

This is extremely significant, showing that *Anulom-Vilom Pranayama* strengthens. FEV₁ is a critical marker of airway efficiency, representing the volume of air exhaled forcefully in the first second. observed regular practice of *Anulom-Vilom Pranayama* Strengthens respiratory muscles such as the diaphragm and intercostals. Promotes full lung inflation and controlled exhalation, enhancing lung compliance and airway patency. Reduces airway resistance, likely due to improved autonomic regulation and parasympathetic activation. The significant rise in FEV₁ supports the role of *Anulom-Vilom Pranayama* as a non-pharmacological method to improve lung function, beneficial for maintaining optimal respiratory health and potentially preventing early airflow limitations.

2. FVC

- Increased from 75.5 to 78.60 • $t = 5.280$, $P < 0.0001$

Significantly improved lung capacity shows that regular *Anulom Vilom Pranayama* expiratory function & Improve lung expansion. These results align with previous research demonstrating that yogic breathing exercises can increase lung volumes, vital capacity, and overall pulmonary efficiency. The significant rise in FVC highlights the potential of *Anulom Vilom Pranayama* as a non-pharmacological, low-cost intervention to improve lung function and maintain respiratory health in healthy individuals.

3. SpO2

- Increased from 95.8% to 96.85% • $t = 5.688$, $P < 0.0001$

This increase is highly statistically significant, indicating that *Anulom-Vilom Pranayama* significantly improves SpO2 levels. This improvement suggests better alveolar gas exchange and enhanced oxygen uptake by the lungs. The slow and rhythmic breathing pattern characteristic of *Anulom-Vilom Pranayama* (alternate nostril breathing) promotes prolonged inspiration and expiration, leading to: Improved alveolar recruitment, allowing previously under-ventilated lung regions to

participate in gas exchange. Enhanced oxygen-carbon dioxide diffusion gradient, optimizing exchange efficiency. Increased Vagal stimulation, which reduces respiratory rate, improves tidal volume, and leads to more efficient ventilation-perfusion matching.

4. FEV1/FVC ratio

• Slight decrease from 0.9520 to 0.9333 • $t = 0.9120$, $P = 0.1820 \rightarrow$ Not significant.

These findings align with previous research on yogic breathing, which shows that lung volumes and expiratory flows improve without significantly altering the FEV₁/FVC ratio in normal subjects. Essentially, *Anulom-Vilom Pranayama* enhances overall pulmonary capacity and airflow while maintaining normal airway function, highlighting its safety and physiological benefit in promoting respiratory health.

Benefits of *Anulom-vilom pranayama*

1. Mental Health: Relieves depression, stress, and anxiety.
2. Respiratory Health: Treats respiratory disorders such as asthma and bronchitis.
3. Overall Health: Helps alleviate serious health issues like heart problems, severe depression, high blood pressure, arthritis, and migraine pain.
4. Positive Thinking: Helps overcome negative thoughts and emotions such as anger, forgetfulness, uneasiness, and frustrations.
5. Cognitive Improvement: Enhances concentration, patience, focus, decision-making ability, and creativity.
6. Dosha Balance: Balances the *Vata*, *Kapha*, and *Pitta doshas*.
7. Lung Capacity: Improves lung capacity and oxygenation throughout the body.
8. Weight Loss: Aids in weight loss and streamlines metabolism.
9. Common Ailments: Alleviates common disorders such as constipation, acidity, allergic problems, asthma, and snoring.
10. Skin Health: Promotes naturally glowing skin.
11. Diabetes Management: Helps keep diabetes under control.
12. Relieves Other Issues: Addresses fever, eye concerns, and ear issues.

Anulom-vilom pranayama is an easy-to-do yoga therapy that offers complete relaxation of the mind, body, and soul. It can be practiced anytime and anywhere, even from the comfort of your home or office chair. For optimal benefits, practice *Anulom-vilom pranayama* 40 times either in the morning or evening. However, cardiac patients and those with high blood pressure should avoid holding their breath and focus on continuous inhaling and exhaling.

CONCLUSIONS

1. Significant Improvement in Pulmonary Functions: Regular practice of *Anulom-vilom pranayama* for 30 days resulted in significant increases in FEV₁, FVC, Spo₂ and FEV₁/FVC ratio, indicating enhanced lung capacity and expiratory function.

2. Enhanced Respiratory Efficiency: The slight improvement in FEV₁/FVC ratio suggests better airway efficiency and ventilatory performance.

3. Non-invasive and Cost-effective Intervention: *Anulom-Vilom Pranayama* is a simple, safe, and easily adoptable practice that can be recommended for healthy individuals to maintain or improve pulmonary health.

4. Potential Preventive Role: These findings suggest that *Anulom-Vilom Pranayama* may serve as a preventive strategy to strengthen respiratory function and may complement therapies for individuals with mild respiratory limitations.

5. Recommendation for Further Research: Larger, long-term randomized controlled trials are recommended to confirm these results and explore benefits in patients with chronic respiratory diseases.

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