

EFFECT OF SIMHA KRIYA ON EXPIRATORY FLOW RATES IN HEALTHY ADULTS

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Abstract

Background: Traditional yogic systems that involve breathing exercise (pranayama) have been known to enhance pulmonary functions. Simhakriya involves deep breathing exercise, it is the practice of extending the breath and expanding lung capacity. The present study was conducted to observe the effect of Simhakriya on the expiratory flow rates of healthy individuals. **Materials and Methods:** The present study was conducted on 50 subjects, (28 males and 22 females). It was a prospective study on healthy volunteers of both genders of age between 20 to 30 years. Volunteers who are on medication and exercise regimes were excluded. Subjects practised Simhakriya twice daily for a duration of 10 minutes, 6 days in a week for 6 months. Spirometry was done before and after the completion of 6 months of Simhakriya practice. Digital Spirometer provided by Schillers health care was used and subjects were assessed for 1) Forced vital capacity (FVC), 2) Peak expiratory flow rate (PEFR), 3) Forced expiratory flow (FEF) 25 – 75%. **Results:** The results were analysed by a paired t-test. There was significant improvement in variables, i.e., FVC (p-value 0.001 < 0.05), PEFR (p-value 0.001 < 0.05), and FEF 25 – 75% (p-value 0.001 < 0.05). **Conclusion:** From this study, we suggest that Simhakriya can be advocated to improve respiratory efficiency for healthy individuals as well as alternate therapy or as adjuvant to conventional therapy in respiratory diseases like asthma and pulmonary fibrosis.

INTRODUCTION

Yoga is an ancient Indian science as well as a way of life that includes the practice of specific postures (asana) and regulated breathing (pranayama).^[1] Yoga originated in India around 500 BCE. Yoga was systematized by Patanjali in the Yoga Sutra.^[2] Pranayama (breathing techniques) is one of the most important yogic practices, which can produce different physiological responses in healthy individuals.^[3] Simhakriya is a type of pranayama involving a deep breathing exercise in which one breathes as forcefully as possible without jerking the abdomen, but with powerful inhaling and exhaling, 21 times each. Simhakriya is a type of rapid diaphragmatic breathing that includes breath retention and is performed while seated. It consists of three phases: Purak (inhalation), Kumbhak (retention), and Rechak (exhalation).^[4] Diaphragmatic breathing is the most productive type of breathing, which helps in the removal of secretions from the bronchial tree, clearing up the respiratory passages and the alveoli.^[5] Peak expiratory flow rate (PEFR) is an objectively measurable quantitative parameter of respiratory health. It is very easy, reliable, and also

reproducible.^[5] The present study was conducted to observe the effect of Simhakriya on the expiratory flow rates of healthy individuals.

Objectives

1. To determine the effect of Simhakriya on PEFR in healthy adults after 6 months of practicing Simhakriya.
2. To compare the PEFR before and after Simhakriya practice

MATERIALS AND METHODS

Place of study: The present study was conducted at the Isha yoga centre, Hyderabad.

Duration of study: January 2021 to Jan 2022

Source of data: The study was carried out on healthy volunteers of the yoga centre.

Sample size: The study population included 50 healthy subjects (28 male and 22 female)

Study design: Prospective study

Inclusion Criteria

1. Age group: 20 – 30 yrs.
2. Male and female healthy adults.

Exclusion Criteria

1. H/o chronic respiratory disease
2. On medication or exercise regime.

3. Obesity.

Equipment used: Digital spirometer supplied by Schiller Health Care India Pvt Ltd.

Study protocol

The study was started with approval from the institutional ethical committee. The subjects were included in the study after taking a written informed consent. The subjects were regularly practicing Simhakriya twice daily (7.00am and 6.00pm) for duration of 10 minutes, 6 days in a week for six months. Digital Spirometry was done before and after the completion of 6 months of Simhakriya practice.

The following parameters were assessed in this study

- FVC(L): Forced Vital Capacity.
- FEF 25-75% (L/sec): Mid Expiratory Flow Rate
- Peak Expiratory Flow Rate (PEFR L/sec)

Data Analysis

These values were first entered into MS Excel software and then imported to SPSS software for further analysis.

Statistical Analysis

The analysis for pulmonary function tests was done using Paired t-test in the SPSS software version 26. $\alpha = 0.05$ was used as the criterion for statistical significance.

RESULTS

Table 1: Shows the Anthropometric Data of the Subjects (N=50)

Age	27.06±2.72
Height (cm)	161.94±8.92
Weight (kg)	59.72±8.34
BMI (kg/m ²)	22.66±2.06

Table: Pulmonary Function Test Parameters Before and After Simhakriya Practice

S. NO	Parameters	Mean ± SD	N	Std. Error mean	t value	Df	Sig. (2-tailed)
1	FVC_B	3.39±0.58	50	0.08	-8.54	49	<.001
	FVC_6	3.86±0.77	50	0.11			
2	FEF25-75%_B	3.15±0.47	50	0.07	-13.01	49	<.001
	FEF25-75%_6	5.5±1.49	50	0.21			
3	PEFR_B	7.07±1.01	50	0.14	-10.31	49	<.001
	PEFR_6	9.5±2.19	50	0.31			

shows that there is a significant improvement in all the parameters after 6 months of Simhakriya practice which is depicted as same in figure 1.

In all subjects (n=50), the mean FVC value before Simhakriya was 3.39±0.58 but after 6 months of practice these values were significantly increased to 3.86±0.77 (p<0.001).

Prior to Simhakriya, the mean FEF25-75% value was 3.15±0.47, but following six months of practise, these values significantly increased to 5.5±1.49 by paired 't' test (p<0.001).

The average PEFR was 7.07±1.01 before starting Simhakriya, but after 6 months of practise, it had increased significantly to 9.5±2.19 (p<0.001).

DISCUSSION

In the present study, there was a significant improvement in parameters like Forced Vital Capacity (FVC, p<0.001), Mid expiratory Flow Rate (FEF 25-75%, p<0.001), Peak Expiratory Flow Rate (PEFR, p<0.001) after 6 months of Simhakriya practice. Several studies were done on various pranayama in healthy and disease conditions and also found similar results.^[6] The possible reason for the present observation could be that during Simhakriya practice, the compliance of the lung thoracic system increases and the airway resistance decreases and the efficient movement of the diaphragm in deep breathing leads to improvement in PEFR and FVC capacities.^[7]

The Inflation of the lung stimulates the pulmonary stretch receptors which reflexively relax the smooth muscles of the larynx and tracheobronchial tree. This, in turn, modulates the airway calibre and reduces airway resistance and probably this could be one of the possible reasons for the improvement in PEFR after pranayama practice.^[8] PEFR is an indicator of the elastic recoil or resistance of the small airways and its improvement is attributed to respiratory muscle conditioning after yoga.^[9,10,11]

The strengthening of inspiration and expiration respiratory musculature among regular pranayama

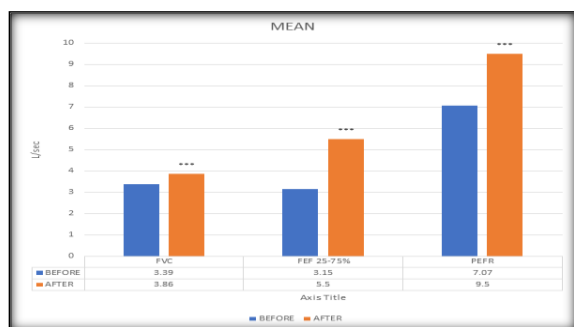


Figure 1: Pulmonary Function Test Parameters Before and After Simhakriya Practice

(NOTE: P value <0.001= *** highly significant)

practitioners could result in improving the FVC and FEF 25-75% significantly.^[12]

CONCLUSION

From this study, we suggest that the practice of Simhakriya on a regular basis may be adapted as an exercise regimen to maintain the functional status and endurance of the respiratory system in an individual irrespective of age and gender.

Conflict of Interest – Nil

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