



“EFFECT OF YOGIC PRACTICE ON PULMONARY FUNCTIONS IN YOUNG ADULTS”

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ABSTRACT

Yoga is a psycho-somatic-spiritual discipline for achieving union & harmony between our mind, body and soul and the ultimate union of our individual consciousness with the Universal consciousness. Yoga is mind-body technique which involves relaxation, meditation and a set of physical exercises performed in sync with breathing. The present study has been done exclusively on young healthy adults to add more data in the field of yoga and pulmonary functions. This study has been designed to explain and ascertain the promotive aspects of health and yoga. In conclusion, the yogic exercises are beneficial for the better maintenance of body functions, particularly pulmonary functions, even in normal healthy subjects.

KEYWORDS : Yoga and peak expiratory flow rate.

Introduction:

Yoga, an ancient Indian science, aims to bring about functional harmony between body and mind through three main practices: asanas, pranayama and meditation. Pranayama means control of 'prana'. "Prana" in Indian philosophy, refers to all forms of energy in the universe. Life force in an individual is symbolized by breathing. Breath is a dynamic bridge between the body and mind.¹ Medical science tries to achieve an optimum physical and mental health of the individual through preventive, curative. And promotive means. However, for a long time medical professionals have laid much emphasis on the curative aspect and only relatively recently the preventive aspect is also being emphasized whereas in yogic practice the stress is mainly on the promotive aspect, although some yogic methods are prescribed for curative purposes as well. A number of studies have been done to assess the effect of yogic practice on FVC FEV-1 PEFr pulmonary functions. Udupa et al studied the effects of some breathing exercises (Pranayam) in normal persons². Nayar et al documented the effects of yogic exercises on human physical efficiency³. In another study, oxygen consumption during three yoga-breathing patterns was shown by Miles Wales⁴. In a related work, Makwana et al studied the effects of shortterm yoga practice on ventilatory function tests⁵. The present study has been done exclusively on young healthy adults to add more data in the field of yoga and pulmonary functions. This study has been designed to explain and ascertain the promotive aspects of health and yoga.

Material and Methods:

This present study was conducted in the Department of Physiology, Hi-tech Medical College and Hospital, Rourkela during the period from June, 2013 to November, 2014. Thirty six healthy subjects, an age match group 18-45 years were selected randomly from a group of participants visiting the yoga centre who had not yet started practicing yoga but were keen on learning. The same subjects were chosen as both study as well as control group. All the data was collected from 5.5am to 6.5am. Data on physical characteristics such as age, height, weight and body mass index (BMI) was obtained. BMI was calculated as weight (kg) / height (m)². Pranayam schedule included the deep breathing, inhalation-retention-exhalation at fixed intervals, abdominal (diaphragmatic) breathing and alternate nostril breathing.

All the subjects used to do yoga practice daily for about one hour. The yogic schedule consisted of a prayer, asanas, pranayam and meditation. The exercise regimen included different yogic asanas like, Padmasana, Yoga Mudra, Matsyasana, Kukkudasan, Uthana Padhasana, Pavanmuktasana, Paschimotasana; Dhanurasana, Bakasana, Mandukasana, Parvathasana, Nauli and Shavasana.

Optionally the subjects could do cleansing procedures (kriya) also. All the subjects had to do pranayam essentially for about 10 to 15 minutes. Pranayam schedule included the deep breathing, inhalation-retention-exhalation at fixed intervals, abdominal (diaphragmatic) breathing and alternate nostril breathing. The subjects who became pregnant during the study were excluded. The subjects with diabetes, hypertension and chronic respiratory problems like asthma, tuberculosis were also excluded. The subjects performing yoga less than 5 days a week were also not included in the study.



Fig. 1: Performing Yoga.

Pulmonary Function Tests (PFT) were recorded by MEDSPIROR - made in India (Chandigarh) a computerized dry type spirometer. The parameters of PFT included in the study were - FVC (Forced vital capacity), FEV1 (Forced expiratory volume in 1st second) and PEFr (Peak expiratory flow rate). Recordings were done on day-L, after 6 weeks and after 12 weeks of yogic practice. Day-L means the very first day the subjects started yogic practice: For PFT - the subjects were first explained the whole procedure and were demonstrated the Same after obtaining their consent. The subjects performed the test in sitting Position. The results of PFT are presented as mean ±

S.D. The data were analyzed using students 't' test. P values <0.05 were considered significant.

Results and Discussion:

On analysis of the physical characters of the 36 subjects, the mean age (years) was 26.0±5.21, the mean height (cm) was 157.31±4.01, the mean weight (kg) was 61.2±3.01 and the mean BMI (kg/m²) was 25.43±5.04.

Table 1: Comparison of pulmonary function tests.

Parameter	FVC(lit.)	FEV-1(lit.)	PEFR (lit/sec)
time interval	mean±sd	mean±sd	mean±sd
Day-1	2.61 ± 1.02	1.89±0.29	4.28 ± 1.03
Weeks-6	2.70 ± 1.2*	2.30 ± 2.87*	5.12±1.12**
Weeks-12	3.15 ± 1.29*	2.55 ± 1.02*	5.10± 1.3***

*P<0.001, **P=Not Significant and ***P<0.05

The FVC, FEV-1 and PEFR of all the subjects on day-1, weeks-6 and weeks-12 has been given. It is evident that the PFT parameters have higher values at weeks-6, weeks-12 and weeks-18 in comparison to day-1 values. The p value has been calculated at weeks-6 and weeks-12 in comparison to values on day-1. In this study, FVC and FEV -1 were significantly higher at weeks-6 and weeks-12 from day-1 (P<0.001). However, PEFR is not statistically significant at weeks-6 but value of PEFR is higher at weeks-6 in comparison to day-1. At weeks-12, PEFR is significantly higher than day-1 (P<0.05). Makwana et al reported significant increase in FVC following 10 weeks of yoga training⁵. Others have recorded similar observations^{3,6}. The improvement in vital capacity is due in part to increased development of respiratory musculature incidental to regular practice of yogic exercise⁷. By the practice the respiratory apparatus is emptied and filled more completely and efficiently which is recorded in terms of increased FVC. Similar ventilatory training even in elderly subjects (age 20 to 65 yrs) has been shown to improve lung volumes and capacities⁸. Makwana et al also showed increased FEV-1 after 10 weeks of yogic practice. The increase in FEV-1 might be due to significant increase in vital capacity. Joshi et al reported significant increase in FVC and PEFR following 6 weeks of pranayam practice⁹. Lung inflation near to total lung capacity is a major physiological stimulus for the release of lung surfactant¹⁰ and prostaglandins into alveolar spaces¹¹, which increase lung compliance and decreases bronchial smooth muscle tone respectively. The other possible mechanism for improved PFT may be; Increased power of respiratory muscles that is due to the work hypertrophy of the muscles during pranayam and other exercises, Cleansing procedures cleans the infective nasal secretions, Yogic breathing exercises train practitioners to use the diaphragmatic and abdominal muscles more efficiently thereby emptying and filling the respiratory apparatus more efficiently and completely and Yoga, with its calming effect on the mind can reduce and release emotional stresses, thereby withdrawing the broncho-constrictor effect. Thus, practice of yogic exercises seems to be beneficial for respiratory efficiency. A number of studies have been done to show the beneficial effects of yoga on asthmatic patients^{12,13}. In recent studies, effect of yoga on ventilatory responses, respiratory endurance and muscle strength have been well documented^{14,15}. Bera et al have studied 'recovery from stress by yogic relaxation posture' in their recent work¹⁶.

Conclusion:

These findings suggest that the yogic exercises are beneficial for the better maintenance of body functions, particularly pulmonary functions, even in normal healthy subjects. In this study, there was Indian J Physiol Pharmacol⁵ significant increase in FVC, FEV-1 and PEFR at the end of 12 weeks of yogic practice in young healthy adults.

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