

The Impacts of Pranayama and Reflection on Respiratory Parameters in Healthy Adults

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Abstract

Pranayama is a strategy of controlling and balancing breath and reflection, a procedure through which one achieves a condition of profound rest yet dynamic perspective. Late reviews on long haul yogic practices have demonstrated enhancements in respiratory capacities. The present project was done to assess the impacts of pranayama and reflection on respiratory parameters. The present review was a relative planned review comprising of 50 (24 male and 26 female) sound subjects of 20-60 years age. Members satisfying the consideration and rejection criteria experienced two hours day by day yoga program for 15 days educated by yoga instructor. Pre and post yoga respiratory capacities were evaluated by measuring mid-section development, breath holding time and pinnacle expiratory stream rate. The parameters were examined by Student t test. There was noteworthy increment in mid-section extension, breath holding time and pinnacle expiratory stream rate contrasted with pre yoga rehearse. The reaction was comparative in both sexual orientations, both age bunches <40 yrs and >40yrs and both gatherings of BMI <25 kg/m² and >25 kg/m². This review demonstrated valuable impacts of short term (15 days) standard pranayama and contemplation hone on respiratory capacities regardless of age, sexual orientation and BMI in typical sound people.

KEYWORDS: Yoga, meditation, peak expiratory flow rate

Introduction

Yoga, an old Indian science, plans to achieve utilitarian amicability amongst body and brain through three fundamental practices: asanas, pranayama and contemplation. Pranayama implies control of 'prana'. "Prana" in Indian theory, alludes to all types of vitality in the universe. Life drive in an individual is symbolized by relaxing. Breath is a dynamic extension between the body and psyche. At the point when the life compel is upset, it brings about physical, mental, enthusiastic and otherworldly disharmonies. Pranayama helps in conveying cognizant attention to breathing and the reshaping of breathing propensities and examples. The substance of the pranayama practice is moderate and profound breathing which is prudent as it decreases dead space ventilation. It likewise invigorates air all through the lungs, conversely with shallow breathing that revives air just at the base of the lungs. In this manner, a yoga expert, through pranayama, can at some stage control other physiological capacities lastly control indications of prana even outside the body.

Contemplation is a method of extending our common awareness to achieve higher conditions of cognizance and there by finding more about ourselves. When we pick up this knowledge we can change our propensities and our more profound, inward identity has a superior opportunity to appear on the other side. Our entire life improves. Likewise

reflection is regularly looked upon as an unwinding strategy to be utilized for treating stress and stress related diseases. In this way pranayama and contemplation as a characteristic method for purging breath has been proposed as a course to sound body and psyche.

Developing number of proofs have asserted that yoga hones builds life span, has helpful and rehabilitative effects. The gainful impacts of six weeks routine of various pranayamas are all around reported and have sound logical premise. Different sorts of pranayama alongside asanas create distinctive physiological reactions in typical youthful people. Breathing activities for three weeks are accounted for to impact cardio respiratory and autonomic capacities. Raja yoga contemplation has appeared to lessen the resting respiratory rate, increment tidal volume and moment volume. All these reviews reported the impacts of individual Pranayama or reflection hone for least of three weeks to six months. A few reviews likewise incorporated the impacts of asanas. Since Pranayama and reflection have demonstrated to have advantageous and helpful impacts, in typical and infected states alike, this review was taken up to know the physiological impacts of short term (15days) joined routine of pranayama and contemplation in affecting respiratory status in solid people of 20-60 yrs.

Methodology

Moral leeway for the review convention was gotten from foundation moral panel. 50 sound subjects, 24 male and 26 females of age gathering 20-60 years were chosen haphazardly from a gathering of members going to the yoga focus who had not yet began honing yoga but rather were enthusiastic about learning. Similar subjects were picked as both review and additionally control assemble with a specific end goal to minimize the frustrating components and make the review more reproducible.

Solid people in the age gathering of 20-60 years with clearly no significant ailment, joining first time to yoga preparing were incorporated. Subjects who were prepared in yoga some time recently, subjects with history of respiratory ailments, cardiovascular maladies and diabetes were barred from the review. We likewise prohibited subjects with neurological issue and the individuals who were not ready to perform respiratory capacity tests. Subjects who smoked, devoured liquor, or any medications were rejected in the wake of taking their history. The soundness of the subject was evaluated by taking note of the present, past, family and individual history furthermore by an exhaustive general and systemic examination. The subjects were clarified about the significance and strategy of the review. An educated assent was acquired from every one of the individuals. The subjects were requested that not change their way of life amid the 15 days of the review and were told not to play out some other physical activities in the event that they were not doing likewise consistently.

Every one of the information was gathered from 5pm to 6pm. Information on physical attributes, for example, age, stature, weight and body mass list (BMI) was gotten. BMI was ascertained as $\text{weight (kg)}/\text{stature (m)}^2$. The review included noninvasive systems with no money related weight on the subjects. The subjects were educated about the techniques in a nutshell and were approached to unwind physically and rationally for 30 minutes in recumbent position in a noiseless room. The mid-section development, breath holding time and pinnacle expiratory stream rate were measured for evaluating

respiratory capacities in standing stance. Estimation of mid-section development amid profound motivation after profound termination was done utilizing a measuring tape at the level of the fourth intercostals space. Three such readings were taken at an interim of 5 minutes and the most extreme perusing was noted in centimeters 4. Breath holding time was measured in seconds from the season of holding breath after profound motivation till the limit of the held breath by utilizing a stop watch. The greatest estimation of three comparable trials at 5 minutes interim was noted. PEFR was measured in liters every moment by smaller than usual Wright's pinnacle stream meter. The subject was requested that take a full breath, put the mouthpiece of the pinnacle stream meter solidly between the teeth and lips and after that to victory with a short sharp impact. The perusing on the scale was noted. Each subject was given such three readings at an interim of 5 minutes and the greatest perusing was noted. Every one of the subjects were under uniform dietary propensities and got same yoga preparing for a time of 15 days for one hours day by day between 6 .00 pm to 7.00 pm.

The yoga practice schedule consisted of:

1. Prayer - 5 min.
2. Pranayama - 20 min.
3. Short break - 5 min.
4. Meditation - 20 min.
5. Omkar Japa - 10 min.

The session was concluded by meditation and prayer. After 15 days, once again the respiratory status was assessed clinically in terms of chest expansion, breath holding time and PEFR recordings as before the start of Pranayama and meditation training. Results were presented as Mean \pm SD. Student t test (two tailed, independent) has been applied using software (SPSS 15.0) to find the significance of study parameters on continuous scale between two groups (Male vs. Female) and Student t test (two tailed, dependent) has been used to find the significance of study parameters on continuous scale within each group. P value less than 0.05 was considered as significant.

Results

The age of the subjects ranged from 20-60 yrs, the mean age being 38.60 ± 8.89 years. There were 6 cases in the age group of 21-30 years, 23 cases in the age group of 31-40 years, 17 cases between 41-50 years and 4 cases between 51-60 years. Out of the 50 cases, 24 cases were males and 26 were females.

On analysis of the physical characters of the 50 subjects, the mean age (years) was 38.60 ± 8.89 , the mean height (cm) was 159.38 ± 9.97 , the mean weight (kg) was 64.21 ± 9.24 and the mean BMI (kg/m²) was 25.31 ± 3.29 . Both the genders were age matched with significant variation in height ($P < 0.001$), weight ($P = 0.003$) and BMI ($P = 0.025$).

Effect on Chest expansion

The chest expansion of the participants significantly increased at end of 15 days yoga practice, irrespective of age, gender.

Table 1: Effect of yoga on Chest expansion (cm)

Group	No. of Case	Pre test	Post test	t Value
Total	50	2.90=1.28	3.82=1.36	14.29
Males	24	3.45=1.45	4.45=1.53	10.14
Female	26	2.40=0.87	3.25=0.86	10.19

Effect on Breath Holding Time (BHT)

At the end of 15 days regular yoga practice, the mean breath holding time increased significantly.

Table 2: Effect of yoga on Breath Holding Time (sec)

Group	No. of Case	Pre test	Post test	t Value
Total	50	33.23=10.48	38.59=11.23	8.74
Males	24	37.18=12.09	41.83=12.49	4.66
Female	26	29.57=7.19	35.60=9.19	8.20

Effect on peak expiratory flow rate (PEFR)

The mean PEFR of all the participants, at end of 15 days regular practice of yoga, increased significantly.

Table 3: Effect of yoga on Peak Expiratory Flow Rate (liters/min)

Group	No. of Case	Pre test	Post test	t Value
Total	50	373.40=101.83	401.70=103.19	10.84
Males	24	430.80=111.79	458.75=111.57	8.40
Female	26	321.15=53.99	349.04=58.75	7.03

Discussion

On dissecting the impact of 15 days customary routine of pranayama and contemplation in the present review, it was found that there was a very noteworthy increment in mid-section development, breath holding time and PEFR after yoga hone. Different reviews have likewise reported critical increment in mid-section development and PEFR after yoga hone. The expanded mid-section development and PEFR because of general routine of pranayama and reflection can be clarified on the accompanying premise:

Generally breathing is not a cognizant occasion and is managed consequently by the sensory system through the respiratory focuses situated in the medulla oblongata and pons. These are the dorsal and ventral gathering of neurons situated in the medulla, the pneumotaxic focus and the apneustic focus situated in the pons. The movement of these respiratory focuses is thus altered by supra-pontine impacts, in the cognizant being. While the essential respiratory mood in ordinary circumstances is kept up by the driving forces released by the dorsal gathering of neurons, the pneumotaxic focus in a roundabout way controls the length of motivation and aides in transferring the suprapontine driving

forces which advance willful motivation and termination. We trust that amid every day routine of pranayama the fundamental movement of the bulbopontine complex is adjusted so as to back off its mood. In this manner after nonstop routine of pranayama for couple of weeks, the bulbo-pontine complex is balanced to the new example of breathing which is slower than its basal beat. Likewise by intentionally drawing out the period of motivation and termination, the respiratory muscles are extended to their full degree and the respiratory mechanical assembly can work to their maximal limit spoke to by expanded mid-section divider development and lung volumes. General routine of moderate and profound breathing activities enhances muscle quality and adaptability because of work hypertrophy. Vibhagiya pranayama (sectional breathing) rehearse increments thoracic-pneumonic compliances by more proficient utilization of diaphragmatic and muscular strength, in this way exhausting and filling the respiratory mechanical assembly all the more effectively and totally. Pranayama rinses aviation route emissions, goes about as a noteworthy physiological boost for the arrival of lung surfactant and prostaglandins into alveolar spaces which expands lung consistence. Stimulation of aspiratory extend receptors because of greatest swelling of the lungs reflex unwinds smooth muscles of larynx and tracheo-bronchial tree which adjusts the bore of aviation routes and decreases aviation route resistance. In this manner opening of little aviation route and decreased aviation route resistance expands PEFr. Additionally pranayama rehearse for fleeting builds most extreme expiratory weight and stream rate. Like different sorts of activities, yoga hone diminished response time, showing change of neuromuscular framework. Pranayama alongside contemplation has quieting impact on psyche and diminishes passionate worries in asthma patients. Facilitate profound and controlled breathing desensitize the tactile nerve endings and diminish the unfavorably susceptible states of the earth. larynx and tracheo-bronchial tree which adjusts the gauge of aviation routes and diminishes aviation route resistance. In this way opening of little aviation route and diminished aviation route resistance expands PEFr. Likewise pranayama rehearse for transient expands greatest expiratory weight and stream rate. Like different sorts of activities, yoga rehearse diminished response time, demonstrating change of neuromuscular framework. Pranayama alongside contemplation has quieting impact on brain and diminishes enthusiastic worries in asthma patients. Encourage profound and controlled breathing desensitize the tactile nerve endings and decrease the unfavorably susceptible states of the earth.

The huge increment in BHT in the present review is reliable with past studies. In ordinary breathing after a specific level of extending or even before this, extend receptors in alveoli are animated and send data to the respiratory focuses so exhalation sets in. Yet, in pranayama there is continuation of the period of inward breath with solid deliberate control so lungs are extended extensively and the dividers of the alveoli are extended to the greatest degree. Consequently the mid-section keeps on getting extended under cortical control. The extend receptors are in this way prepared to withstand increasingly extending. This aides in holding the breath for a more drawn out time. As the span of breath holding amid pranayama is bit by bit expanded by practice, the respiratory focus is acclimatized to withstand ever more elevated carbon dioxide fixations in the alveoli and the blood. Likewise, the subject keeps his willful muscles casual and stable while in the meantime practicing a nearby and constant intentional control over respiratory muscles, accordingly deliberately and perseveringly abrogating the typical excitatory jolts to

respiratory focuses. Likewise the receptors get acclimatized to the expanded centralizations of carbon dioxide bit by bit by customary routine of pranayama.

Likewise, expanded advancement of respiratory musculature and perseverance because of normal routine of pranayama postpones the onset of weariness, therefore permitting the breath holding for longer time. Routine of contemplation alongside pranayama produces a hypometabolic state of the body described by diminished carbon dioxide creation and diminished oxygen utilization, in this manner permitting breath holding for a more drawn out time. In the present review, the reactions to 15 days of customary joined routine of Pranayama and reflection were likewise evaluated concerning age, sexual orientation and BMI. It uncovered that both male and females reacted comparatively to the yoga hone. Comparable perceptions in both sexual orientations in respiratory parameters were likewise reported by past review.

At the point when looked at age shrewd, it uncovered comparable reaction to 15 days of pranayama and reflection rehearse in both age aggregate ≤ 40 years and age amass >40 years. Also when contrasted with deference with BMI, there was huge change of respiratory capacities in both BMI < 25 and BMI > 25 kg/m².

Despite the fact that a huge increment in mid-section development, BHT and PEFr after the yoga rehearse in the present review is as per the discoveries of different reviews on physiological impacts of yoga practice in solid people, the present review has a few contrasts. The present review included customary consolidated routine of pranayama and contemplation for 15 days, though different reviews reported the impacts of individual Pranayama or reflection hone for least of 4weeks to 6months. A few reviews additionally incorporated the impacts of asanas.

The vast majority of the reviews led so far have summed up their outcomes regardless of age, sexual orientation and BMI of the subjects. Not very many reviews have been led on subjects over 40 years. In the present review, an endeavor was made to top off these lacunae.

In this way more or less, with this review, it is demonstrated certain, that customary routine of pranayama and contemplation for least of 15 days is advantageous in enhancing the respiratory capacities even in sound people independent of age, sexual orientation and BMI. The consequences of this review and their clarifications would legitimize the fuse of yoga as a major aspect of our way of life in advancing wellbeing and along these lines counteracting age related respiratory sicknesses. In any case, it stays to be surveyed whether these progressions continue subsequent to continuing typical breath and whether long haul practice will prompt to stable alterations of respiratory control.

References

1. Bijlani RL. Understanding medical physiology. 3rd Ed. New Delhi: Jaypee Brothers; 2004. p. 871-910.
2. Nagarathna R, Nagendra HR. Yoga for promotion of positive health. 4th ed. Bangalore: Swami Vivekananda Yoga Prakashana; 2006.

3. Bharshankar JR, Bharshanker RN, Deshpande VN, Kaore SB, Gosavi GB. Effect of yoga on cardiovascular system in subjects above 40 years. *Indian J Physiol Pharmacol*, 2003; 47(2):202-06.
4. Khanam AA, Sachdev V, Guleria R, Deepak KK. Study of pulmonary and autonomic functions of asthma patients after yoga training. *Indian J Physiol Pharmacol*, 1996; 40(4):318-24.
5. Katiyar SK, Bihari S. Role of pranayama in rehabilitation of COPD patients – a randomized controlled study. *Indian J Allergy Asthma Immunol*, 2006; 20(2):98-104.
6. Joshi LN, Joshi VD, Gokhale LV. Effect of short term pranayama on breathing rate and ventilator functions of lungs. *Indian J Physiol Pharmacol*, 1992; 36(2):105-8.
7. Madanmohan, Udupa K, Bhavani AB, Vijayalakshmi P, Surendiran A. Effect of slow and fast pranayamas on reaction time and cardiorespiratory variables. *Indian J Physiol Pharmacol*, 2005; 49(3):313-8.
8. Vyas R, Dikshit N. Effect of meditation on respiratory system, cardiovascular system and lipid profile. *Indian J Physiol Pharmacol*, 2002; 46(4):487-91.
9. Chanavirut R, Khaidjapho K, Jaree P, Pongnaratorn P. Yoga exercise increases chest wall expansion and lung volumes in young healthy Thais. *Thai Journal of Physiological Sciences*, 2006; 19(1):1-7
10. Upadhyay KD, Malhotra V, Sarkar D, Prajapati R. Effect of alternate nostril breathing exercise on cardiorespiratory functions. *Nepal Med Coll J*, 2008; 10(1):25-7.
11. Subbalakshmi NK, Saxena SK, Urmimala, Urban JAD. Immediate effect of nadishodhana pranayama on some selected parameters of cardiovascular, pulmonary and higher functions of brain. *Thai Journal of Physiological Sciences*, 2005; 18(2):10-6.
12. Makwana K, Khirwadkar N, Gupta HC. Effect of short term yoga practice on ventilatory function tests. *Indian J Physiol Pharmacol*, 1988; 32(3):202-8.
13. Madanmohan, Jatiya L, Udupa K, Bhavanani AB. Effect of yoga training on handgrip, respiratory pressures and pulmonary function. *Indian J Physiol Pharmacol*, 2003; 47(4):387- 92.
14. Mascarenhas JF. Autonomic responses to breath holding and its variations following pranayama. *Indian J Physiol Pharmacol*, 1988; 32(4):257-64.
15. Wallace RK, Benson H, Wilson AF. A wakeful hypometabolic physiologic state. *Am. J. Physiol.* 1971; 221(3):795-99.