

EFFICACY OF SELECTED YOGIC PRACTICES ON BREATHE HOLDING CAPACITY AMONG ASTHMATIC PATIENTS

Authors

1. **Dr.C.MURUGESAN**, Assistant Professor, Department of Physical Education, Government Polytechnic College, Kooduveli, Kattumannarkoil Tk – 608305, Cuddalore Dt, Tamil Nadu, India.
2. **Mr.G.GIRISHKUMAR**, Assistant Professor, Department of Electrical and Electronics Engineering, Government Polytechnic College, Kooduveli, Kattumannarkoil Tk – 608305, Cuddalore Dt, Tamil Nadu, India.

ABSTRACT

The purpose of the study was to find out efficacy of selected yogic practices on breathe holding capacity among asthmatic patients. The study was conducted on 20 asthmatic patients. Totally two groups, namely experimental group I underwent four weeks yogic practice and control group II did not undergo any type of training consisting of 10 asthma patients in each group. The breathe holding capacity was measured before and after the experimentation using the standardized test, which was analyzed by Analysis of Covariance (ANCOVA) and it was concluded that the experimental group had significant ($P < 0.05$) effect on the breathe holding capacity.

Key words: asthma, yoga, breathe holding time, asana, pranayama,

Introduction:

Asthma is a condition in which the airways narrow and swell and may produce extra mucus. This can make breathing difficult and trigger coughing, a whistling sound (wheezing) when you breathe out and shortness of breath. Asthma symptoms vary from person to person. You may have infrequent asthma attacks, have symptoms only at certain times such as when exercising or have symptoms all the time. Asthma signs and symptoms include shortness of breath, chest tightness or pain, wheezing when exhaling, which is a common sign of asthma in children. Trouble sleeping caused by shortness of breath, coughing or wheezing. Coughing or wheezing attacks that are worsened by a respiratory virus, such as a cold or the flu. Breathing is something most people take for

granted except for those with severe asthma. Asthma narrows the airways in the lungs to the point where it can be hard to catch the breath. Medicines may help to open up the airways to help breathe easier. But people with severe asthma, these medicines might not be enough to control symptoms, where they need to try breathing exercises. More recent studies suggest these exercises might help improve the breathing and quality of life. Based on current evidence, breathing exercises may have value as an add-on therapy to medication and other standard asthma treatments.

Purpose of the Study

The purpose of the study was designed to examine the efficacy of selected yogic practices on breathe holding capacity among asthmatic patients.

Review of Literature

- **Akhila Nair et al., (2020)** analyzed the effect of yoga and pranayama on chest expansion and breath holding time in chefs exposed to cooking fumes. Chefs exposed to cooking fumes are at risk due to the toxic products that are produced during cooking. Studies have shown that exposure to cooking fumes decreases lung capacities, affects breathing and cause other respiratory diseases. Yoga strengthens the respiratory musculature due to which chest and lungs inflate & deflate to fullest possible extent & muscles are made to work to maximal extent. Pranayama makes efficient use of abdominal & diaphragmatic muscles and improves the respiratory apparatus. Aim: The present study was done to determine the effect of Yoga & Pranayama on chest expansion & breath holding time in chefs exposed to cooking fumes. In this experimental study 30 chefs exposed to cooking fumes who fulfilled the inclusion and exclusion criteria using Medical research council questionnaire for respiratory symptoms were selected for yoga and pranayama program for 6 weeks, 3 sessions per week for 45 minutes. Pre and post respiratory functions were assessed by measuring chest expansion and breath holding time. Stastical analysis was done by using Wilcoxon test to compare the pre & post chest expansion. Paired t test was used to compare the pre & post breath holding time. Results: There was significant

increase in chest expansion and breath holding time compared to pre yoga and pranayama practice. This study showed that there is significant effect of yoga and pranayama on chest expansion & breath holding on chefs.

- **Sankar J, Das RR. Asthma (2018)** analyzed a Disease of How We Breathe: Role of Breathing Exercises and Pranayama. To describe the role of breathing exercises or yoga and/or pranayama in the management of childhood asthma. We conducted an updated literature search and retrieved relevant literature on the role of breathing exercises or yoga and/or pranayama in the management of childhood asthma. We found that the breathing exercises or yoga and/or pranayama are generally multi-component packaged interventions, and are described as follows: Papworth technique, Buteyko technique, Yoga and/or Pranayama. These techniques primarily modify the pattern of breathing to reduce hyperventilation resulting in normalization of CO₂ level, reduction of bronchospasm and resulting breathless -ness. In addition they also change the behavior, decrease anxiety, improve immunological parameters, and improve endurance of the respiratory muscles that may ultimately help asthmatic children. We found 10 clinical trials conducted in children with asthma of varying severity, and found to benefit children with chronic (mild and moderate) and uncontrolled asthma, but not acute severe asthma. Breathing exercises or yoga and/or pranayama may benefit children with chronic (mild and moderate) and uncontrolled asthma, but not acute severe asthma. Before these techniques can be incorporated into the standard care of asthmatic children, important outcomes like quality of life, medication use, and patient reported outcomes need to be evaluated in future clinical trials.
- **Balakrishnan R et.al (2018)** demonstrated a voluntarily induced vomiting - A yoga technique to enhance pulmonary functions in healthy humans. Vomiting is a complex autonomic reflex orchestrated by several neurological centres in the brain. Vagus, the cranial nerve plays a key role in regulation of vomiting. Kunjal Kriya (Voluntarily Induced Vomiting) is a yogic cleansing technique which involves voluntarily inducing vomiting after drinking saline water (5%) on empty stomach. This study was designed with an objective to understand the effect of voluntary induced vomiting (ViV) on pulmonary functions in experienced practitioners and novices and derive its possible therapeutic applications. Eighteen healthy individuals volunteered for the study of which nine had prior experience of ViV while nine did

not. Pulmonary function tests were performed before and after 10 min of rest following ViV. Analysis of Covariance was performed adjusted for gender and baseline values. No significant changes were observed across genders. The results of the present study suggest a significant increase in Slow Vital Capacity [$F(1,13) = 5.699$; $p = 0.03$] and Forced Inspiratory Volume in 1st Second [$p = 0.02$] and reduction in Expiratory Reserve Volume [$F(1,13) = 5.029$; $p = 0.04$] and Respiratory Rate [$F(1,13) = 3.244$, $p = 0.09$]. These changes suggest the possible role of ViV in enhancing the endurance of the respiratory muscles, decreased airway resistance, better emptying of lungs and vagal predominance respectively. We conclude that ViV when practiced regularly enhances the endurance of the respiratory muscles and decreases airway resistance. These findings also indicate need for scientific understanding of ViV in the management of motion sickness and restrictive pulmonary disorders like bronchitis and bronchial asthma.

- **Papp ME et.al (2017)** studied the effects of yogic exercises on functional capacity, lung function and quality of life in participants with obstructive pulmonary disease: a randomized controlled study. Knowledge of hatha yogic exercises, the most used yoga style, for increasing functional capacity in patients with obstructive pulmonary diseases remains limited. The aim was to evaluate the effects and feasibility of hatha yoga (HY) compared to a conventional training program (CTP) on functional capacity, lung function and quality of life in patients with obstructive pulmonary diseases. The study was performed at the Karolinska University Hospital, Stockholm, among outpatients. Thirty-six patients with obstructive pulmonary disease. Forty patients were randomized with 36 (24 women, median age =64, age range: 40-84 years) participating in HY (N.=19) or CTP (N.=17). Both HY and CTP involved a 12-week program with a 6-month follow-up. Functional capacity (using the 6-Minute Walk Test), lung function (spirometry), respiratory muscle strength (respiratory pressure meter), oxygen saturation (SpO₂), breathlessness (Borg), respiratory rate (f) and disease-specific quality of life (CRQ) were measured at baseline, at 12 weeks and at a 6-month follow-up. Testing for interactions (group x time) with ANOVAs showed significant effects on the CRQ fatigue ($P=0.04$) and emotional ($P=0.02$) domains, with improvements in the CTP group after the 12-week intervention ($P=0.02$ and 0.01 , respectively) but not in the HY group. No between group effects emerged, however, within each group, significant improvements

emerged for the six-minute walk distance (6MWD) after 12-week intervention (HY: mean difference 32.6 m; CI: 10.1-55.1, $P=0.014$; CTP: mean difference 42.4 m; CI: 17.9-67.0, $P=0.006$). Within-group improvements in CRQ appeared in both groups. Within the HY group, f decreased and SpO₂ increased. Improved effects after follow-up emerged only for the CTP group for diastolic blood pressure ($P=0.05$) and CRQ emotional and fatigue domain ($P=0.01$). There were no between-group differences. After 12 weeks, 6MWD improved significantly within both groups. Within the HY group, improvements in the CRQ mastery domain, f and SpO₂ emerged. Within the CTP group, there were improvements in lung function parameter forced vital capacity, respiratory muscle strength and all CRQ-domains. The CTP also exhibited effects on CRQ after the 6months follow-up. Limited effects of HY and CTP emerged. HY seems feasible and safe as a form of physical exercise for pulmonary disease patients. As part of the rehabilitation, HY may constitute an alternative to other physical training activities and may be a useful addition to formal rehabilitation programs.

Methodology

For the present study 20 asthmatic patients aged between 45 – 50 years were selected as the subjects from Chidambaram. The two group's namely experimental group I which underwent yoga practices asana such as bhujangasana, ustrasana and pranayama such as nadi sudhi, sectional breathing for four weeks and control group no practices were given. The 20 samples were divided into 10 in each group randomly. The breathe holding capacity was measured by stop watch.

Results and Discussions

The data pertaining to the variables collected from the two groups before and after the training period were statistically analyzed by using Analysis of Covariance (ANCOVA) to determine the significant difference and tested at 0.05 level of significance. The following tables illustrate the statistical result to examine the efficacy of selected yogic practices on breathe holding capacity among asthmatic patients.

TABLE - I

**COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST –
TESTS DATA ON BREATHE HOLDING CAPACITY OF EXPERIMENTAL
AND CONTROL GROUPS**

(Scores in seconds)

	Experimental Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre test Mean	13.4	13.5	Between	0.05	1	0.05	0.02
			Within	38.9	18	2.16	
Post test Mean	21.7	13.6	Between	328.05	1	328.05	171.16*
			Within	34.5	18	1.91	
Adjusted Post Test Mean	21.7	13.6	Between	330.79	1	330.79	196.90*
			Within	28.56	17	1.68	
Mean Diff	8.3	0.1					

* Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 1 and 18 (df) = 4.41, 1 and 17 (df) = 4.45

TABLE - II

**SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE
ADJUSTED POST – TEST PAIRED MEANS OF BREATHE HOLDING
CAPACITY**

(Scores in seconds)

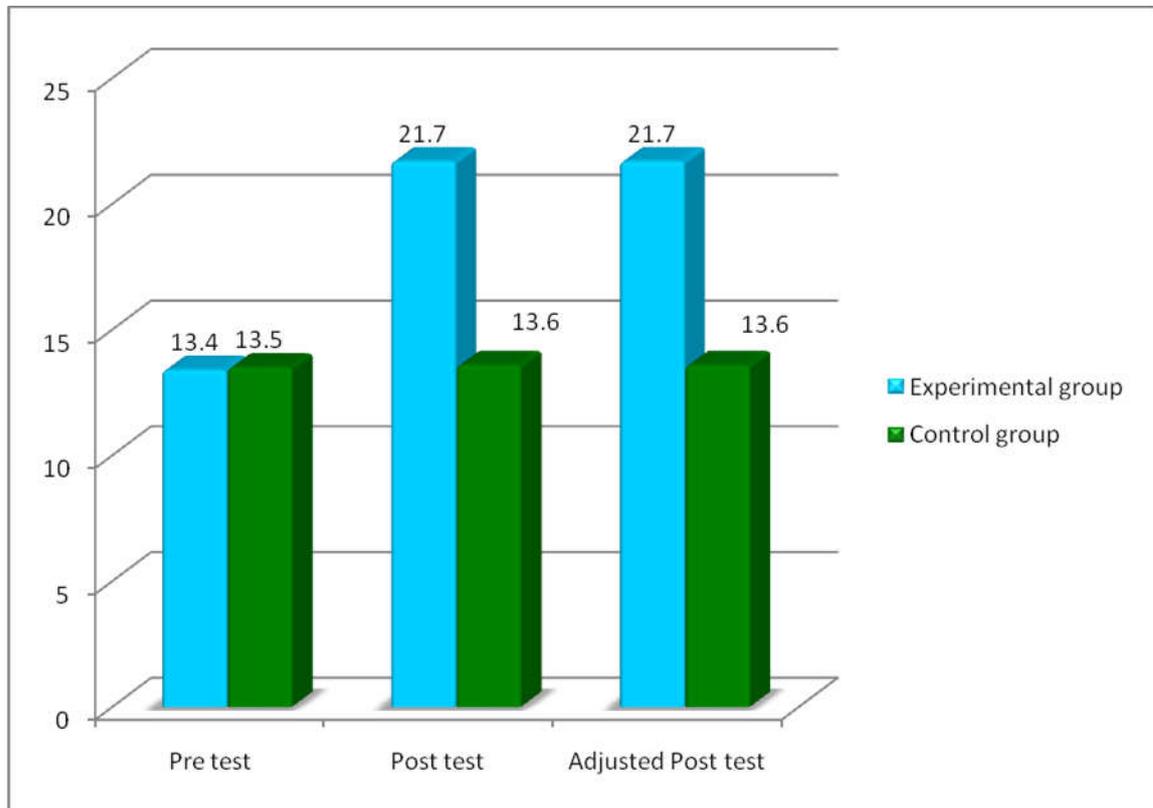
Experimental Group	Control Group	Mean difference	Required C.I
21.72	13.58	8.14*	0.96

* Significant at .05 level

FIGURE - 1

BAR DIAGRAM SHOWING THE ADJUSTED POST MEAN VALUES OF EXPERIMENTAL GROUP AND CONTROL GROUP ON BREATHE HOLDING CAPACITY

(Scores in seconds)



Results of Balance

The analysis of covariance of breathe holding capacity data between pre-test and post-test of the two groups have been presented in Table I. The pre-test means of experimental and control group were 13.4 and 13.5 respectively. Since the obtained F-ratio of 0.02 is lower than the table value, F-ratio of 4.41, the pre-test means were not significant at 0.05 level of confidence with the degrees of freedom 1 and 18. The post test means of experimental and control group were 21.7 and 13.6 respectively. The obtained F-ratio of 171.16 is seen to be higher than the table F-ratio of 4.41. Hence, the differences among the post-test means were significant at 0.05 level of confidence with degrees of freedom 13 and 18. The adjusted post-test means of experimental and control group were 21.7 and 13.6 respectively. Since the obtained F-ratio of 196.90 is higher than the table F-ratio of 4.45 the adjusted post-test mean difference among the two groups was significant

at 0.05 level of confidence with the degrees of freedom 1 and 17. Scheffe's post-hoc test was resorted-to, to find out the significance of ordered adjusted final means difference among the groups. Table II shows the Scheffe's post-hoc test results. The ordered adjusted breathe holding capacity means, differences between means and Scheffe's Post Hoc test F-ratio of experimental and control group were tested for significance against Scheffe's post-hoc test F ratio.

Conclusion

Based on the results obtained, the following conclusion was drawn: It was concluded that experimental group (yoga practices) was effective than the control group in increasing the breathe holding capacity among asthmatic patients.

References

1. Akhila Nair, Anagha Palkar, Priyanka Honkalas. effect of yoga and pranayama on chest expansion and breath holding time in chefs exposed to cooking fumes. International Journal of Physiotherapy and Research, Int J Physiother Res 2020, Vol 8(3):3499-03. ISSN 2321-1822 DOI: <https://dx.doi.org/10.16965/ijpr.2020.137>. Balakrishnan Ragavendrasamy, Ramesh Mavathur Nanjundaiah, and Nandi Krishnamurthy Manjunath. Voluntarily induced vomiting – A yoga technique to enhance pulmonary functions in healthy humans. Published online 2017 Dec 11. doi: 10.1016/j.jaim.2017.07.001. PMID: 29242088. J Ayurveda Integr Med. 2018 Jul-Sep; 9(3): 213–216.
2. Papp ME, Wändell PE, Lindfors P, Nygren-Bonnier M. Effects of yogic exercises on functional capacity, lung function and quality of life in participants with obstructive pulmonary disease: a randomized controlled study. Eur J Phys Rehabil Med. 2017 Jun;53(3):447-461. doi: 10.23736/S1973-9087.16.04374-4. Epub 2016 Nov 10.
3. Sankar J, Das RR. Asthma - A Disease of How We Breathe: Role of Breathing Exercises and Pranayama. Indian J Pediatr. 2018 Oct;85(10):905-910. doi: 10.1007/s12098-017-2519-6. Epub 2017 Dec 16.