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Research Article

Investigation on the Changes of Peak Flow Expiratory Rate due to Yogic Practices on Asthmatics Adolescent Boys

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ABSTRACT

This study was find about investigation on the changes on peak flow expiratory rate and breath holding due to yogic practices among asthmatic adolescent boys. To achieve the purpose of the study, 60 asthmatic adolescent boys only from Chennai, aged between 13 and 19 years, were selected. The selected sixty subjects were randomly divided into two equal groups of fifteen subjects each, out of which group – I (n = 30) underwent yogic practices pack programme and group – II remained as control. The training period for the present study was six days per week for twelve weeks. Prior to and after the training period the subjects were tested for peak flow expiratory rate and breath holding. The statistical tool were used for the present study is 't' test and RMANOVA. The result of the study was significant improvement on peak flow expiratory rate and breath holding after twelve weeks of yogic practices programme. However, the improvement was favour of experimental group. There was a significant difference was occurred between yogic practices group and control group after twelve weeks of yogic practices pack programme.

Keywords: Yogic practices, Peak flow expiratory rate, Quality of Life, Asthma.

INTRODUCTION

Asthma is a common and distressing condition characterized by recurrent spasms of the lungs' tubes, which cause wheezing, coughing, and a sense of suffocation (*GINA-2023*, n.d.). The larger airways (bronchi) constrict and become clogged with excessive, thick mucus secretions produced by the cells that line the airways(Duncan F, 2007). Asthma attacks can last for a few minutes or hours, even days, leaving the sufferer exhausted physically, mentally, and emotionally(Papiris et al., 2001). In rare and extreme cases, when the condition known as' status asthmaticus' prevails, asthma can be fatal. Asthma can develop at any age, but it is most common in children and adolescents(*GINA-2023*, n.d.). Its occurrence can be gradual or sudden(Papiris et al., 2001). Asthmatics frequently report that the disease first appeared in childhood, adolescence, or adulthood, shortly after a loss, rejection, or significant threat to personal security(Sears, 2015),(Fuchs et al., 2017). Restoring depleted and blocked pranic energy channels is an important aspect of yogic management(Das et al., 2022). This is accomplished gradually through the combined effects of yogasana, pranayama, and shatkarma. Only consistent and regular daily practice allows for complete and long-term drug-free recovery. As a result, asthma will be cured in the shortest possible time and with the least amount of suffering. Karmananda S (2001) "Yogic Management of Common Diseases"

In recent years, approximately 30-35% of adolescents suffer from allergic disorders, and their occurrence has been growing worldwide. Juvenile allergic disorders include atopic dermatitis, allergic rhinitis, asthma, and food allergies, with asthma being the most common chronic condition among children and adults together (Dharmage et al., 2019). Asthma causes the small airways in the lungs to narrow due to inflammation, resulting in wheeze, coughing, difficulty breathing, and chest tightness (Gong, 1990), (*Asthma*, 2023). It is frequently under-diagnosed and under-treated, particularly in low-and middle-income countries, and has an impact on quality of life(*Asthma*, 2023).

It was hypothesized that there would be significant improvements in each variable following the use of yogic techniques. The study's aim was to evaluate the effectiveness of yogic techniques in terms of PEFR and Quality of life on pre and post-intervention and follow-up among asthmatic adolescents.

METHODOLOGY

Adolescent boys were chosen as subjects to receive special attention rather than both genders. Patients aged 13 to 19 fromthe Chennai city south region were invited to participate in the study. Out of 98 entries, 60 had provided informed consent. The study was a randomized control trial, and the adolescent boys who provided informed consent were divided into groups. Based on this, two groups were randomly assigned to either the Yoga Group or the Control Group using a computerized random number generator. Both the groups were tested PEFR and PAQLQ on pre, post and follow up of intervention period.

INCLUSION CRITERIA

Adolescent boys, between the ages of 13 and 19, who have never practiced yoga; whose asthma has been clinically assessed and rated as mild to moderate using the standard criteria (GINA-2014 Persistent Bronchial Asthma Severity); who have not smoked for at least six months.

EXCLUSION CRITERIA

Clinical analysis of asthma using standard analytical criteria; hypertension; acute infection within the previous six weeks; smoking within the previous six months; other serious systemic illness, such as hepatic, renal, cardiac, or central nervoussystem; major psychiatric illness.

INTERVENTION

The yoga group received the techniques as an additional practice in combination with medication. Every day, pre-recordedaudio was used to teach in order to prevent instructor bias on sound-deficient halls. However, the instructor was on handto answer questions and correct posture during the practice. In a similar way, the Control Group allowed to take prescribedmedication alone during whole intervention period.

Table 1: Yoga Group Module of practice

S.No	Name of the Practice	Duration
1.	Trikonasana	1 min
2.	Parivarta Trikonasana	1 min
3.	Virabhadrasana	1 min
4.	Ushtrasana	2 min
5.	Ghomugasana	1 min
6.	Sethubandhasana	2 min
7.	Matsyasana	1 min
8.	Bhujangasana	2 min
9.	Dhanurasana	1 min
10.	Kapalabhati kriya	5 min
11.	Bhramari	2 min
12.	Bhastrika (yogic bellows breath)	3 min
13.	Nadishodhana Pranayama	2 min
14.	Ujjai Pranayama	2 min
15.	Vibhagiya pranayama (Sectional breathing)	6 min
16.	Relaxation	5min
17.	Mantra Chanting (om)	5 min

SAMPLE SIZE

The G*power software was utilized to analyze yoga poses combined for asthma, with a significance level of $p<0.05$. It recommended 47 participants for each group, but 60 were used to account for dropouts.

RESULTS

The demographic information for two groups—age, education, religion, family history, and type of school—is shown in table 2. Table 3 provides specifics on the baseline study variables.

Table 2: Demographic data of two groups

Demographic variables			Yoga Group (n=30)		Control Group (n=30)		Chi- square value and p value
			No.	%	No.	%	
1. Age in Years a.13 - 14			4	13.3	4	13.3	χ 2 = 1.450 d.f = 3
.15 - 16 c.17 - 18d.19	7 17 2	23.3 56.7 6.7	9 13 4	30.0 43.3 13.3	p= 0.694 (N.S)		
2. Education a. <8 Std b. Secondary c. Hr. Sec d. Higher education	 3 7 13 7	 10.0 23.3 43.3 23.3	 4 10 8 8	 13.3 33.3 26.7 26.7	χ 2 = 1.929 d.f = 3 p= 0.587 (N.S)		
3. Religion a. Hindu b. Muslim c. Christian	 24 3 3	 80.0 10.0 10.0	 24 4 2	 80.0 13.3 6.7	χ 2 = 0.343 d.f = 2, p= 0.842 (N.S)		
4. Family history a. Yes b. No	 4 26	 13.3 86.7	 3 27	 10.0 90.0	χ 2 = 0.162 d.f = 1 p= 0.688 (N.S)		
5. Type of school a. Govt School b. Govt. Aided School c. Private Metric School d. CBSE School e. Govt. College f. Private College	 3 7 6 2 3 9	 10.0 23.3 20.0 6.7 10.0 30.0	 4 8 7 1 5 5	 13.3 26.7 23.3 3.3 16.7 16.7	χ 2 = 2.263 d.f = 5 p= 0.812 (N.S)		

Table 3: Yoga and control group Pre test values

Clinical variables	Yoga Group (n=30)		Control Group (n=30)		t test value and p value
	Mean	SD	Mean	SD	
PEFR	305.67	39.74	296.50	35.41	t=0.943, p=0.349 (N.S)
BHT	14.33	1.58	14.37	1.098	t = 0.095 p=0.925 (N.S)
PAQLQ	60.33	7.23	58.90	7.862	t = 0.735 p= 0.465 (N.S)

Note: p value are Not significant (p>0.05)

Table 4: Yoga and control group Post test values

Clinical variables	Yoga Group (n=30)		Control Group (n=30)		t test value and p value
	Mean	SD	Mean	SD	
PEFR	448.83	35.45	310.17	27.65	t=16.895, p=0.000***
BHT	45.27	6.596	15.77	1.501	t = 23.884 p=0.000***
PAQLQ	132.27	15.090	66.43	8.791	t = 20.647 p= 0.000***

Note: p value are significant (p<0.001)

Table5: Yoga and control group follow up test values

Clinical variables	Yoga Group (n=30)		Control Group (n=30)		t test value and p value
	Mean	SD	Mean	SD	
PEFR	483.67	33.47	314.67	26.81	t=21.583, p=0.000***
BHT	50.03	7.218	16.27	2.196	t = 24.513 p=0.000***

PAQLQ	135.80	17.365	70.57	7.981	t = 18.695 p= 0.000***

Note: p value are significant (p<0.001)

Table 6: Effect score of PEFR between the groups

Group	Effect Score of PEFR			
	Yoga Group		Control group	
	Mean	Paired t test	Mean	Paired t test

	(SD)	and p value	(SD)	and p value
Pre-test – Post test	143.17 (11.256)	t = 69.66 p = 0.000 ***	13.67 (18.380)	t = 4.073 p = 0.000***
Pre-test – Follow-up	178.00 (28.454)	t = 34.263 p = 0.000 ***	18.17 (22.533)	t = 4.416 p = 0.000***
Post test – Follow-up	34.83 (24.99)	t = 7.632 p = 0.000 ***	4.50 (12.618)	t = 1.953 p = 0.060(N.S)
Pretest- Posttest-Follow-up	Repeated Measures ANOVA F = 4462.612 p= 0.000***		Repeated Measures ANOVA F = 3533.568, p= 0.000***	

Table 7: Effect score of BHT between the groups

Group	Effect Score of BHT			
	Yoga Group		Control group	
	Mean (SD)	Paired t test and p value	Mean (SD)	Paired t test and p value
Pre-test – Post test	30.93 (6.023)	t = 28.132 p = 0.000 ***	1.400 (1.993)	t = 3.847 p = 0.001***
Pre-test – Follow-up	35.70 (6.758)	t = 28.936 p = 0.000 ***	1.900 (2.631)	t = 3.956 p = 0.000**
Post test – Follow-up	4.767 (3.202)	t = 8.153 p = 0.000 ***	0.500 (2.418)	t = 1.133 p = 0.267(N.S)
Pretest- Posttest-Follow-up	Repeated Measures ANOVA F = 1783.557 p= 0.000***		Repeated Measures ANOVA F = 7963.755, p= 0.000***	

Note: p value are significant ***(p<0.001), N.S-Not Significant

Table 8: Effect score of PAQLQ between the groups

Group	Effect Score of PAQLQ			
	Yoga Group		Control group	
	Mean (SD)	Paired t test and p value	Mean (SD)	Paired t test and p value
Pre-test – Post test	71.933 (12.717)	t = 30.982 p = 0.000 ***	7.53 (10.963)	t = 3.764 p = 0.001 ***
Pre-test – Follow-up	75.467 (16.115)	t = 25.649 p = 0.000 ***	11.67 (9.890)	t = 6.461 p = 0.000 ***
Post test – Follow-up	3.533 (6.740)	t = 2.871 p = 0.008*	4.133 (10.686)	t = 2.119 p = 0.43 (N.S)
Pretest- Posttest-Follow-up	Repeated Measures ANOVA F = 2531.527, p= 0.000***		Repeated Measures ANOVA F = 4167.91, p= 0.000***	

Note: p value are significant ***(p<0.001), *(p<0.05), N.S-Not Significant

DISCUSSION

Parametric tests were used for all statistical analysis with a p-value of greater than 0.05. The new intervention module hasproduced significant results in all measured variables, including zero dropout. Comparisons of the baseline, post-intervention, and follow-up values using the Independent t test are provided in Tables 3, 4, and 5, respectively. The two groups' differences, as indicated in Tables 6,7 and 8 were substantial and highly significant.

Tables 6, 7, and 8 demonstrate that the results of the repeated measures ANOVA and t test on the yoga group had a highert value than the control group with a significance level of <0.001.

The study's entire set of results indicates that BHT and PEFR are statistically significant in the asthmatic participants. If someone argues that a study needs a large number of subjects, but the study has zero dropout rate and the data was collected based on the G power, then deviating from this requirement would have made the study inappropriate.

Based on PEFR findings and BHT practices of pranayama According to a study(Turankar et al., 2013), alternate nostril breathing (ANB) with intermittent breath holding resulted in decreased pulse rate and increased galvanic skin resistance. A study showed that doing Ujjayi Pranayama with breath holding for a brief period of time increased oxygen consumption(Telles & Desiraju, 1991).

Conversely, extended breath holding was associated with decreased oxygen consumption. The effects of intermittent breath holding are unknown because the practices of ANB and Ujjayi Pranayama have been found to affect human

physiology even in the absence of breath holding ((Bhavanani et al., 2014); (Ghiya & Lee, 2012)). Also, pranayama and chanting results decreased sympathetic activity and increased parasympathetic activity. These also increases oxygenationof tissue, balances metabolism and autonomic activity.

CONCLUSION

It is concluded that yogic practices have significant changes on Peak flow expiratory rate and breath holding among asthmatic adolescents' boys. Pranayama practices increased pulmonary activity, improve lung efficiency, reduce inflammation, and enhance deep breathing. The present study shows yogic practices, pranayama with mantra chanting results better lung function and improved quality of life among asthmatic adolescent.

ETHICAL APPROVAL

The Meenakshi Medical College and Research Institute's Institutional Ethics Committee approved the study on August 5, 2022.

CONFLICT OF INTEREST

No conflict of interest.

SOURCE OF FUNDING

Nil

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