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IMPACT OF YOGA ON PULMONARY FUNCTIONS AMONG ASTHMATIC PATIENTS

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ABSTRACT

"Pranayama" is a Sanskrit word, meaning development of control on breathing, it also said as the different forms of energy in the universe. Breath is the symbol of life force in all individuals which also form a bridge between the body and mind. This breathing technique can produce various physiological responses in healthy individuals. Breathing improves the efficiency of respiratory muscle and lung compliance during inspiration by reducing the elastic and viscous resistance of lung. Pranayama is a basic self-control method that entails raising one's awareness of one's breath. Because chronic asthma reduces expiratory air flow and chronic inflammation, patients with asthma use their auxiliary breathing muscles more. Patients experience air hunger as a result, and they end up breathing through their mouths in little, fast breaths. These modifications lessen the capacity for deep breathing and breathing efficiency. High degrees of worry, fear, and anxiety are also brought on by respiratory distress, especially during asthma attacks. The symptoms of asthma can be exacerbated by these abnormal breathing patterns. By the practice of pranayama, conscious breathing patterns are meant to take the place of these weak breathing patterns. Asthma symptoms can be controlled by using a variety of breathing techniques, including deep breathing, breath-holding sessions, rapid/slow breathing, nasal breathing, and diaphragm use, which are used to regulate the differentiation of the respiratory rate over time in pranayama.

KEYWORD: Pranayama, deep breathing, breath-holding sessions, rapid/slow breathing

1. INTRODUCTION

Acute asthmatics can recover, but those with chronic asthma must take medication on a daily basis. Inhaled corticosteroids and long-acting β2-agonists are the mainstays of treatment for persistent asthma. Other beneficial medications include the use of IgE blockers, leukotriene modifiers, and oral steroids. The majority of asthmatics still have symptoms and a low quality of life despite all these medications8.

Asthma management with an integrated strategy is becoming more popular. The traditional approach to managing asthma has been to concentrate on medication while maybe neglecting alternative management options. Breathing exercises, acupuncture, chiropractic care, homeopathy, massage treatment, Qigong, relaxation, mind-body therapies, and nutrition are reviewed in relation to the employment of unorthodox methods. Asthma is a respiratory system breathing illness, thus using improper breathing techniques might make symptoms worse. Deep breathing, relaxation techniques, breathing pattern modification, and other activities are examples of breathing exercises. When performed correctly and consistently, it offers a basic method for self control. The three primary breathing techniques that are frequently employed and have been shown to be beneficial for asthma sufferers are the Buteyko breathing technique, respiratory physiotherapy breathing exercises, and pranayama, a yoga component.

When pranayama is used in yoga therapy for asthmatics, the need for adrenergic inhalers is reduced without affecting the results of pulmonary function tests. Another study found that asthmatic patients who learned pranayama saw a statistically significant rise in the absolute values of the various ventilatory function measures as well as a decrease in medication dosage. Regarding Pranayama's impact on pulmonary function tests, bronchodilator use, and other factors, there are conflicting data. Studies comparing the benefits of Buteyko Breathing Technique (BBT) and Pranayama using the Pink City Lung Exerciser (PCLE), a device that replicates the Pranayama breathing technique, revealed no advantages for Pranayama. The foundation of BBT consists of a set of breathing exercises with an emphasis on relaxation, breath holding, and nasal breathing. Similar to some types of yoga, it is said to assist patients in retraining their breathing to reestablish a natural pattern. There is a need to investigate the impact of pranayama in chronic stable asthma in light of these contradictory reports.

There have only been seven such trials carried out, and the outcomes of these trials have not been consistent, according to a recent Cochrane review of breathing exercises on asthma, which chose randomized or quasi-randomized controlled trials of breathing retraining in patients of all ages with a diagnosis of asthma. The effect of breathing exercises on asthma has not been thoroughly studied in controlled studies, so our study aimed to address the following research questions: can pranayama and respiratory physiotherapy help manage chronic asthma better than controls, and can these methods have an impact on the pathophysiology of asthma, specifically inflammation and atopy?

Studies using breathing exercises based on respiratory physiotherapy have shown increases in quality of life, and decreases in the usage of bronchodilators in asthma; nevertheless, its impact on pulmonary function tests is

debatable. In the case of asthma, breathing techniques such as pursed-lip breathing have been recommended by respiratory physiotherapy. Pursed-lip breathing is supposed to give patients a better sense of control over their respiratory condition, which in turn allows them to relax during flare-ups and lessens symptoms. Nevertheless, respiratory exercises are rarely recommended by clinicians to their patients with chronic asthma. Therefore, it's important to evaluate the role that respiratory physical therapy plays in the daily treatment of asthma.

There isn't much research on comparing Pranayama and respiratory physiotherapy head-to-head, despite the fact that studies on the two practices separately have been published. In order to determine whether Pranayama has a greater effect on asthmatics than respiratory physiotherapy, our study compared the effects of the breathing exercise known as Pranayama on subjects with chronic bronchial asthma to controls on standard care.

1.1 STATEMENT OF THE PROBLEM

Asthma is not just a condition but a syndrome. This is an episode of the disease is interspersed with acute exacerbations and without symptoms Timeframes. Most attacks are typically short-lived and last minutes to hours, and clinically, after an attack the patient seems to recover entirely. There can be a phase however in which the patient experiences some Degree of daily airway obstruction known as chronic asthma. This phase may be mild, with severe episodes superimposed or not, or much more serious with severe obstruction that persists for days or even days Weeks this latter condition is known as severe acute asthma. Those studies were overall too small to provide a reliable estimate of the efficacy of asthma respiration exercises. Nonetheless Impossibility to run double-blind breathing retraining studies further randomised controlled trials should be appropriate as intervention breathing retraining undertaken to evaluate the different methods. The methods for assessing patients should be fully described, Officials and professionals. Additional research and bigger research required including results measurements such as state of health Questionnaires, symptom free days and frequency assessments and definitions of exacerbations alongside physiological routine Measurements and also measures for inflammation of the airways.

2. REVIEW OF LITERATURE

A study was carried out in 2020 by Harinath, Malhotra, Pal, Prasad, Kumar, Kain, and Sawhney to assess the "effects of Hatha yoga and Omkar meditation on cardio respiratory performance, psychological profile, and melatonin secretion." A total of thirty healthy men in the 25–35 age range were chosen as subjects, and they were split into two groups of fifteen each at random. For three months, Group 1 subjects acted as controls. They

engaged in 40 minutes of body flexibility exercises, 20 minutes of gentle running in the morning, and 60 minutes of gaming in the evening. Group 2 participants engaged in 45 minutes of specific yoga asanas (postures) and 15 minutes of pranayama in the morning. In contrast, these participants engaged in preparatory yoga postures for 15 minutes, pranayama for 15 minutes, and meditation for 30 minutes every day for three months during the evening hours. Before and after three months of practicing yoga, the following parameters were measured: orthostatic tolerance, heart rate, blood pressure, respiratory rate, and psychologic profile. Dynamic lung function includes forced vital capacity, forced expiratory volume in one second, forced expiratory volume percentage, peak expiratory flow rate, and maximum voluntary ventilation. In order to investigate the impact of these yoga techniques and Omkar meditation on melatonin levels, serial blood samples were taken at different time intervals. The psychological profile and cardio-respiratory performance improved after three months of yogic practices. Following three months of yoga practices, there was also a rise in plasma melatonin. Plasma melatonin did not significantly correlate with systolic blood pressure, diastolic blood pressure, mean arterial pressure, or orthostatic tolerance. Nonetheless, there was a noteworthy association ($r = 0.71$, $p < 0.05$) between the highest melatonin levels at night in the yoga group and the well-being score. These findings imply that yoga exercises can be used as psychophysiologic stimuli to raise melatonin secretion in the body, which may then be the cause of an enhanced experience of wellbeing.

A study was carried out by Saxena & Saxena (2019) "to evaluate the effect of breathing exercises (pranayama) in patients with mild to moderate severity bronchial asthma." 50 bronchial asthma cases (defined as Forced Expiratory Volume in One Second; FEV1) greater than 70% were chosen as participants and split into two groups: group B (control) and group A (experimental). For a duration of 12 weeks, patients in group A received treatment with breathing exercises (such as deep breathing, Brahmari and Omkara chanting, etc.) for 20 minutes twice a day. In contrast to regular Omkara chanting, patients were taught to chant at a high pitch (forcefully) and with a lengthy exhale. During a 12-week period, Group B received 20 minutes of meditation twice a day. Peak Expiratory Flow Rate (PEFR) and FEV1% were measured for both groups at the beginning and end of the 12-week period. Compared to group B individuals, after 12 weeks, group A subjects had significantly better symptoms, FEV1, and PEFR. It was determined that pranayama, or breathing exercises, particularly expiratory activities, enhanced lung function both objectively and subjectively and ought to be a regular component of treatment.

The study undertaken by Sultana D., Mathew, Gincy, and Vipin A.U. (2019) sought to ascertain the "effect of 12-weeks of cycling and pranayama on selected respiratory variables." Sixty women postgraduate students from

Pondicherry University were chosen as subjects and split into four groups at random: three experimental groups (each with 15 participants) and one control group (with 15 participants). For a duration of 12 weeks, Group I engaged in cycling, Group II in pranayama, and Group III in a mix of cycling and pranayama five days a week. During the same time period, the control group did not engage in any kind of physical activity (cycling or pranayama). Prior to and following a 12-week period of cycling and pranayama, each individual underwent testing in a selection of respiratory variables, including respiratory rate, tidal volume, and vital capacity. The number of breaths per minute was used to determine the respiratory rate. the vital capacity and tidal volume measured in trash using a typical Spiro meter. After 12 weeks of cycling and pranayama practices, there was a substantial change in respiratory rate, tidal volume, and vital capacity, according to an analysis of data relevant to specific respiratory variables using ANOVA.

3. OBJECTIVES OF THE STUDY

1. Effect of breathing exercises in Pranayama or respiratory physiotherapy on improvement of the six-minute walk test and breathing time in chronic bronchial asthma
2. Effect of Pranayama or respiratory breathing exercises in chronic bronchial asthma on the medication dosage of inhaled corticosteroids and bronchodilators

4. RESEARCH METHODOLOGY

The present study is intended to evaluate Pranayama's efficacy in decreasing the level of depression among the elderly. The chapter deals with a brief overview of the various steps that the researcher or analysis is taking under. This includes research method, environment, population, sampling and sampling methodology, tool range, validity, reliability, pilot project, data collection process, and data analysis plan. This study was conducted in New Delhi. The elderly from Indian Red Cross Society Old Age Home, Saket, New Delhi and the sampling too was from the same site. Such a setting was chosen as maximum number of patients with chronic asthma on stable therapy was likely to visit. This study was a controlled (non-randomized) clinical trial with three separate groups consisting with adult patients with persistent, chronic asthma who met the criteria for inclusion and exclusion. The patients were initially stable on medication until no further symptomatic progress took place. Along with standard treatment, all research subjects were assigned to the respiratory physiotherapy group or the Pranayama group, and only standard treatment was provided to the control group. Participants included qualifying subjects who met the study's requirements of inclusion and exclusion. The research

included a total of 150 subjects. These patients were eventually assigned to three groups.

4.1 STATISTICAL ANALYSIS OF THE STUDY

For all the quantitative data between the 3 groups and the Chi-square test for the qualitative data, the study was carried out using ANOVA, a one-way variance analysis (F-test). Using descriptive statistics, all the descriptive analysis of age, sex, degree of dyspnoea, and asthma symptom score was performed. Age, gender and period of asthma were balanced by confounding variables. Adjustment was not needed for confounding variables because it was done at the time of subject selection.

5. RESULTS AND DATA INTERPRETATION

Four of the Pranayama group's subjects were lost to follow-up before the study's conclusion. These subjects could not be located and did not show up for the follow-up. Adverse effects resulted in the withdrawal of two trial participants from the Pranayama group. Total sample size is 150 in this randomly selected sample is used for analysis.

Blood tests that measure the atopy of bronchial asthma include the measurement of immunoglobulin E (IgE) and the Absolute Eosinophil count (AEC). An evaluation of the inflammatory response in the respiratory tract is provided by C-reactive protein (CRP). Every one of the three was evaluated both at baseline and six weeks later.

TABLE 5.1: CHANGE IN THE OUTCOME OF IGE, CRP AND AEC IN THE STUDY GROUPS AT BASELINE AND 6 WEEKS POST INTERVENTION USING WILLCOXAN SIGNED RANK TEST

Group	Parameter	Baseline	Post intervention	Mean Difference	Std. Deviation	Z	p value	Mean (95% CI) between group difference	
								Upper bound	Lower bound
Pranayama Group (n=5	IgE(IU/mL)	2358.56	1653.77	693.6	1754.14	4.565	**0.001**	181.52	748.74
	AEC	383.38	310.37	76.3077	204.977	3.056	**0.002**		
		19.24	133.37						

2)	(cells/cmm)						
	CRP (mg/dL)	5.01 0.42 5.55	2.12	2.9885	9.216	2.312	0.021
Respiratory Physiotherapy Group (n=50)	IgE (IU/mL)	1492.05 -22.36 382.61	1311.92	180.126	712.50050	4.252	**0.001**
	AEC (cells/cmm)	375.90 27.77 153.67	285.18	90.7200	221.51317	3.847	**0.001**
	CRP (mg/dL)	7.93 .55 11.51	1.90	6.0320	19.28694	3.059	**0.002**
Control Group (n=31)	IgE (IU/mL)	1245.53 201.3419 742.80487	1446.87 2.038	- 0.042	-473.80	71.12	
	AEC (cells/cmm)	319.31 12.2032 176.94250	331.52 .885	- 0.376	-77.10	52.70	
	CRP (mg/dL)	6.12	4.74	1.3871	8.34537	.405	0.686 -1.67 4.45

IgE in the Pranayama group significantly dropped by 693.6 IU/mL (p=0.001), but there was a decrease of 180.126 IU/mL (p=0.001) in the respiratory physiotherapy group, according to Table. In contrast, there was an increase of 201.3419IU/mL (p=0.042) in the control group. Following intervention, AEC levels dropped by 76.3077 cells in the Pranayama group and by 90.7200 cells in the respiratory physiotherapy group; however, the control group experienced a slight rise of 12.2032 cells. CRP levels showed a slight decrease of 2.9885 mg/dl in the Pranayama group and 6.0320 mg/dl in the respiratory physiotherapy group. Additionally, by the conclusion of the six weeks, the control group had marginally decreased (but not statistically significantly) by 1.3871 mg/dl.

TABLE 5.2: MEAN DIFFERENCE OF THE BLOOD PARAMETERS IN THE DIFFERENT GROUPS USING KRUSKALL WALLIS TEST

Parameter	Group	N	Mean	Std. Deviation	H	p value

IgE Diff.	Pranayama	52	693.646	1754.150		
	Respiratory physiotherapy	50	180.126	712.501	25.643	**0.001**
	Control	31	-201.342	742.805		
CRP Diff.	Pranayama	52	2.988	9.217		
	Respiratory Physiotherapy	50	6.032	19.287	6.623	0.036
	Control	31	1.387	8.345		
AEC Diff.	Pranayama	52	76.308	204.977		
	Respiratory Physiotherapy	50	90.720	221.513	10.213	**0.006**
	Control	31	-12.203	176.942		

The comparison of the three groups is displayed in Tables. Comparing the Pranayama group to the respiratory physiotherapy group and the control group, it was seen that the Pranayama group had a higher drop in IgE levels. However, the respiratory physiotherapy group's AEC and CRP levels decreased more than the other group's. At the end of the six weeks, the CRP levels in the control group had not significantly decreased, but the levels of IgE and AEC had. As can be observed in Table, a between-groups study revealed no discernible difference between the respiratory physiotherapy and Pranayama groups. However, when comparing the two intervention groups separately to the control group, a substantial difference was seen.

TABLE 5.3: COMPARISON OF THE IGE, CRP AND AEC DIFFERENCE BETWEEN THE 3 DIFFERENT STUDY GROUPS USING MANN WHITNEY U TEST

difference Study groups	**IgE difference**		**CRP difference**		**AEC**
	z	p p	z	p	z
Pranayama	1.024	.306	.764	.445	.368	.713
vs						
Respiratory physiotherapy						

Pranayama *vs* Control	4.566	.001	1.955	.05	2.688	**.007**
Respiratory physiotherapy *vs* Control	4.411	.001	2.532	.011	3.052	**.002**

Table displays any variation in bronchodilator usage that the subjects in the three distinct groups reported. Out of the 52 participants in the Pranayama group, two had stopped taking bronchodilators, and three had stopped using rescue inhalers in the respiratory physiotherapy group. It should be mentioned that the participants were told not to quit taking any medications while they were receiving treatment. In contrast, all of the participants in the control group finished their medication by the conclusion of the follow-up.

TABLE 5.4: NUMBER OF PATIENTS WITH CHANGE IN BRONCHODILATOR USAGE IN EACH GROUP BEFORE AND AFTER INTERVENTION USING MCNEMAR TEST

Group	Timeline	**No of subjects on Bronchodilators**		**p value**
		Yes	No	
Pranayama Group	At Baseline (number)	52	0	.775
	After 6 weeks (number)	50	2	
Respiratory physiotherapy group	At Baseline (number)	50	0	No significance
	After 6 weeks (number)	47	3	
Control group	At Baseline (number)	30	0	No significance
	After 6 weeks (number)	30	0	

Table demonstrates a significant reduction in the Pranayama group's inhaled corticosteroid-using patients by the conclusion of the 6-week period ($p<0.001$). The number of participants utilizing inhaled steroids did not significantly decrease in the respiratory physiotherapy and control groups, however. Once more, the individuals were told not to discontinue or alter their ICS during the course of treatment.

TABLE 5.5: NUMBER OF PATIENTS IN EACH GROUP WHO HAD CHANGED THEIR USAGE OF INHALED STEROIDS BEFORE AND AFTER INTERVENTION USING MCNEMAR TEST

Group	Timeline	**Number odf subjects on ICS**		**p value**
		Yes	No	
Pranayama	At baseline	47	5	**< .001**
	After 6 weeks	29	23	
Respiratory physiotherapy	At baseline	48	2	No significance
	After 6 weeks	42	8	
Control	At baseline	29	3	No significance
	After 6 weeks	30	1	

Table shows that following intervention, the Pranayama group's dyspnea grade improved. At baseline, the majority of the Pranayama group's participants (n=34) had a Dyspnoea Grade of 3, however following six weeks of intervention, the majority of the patients had a Grade 2, which represented a significant change.

6. CONCLUSION

The primary secondary goals of IgE, AEC, and CRP were evaluated following a 6-week intervention, as indicated by the secondary outcome measure. Following intervention, there was a reduction in the levels of atopy and inflammatory markers in both the Pranayama and respiratory physiotherapy groups. IgE and AEC levels increased in the control group from the beginning to the end of the six-week period. However, there was a non-significant drop in the control group's CRP levels.

There was no discernible difference in the intake of bronchodilators as indicated by the other secondary outcome measures of drug usage. Despite being instructed not to reduce their use, only the Pranayama group's

ICS usage reduced. Both intervention groups improved on the dyspnea grade and asthma symptom score assessments. After six weeks, the control group's assessment revealed no changes.

Our study's findings indicate that practicing pranayama and respiratory physiotherapy for six weeks can help asthmatics. Its importance in chronic asthma will be demonstrated by long-term research lasting three, six, or even a year. Given that these procedures are both inexpensive and side effect-free, it is advantageous even if only 50% of the patients follow through.

The low dropout rate is the study's strongest point. Consequently, it is highly advised that these breathing techniques be applied as an adjuvant therapy to treat and improve chronic bronchial asthma and help people with the illness gain greater control.

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