ORIGINAL RESEARCH PAPER

Physiology

A PEFR (PEAK EXPIRATORY FLOW RATE) STUDY TO ACCESS THE EFFECTIVENESS OF PRANAYAMA ON PATIENTS WITH BRONCHIAL ASTHMA

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ABSTRACT

BACKGROUND: Asthma is reversible airway obstruction and bronchial hyper responsiveness to stimuli such as allergens, viruses air pollutants, exercise and cold air. Asthma is a chronic inflammatory disorder of tracheobronchial airways. Bronchial asthma is one of the most frequent chronic inflammatory disorder of airways and constitute a major social problem.

AIMS-A PEFR (Peak expiratory flow rate) Study to access the effectiveness of pranayama on patients with bronchial asthma.

OBJECTIVES

1.To determine the effect of all breathing exercise(Anuloma-viloma,Bhramri,Kapalbhati,Bhastrika,Bhaya) in Bronchial asthma Patients.

2.To compare the PEFR in Control group(WithoutPranayama)and study group (practising pranayama) in Bronchial asthma patients after 6 months.

MATERIAL& METHOD: Study group-PEFR was measured in diagnosed 80 (40 male and 40 female)bronchial asthma patients of aged 30-50 years. That we divide into two subgroup. One is control group in that patients taking only drugs not doing any type of pranayama and another study group in which patients taking drugs and practicing pranayama. Mini Wright Peak Flow Meter was Used to Record PEFR.

RESULT: The Result of PEFR(Peak Expiratory Flow Rate) Before& After six month of all breathing exercise were compared & it was statistically significant improvement.for PEFR (p value<0.01). It was concluded From the study that the Pranayam (breathing exercise) is beneficial in long term.

INTRODUCTION

In the modern age due to growing industrialization mankind is compelled to face problem arising from pollution. This growing air pollution is probably a significant causative factor in certain bronchopulmonary diseases. Asthma is a heterogenous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptom such as wheeze, shortness of breath, chest tightness and cough that very overtime and in intensity, together with variable expiratory airflow limitation. Asthma is a common chronic inflammatory airway disorder. It is very common in children, teens,adults. It is a condition where air passage in the lungs become inflamed. The airpassage are the airways that carry air in and out of the lungs. When the air passage get inflamed it become red and swollen.It start to swell and sticy mucous or phlegm is produced. All these factor cause the airways to become narrow and make it difficult to breath.

Global asthma burden reported the prevalence of asthma is approximately 300 million cases all over the world and india has alone 30 million asthma patients Asthma is increasing 50% per decade out of every 250 death, one is due to asthma worldwide.

MATERIAL AND METHOD

PEFR was measured in diagnosed 80 (40 male and 40 female)bronchial asthma patients of aged 30-50 years. That we divide into two subgroup.One is control group in that patients taking only drugs not doing any type of pranayama and another group study group in which patients taking drugs and practicing pranayama.

WITHOUT PRANAYAMA (CONTROL)GROUP-it include 40 patients(20 male&20 female)it was informed not to do any new exercise program, but still maintain daily activities.

PRANAYAMA(STUDY) GROUP- It include 40 patients(20 male&20 female) was conducted to practice pranayam in 6 months.

1. The patients was advised to perform the following pranayama for the following duration :-

Types of Prnayama	Duration
1. Bhastrika Pranayama	3-5 minute
2. Kapalbhati Pranayama	3-5 minute
3. AnullomaViloma Pranayama	3-10 minute
4. Bhramri Pranayama	10 to 20 times
5. Bhaya Pranayama	5-10 minutes

All procedure was done in sitting posture and before starting the pranayam warm up session(yoga stretching) will be done. This cross sectional prospective study was conduct under supervision of Dr. Shashikant Agarwal (Professor in Physiology Department) in Department of Physiology and Yoga OPD at Jhalawar Medical College and Hospital, Jhalawar (Rajasthan) in collaboration with Department of Medicine and Department of T.B and Chest .The subjects was selected from SRG Hospital and Medical College Jhalawar

INCLUSION CRITERIA:-

1. 40 male and 40 female patient within the age goup 30-50 yrs who are having history of bronchial asthma for minimum 1yrs. They were on conventional drug therapy for the same period.
2. The weight of male patients will range from 70kg to 80kgs.
3. The heights of male patients will range from 175cm to 185cm
4. The weight of female patients will range from 55kg to 65kg
5. The height of female patients will range from 160cm to 170cm.
6. Patients not performing any type of breathing exercises during the past 6 months.

EXCLUSION CRITERIA:-

1. The patient who showed only seasonal attacks.The patients who were hospitalised in last 1 year due to severe attack of bronchial asthma which had required ventilator support
2. The patient who are having history of any other illness like Ischaemic Heart Disease, Renal Impairment, Respiratory Tract Infection ,Tuberculosis, Skeletal Chest Deformity
3. Female Patients who are Pregnant.

4. Any patient with History of Smoking ,Alcohal and tobacco.
5. Any patient who is performing any breathing exercise during past 6 months.

RESULT

Table 1 : Distribution of PEFR LT/MIN IN BASELINE among Without Pranayama and With Pranayama

Group Statistics						
	Group	N	Mean	Std. Deviation	T value	P value
Pefr Lt/min In Baseline	Without Pranayama	40	290.4250	46.60521	0.456	0.650
	With Pranayama	40	285.7500	45.15770		

Table :1 Show Statistically analyzed,mean value of PEFR in baseline among without Pranayama group and with Pranayama group.The mean value of PEFR in without Pranayama group was mean±SD (290.42±46.60) found and the mean valueof PEFR in with Pranayama group was mean±SD(285.75±45.15) found which indicate no significant difference (p>0.0001) between them.
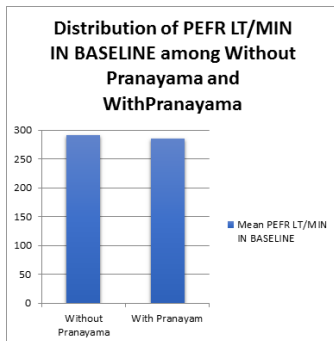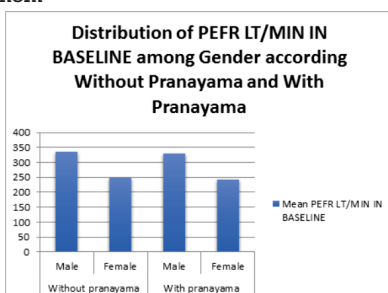
Graph-1

Distribution of PEFR LT/MIN IN BASELINE among Without Pranayama and WithPranayama

Table 2: Distribution of PEFR LT/MIN IN BASELINE among Gender according Without Pranayama and With Pranayama

Report						
PEFR LT/MIN IN BASELINE						
Group	Gender	Mean	N	Std. Deviation	T value	P value
Without Pranayama	Male	334.3500	20	11.45368		
	Female	246.5000	20	16.28852	19.7393	<0.0001*
	Total	290.4250	40	46.60521		
With Pranayama	Male	329.0500	20	9.87541		
	Female	242.4500	20	11.87866	25.0876	<0.0001*
	Total	285.7500	40	45.15770		

Table:2 Shows statistically analyzed, mean distribution of PEFR in baseline among gender acoording without Pranayama and with Pranayama group.The mean PEFR in baseline without Pranayama male mean±SD(334.35±11.45) and female mean±SD (246.50±16.28)found and the mean PEFR in baseline with Pranayama male mean ±SD (329.05±9.87) and female mean ±SD(242.45±11.87) found which indicate highly significant difference (p<0.0001) between them

Distribution of PEFR LT/MIN IN BASELINE among Gender according Without Pranayama and With Pranayama

GRAPH-2

Table 3 : comparison of PEFR LT/MIN IN different times among practising Pranayama Group

	N	Mean	Std. Deviation	F value	P value
Base Line	40	285.7500	45.15770		
After 3 Months	40	301.2250	45.74819	5.326	0.006*
After 6 Months	40	319.1250	46.40689		
Total	120	302.0333	47.40846		

Table :Pair wise comparison of PEFR LT/MIN

Post Hoc Tests

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Base Line	After 3 Months	-15.47500	10.23533	0.289
	After 6 Months	-33.37500*	10.23533	0.004*
After 3 Months	After 6 Months	-17.90000	10.23533	0.192

Table:3shows statistically analyzed, mean comparison of PEFR in different times baseline, after 3 months and after 6 months among practising Pranayama group.The mean PEFR in baseline among practising Pranayama group mean±SD(285.75±45.15)and after 3 months mean±SD(301.22±45.74)and after 6 months mean ±SD (319.12±46.40)found which indicate highly significant difference(p<0.0001) between them.
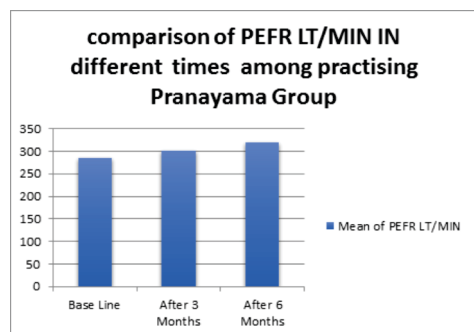
GRAPH-3

comparison of PEFR LT/MIN IN different times among practising Pranayama Group

Table4: Correlation of PEFR LT/MIN IN BASELINE with age, height and Weight

Descriptive Statistics					
	Mean	Std. Deviation	N	r value	P value
Age	40.2125	5.66511	80	-0.308	0.005*
Pefr Lt/min In Baseline	288.0875	45.65645	80		
height in cm	168.5250	10.93245	80	0.805	<0.0001*
Pefr Lt/min In Baseline	288.0875	45.65645	80		
Weight in kg	67.4250	8.27192	80	0.815	<0.0001*
Pefr Lt/min In Baseline	288.0875	45.65645	80		

Table:4 Shows it was Statistically significant (p=0.005) Negative correlation (-0.308) between age and PEFR in baseline. Mean ± SD for age (40.21±5.66) and for PEFR (288.08±45.65) was found. It was Statistically significant(p<0.0001) correlation (0.805) between height and PEFR in baseline. Mean ±SD for height(168.52±10.93) and for PEFR (288.08±45.65) was found. It was Statistically significant (p<0.0001) correlation (0.815) between weight and PEFR in baseline. Mean± SD for weight (67.42±8.27) and for PEFR (288.08± 45.65) was found.

DISCUSSION

Bronchial asthma, which has been increasing in incidence worldwide, is a morbid disease that can also be fatal. The important precipitating factors of asthma include occupational factors, viral infections, drugs, cold air, family history, stress, etc. It is a multifactor disease; clinically, it produces symptoms and signs like dyspnea (expiratory

difficulty), cough, and wheezing.

The present study was conduct on total number of 80 subjects, out of which 40 were without Pranayama (control group) (20 male and 20 female) and 40 were with Pranayama (study group) (20 male and 20 female). PEFR in without Pranayama group and with Pranayama group studied before and after 3 and 6 month of Pranayama therepy with refrence to age, height and weight. Value of PEFR was determined by Wrights peak flow meter.

Thus the result obtained in different experiments are presented in chapter-iv. This chapter describe the discussion on the result obtained in the study.

There was highly significant difference ($p<0.0001$) between Distribution of PEFR LT/MIN IN BASELINE among Without Pranayama and with Pranayama group according to Gender in our present study (shows in table 2 and graph 2)Because the mechanism by which pranayama is increasing the depth of breathing than normal depth of breathing. Lungs expand considerably and walls of the alveoli are stretched to maximum. It stimulate the stretch receptor situated in alveolar walls. Chest continues to expand under cortisol control, by doing so, it increase the surface area and air diffusion across the alveoli membrane. Exchange of O_2 and CO_2 across the thin walls of alveoli and blood capillaries takes place more as they practice more time. As the expiratory reserve volume of the air is used the air containing CO_2 is squeezed out from the lungs that causes increase in PEFR.

Similar result were reported by Nagrathna et al 2004, Goyeche et al 1982, Mcfadden et al 2005.

There was highly significant difference($p<0.0001$) between comparison of PEFR LT/MIN IN different times among practicing Pranayama Group in our present study (shows in table 3 and graph 3) And the significant PEFR found in after 6 month in Pranayama group. Similar result were reported by Erskine&Shoneel et al,1971, V singh, Wisniew, Britton,& Tatters, et al 1990,sodhi, singh&Dandona et al 2009.Because slow breathing like pranayama reduces the response of chemoreflex to hypercapnia and hypoxia. During slow breathing baroreflex sensitivity also high compared to the normal breathing it stimulate the theta amplitude and delta waves, which is indicate the parasympathetic state arousal .pranayama activate the pulmonary stretch receptor and which induce the duration& frequency of inhibitory neural impulses. Lungs inflation is a main physiological stimulus to release lungs surfactant and prostaglandin into alveolar space and it reduce the tone of bronchial smooth muscle .

CONCLUSION
It was concluded from the present study that pranayama has a beneficial effect on the patients of bronchial asthma& Hence breathing exercise can be suggest as an adjunct to the conventional drug therepy for the patients of bronchial asthma.

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