EFFECT OF YOGA THERAPY ON LUNG FUNCTIONS IN RESPIRATORY DISORDER SUBJECTS

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Abstract

The study entitled "Effect of Yoga therapy on Lung Functions in respiratory disorder subjects" has been done to the workers of Mandovi Motors Pvt. Ltd, Mangalore. 22 volunteer subjects suffering from respiratory problems between the age group 20- 50 years were selected. A 40 days long practical session were conducted from 9th February to 20th March, 2012, with a total of 13 subjects as Experimental group and another 9 subjects as control group. The experimental group was progressively introduced to the selected yogic practices. The session included a series of Āsanas, Prāṇāyāmas, Mudras and Relaxation techniques. The control group was not given any of these practices. The initial and final Lung Function Test readings were taken for both the groups using a Digital Spirometer, namely Helios 401. The results of various tests were analyzed through student 't' test. After Yoga therapy, the experimental group showed a significant improvement in FVC, FEV1,IRV and MVV. But there were no such significant results found in the Control Group.

Keywords: Yoga therapy, Lung function Test

Introduction

Health is the greatest asset in human life. Disease exists when health does not. Good health results from right diet, adequate exercise and a mind, which is stress free. The dramatic changes in our life style, sedentary way of working, wrong dietary habits, lack of exercise, smoking and alcoholism leading to many psychological and psychosomatic problems.

Every human society, be it rural or urban, industrial or technologically advanced, is affected extremely by pollution of the air. Atmospheric pollution due to the increase in the concentration of gases other than oxygen in the air is responsible for various respiratory illnesses like,

dust allergy, Cough, Cold, Noses block, Abnormal breath, Asthma, COPD[Chronic Obstructive Pulmonary Disease]. And Psychogenic [E.g. anxiety], Emotional imbalance and Excretion are the triggering factors for the Lung Function disturbances.

Increasing incidence of respiratory illness in modern times has triggered studies of how yoga can help in handling this problem. Various studies have revealed that regular practice of Yoga can prevent and cure respiratory illness. Yoga is used as preventive, promotive and curative measured in the treatment of various respiratory disorders as various practices like Kriyas, Āsanas, Prāṇāyāmas, Meditation and Relaxation techniques. This helps to relief the bronco-constriction, strengthens the lungs, improves the lung capacity and thus effectively used in the management of respiratory disorders. This study was an attempt to know the effect of selected Yogic practices on Lung Function Tests.

Objective of the study

1. To find out the impact of selected yogic practices on Lung Functions in respiratory disorder subjects.

Review of Literature

Bhole M.V and Karambelkar P.V (1969) in their study *Effect of yoga training on Vital capacity and breath holding time* stated that An average increase of 157mI. in vital capacity and an average increase of 15 seconds in the breath holdingtime were observed after the yoga training period.

Gore M M and Bhole M V (1982) concluded through their study namely *the respiratory responses to Vastra dhauti* in Asthmatics, that Yoga training for four weeks improved one second and two second TVC after VDh by 8 to 14 % and thiswas significant in the case of Males.

Nagarathna R and Nagendra H R (1985) reported that there was a significantly greater improvement in the group who practised yoga in the weekly number of attacks of asthma, scores for drug treatment, and peak flow rate in the patients of Bronchial Asthma.

Raj Kumar Yadav and Shobha Das (2000) studied the Effect of yogic practice on pulmonary functions in young females and shown significant increase in Forced Vital capacity(FVC), Forced Expiratory Volume in 1st second (FEV-l) and Peak Expiratory Flow Rate (PEFR) at the end of 12 weeks of yoga practice.

Manocha R et al (2002) showed that the practice of Sahaja yoga does have limited beneficial effects on some objective and subjective measures of the impact of asthma.

Demeke Mekonnen, and Dr Andualem Mossie (2010) in their study showed that Yoga exercise among asthmatic patients resulted in a decreased

number of day and night attacks and use of drugs. It also shows significant improvement in the peak expiratory flow rate.

Ahmed QR et al (2010) done an evaluation of pulmonary parameters in two groups of subjects during *Yoga* practice and concluded that regular practise of asanas and prānāyāmas can increase the efficacy of respiratory muscles.

Materials and Methods

The present study entitled "Effect of yoga therapy on Lung Functions IN respiratory disorder subjects" was conducted to assess the effect of selected yogic practices on the subjects suffering from respiratory problems in workshop workers of Mandovi Motors Pvt. Ltd, Mangalore. The subjects were randomly divided into two groups namely Experimental and Control. After taking a detail case-history of each individual, the Control group continued with normal lifestyle whereas the Experimental group was subjected to a set of seventeen yogic practices, which were introduced gradually and practiced six days per week between 6.15 pm to 7.15 pm. This practical session utilized a standard sequence of selected Āsanas, Prāṇāyāmas, Mudras and Relaxation Techniques. Appropriate precautions were taken for patients with other complications.

The following parameters are considered for the study.

FVC (Forced Vital Capacity), **FEV1** (Forced Expiratory Volume), **FEV1/FVC**
SVC (Slow Vital Capacity), **ERV** (Expiratory Reserve Volume), **IRV** (Inspiratory Reserve Volume), **MVV** (Maximum Voluntary Ventilation)

A Paired"t" test was employed in the study to analyze the results statistically.

The following yogic practices were administered to the Experimental group

Asanas:

Svastikāsana, Vajrāsana, Supta-Vajrāsana, Tādāsana I, Tādāsana II, Trikoṇāsana, Pārśvakoṇāsana, Pūrvottānāsana, Pavanamuktāsana, Bhujaṅgāsana, Śalabhāsana, Dhanurāsana, Vakrāsana, Marīcāsana I, Marīcāsana III, Viparītakaraṇi, Uttānapādāsana.

Pranayamas:

Ujjāyi, Anuloma-viloma, Bhastrikā

Relaxation Techniques:

Śavasana I, Śavasana II

Results

All the subjects under study were tested before and after 40days of yoga training which consisted of 60 minutes of practice in a day. The result shows an overall improvement in FVC, FEV1, ERV and MVV in

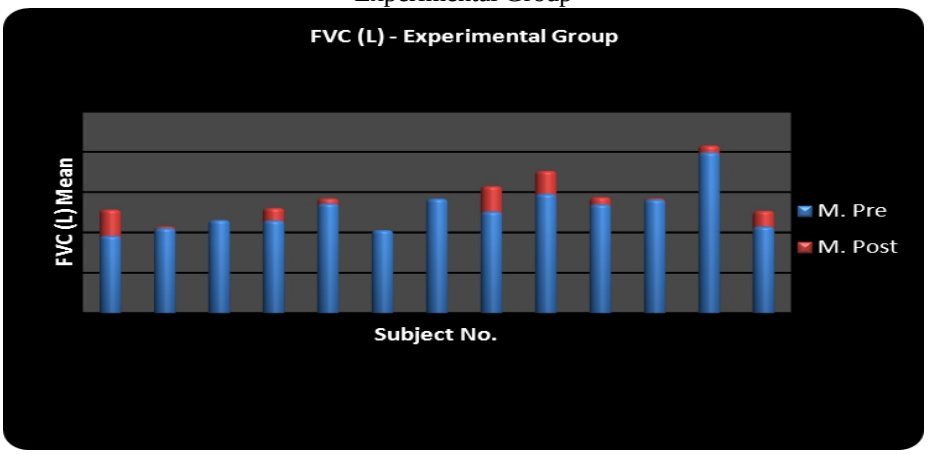
Experimental group. But not such significant improvement had shown in case of Control group. Some of the subjects in the Experimental group were reduced their dose of bronco dilators. It shows that functioning of Lungs and overall health has improved in the Experimental group compared to the Control group. Therefore, in general we can analyze the result as follows:

- As far as Forced Vital Capacity (FVC), is concerned, 13 out of 13 subjects of Experimental group showed an improvement in FVC.
- Maximum Voluntary Ventilation (MVV), which measures the greatest amount of air one can breathe in and out during one minute, has improved tremendously in Experimental group.
- Spirometric-interpretation has shown

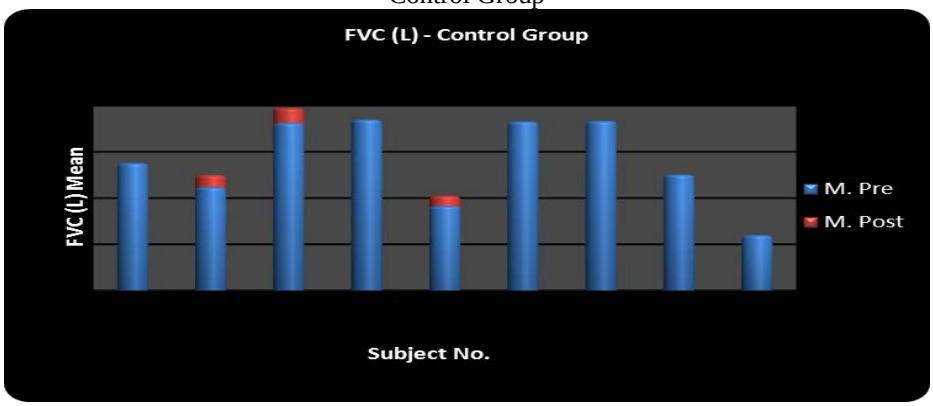
1. One subject recovered from Severe Early Small Airway Obstruction to normal and Chronic Obstructive Pulmonary Disease (COPD) severity from very severe stage to the normal limits.
2. Five subjects of Early Small Airway Obstruction recovered to normal after yoga therapy from severe stage.

Graphical Representation of FVC result before and after the Yoga Therapy

Experimental Group



Control Group



STATISTICAL ANALYSIS

A Paired "t" test was applied for each parameter and found out the value for each group viz, Experimental and Control. The results of "t" test are as follows.

Table I. Result of Statistical Analysis of Experimental Group

Sl. No.	Para-meter	Mean		S.D		t- value	p- value	Signi-ficance
		Pre	Post	Pre	Post			
1	**FVC (L)**	2.5692	2.7792	0.5445	0.5888	-2.67643	0.02017	**S**
2	**FEV1 (L)**	2.3407	2.6930	0.8726	0.6027	-1.88281	0.042094	**S**
3	**FEV1/FVC (%)**	91.4100	96.8276	26.5894	5.1843	-0.83318	0.421019	**NS**
4	**SVC (L)**	3.2423	3.3669	0.6870	0.5724	-1.1582	0.269313	**NS**
5	**ERV (L)**	0.6269	0.6015	0.7704	0.5219	0.132707	0.896624	**NS**
6	**IRV (L)**	0.7500	1.1030	0.4135	0.5116	-2.22251	0.046229	**S**
7	**MVV (L)**	77.8461	94.69231	36.7351	26.2944	-3.4658	0.004667	**HS**

Table II. Result of Statistical Analysis of Control Group

Sl. No.	Para-meter	Mean		S.D		t- value	p- value	Sig.
		Pre	Post	Pre	Post			
1	**FVC (L)**	2.8000	2.6577	0.9284	1.0159	1.110496	0.299045	**NS**
2	**FEV1 (L)**	2.6622	2.5500	0.9189	0.9551	1.361234	0.10527	**NS**
3	**FEV1/FVC (%)**	95.0833	96.4889	6.0251	4.0101	-0.69424	0.507188	**NS**
4	**SVC (L)**	3.6600	3.3855	0.7702	0.7456	1.516837	0.167782	**NS**
5	**ERV (L)**	0.7255	0.5288	0.5674	0.4635	0.835557	0.427652	**NS**
6	**IRV (L)**	0.9888	0.7500	0.5086	0.3138	2.147585	0.064016	**NS**
7	**MVV (L)**	76.5556	83.8889	31.3652	28.1889	-1.76	0.116447	**NS**

DISCUSSION

The various practices administered under the omnibus title 'yoga' cover a wide spectrum. This is inevitable because it is a way of life, the implications of which go beyond health and disease. When yoga is employed for prevention or management of disease some convenient and highly visible elements of yoga are used selectively. These practices have used yoga as a tool in mind-body medicine. This approach now has a strong foundation in psychoneuroimmunology, and is particularly relevant to a disorder of lung functions, which is characterized by deranged immune function.

The present study reveals that the concerned variables of Lung Function Test have been rationalized in terms of the hypotheses that the Experimental group will outperform the control group due to 40 days of yogic interventions. The results could best depicted that, there is significant improvement at a level of significance $p<0.05$ in FVC from the mean 2.569231 to 2.779231 with a significant p value 0.02017, for FEV1from 2.340769 to 2.693077at p=0.042094, IRV from 0.75 to 1.103077 at p=0.046229, the MVV has shown a highly significant improvement from 77.84615 to 94.69231 with a p value of 0.004667*. FEV1/FVC and SVC

have got a non-significant p-value but there was an improved significant mean for all these before and after the practice. That FEV1/FVC from 91.41 to 96.82769 and SVC has shown improvement in the mean from 3.242308 to 3.366923. But only ERV rate has not shown any significant improvement in p value and in mean. Compared to Experimental group, the Control group has not shown any such significant changes after the study. This reveals that the Experimental group has been benefited by yoga therapy.

The results of the present study allow a few fairly firm conclusions. Significant, steady and progressive improvement in key objective variables such as FVC and FEV1 only in the experimental group indicates the efficacy of yoga. This is further substantiated by the significantly greater improvement in quality of life in the experimental group than in the control group. Another possible explanation for the role of yoga in improving the functioning of Lungs and in reducing the mast cell degranulation could be based on the frictional stress from air flowing through narrowed airways damaging the airway mucosa and thereby perpetuating airway inflammation and airway obstruction. At high air flow rates, high values of the frictional stress could damage the airway wall, especially during episodes of cough, and particularly when the mucosa is inflamed and friable as it is in asthmatic patients. The slow and gentle breathing in some of the Prāṇāyāmas may reverse the process by reducing the frictional stress, and thereby stabilizing the mast cell degranulation. The yogic practices will remove the excess phlegm, cleanses the nerve channels, purifies the blood stream, and regenerates the liver, spleen and pancreas.

Conclusion

The result obtained from the present study can be concluded as below:

1. Yogic treatment will work efficiently to improve the functioning of the lungs.
2. It can work as a therapeutic tool for the disorders of the lungs.

It is evident from the above result that all the 13 patients responded to the treatment positively. Hence it is hypothysed that “The yogic practices will have a significant impact in the improvement of lung functions.” But the variation of the rate of success could be depended on the regularity of the practice, lifestyle, dietary change and the chronicity of the disease. Thus, we can say that Yoga therapy is fully fruitful for those who adhere to the regular practice. However, in practice the decline in compliance increases steeply as the study gets longer, possibly owing to the time commitment required from the subjects.

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