

A Study to Evaluate Efficacy of Pranayama on Respiratory Status of the Rice Mill Workers in the Selected Rice Mill Area in Burdwan West Bengal

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Abstract: A quasi experimental study designed to evaluate the efficacy of Pranayama on respiratory status of the rice mill workers in terms of FVC, FEV₁, FEV₁/FVC, FEF_{25%} - 75% PEFR. The Objectives of the study was to evaluate the efficacy of Pranayama exercises and to assess the relationship between the improvement of respiratory status and the demographic variables. The conceptual framework was based on Nursing Process. Simple random sampling technique was adopted in the study; a semi structured interview schedule was prepared for recording the data for demographic variables. Pranayama exercises were selected by the Head, Department of Physical Education, Jadavpur University. The data were collected through a computerized Spirometer Haliou 401, RMS made. The finding of the study revealed that there was no significant improvement in FVC and PEFR, but there was significant improvement in FEV₁ [t value 3.61 at df (45), p<0.05], FEV₁/FVC [t value 3.23 at df (45), p<0.05] and FEF_{25%} - 75% [t value 4.43 at df (45), p<0.05]. Chi square test for association with the improvement of respiratory status and the demographic variables was not significant. Based on the study findings, the recommendation was made for replication of the study on a large sample with greater duration of time.

Keywords: Pranayama, Respiratory status, Rice mill workers

1. Introduction

From ancient Indian history, we observe that the aim of Indian culture was to organize with the help of Yoga a godly type of mankind through individual regeneration. Pranayama was originated by "Indian Yogis" about five thousand years back. It has being used by the Yogis as a path for their spiritual needs Kundalini awakening and attainment of god, while its miraculous results start right from physical health and mind peace. Yoga has a great message for mankind - a message for a healthy body, a message for a beautiful body, a message for mental upliftment, a message for spiritual progress. (3)

Mechanism of Pranayama:

- 1) Pranayama is based on physical control of vital air.
- 2) Physics is the science of physical quantities and measurements.
- 3) During process of Pranayama many rules Physics and phenomenon are working.

Physiological effect:

The Physiological effects of Pranayama were described by Benson's group as the relaxation response. The components of the relaxation response which may be easily anticipated in terms of a shift in autonomic balance in favour of the parasympathetic division are:

- 1) Decrease in heart rate.
- 2) Decrease in respiratory rate.
- 3) Decrease in oxygen consumption.
- 4) Decrease in Blood Pressure, if basal Blood Pressure is high.
- 5) Increase in % time spent in alpha rhythm of EEG.
- 6) Decrease in blood lactate level.

What Are Mold Spores and Why Are They so Dangerous?

Just as plants produce seeds for reproduction, molds produce tiny spores. These spores are less than 4 microns in size - so small that as many as 250, 000 spores can fit on the head of a pin. On the farm, molds tend to grow in stored hay, grain, or silage when moisture content is high (30 percent) and storage areas are poorly ventilated.

Mold spores attach themselves to airborne dust particles when farmers move or work with hay, grain, or silage materials in which mold spores have grown. As a result, farmers and grain workers inhale both dust particles and mold spores. In fact, a farmer can inhale up to 750, 000 of these spores per minute.

Chronic farmer's lung has several symptoms:

- Occasional fever and sweating at night
- Progressively increasing shortness of breath
- Chronic cough
- Generalized aches and pains
- Appetite depression and weight loss
- Weakness, loss of energy
- Depression (9)

Because the shortness of breath develops gradually, a victim may not even be aware of the change. Also, the last three symptoms - - weight loss, lack of energy and depression - - tend to push the other symptoms into the background.

Objectives of the Study:

- 1) To assess the respiratory status of the group of workers who are exposed to the rice mill before the administration of Pranayama by pretest of lung function.
- 2) To assess the respiratory status of the same group of workers after the administration of Pranayama through post test of lung function.
- 3) To evaluate the efficacy of pranayama on respiratory status of the rice mill workers in terms of improvement of pulmonary function before & after the administration of Pranayama.

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4) To determine the relationship between the improvement of respiratory status by Pranayama with age, smoking habits, Year of exposure at rice mill, Previous history of chronic & acute Obstructive respiratory diseases of the workers of sample.

Research Approach

The research approach of the study was quasi experimental, which is a sub classification of quantitative research approach.

Research Design

The present study adopted the one group pre test – post test design.

Symbolic representation of the design

$R_E O_1 X O_2$



Variables under study:

- Independent variable: Pranayama Exercises.
- Dependent variable: Respiratory status in terms of FVC, FEV₁, FEV₁/FVC, FEF_{25% - 75%}, PEF_R.

dust of rice mill during their working hours for more than 3 years. Among 50 sample subjects, four refused to practice Pranayama regularly, so 46 actually considered as study subject.

Setting of the Study:

The study was conducted at Jagannath Rice Mill, Kamnara, Burdwan, West Bengal.

Sampling Technique

The sample selection was done by probability simple random sampling technique.

Population:

In the present study the population comprised all rice mill workers who are working at Jagannath Rice Mill, Burdwan for more than 3 years during the data collection period of 20.12.2010 to 15.1.2011.

Data collection tool and techniques:

Based on the objectives of the study, a computerized spirometer Helious 401, make RMS was used as data collection tool in order to obtain necessary data. The spirometer was the property of the Dept. of Physiology, Burdwan Medical College under the Dept. of Health and Family welfare, Govt. of West Bengal.

Sample

In the present study the sample size was 50 comprising those who were exposed to rice mill husk and dust for more than 3 years.

Demographic questionnaire was developed to get the demographic characteristics of the sample.

Sample size

In the present study total 50 subjects were enrolled within study period. The subjects were exposed to the husk and

For convenience of data collection, total sample was divided into 5 subgroups.

Table 1: Schematic presentation of the data collection Technique

Randomized Experimental groups (Four group consisting 9 persons and 10 persons in one group)	Pre - Test→ (respiratory status test by spirometry in terms of FVC, FEV ₁ , PEF _R , FEF _{25% - 75%} , FEV ₁ /FVC)	Treatment→ (Pranayama Exercises for 30 mins each day total 21 days)	Post test (respiratory status test by spirometry in terms of FVC, FEV ₁ , PEF _R , FEF _{25% - 75%} , FEV ₁ /FVC)
Group - A	Day - 1	Day - 2 to Day - 22	Day - 23
Group - B	Day - 2	Day - 3 to Day - 23	Day - 24
Group - C	Day - 3	Day - 4 to Day - 24	Day - 25
Group - D	Day - 4	Day - 5 to Day - 25	Day - 26
Group - E	Day - 5	Day - 6 to Day - 26	Day - 27

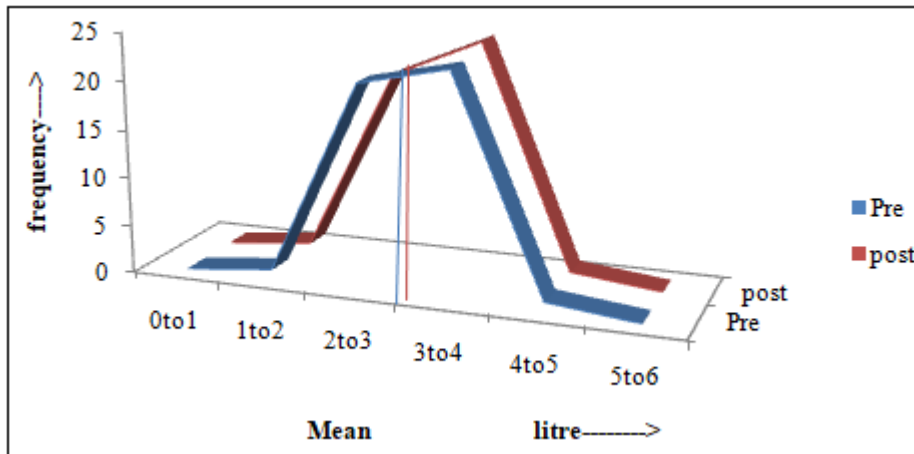


Figure presents the frequency polygon of the pre test and post test FVC value of the sample. The graphical representation compares between the pre test and post results of FVC value. The mean value of pre test FVC is 3.002 and the post test mean value of FVC is 3.005. Median value of pre test is 3.04 and for post test median value is 3.08. which shows positive skewness but it is negligible. It can be said that frequency is more in the class interval 3 to4, where the mean and median lie.

Table 2: Paired ‘t’ test for pre test and post test of FVC, before and after the practice of Pranayama exercises for 21 days, (n=46)

Result of FVC	Mean	Mean Difference	S. D	‘t’ value
Pre test	3.002	0.003	0.52	0.108 NS
Post test	3.005		0.54	

‘t’ (df45) ≥ 2.02, p>0.05

The result of paired ‘t’ test depicts that there is no significant improvement of FVC among the rice mill workers after completion of Pranayama exercises for 21 days. As the tabulated value of ‘t’ (df45) is ≥ 2.02. Obtained value is 0.108, which is less than the tabulated value.

Table 3: Paired ‘t’ test for pre test and post test of FEV₁ among 46 sample before and after practice of Pranayama for 21 days, (n=46)

Result of FEV ₁	Mean	Mean Difference	S. D	t value
Pre test	2.12	0.11	0.66	3.619*
Post test	2.01		0.67	

*Significant at 0.05 level

‘t’ (df45) ≥ 2.02, p<0.05

The table depicts that the ‘t’ value of paired ‘t’ test is 3.619 where as the table value of ‘t’ at df45 =2.02 at 0.05 level of significance. So there is significant increase of the value of FEV₁ on post test of respiratory status after practice of Pranayama for 21 days. The mean difference between the pre test and post test is not by chance, it is the true difference.

Table 4: Paired ‘t’ test for pre test and post test of FEV₁/FVC of the sample before and after the practice of Pranayama for 21 days (n=46)

Result of FEV ₁ /FVC	Mean	Mean Difference	SD	t value
Pre test	67.60	3.81	19.89	3.23 *
Post test	71.41		20.46	

*significant at 0.05 level

‘t’ (df45) ≥ 2.02, p<0.05

The table depicts that the ‘t’ value of paired ‘t’ test is 3.23 which is significant at 0.05 level with df =45. So there is significant increase of the value of FEV₁/FVC on post test of respiratory status after practice of Pranayama for 21 days which is statistically proved. The mean difference that is 3.81 percent is not by chance but it is a true difference which depicts that there is significant improvement of FEV₁/FVC value after doing Pranayama exercises for 21 days.

Table 5: Paired ‘t’ test for pre test and post test of FEF_{25% - 75%} among the rice mill workers before and after the practice of Pranayama for 21 days (n=46)

Result of FEF _{25% - 75%}	Mean	Mean Difference	SD	t value
Pre test	2.31	0.17	1.59	4.43*
Post test	2.48		1.56	

*significant at 0.05 level

‘t’ (df45) ≥ 2.02, P<0.05

The table 5 depicts that the ‘t’ value of paired ‘t’ test is 4.43 which is significant at 0.05 level with df (45). So there is significant increase of the value of FEF_{25% - 75%} on post test of respiratory status after practice of Pranayama for 21 days. The mean difference is 0.17 which is not by chance but it is a true difference.

Discussion of the findings related to the other studies

The finding of the present study reveals that Pranayama exercise improves the respiratory status of the rice mill workers who are potentially at risk of development of respiratory problem. Several researchers have reported the same kind of finding regarding efficacy of Pranayama on improvement of respiratory status among different kind of population, such as Dr. Thirunarayanawamy M, Dr. Jayabharati G (2010), Rai S, Mitkari S (2010), Yadav A (2008), Katihar S. K, Bihari S (2006), Nagerathna R (2006). All of them administered different kind of Pranayama exercises on different population for different duration. On post test of pulmonary function all of them were convinced the effect of Pranayama in improvement of respiratory status.

2. Conclusion

Based on the scientific evidence the present study concludes that Pranayama practice is effective in improvement of

respiratory status among rice mill workers who are exposed to husk and dust. Thus the potential problem of inadequate breathing pattern related to poor respiratory status can be prevented and or improved through regular exercises of Pranayama.

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