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Effect of pranayama on the selected physiological parameters of middle aged female

Dr. Susanta Jana

Abstract

The purpose of the study was to investigate the effects of Pranayama of selected physiological parameters of middle aged female (Age ranging 30 to 60 years). There was an Experimental Group and a Control Group. According to age the subjects were divided into two groups i.e., Young Adult (YA) age ranging from 30 to 45 years and Elderly Adult (EA) age ranging from 46 to 60 years. In the present study, all the subjects (34 volunteered women) of the Experimental groups were brought under a Pranayama training programme for 18 weeks. All the parameters i.e. Forced Expiratory Volume in one second (FEV_1) and Forced Vital Capacity (FVC) were measured before and after the Training Programme. For statistical analysis and interpretation of data 't'-test was conducted. Result showed a significant change in FEV_1 and FVC among both YA and EA of the experimental subjects.

Keywords: pranayama, experimental, control, FEV_1 and FVC

Introduction

The strength of the nation depends on the well-being of the mothers. Therefore, health of women folk should be our prime concern. Development of science and technology discouraging the human being from doing vigorous activity in daily life. As a result of which various physical and mental diseases are flourishing at a great speed throughout the world. Pranayama may be an important tools for the women for maintaining healthy and quality of life. Pranayama is one of the important aspects of Yoga. It is nothing but a controlled breathing exercise. According to Patanjali Pranayama is 'the regulation of incoming and outgoing flow of breath with retention'. Pranayama helps in strengthening the immune system. Regular practice of Pranayama helps in improving the mechanical efficiency of our breathing and makes the most of our lung capacity (Sripriya Venugopal). Every human society, be it rural or urban, industrial or technologically advanced, is affected extremely by pollution of the air. The expiratory system takes oxygen from the atmospheric air and conveys it through circulation of blood to all body cells, and tissues according to their needs. The bronchi and bronchiole are air pathways that may cause respiratory distress if they become constricted or narrowed for any reason (Williams, M.H: 1985). Any obstruction in the respiratory passages causes in sufficient aeration of lungs and sometimes it may lead malformation of chest (Rathbone, J.L: 1939) and weakness in the intercostals muscles restricting the movement of diaphragm which plays very important part in breathing. Obstruction in normal breathing also leads to irritation of the mucous membranes in the nasal pharynx, and cardio pulmonary insufficiency develops leading to loss of capacity of motor abilities. Pranayama is one of the best remedies to tackle respiratory illness caused by air pollution and other naturally occurring respiratory illness (Dr Sripriya Krishnan 2003) [16]. Pranayama brings deeper benefits than the simple mechanics effect of exercising the lungs. It teaches us to use every part of our lungs, stimulates our lungs tissue, relax our chest muscles and energise the entire system. The success of pranayama depends on proper ratios being maintained between inhalation, exhalation and retention. Study may encourage the people to use of pranayama as a preventive, curative and rehabilitative measures especially during the Pandemic situation of Covid-19.

Materials & Methods

There were two groups – Experimental and Control Groups. Experimental group consist of

34 female staff (age 30 to 60 years) of a CBSE school, Purba Medinipur. Control Group consist of 20 female staff (Age 30–60 years) from a secondary girls school, Purba Medinipur. According to age, all subjects were divided in two sub-groups, i.e. young adult and elderly adult. Young adult consists of 30 to 45 years of age and elderly adult consists of 46 to 60 years of age. Physiological parameter selected for the study were Forced Expiratory Volume in one second and Forced Vital Capacity.

The present study has three separate parts i.e pre-test, the specific training programme and the post-test. Pre-test was conducted in a single day before the onset of a planned exercise programme of 18 weeks. FEV₁ & FVC of both the Experimental & Control group were measured by a physician¹. Hand held Electrical Spirometer² was used to

measure FEV₁ & FVC.

All the subjects of the experimental group were brought under a common training programme which consists of specific Pranayama i.e., Vastrika, Anuloma-Viloma, Bhramari and Bahya for five days a week, for 45–60 minutes/day with gradual increase of intensity, sets and repetitions for eighteen weeks. The training period was divided into five phase, viz. first two weeks, 3rd and 4th weeks, 5th and 6th weeks, 7th and 8th weeks and 9th to 18th weeks. After the completion of 18 weeks planned programme.

The post test was conducted in the similar fashion with that of pre-test. However the Control group did not participate in the training programme of eighteen weeks but their post test was conducted along with the Experimental group in the same day.



The subjects of the Experimental Group are performing Anuloma-Viloma Pranayama

A Physician conducting the Spirometry measurement (FEV₁ & FVC)

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Results and Discussion

Table 1: Mean, SD of Forced Expiratory Volume in one second (litres) and Comparison of t-test Between Pre and Post-test Means of YA and EA Groups

Age Group	Group	Pre-test Mean ± SD	Post test Mean ± SD	Mean difference	t-value	Level of Significance
YA	Experimental	2.06 ± 0.23	2.51 ± 0.33	0.45	20.30**	0.00
	Control	2.01 ± 0.12	1.97 ± 0.12	0.03	0.78	0.46
EA	Experimental	1.57 ± 0.17	1.77 ± 0.22	0.21	16.08**	0.00
	Control	1.48 ± 0.13	1.51 ± 0.13	0.03	1.61	0.14

** Sig at 0.01 level

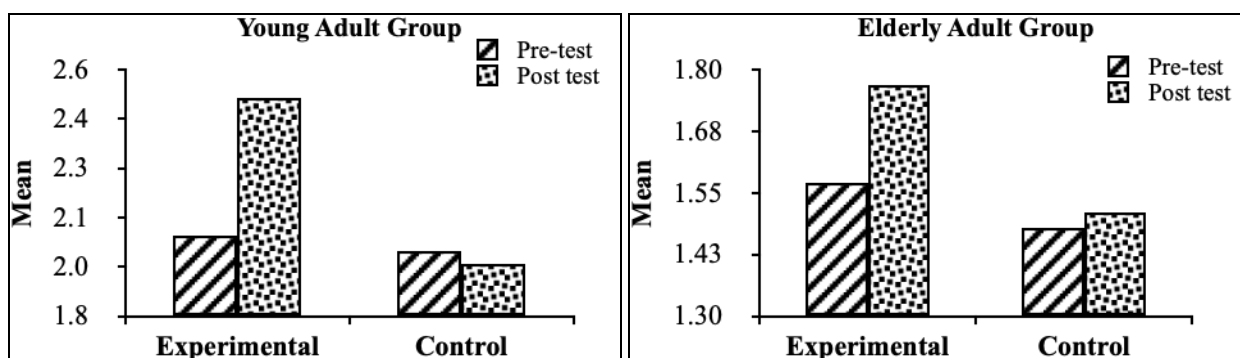


Fig 1: Graphs Showing Forced Expiratory Volume in one second Between Pre and Post-test Means of YA and EA Groups

Table - 1 shows that mean FEV₁ during pre-test was 2.06 with a variation of ±0.23. Following eighteen weeks participation in planned Pranayama training programme the mean FEV₁

increased to 2.51 with a variation of ±0.33 in experimental YA group and t-value (20.30) was found significant at 0.01 level. But in control YA group t-value (0.78) appeared

insignificant. In experimental EA group during pre-test the mean FEV₁ was 1.57 with variation of ± 0.17 . During post-test the mean FEV₁ increased to 1.77 with a variation of ± 0.22 and t-value (16.08) was found significant at 0.01 level. But in control EA group t-value (1.61) appeared insignificant. Table-1 was illustrated through graphical representation (Fig. 1) for clear understanding of this study.

A significant increment of FEV₁ was observed in both the young and elderly experimental subjects which was similar to the findings of Murthy K. R. J.; Sahay B. K. *et al.* (1984) [9]

who experimented the effect of Pranayama on asthma patients. Sheema Singh *et al.* (2009) observed significant increment of FEV₁ among 120 bronchial asthma patients. R. Nagarathan, H. R. Nagendra (1985) [10], Chalet *et al.* (1965) Dr. M. V. Bhole (1982) [2], Vedanthan P. K. *et al.* (1998) [13], Sodhie *et al.* (2009) [11], Dr. Sripriya (2003) [16], Behera (1998) [1], Joshi *et al.* (1992) [6] also founded significant improvement of FEV₁ among asthma patients. Gaurav Swami *et al.* (2009) observed significant improvement of FEV₁ among hypothyroid patients.

Table 2: Mean, SD of Forced Vital Capacity (litres) and Comparison Between Pre and Post-test Means of YA and EA Groups by t-test

Age Group	Group	Pre-test Mean \pm SD	Post test Mean \pm SD	Mean difference	t-value	Level of Significance
YA	Experimental	2.49 \pm 0.30	3.04 \pm 0.40	0.55	20.79**	0.00
	Control	2.33 \pm 0.15	2.25 \pm 0.17	0.08	1.37	0.20
EA	Experimental	1.96 \pm 0.22	2.22 \pm 0.27	0.26	15.24**	0.00
	Control	1.82 \pm 0.16	1.83 \pm 0.17	0.01	0.46	0.66

** Sig. at 0.01 level.

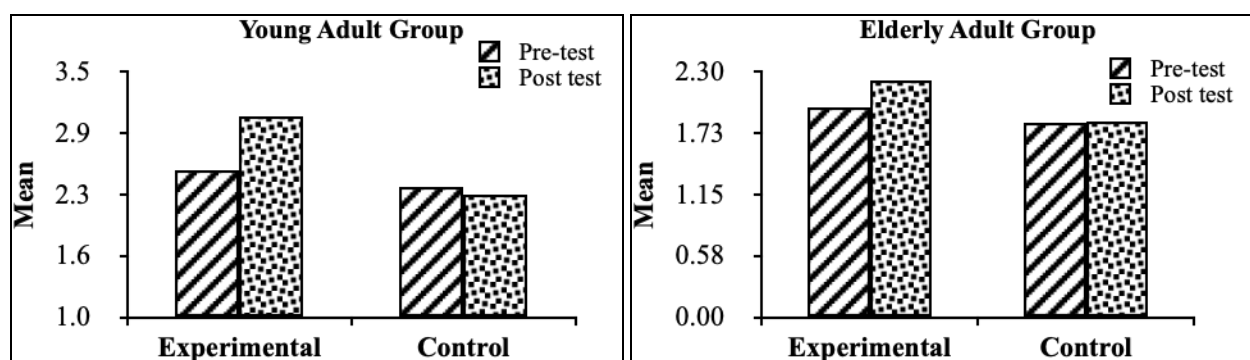


Fig 2: Graphs Showing Forced Vital Capacity between Pre and Post-test Means of YA and EA Groups

Table-2 indicates that in experimental YA group, during pre-test the mean FVC was 2.49 with a variation of ± 0.30 and during post-test the mean FVC elevated to 3.04 with a variation of ± 0.40 . t-value (20.79) obtained was significant at 0.01 level and in control YA group t-value (1.37) appeared insignificant. In experimental EA group the mean difference was 0.26 and t-value (15.24) was found significant at 0.01 level. t-value was found (0.46) insignificant in control EA group. Graphical representation (Fig. 2) also indicates similar trend of this study.

Significant improvement in FVC with response to Pranayama training have been reported by many leading researchers and are similar to that of the present study. Bhanu Prakash Joshi (2003) [7] has found significant improvement of FVC among college going student age ranging from 18–25 years following Pranayama training programme. Murthy, K. R. J.; Sahay B. K. *et al.* (1984) [9] observed significant improvement of FVC among perennial Asthma patients. Significant increment of FVC among asthma patients were also observed by Candy Sodhi *et al.* (2009) [11], R. Nagarathan, H. R. Nagendra (1985) [10], Chalet *et al.* (1965), Martin J. Bunch (2001), Dr. M. V. Bhole (1982) [2], Vedanthan P. K. *et al.* (1998) [13], Dr. Sripriya (2003) [16], Behera (1998) [1].

Conclusion

Based on the result of the present study and within the limitation, the following conclusions may be drawn.

4.1 FEV₁ increased significantly in both (YA & EA) experimental groups following Pranayama training programme of eighteen-weeks. However, the magnitude of increment was more in YA group. No significant change was

found in both (YA & EA) control groups.

4.2 Pranayama training resulted in significant increase in FVC in both (YA & EA) experimental groups. The magnitude of increment was more in YA groups. In case of control group no significant change was observed in both (YA & EA) groups.

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