

# TO COMPARE THE EFFECT OF PRANAYAMA AND BREATHING EXERCISES ON EXPIRATORY CAPACITY IN GERIATRIC POPULATION

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## ABSTRACT

**Introduction:** Geriatric population faces so many health related problems like arthritis, obesity, depression, heart disease, respiratory diseases, falls etc. Respiratory diseases includes reduce lung capacities and volumes; reduce chest expansions etc. Pranayama works at mind and body level. It increases lung capacities by developing better lung function and increase the concentration of oxygen in the lungs. It helps to eliminate toxins and strengthen the immune system.

**Materials and Methods:** Ethical clearance was taken from the institution. Consent were taken from the subjects. 60 geriatric subjects (55-75 years) were included in the study from in and around Pune city by simple random sampling method after inclusion and exclusion criteria.

**Study design:** Quasi experimental study. Subjects were divided into two groups: group A (n=30, experimental) and group B (n=30, control). Group A were given anulomaviloma, brahmari pranayama and group B were given conventional breathing exercises for 12 weeks.

**Results:** Data were analysed by unpaired t- test with the help of instat 3 softwar. Expiratory capacity (group A - p value is 0.01, group B- p value is 0.04) which shows pranayama is more effective than breathing exercises.

**Conclusion:** Pranayama is effective in increasing expiratory capacity in geriatrics.

**KEY WORDS:** Geriatric, pranayama, expiratory capacity, anuloma viloma, brahmari.

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## Access this Article online

### Quick Response code



DOI: 10.16965/ijpr.2016.148

### International Journal of Physiotherapy and Research

ISSN 2321- 1822

[www.ijmhr.org/ijpr.html](http://www.ijmhr.org/ijpr.html)

Received: 13-06-2016

Accepted: 24-06-2016

Peer Review: 13-06-2016

Published (O): 11-08-2016

Revised: None

Published (P): 11-08-2016

## INTRODUCTION

Geriatric age group grading: Grade 1 -55-65 year, Grade 2 -65-75 year, Grade 3 -above 75 year. With ageing developmental process starts to conception. Environmental factors can accelerate ageing. Diseases become more common while ageing.

Respiratory changes which occur in geriatric population are reduce elasticity in lung tissue and chest wall decreases, which causes there decreased function of the respiratory muscles .Decreased cilliary action and impaired cough mechanism to clear secretions .Residual volume

(RV) increases (1500ml). Altered pulmonary gas exchange, oxygen tension (pao<sub>2</sub>) falls (80-100mmhg).

Cardiovascular function changes in geriatric population are heart rate max (Hr max) decreases due to decreased sympathetic nervous system activity and changes in cardiac conduction (60-100 beats/min). Stroke volume max (SV max) decreases primarily due to increased total peripheral resistance (increased after load) and decreased myocardial contractility (60-130ml/beat). Aerobic capacity decreased about 1%per year after age 55yrs [1].

Neurological system changes are atrophy of nerve cells in cerebral cortex; overall loss of cerebral mass /brain weight and Changes in brain atrophy. Narrowing and flattening of gyri and widening of sulci and ventricular dilatation leads to decreased cerebral blood flow and energy metabolism. Speed and coordination of movements are decreased which leads to increase in difficulty with fine motor movements causes both reaction time and movement time is reduced. Renal and gastric changes are also seen in geriatric population. Overall changes increase depression and anxiety in geriatric population [1].

Breathing exercises enhance your body's ability to absorb more oxygen and make use of it improves the expiratory capacity. Regular breathing exercises strengthen and tone the lung and heart enabling the pulmonary system to increase the maximum amount of oxygen that the lungs can handle. Deep breathing exercises such as diaphragmatic breathing; pulse lip breathing lowers the diaphragm to fully expand your lungs on inhalation and uses the abdominal muscles to squeeze air out on exhalation [2].

Exercise has been associated with improvements in cognitive function and may also provide benefits like reducing stress and anxiety, which improves their mental health and social engagements. It improves the elasticity of the lungs and reduces the accumulation of secretion in the lungs, reduce work of breathing, and improve ventilation.

Pranayama is a technique of controlling and modulating breath and meditation, a process through which one attains a state of deep rest yet active state of mind [2]. In elderly people, pranayama work in tandem to increase lung capacity by developing better lung function and increase the concentration of oxygen in the lungs. It also improves the circulation of blood and the lymphatic system, helping to eliminate toxins and strengthen the immune system.

Pranayama offers many anti aging benefits, beyond just the physical. It also provides emotional, spiritual and social advantages. It also reduces the stress and depression as the additional advantage of accessibility it can be practiced any time, any place, without special equipment or clothing [3].

Quality of life also improves by doing pranayama [1].

Anulomaviloma is the alternate nostril breathing is to balance the physical energy and mental energy. Benefits are proper supply of oxygen is ensured and CO<sub>2</sub> is effectively removed. Blood is purified of toxins. It helps in reducing the stress, anxiety, depression, and other illnesses. It removes the blockages in the panic energy channels. Bhramari pranayama helps to release the mind of agitation, frustration or anxiety and get rid of anger. It Improves concentration, memory and helps in reducing blood pressure. It builds confidence mitigate migraines and Give relief from slight headache.

Thus the need of the study is to reduce the ill effects of ageing in Indian geriatric population. To see the effects of pranayama and breathing exercises on depression scale in Indian geriatric population.

**AIM:** To compare the effect of pranayama and breathing exercises on expiratory capacity in geriatric population. To measure and compare the effect of pranayama and breathing exercises on expiratory capacity (EC).

## MATERIALS AND METHODS

Present study conducted with a sample size of 60, all the subjects were staying in and around the Pune City of Maharashtra, India, Convenient method has adopted and study was designed as a quasi experimental study.

Materials used for this study were Geriatric depression scale, Peak flow meter, Pen and Paper.

Subjects with age in between 55-75 years, Physically Healthy Geriatric, both male and female genders with moderate to severe depressive population were included in the study.

Geriatric peoples having any type of neurological (spinal cord injury etc) or psychological disorders (OCD, mentally retarded etc), musculoskeletal conditions like back pain; OA etc were excluded from the study.

**Outcome measures:** Expiratory capacity: - It is measured by using peak flow meter. It is used to measure the amount of air that can be

expelled from the lungs .If the airways become narrowed or blocked due to asthma, peak flow values drop because the person cannot blow air out of the lungs.

**Procedure:** Subjects were divided into two groups. Group A (n=30) and Group B (n=30). Ethical clearance was taken from the institution. Consent was taken from the subjects. Subjects were selected as per the inclusion and exclusion criteria. Subjects in the age group of 55-75 years were included in the study .The mean age in group A was 69.9, and the mean age in group B was 70 .Therefore there was no significant difference in the age groups included in the study as the p value was >0.15 which is considered to be significant. Subjects of Group A were given pranayama like anulomaviloma and brahmari pranayama with frequency of 10-15 minute, thrice a day for 12 weeks. Subjects of Group B were control group and conventional breathing exercises were taught to them like, deep breathing exercises, pursed lip breathing, frequency of 10-15 minutes, and thrice day duration for 12 weeks.

On day 1- All parameters were checked and technique was explained. Revaluations were done on 1<sup>st</sup> week, 6<sup>th</sup> and 12<sup>th</sup> week and recording taken. Statistical analyses were drawn by using paired t- test. Result and conclusion were drawn on the basis of data analysis.

**DATA ANALYSIS AND RESULTS:**

Data were analysed by paired t-test and comparison was done by unpaired t- test with the help of instat 3 software.

**Fig 1:** Brahmari pranayama.



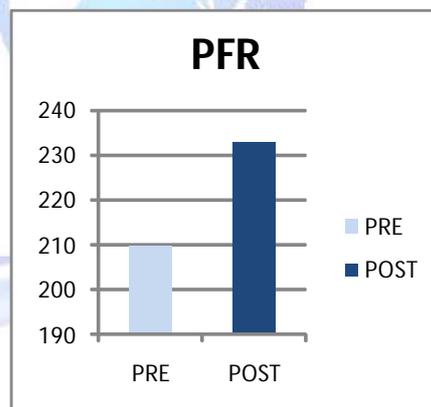
**Fig 2:** Anulomaviloma Pranayama.



**Table 1:** Comparison between the pre and post peak flow meter reading in group A. Pre treatment mean was 209, post treatment the mean was 232 and p value is 0.01 considered to be extremely significant.

	pre	post	P value
<b>PFR</b>	209.85	232.73	0.01

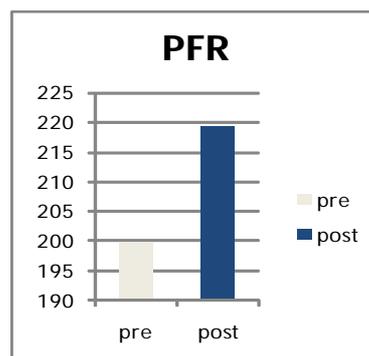
**Graph 1:** PFR in yoga group.



**Table 2:** Comparison between the pre and post peak flow meter reading in group A. Pre treatment mean was 199.8, post treatment the mean was 219 and p value is 0.04 considered to be significant.

	Pre	post	P value
<b>PFR</b>	199.83	219.33	0.04

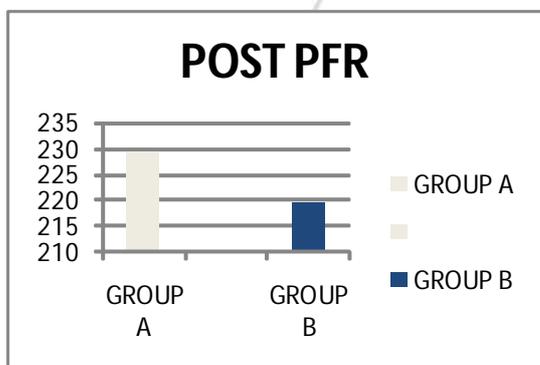
**Graph2:** PFR in control group.



**Table 3:** It shows that the comparison between group A and group B peak flow meter reading which shows that p value is 0.85 considered to be insignificant that shows both the groups are equal effective.

	GROUP A	GROUP B	P VALUE
PFR	229.5	219.33	0.85

**Graph 3:** Comparison of group A and group B on PFR



Group A - expiratory capacity p value is 0.01 which shows pranayama is effective. Group B- expiratory capacity p value is 0.04 which shows breathing exercises are also effective. By comparing group A and group B Peak flow reading shows pranayama is more effective than breathing exercises.

## DISCUSSION

Expiratory capacity of geriatric population between age group of 55-75 years old both male and female age group of 60 samples was analysed, which are divided into two groups A and B. Group A consist of 30 samples, 15 males and 15 females which are in experimental group and pranayama were taught to them. Group B consists of 30 samples, 15 males and 15 females which are in control group breathing exercises were taught to them.

The increased values of post intervention treatment suggest that both exercises as well as pranayama were effective for increasing expiratory capacity in geriatric population. Usually breathing is not a conscious event and is regulated automatically by the nervous system through the respiratory centers located in the medulla oblongata and pons. These are the dorsal and ventral group of neurons located in medulla, the pneumotaxic centre and the apneustic centre located in the pons.

Regular practice of slow and deep breathing exercises improves muscle strength and

flexibility due to work hypertrophy. Pranayama cleanses the airways secretion, acts as a major physiological stimulus for the release of lung surfactant and prostaglandins into alveolar spaces which increases lung compliance. Pranayama practises for short term increases maximum expiratory pressure and flow rate. It decreases reaction time indicating improvement of neuromuscular system. Deep and controlled breathing desensitizes the sensory nerve ending and reduces the allergic conditions of the environment. In additional, increased development of respiratory musculature and endurance due to regular practice of pranayama delays the onset of fatigue. In present study, 12 weeks protocol of regular including two groups of exercises and pranayama was done and expiratory capacity was assessed with the help of peak flow meter and post intervention results shows that both exercise as well as pranayama increases expiratory capacity.

**Limitation:** Sample size was less. Others respiratory parameters should be considered. For more significant result long duration studies can be conducted.

**Future scope:** Further studies with larger sample size can be conducted. Outcome of the intervention can be compared in patients with asymptomatic and symptomatic respiratory conditions. Further studies can be conducted with other lung parameters like inspiratory capacity, expiratory capacity, total lung capacity, residual volume etc

## CONCLUSION

Pranayama and breathing exercises improves expiratory capacity of the lungs. Regular practices helps in setting the mind better and prevent many cardio-respiratory complications.

## ACKNOWLEDGEMENTS

The authors would like to thank all the patients who kindly accepted voluntarily to participate in the study.

**Conflicts of interest: None**

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**How to cite this article:**

Prachi Deshbhratar. TO COMPARE THE EFFECT OF PRANAYAMA AND BREATHING EXERCISES ON EXPIRATORY CAPACITY IN GERIATRIC POPULATION. *Int J Physiother Res* 2016;4(4):1611-1615. DOI: 10.16965/ijpr.2016.148