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Research Article

COMPARISON BETWEEN THE EFFECTS OF PRANAYAMA AND BREATHING EXERCISES ON EXPIRATORY CAPACITY IN OBESE WOMEN

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A R T I C L E I N F O

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Expiratory capacity, Pranayama, Breathing exercise, PEFR.

A B S T R A C T

Background: Obese people are at increased risk of respiratory symptoms, the presence of adipose tissue around the ribcage and abdomen and in the visceral cavity loads the chest wall and reduce functional residual capacity. The reduction in FRC and in expiratory reserve volume is detectable, even at modest increase in weight.

Objective: To compare the effects of breathing exercises and pranayama on expiratory capacity in obese women by using peak flow meter.

Methodology: This was a comparative interventional study. 60 obese females with BMI more than 25kg/m2 and between the age of 35-45 were selected. The subjects were randomly divided into two groups Group A and Group B. Group A were given pranayama and Group B were given conventional breathing exercise, twice a day, three sessions per week for 4 weeks. Pre and post Peak Expiratory Flow Rate (PEFR) values were taken by using peak flow meter. Data was collected and statistically analysed by unpaired t-test.

Result: There was significant difference between PEFR values of pranayama and breathing exercise (p value: <0.0001). Comparing pranayama and breathing exercise PEFR reading shows pranayama is more effective than breathing exercise.

Conclusion: Pranayama is more effective than breathing exercise to increase expiratory capacity in obese women.

INTRODUCTION

Obesity is generally acknowledged as a global phenomenon that increases morbidity and reduces life expectancy. Obesity is defined by WHO as an abnormal or excessive fat accumulation that may impair health.

In 2000 the Western Pacific Regional Office of WHO (WPRO) proposed an alternative definition of obesity (BMI ≥ 25.0 kg/m2) for Asian populations.[1]

Obese people are at increased risk of respiratory symptoms, even if they have no obvious respiratory illness.It increases oxygen consumption and carbon dioxide production, while at the same time it stiffens the respiratory system and increases mechanical work needed for breathing. In obese people, the presence of adipose tissue around the ribcage and abdomen and in the visceral cavity loads the chest wall and reduce functional residual capacity.[2]

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The reduction in FRC and in expiratory reserve volume is detectable, even at modest increase in weight. The major respiratory complication of obesity includes a heightened demand for ventilation, elevated work of breathing, respiratory muscle inefficiency and diminished respiratory compliance.[2] 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 muscle to squeeze air out on exhalation. It improves the elasticity of lungs and reduces the accumulation of secretion in the lungs, reduce work of breathing and improve ventilation.[3]

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.Pranayama involves manipulation of breath movement, and the breath is a dynamic bridge between the body and mind.[5]Regular practice of pranayama improves cardiovascular and respiratory functions.

It can be practiced any time, any place, without equipment or clothing.

MATERIALS AND METHODOLOGY

Study Design

Type of study wasComparative Study, done in metropolitan city and duration of study was 1 year.

Sample Design

Type of sampling was simple random sampling, consist of 60 obese women. Group A consisted of 30 and Group B consisted of 30.

Materials Used

Materials used were Peak flow meter, measuring tape, weighing machine, chair

Selection Criteria

Subjects included in this study were women with BMI >25kg/m2 and within age group of 35 to 45.Subjects with pre-existing respiratory and cardiovascular conditions, neurological conditions, psychological illness, who has history of smoking, uncontrolled hypertension and diabetes mellitus and subjects undergoing any other exercise program were excluded from this study.

Procedure

Subjects were screened as per the inclusion and exclusion criteria.A written informed consent was taken from all thesubjects.Purpose of the study and procedure were explained to the subjects.

Subjects in the age group of 35 to 45 were included in the study and were randomly divided into two groups. Group A (n=30) and Group B (n=30).

Subjects of Group A were given pranayama i.e. anulomaviloma and kapalbhati with frequency of 10-15 minutes, twice a day, three times in a week, and that was continued for 4 weeks.

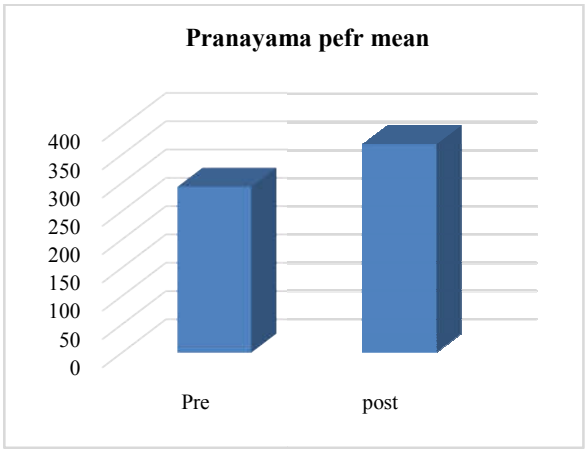
Subjects of Group B were given conventional breathing exercises i.e. deep breathing exercise and pursed lip breathing, of frequency of 10-15 minutes, twice a day, three times in a week, and that was continued for 4 weeks.

On day one PEFR was evaluated by using peak flow meter. Subjects were asked to perform it three times and best of three readings were taken.Revaluations was done on end of 1st week and on the end of 4th week and recording were taken. Data was collected and statistically analysed by unpaired t-test.

DATA ANALYSIS AND RESULT

Demographic Data

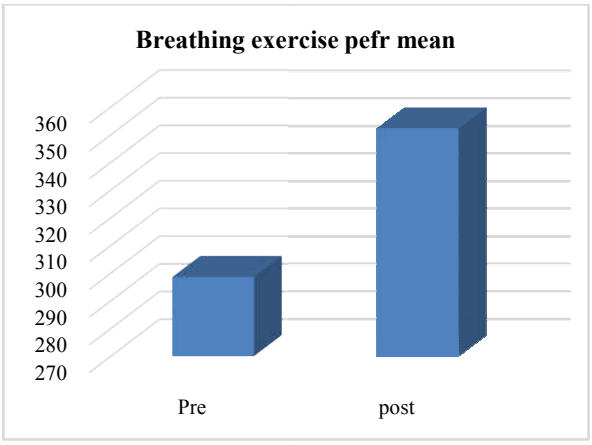
PARAMETERS			
No. of samples			60 Group A- 30 Group B- 30
Gender			Female
		Age	BMI
Group A (pranayama)	Mean	39	27.8
	SD	±3.18	±1.75
Group B (breathing exercise)	Mean	37.5	28.8
	SD	±3.3	±2.71



Graph 1 Comparison Between Pre and Post PEFR Reading in Pranayama (Group A)

	Pefr mean	Sd	Pvalue
Pre	293.66	±37.91	<0.0001
Post	372.66	±38.50	

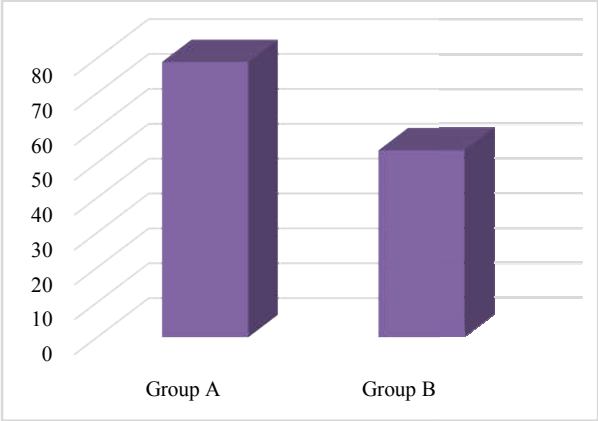
Inference: Above data has passed normality test, so mean pre and post PEFR was analysed by using paired t test.
There was significant difference between pre and post PEFR values by pranayama (p value:<0.0001)



Graph 2 Comparison Between Pre and Post PEFR Reading in Breathing Exercise (Group B)

	Pefr mean	Sd	P value
Pre	298.66	±39.1	<0.0001
Post	352.33	±40.4	

Inference: Above data has passed normality test, so mean pre and post PEFR was analysed by using paired t test.
There was significant difference between pre and post PEFR values by breathing exercise (p value <0.0001)



Graph 3 Comparison Between Pranayama (Group A) and Breathing Exercise(Group B)PEFR reading

	Pefr mean	Sd	P value
Pranayama (group a)	79	±14.22	<0.0001
Breathing exercise (group b)	53.66	±10.98	

Inference: Above data has passed normality test, so mean PEFR was analysed by using unpaired t test.There was significant difference between Group A and Group BPEFR values (p value <0.0001)

DISCUSSION

Obesity is generally acknowledged as a global phenomenon that increases morbidity and reduces life expectancy. Inobese people, the presence of adipose tissue around the ribcage and abdomen and in the visceral cavity loads the chest wall and reduce functional residual capacity.

The aim was to compare the effects of breathing exercise and pranayama on expiratory capacity in obese women. So Expiratory capacity of obese women between age group of 35-45 and BMI >25kg/m2 of 60 samples were analysed, which were divided into two groups A and B. Group A and B both consisted of 30 samples and Pranayama and Breathing exercise were taught to them respectively. On day one PEFR was evaluated by using peak flow meter. Revaluations was done on end of 1st week and on the end of 4th week. Data was collected and statistically analysed by unpaired t test.

There was significant difference between pre (293.66±37.91) and post (372.66±38.50) PEFR reading with pranayama (p value- <0.0001). Hence pranayama is effective to improve expiratory capacity in obese women. There was significant difference between pre (298.66±39.1) and post (352.33±40.4) PEFR reading with breathing exercise (p value- <0.0001). Hence breathing exercise is also effective to improve expiratory capacity in obese women. There was significant difference between pranayama (79±14.22) and breathing exercise (53.66±10.98) PEFR reading (p value- <0.0001). Comparing pranayama and breathing exercise PEFR reading shows pranayama is more effective than breathing exercise.

There was significant improvement in group A individuals post pranayama, this might be because pranayama improves the ventilatory function of the lungs by using them to its fullest capacity, reduces the oxygen debt and improves the gaseous exchange**.** Pooja Akhtar and et. Al conducted a study on Effects of yoga on functional capacity and wellbeing and concluded that pranayama and yoga practices are beneficial in improving functional capacity[4].As a deep breathing technique, pranayama reduces dead space ventilation and decreases work of breathing. It also refreshes the air throughout the lungs, in contrast with shallow breathing that refreshes the air only at the base of the lungs[5].Pranayama practice for short term increases maximum expiratory pressure and flow rate.

There was significant improvement in group B individual post breathing exercise, this might be because Regular practice of deep breathing exercise improves muscle strength and enhance the body's ability to absorb more oxygen and helps to improve expiratory capacity. It improves the elasticity of the lung and reduces the accumulation of secretion and reduce work of breathing and improve ventilation.[3]

Significantly higher improvement in PEFR reading with pranayama can be hypothesized to the reason that breathing during pranayama requires breath coordination at higher rate and hence, higher rate of respiratory muscle activity. Thisproduces strengthening of the respiratory muscles and therefore, improvement in the effort produced by the subjects[5]. Study supporting this by T Dinesh, *et al*. on Comparative effect of 12 weeks of slow and fast pranayama training on pulmonary function in young, healthy volunteers concluded thattwelve weeks of pranayama training in young subjects showed improvement in the commonly measured PFT values.
Thus, our study concludes that pranayama and breathing exercise both increases expiratory capacity, and pranayama is more effective than breathing exercise.

CONCLUSION

This study concludes that both pranayama and breathing exercise increases expiratory capacity in obese women. And by comparing it shows that pranayama is more effective than breathing exercise.

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