



RESEARCH ARTICLE

**EFFECT OF AEROBIC EXERCISE AND YOGASANAS ON PEAK EXPIRATORY FLOW RATE
AMONG OBESE MEN**

***Prasanna Sundara Raju**

Lecturer in Physical Education, PIMS, Puducherry - 605014

*Corresponding author

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ABSTRACT

Overweight can also cause problems such as sleep apnea (interrupted breathing during sleep). The purpose of the study is to assess the effect of aerobic, yogasanas and combination of aerobic and yogasana on peak expiratory flow rate among obese men. To achieve the purpose one hundred and forty four obese men were selected as samples for the experimental study. These subjects age ranged between 25 and 40 years. For this, a purposive sampling technique was used. Further, the sample subjects were randomly assigned into almost four equated groups, viz., three experimental groups (Group I: $n_1= 37$); Group II: $n_2= 35$; Group III: $n_3= 42$) and one control group (Group IV: $n_3 = 30$). All these subjects were residing within radius of one to three kilometers range in grater Puducherry. The research scholar made sure from the subjects that the entire groups were ready to go through the experimental treatment. Finally it was decided to select 120 subjects for the post test having 30 subjects in each group for data collection after 12 weeks experimental training. To know the training effect ANCOVA was applied. When F is significant Scheffe's post hoc test was applied to see the significant improvement, if any, as a result of three different training interventions. The result showed that peak expiratory flow rate showed significant difference between the groups after adjusting the initial mean difference $p < 0.05$. It is concluded that combined effect of yoga and aerobic exercise significantly altered the peak expiratory flow rate.

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INTRODUCTION

The Indian Express dated 19th July, 1997, it was stated that the Incidence of obesity in India is 7- 9 % and comprising mainly of urban population. Although this number is small as compared to America and other countries, it is significant due to the sheer size of the population in India. Obesity, in fact, is an accumulation of excessive percentage of body fat (% fat) that is associated with increased risk of development various health hazards example hypertension, coronary heart disease, diabetes etcetera. The negative social stigma that arises due to disproportionate body and one's reduced physical working capacities are also associated with the obesity. Now a day the problem of obesity is also increasing among the school children. Obese children face numerous obstacles, ranging from harassment, teasing and rejection from peers, to biased attitudes from teachers. At young age, children are exposed to negative stigma due to obesity. Obese children often remains unhappy, lazy, and inactive and do not have more friends. This interdisciplinary study would help the teachers to encourage these obese children to select appropriate yoga training or aerobic to burn extra fat. Thyroid problem is often observed in many obese persons responsible for overweight and thus obesity. Aerobic is not solution for this problem. Yogasanas on the country, provides gentle message to the thyroid gland, which may reduce the associations complications in obese.

Although ample of reports on aerobic which emphasize the efficacy in reduction of excessive body weight, question arise

about its intensity. Intensive aerobic movements put extra burden on the cardio-respiratory system. However, yogasanas on the contrary does not put any such burden. Secondary, many people experience early and quick reduction in excessive body fat in aerobic, but in the longer run if the practice is discontinued for a month or so, the level of body fat and weight again starts increasing. Rajarathi, Pitchaiappa and Chittibabu (2012) identified that when aerobic training was combined with resistance training which displayed greater improvement in aerobic capacity of obese adolescent school children. However, a contrast result was produced when resistance combined with yogic practices. Numerous health-related benefits have been observed in overweight and obese people who participate in different types of exercise training programs, even in those without significant weight loss (ACSM, 2009).

Although availability of research report on Yogasanas in this direction is limited (Gharote, 1976; Ganguly & Gharote 1974), the report of Rajarathi, Pitchaiappa and Chittibabu (2013) indicates that daily practice of yoga along with aerobic or resistance training can alter the cardiovascular parameters and fat content in the body. The traditional texts on Yogasanas also indicate that Yogasanas has a long term as well as consistent effects. It can be postulated that Yogasanas may have better follow-up effects than the aerobic exercises in controlling obesity. There were no investigation was studied, till date, the comparative efficiency of both the non-conventional training systems (i.e., aerobic and Yogasanas) in controlling obesity. The

purpose of the study is to assess the effect of aerobic, yogasanas and combination of aerobic and yogasana on peak expiratory flow rate.

METHODS

Selection of Subjects and variable

One hundred and forty four obese men were selected as samples for the experimental study. These subjects age ranged between 25 and 40 years. For this, a purposive sampling technique was used. Further, the sample subjects were randomly assigned into almost four equated groups, viz., three experimental groups (Group I: $n_1= 37$); Group II: $n_2= 35$; Group III: $n_3= 42$) and one control group (Group IV: $n_4 = 30$). All these subjects were residing within radius of one to three kilometers range in grater Puducherry. The research scholar made sure from the subjects that the entire groups were ready to go through the experimental treatment. Finally it was decided to select 120 subjects for the post test having 30 subjects in each group for data collection after 12 weeks experimental training. Peak Exploratory Flow Rate is measured in lit. /min, with the help of Wright’s Peak Flow Meter, procured from England in standing condition. The subject was asked to inhale deeply then to hold the mouth piece into the mouth and exhale forcefully all of a sudden. Three attempts were given and the best attempt was taken as a reading for calculation purpose.

Pilot Study

To ensure the consistency in the intensity and repetition in the experimental treatment a pilot study was conducted. The pilot study was conducted on twenty randomly selected subjects from yogasanas and aerobic exercises group. The average time and repetition time were calculated for yogasanas and also on aerobic exercises separately. Further it was also worked out for the maximum training load for yogasanas and also on aerobic exercises.

Daily Administration of training interventions

Training programmes on Yogasanas and Aerobic exercises were scheduled separately. Although attendances of the subjects were taken regularly, the percentage of attendance of majority of the participants after completion of training was found more than 95%. In fact, some of the subjects were dropped out because of their inability to continue training. Any questions asked by the subjects had been clarified. They were also motivated properly to undergo the training schedule.

Yogasanas training

Yogasanas training were imparted to the Yogasanas Group (with strictly vegetarian diet as per the principles of Yogasanas) at Pondicherry. The Yogasanas practices, their sequence and daily schedule extras, was prepared on the basis of traditional yogic texts and was common for both these groups. The asanas are Shuddhi Kriyas, Vaman, Neti, Vasra dhauti, Kapalabhati, Ardhalasana, Sarvangasana or Viparita Karani, Matsyasana, Pavan muktasana, Supta Vakrasana, Naukasana, Vakrasana, Gomukhasana, Vajrasana, Tadasana, Chakrasana, Kati Vrikshasana, Hastapadasana. Anulom – Vilom, Ujjayi pranayama, Bhastrika Pranayama, Suryabhedan Pranayama. The duration of the practical class was one hour. Such practical classes were held in the morning and evening on all 6 days of a week, except holidays. Sunday was a weekly

off. The Yogasanas teachers were after the training. It was supervised by the research fellow.

Aerobic exercises

Formal aerobic exercises will be divided into different levels of intensity and complexity. This allowed participants to select their level of intensity according to their fitness level. Many gyms offer a wide variety of aerobic exercise for participants. Each pattern is designed for a certain level of experience. Following Dance-Group were included in one hour programme of aerobic exercise for these obese persons for 3 to 5 minutes each with the help of western music. The exercise are basic Warm up stepping, basic V step, basic L step, basic A step, straddle step Jump and turn Jump and bend forward Climbing action with a right leg and raising hands above head Climbing action with a left leg and raising hands above head Climbing action with right leg and clap Climbing action with left leg and clap.

Statistical Analysis

Descriptive statistics was applied to process the data before employing the inferential statistics. Since the variables of varied nature (physiological and morphological) along with eight testing programme (pre-test and post-test) was conducted for four different groups (Yogasanas Group, Aerobic exercises group and Yogasanas plus Aerobic exercises group and Control Groups) ANCOVA was applied. Scheffe’s post hoc test for each of the above variables was applied to see the significant improvement, if any, as a result of three different training interventions.

RESULTS

In Peak expiratory flow rate (Liters), of “Yogasanas training Group,” “Aerobic exercises training Group”, “Yogasanas plus aerobic exercises training Group” and “Control Group” as presented in Figure 1. The analysis showed that after adjusting the pre test mean the adjusted post test F is significant Scheffe’s Post Hoc test applied and it revealed Yogasanas training” helped to increase Peak expiratory flow rate than the “Control” (CD=0.46, $p<0.01$). “Aerobic exercises training” helped to increase Peak expiratory flow rate as compared to the “Control”(CD=0.32, $p<0.05$). “Yogasanas plus aerobic exercises training” showed significant improvement in Peak expiratory flow rate as compared to the “Control” (CD=0.48, $p<0.01$).

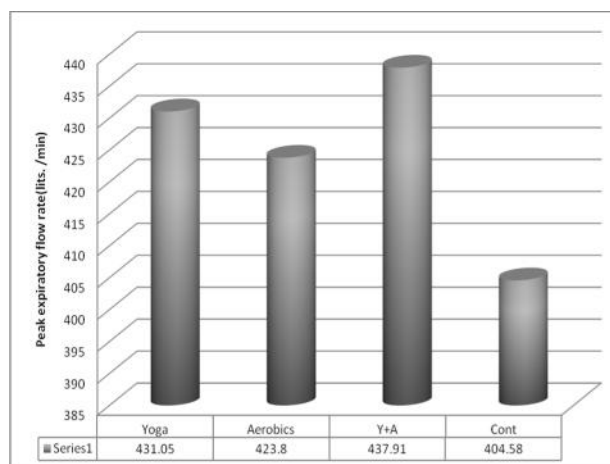


Figure 1 Changes on peak expiratory flow rate

“Yogasanas training” was found significantly superior to “Aerobic exercises training” in improving Peak expiratory flow rate (CD=0.25, $p<0.05$). “Yogasanas plus aerobic exercises training”

had better effect over “Yogasanas training” (CD=0.22, $p<0.05$) and showed significant superiority over the “Aerobic exercises training” (CD=0.30, $p<0.05$) in improving Peak expiratory flow rate. Thus, all the training interventions could contribute to improve Peak expiratory flow rate than the control group. However, “Yogasanas plus aerobic exercises training” had superior effect towards improvement in Peak expiratory flow rate than “Yogasanas training” and “Aerobic training”. This result revealed that Yogasanas training alone is self-sufficient for improvement in Peak expiratory flow rate reduction among the obese subjects. However, the combined effect of yogasanas with aerobic exercises which significantly reduce the pulse rate of the obese subjects than aerobic and yogasanas training.

DISCUSSION FINDINGS

Yogasanas has a hoary past and it was evolved from our Indian *Rishi* Culture. In the past many scientific investigations on Yogasanas and allied disciplines have already been done separately to record its positive effect on one’s health and fitness. However, nowadays, Aerobic exercises are being popular among the mass and could claim amazing impact on health and fitness of common mass. Ample of research is available on “Yogasanas” and “Aerobic” for human health and obesity, however, information about their combined effect on morphological and physiological variables of obese subjects is meager in literature. Moreover, in general sense, obesity generally appears because of disparity between energy intake and expenditure (Ogden 2002; Troiano *et al.*, 1995). Although there are many reasons for initiating obesity, heredity plays the predominant role too. Further, the impact of many environmental factors viz., improper life style, wrong food habit, lack of exercises excessive secretion of growth hormones attributes overweight from childhood. During last few decades some countries have reported an increasing prevalence of obesity in the age of adult to adult hood because of their uncontrolled obesity in childhood (Wiecha and Casey 1994). Similar trend in obesity among the Indian adult population is evident. Since both “Yogasanas” (originated in India) and “Aerobic” (originated in Western countries) are popular among the masses, it was assumed that their combined effect may have favorable impact in controlling obesity. Therefore, it is assumed that along with improved heart function, the function of the lungs will be improved. Similar findings were evident in this experiment that revealed that peak expiratory flow rate was increased significantly due to *Yogasanas plus aerobic training* than the other training interventions.

The appearance of such results of combined training intervention in peak expiratory flow may be due to the fact that Yogasanas practices might have enhanced micro circulation so that the nutrition as well as oxygen reaches to the deep muscles of heart, whereas the components of aerobic perhaps enhanced macro circulation of blood. Thus, the combined intervention of Yogasanas (internal) plus aerobic (external) might have helped to reduced with an improved trend in peak expiratory flow rate among the male obese.

CONCLUSION

Thus, the result and discussion as presented above revealed that combination of Yogasanas and aerobic exercises training intervention was found useful in improving peak expiratory flow rate in exhale (breathe out) and lung functioning condition of obese male.

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