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# Effect of Physical Exercises and Yogic Practices on Health Related Physical Fitness and Basal Metabolic Rate Variables of the Obese School Boys

**Dr.V.Vallimurugan[1] & C. Senthil[2]**

[1]*Assistant Professor. Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu, India.*
[2]*Physical Education Teacher. Government Boys Higher Sec School Erumapatty, Namakkal, Tamilnadu, India.*

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**Abstract**

*The purpose of the study was to find out the effect of physical exercises and yogic practices on health related physical fitness and basal metabolic rate variables of the obese school boys. To examine 100 male students Secondary School boys were selected from Government Boys Higher Sec Schools Namakkal District, TamilNadu. The age group ranges from 13 to 16 years. Subjects were equally divided into two experimental groups and one control group with fifteen subjects in each (n=15). Experimental group I underwent physical exercises (PEG), Group II underwent yogic practices (YPG) and Group III served as control group (CG). The physical exercises and yogic practices was scheduled for **six** weeks prior and after the training for flexibility and basal metabolic rate variables were put in-to statistical treatment using Analysis of Covariance (ANCOVA) to find out the significant mean differences. Scheffe s post hoc test was used to find out the paired mean differences. In all the cases the 0.05 level of confidence was fixed.*

**Keywords:** Physical Exercises, Yogic Practices, School Boys.



## Introduction

Aim for a healthy body weight" Health and longevity are threatened when a person is either overweight or underweight. Overweight and obesity increase one's risk of developing serious CVD. Likewise, individuals who are underweight may have a higher risk than others of cardiac, musculoskeletal and reproductive disorders. Thus, healthy weight is key to a healthy and longer life. One will learn about weight control principles and practices, as well as guidelines for designing exercise programs for weight loss, weight gain and body composition change. Individuals with body fat levels falling at or near the extremes of the body fat continuum are likely to have serious health problems that reduce life expectancy and threaten their quality of life. (Heyward, 2012)

The overall average prevalence of obesity in adults for the year 2000 was 8.2% of the global population. The prevalence of obesity progressively increases with the degree of development of countries, as seen in the data for undeveloped countries (1.8%), developing countries (4.8%), countries in transition (17.1%), and developed countries (20.4%) (WHO, 2001). Excess body weight and fatness pose a threat to both the quality and quantity of one's life. Obese individuals have shorter life expectancy and greater risks of CHD, hypercholesterolemia, hypertension, diabetes mellitus, certain cancers and osteoarthritis. Exercise is a key component in the prevention of obesity. This is a condition in which energy intake, in the form of food, exceeds the energy expenditure of daily living and the excess energy is stored in the form of adipose tissue made up of fat cells. Two factors facilitate the onset and progressive nature of obesity. The first is the age related reduction in the energy expended to maintain waking bodily functions the basal metabolic rate of about 2% every 10 years. The second is the lowered metabolic rate of obese individuals. Combine these two factors with reduced physical activity and the development of obesity is inevitable. Regular aerobic exercise not only increases energy expenditure during the exercise but also for some time afterwards because the non-exercising metabolic rate remains elevated during the post-exercise recovery period. A combination of exercise with reduced dietary intake provides the best strategy for counteracting obesity and the associated CVD. (Hale, 2015).

**Correspondence**
C.Senthil
E-mail: chinnasenthilpet316@gmail.com, Ph. +9199528 53360

## Statement of the Problem

The purpose of the present study was to find out the effect of physical exercises and yogic practices on health related physical fitness and basal metabolic rate variables of obese school boys.

## Hypotheses

1. There would be significant differences due to the influence of physical exercises and yogic practices

on health related physical fitness variables such as flexibility of obese boys.
2. There would be significant differences due to the influence of physical exercises and yogic practices on basal metabolic rate of obese boys.

**Delimitations**

The study was delimited to the following factors.

1. To achieve the purpose of the study, 45 obese adolescent school boys were selected at random from in and around Namakkal District, TamilNadu, India.
2. Selected subjects were divided into three equal groups namely experimental group I (PEG=15) underwent physical exercise training. Group II (YPG=15) underwent yogic practices, and Group III served as control (CG=15).
3. The age of the subjects were ranged between 13-16 years.
4. The following dependent variables were selected for this study flexibility and basal metabolic rate.

**Methodology**

The purpose of the preset study was to find out the effect of physical exercises and yogic practices on health related physical fitness and basal metabolic rate variables of the obese school boys. To achieve the purpose of this study, a qualified physician examined 100 male students from 10 schools Government Higher Secondary School in Namakkal District, Tamil Nadu, India, and found out 100 obese out of forty five obese meal students, were selected at random, their age ranged from 13 to 16 years as per the school records. The selected subjects were divided into two experimental groups and a control group with fifteen subjects in each (n=15). Experimental group I underwent physical exercises (PEG), Group II underwent yogic practices (YPG) and Group III served as control group (CG) for the training period of six weeks.

**Statistical Techniques**

The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance. The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance. (Clarke and Clarke, 1972) Whenever the 'F' ratio was found to be significant, Scheffe's test was used as post-hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence ($P<0.05$).

Table 1
*Exercises prescribed for physical exercise training during the training period*

| Number of Weeks and Intensity | | | Exercises | Number of Sets | Duration of Exercise | Density Between Sets | Density Between Rounds |
|---|---|---|---|---|---|---|---|
| 1 to 2 Weeks | 3 to 4 Weeks | 5 to 6 Weeks | Aerobic Type Exercises | 1 | 15 min | 6 min | 10 min |
| 60% THR | 70% THR | 80% THR | Running | 1 | 20 min | 5 min | 7min |
| | | | Skipping | 1 | 10 min | 3 min | 5 min |

Table 2
*Asanas prescribed for yogic practice group*

| Weeks | Asanas Position | Repetitions | Sets | Rest Between Asanas | Frequency Per Week |
|---|---|---|---|---|---|
| 1-6 | Standing | 1 | 1 | 30 secs | 3 days |
| | Sitting | 1 | 1 | 30 secs | |
| | Kneeling | 1 | 1 | 30 secs | |
| | Prone | 1 | 1 | 30 secs | |
| | Supine | 1 | 1 | 30 sec | |

Table 3
*Analysis of covariance for the pretest and post test data on flexibility scores of physical exercise yogic practices and control groups*

| Test | PEG | YPG | CG | SOV | Sum of Squares | df | Mean Squares | 'F' Ratio |
|---|---|---|---|---|---|---|---|---|
| Pre Test | 14.4 | 14.14. | 186 | B | 1.64 | 2 | 0.82 | 0.5 |
| | | | | W | 68.93 | 42 | 1.64 | |
| Post Test | 16.67 | 15.78 | 14.93 | B | 22.57 | 2 | 11.29 | 7.27* |
| | | | | W | 65.2 | 42 | 1.55 | |
| Adjusted Post Test | 16.65 | 15.92 | 14.76 | B | 27 | 2 | 13.5 | 22.83* |
| | | | | W | 24.25 | 41 | 0.59 | |

* F (0.05) (2, 42 and 2, 41) = 3.22, *Significant at 0.05 level of confidence.

Table 3 shows that the pre-test means in flexibility of the PEG, YPG and the control groups (CG) are 14.4, 14.13 and 14.6 respectively, resulted in an "F' ratio of 0.5, which indicates statistically no significant difference between the pretest means at 0.05 level of confidence. The posttest means of flexibility of the PEG, YPG and the control groups (CG) are 16.67, 15.73 and 14.93 respectively, resulted in an "F' ratio of 7.27, which indicates statistically significant difference between the posttest means at 0.05 level of confidence. The adjusted posttest means of flexibility of the PEG, YPG and the control groups (CG) are 16.65, 15.92 and 14.76 respectively. The obtained F-ratio value was 22.83, which was higher than the table value 3.22 with df 2 and 41 required for significance at 0.05 level. It indicates that there was a significant difference among the adjusted posttest means of flexibility of the PEG, YPG and the control groups (CG).

Table 4
*Scheffe's test for differences of the adjusted post-test paired means of flexibility*

| Adjusted Post-test means | | | Mean Differences | Confidence Interval |
|---|---|---|---|---|
| PEG | YPG | CG | | |
| 16.65 | 15.92 | - | 0.73* | 0.71 |
| 16.65 | - | 14.76 | 1.89* | |
| - | 15.92 | 14.76 | 1.16* | |

* Significant at 0.05 level.

Table 4 shows that the adjusted post-test mean difference in flexibility between PEG and YPG, PEG and CG and between YPG and CG are 0.28 and 0.3, respectively which were statistically significant at 0.05 level of confidence. It is concluded that there was a significant difference on flexibility among the groups. However, physical exercise group was to be found better in improving the flexibility than yoga practice group and control group.

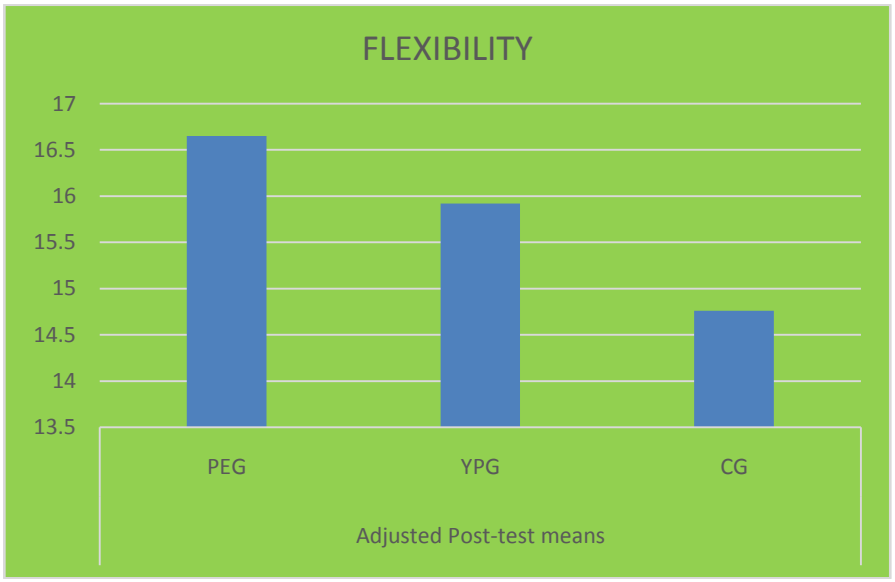


*Figure I*
Mean Scores of Adjusted Post Test of PEG, YPG and CG on Flexibility

Table 5
*Analysis of covariance for the pretest and post test data on bmr scores of physical exercise yogic practicesand control groups*

| Test | PEG | YPG | CG | SOV | Sum of Squares | df | Mean Squares | "F" Ratio |
|---|---|---|---|---|---|---|---|---|
| Pre Test | 2128.8 | 2117.4 | 2118.6 | B | 1177.2 | 2 | 588.6 | 0.15 |
| | | | | W | 162667.6 | 42 | 3873.04 | |
| Post Test | 2010.93 | 2055.93 | 2122.27 | B | 94101.11 | 2 | 47050.56 | 9.67* |
| | | | | W | 204460.8 | 42 | 4868.114 | |
| Adjusted Post Test | 2005.43 | 2059.15 | 2124.56 | B | 106323.8 | 2 | 53161.92 | 19.94 |
| | | | | W | 109295.6 | 41 | 2665.748 | |

* F (0.05) (2, 42 and 2, 41) = 3.22, *Significant at 0.05 level of confidence

Table 5 shows that the pre-test means in BMR of the PEG, YPG and the control groups (CG) are 128.8, 2117.4 and 2118.6 respectively, resulted in an "F' ratio of 0.15, which indicates statistically no significant difference between the pretest means at 0.05 level of confidence. The posttest means of BMR of the PEG, YPG and the control groups (CG) are 2010.93, 2055.93 and 2122.27 respectively, resulted in an "F' ratio of 9.67, which indicates statistically significant difference between the posttest means at 0.05 level of confidence. The adjusted posttest means of BMR of the PEG, YPG and the control groups (CG) were 2005.43, 2059.15 and 2124.56 respectively. The obtained F-ratio value was 19.94, which was higher than the table value 3.22 with df 2 and 41 required for significance at 0.05 level. It indicates that there was a significant difference among the adjusted posttest means of BMR of the PEG, YPG and the control groups (CG).

Table 6
*Scheffe's test for differences of the adjusted post-test paired means of BMR*

| Adjusted Post-test means | | | Mean Differences | Confidence Interval |
|---|---|---|---|---|
| PEG | YPG | CG | | |
| 2005.43 | 2059.15 | - | 53.72* | 47.84 |
| 2005.43 | - | 2124.56 | 119.1* | |
| - | 2059.15 | 2124.56 | 65.41* | |

* Significant at 0.05 level.

Table 6 shows that the adjusted post-test mean difference in BMR between PEG and YPG, PEG and CG and between YPG and CG are 53.72, 119.1 and 65.41, respectively which were statistically significant at 0.05 level of confidence. It is concluded that there is a significant difference on BMR among the groups. However, physical exercise group was to be found better in reducing the BMR than yoga practice group and control group.

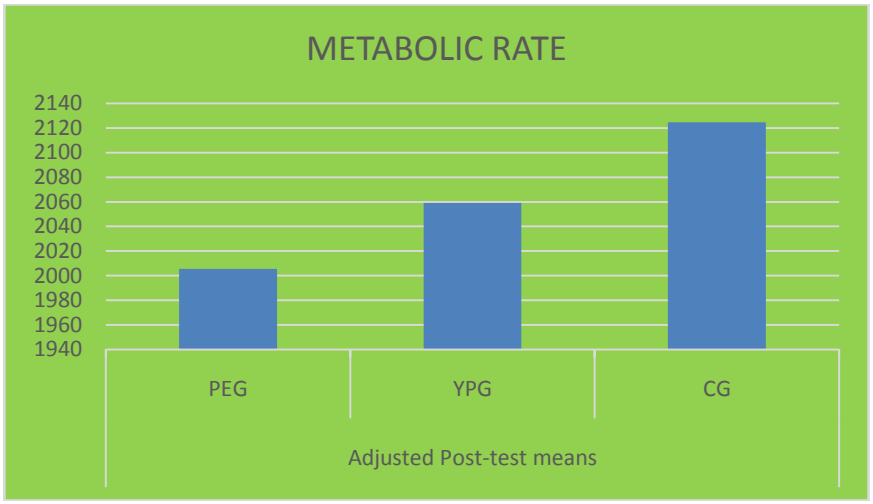


Figure II
*Mean Scores of Adjusted Post Test of PEG, YPG and CG on Metabolic Rate*

**Discussion on Findings**

The result of the study on health related fitness and BMR variables that the experimental group namely physical exercise training (PEG), and yogic practice groups (YPG) had significantly improved after the six weeks of training Besides, the analysis of the data indicated that there was a significant difference between the PEG and YPG on all the selected dependent variables. More over physical exercise training showed better results in the entire selected dependent variables than the YPG.

**Discussion on Hypothesis**

1. It was mentioned in the first hypothesis that there would be significant differences due to the influence of physical exercises and yogic practices on health related physical fitness variables such as flexibility variables of obese school boys. The results of the study indicate that there was a significant improvement in the health related fitness variables due to the effect of physical exercises and yogic practices. Hence, the first hypothesis was completely accepted with respect to the all health related fitness variables at 0.05 level of confidence.
2. It was mentioned in the second hypothesis that there would be significant differences due to the influence of physical exercise and yogic practices on basal metabolic rate of obese school boys. The results of the study indicate that there was a significant change in BMR due to the effect of physical exercise and yogic practices. Hence, the second hypothesis was also completely accepted at 0.05 level of confidence.

**Conclusions**

It was concluded from the results of the study that the physical exercises and yoga practices groups showed significant improvement in flexibility and basal metabolic rate when compared with a control group as well as pretest.

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