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Research Article

EFFECT OF 8 WEEK OF AEROBIC EXERCISE ON INSULIN RESISTANCE INDEX AND BODY COMPOSITION CHANGES IN OVERWEIGHT BOYS10 TO 12 YEARS

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ABSTRACT
Health of the society depends on the health of children and adolescents. One of the major risk factors for many diseases is overweight and obesity that it's underlying factors begins of the embryonic period and gradually is formed during growth. The aim of the present study is, Effect of aerobic exercise on insulin resistance index and body Composition changes. The research population consists of Overweight boys 10 to 12 years that were prepared voluntarily for this study. Primary Information were measured and recorded related to insulin levels, height, weight, body mass index, body fat percentage, waist circumference, hip circumference and waist circumference to hip circumference ratio. 5 ml blood was taken of venous from the right hand of each subject that was used to determine the amount of insulin levels. After this stage, groupexercise3 times a week for 8 weeks were affected by endurance exercise. Endurance exercise in this research consist of warm up and running (40 to50% HR.min the first two weeks, 50 to 60% HR. min the second week, 60 to70% HR.min the third weekand70 to80% HR. min the fourth week) and It was make-cold and return to the initial state. After completion of training period, the subjects of this study were to measure and evaluate the previous test. After analyzing the blood samples, Data were analyzed using statistical method of the Student and the results were investigated inthe$p \leq 0 / 05$ level. The result showed: weight, Body Mass Index, Fat percentage, waist circumference and hip circumference of subjects were created a significant reduction. The8-week endurance training can cause improves indexes related to body composition in overweight boys.

Keywords: *Aerobic Exercises, Body Mass Index, Insulin Resistance, Overweight*

INTRODUCTION
The cornerstone of most chronic diseases including diabetes, cardiovascular disease, osteoporosis and many other diseases to be of early life.
One of the major risk factors for these diseases, is overweight and obesity that it's underlying factors begins of embryonic period And gradually, it takes shape over time. Obesity in children and Adolescents is known a risk increasing factor for insulin resistance syndrome and mortality due cardiovascular disease in adulthood.
According to figures released by the World Health Organization, Currently, about 1 billion people, means out of every seven people on Earth a person have overweight and At least300 million of the mare obese. In the last decades, the number of overweight and obese individuals has been increasing rapidly and the notable point that is a serious risk for public health; it is growing trend of overweight and obesity in children and adolescents. At present, more than22million children under five years old have overweight worldwide.
This statistic is far greater in older children and adolescents. This situation have a certain features in developing countries, these communities while still suffer of the problem of underweight and mal nutrition of children and adolescents, immediately with other dimension of weight disorders has been faced, means overweight and obesity indifferent age groups, including obesity in childhood and adolescence. The main reason for this is the rapid changes of lifestyle, tendency towards high-calorie foods and also physical inactivity. Nervous tension of the machine life has been added and intensifies the

situation (Kelishadi, 2010). Obesity in children and Adolescents is known a risk increasing factor for insulin resistance syndrome and mortality due cardiovascular disease in adulthood (Freedman *et al.*, 1999). Also in Iran is increased prevalence of obesity in children and adolescents, So that body mass index (BMI) 6/22%of adolescents11to 17 years has been more than 95 percentile and also 6/26% of them had metabolic syndrome (Moayeri *et al.*, 2008).

Also many obese children have simultaneous metabolic syndrome, so that in a study was done in 2008byKelishadiet al, 42.5 percent of obese children were suffered from this syndrome (Kelishadi *et al.*, 2008).

Rapid changes in life style is caused the altered dietary pattern and physical activity in children and adolescents and put them at risk of overweight and obesity (Ebbeling *et al.*, 2002). This problem especially in developing countries, including Iran, is increasing rapidly (7&8). Childhood and adolescence obesity In addition to the acute complications, puts people eat risk of many chronic complications (Strong *et al.*, 1999).

Physical activities are considered as a public health tool that can be used in the prevention and treatment of many physical and mental diseases (MonterioPeluso *et al.*, 2005). In a study that Svjvng *et al.*, (2012) done on 45obese adolescent Korean at12-weeks, he found that, Aerobic exercise prevents weight gain and improves insulin action and resistance to insulin. In another (Sung *et al.*, 2012) found that Aerobic exercise with reduced body mass index and significant progress led to in the insulin resistance in children and adolescents Korean 10 to 13 years.

Due to the importance of the issue in children and adolescents, the aim of the present research is to investigate the role of aerobic exercise on body composition and insulin resistance index in group of adolescents that have over weight and are obese.

MATERIALS AND METHODS

This study was quasi-experimental with pretest and posttest and the research population consists of boys 10 to 12 years that have simple overweight. Fist subjects that are 10 students of primary school in Tehran Voluntarily declared their readiness.

Then with filling out the initial questionnaire and taking the parental consent and their commitment to participate in training sessions without the absence of adequate medical evaluation into their physical health was done, then biochemical and physical measurements and evaluations were performed. Subjects with researcher in the fasting state were present in Clinical Laboratory and 5 ml blood were taken from the right hand's venous of each subject that used to determine the level of insulin in the scale mic U / ml.

Measurements of height, weight, BMI, percent of body fat, waist circumference, hip circumference and waist to hip ratio was performed. After this stage, group training for 8 weeks and 3 sessions per week were under the supervision of the coach under the influence of aerobic exercise. Aerobic exercise in this research was consist of warm-up and running Intensity 50% to 80percent of maximum heart rate and cools down and returns to the initial state.

After completion of training, the subjects of research again were measured and evaluated in test of the prior medical diagnostic laboratory. First, was used of Kolmogorov-Smirnov test until tested the normal distribution of the samples. Then, using the paired test and considered a significant level the five percent (05/0 = α) was used to analyze the data and test the hypotheses.

RESULTS AND DISCUSSION

Results

Run eight weeks of aerobic exercise on obese boys ten to twelve years, caused a significant changes in weight variable, body mass index, body fat percentage, dimension of waist circumference and hip circumference were($p \leq 0$ / 05), but didn't cause significant changes in insulin, insulin resistance, and waist-hip ratio ($p > 0/05$).

Average and standard deviation of subjects are shown in pre-test and post-test in Table 1.

Table 1: The mean and standard deviation of variables in subjects before and after aerobic exercise

P	Pre-test	Post-test	Variables	Row
0.93	3.02±14.12	2.59±14.03	insulin	1
0.83	0.082±2.91	0.50±2.85	Insulin resistance	2
0.022*	5.34 ±63.23	6.29±61.91	weight	3
0.004*	1.71±28.55	2.04±27.5	Body mass index	4
0.006*	2.88±33.11	3.78±31.42	Fat percentage	5
0.003*	5.25±94.4	5.21±9.45	waist circumference	6
0.0001*	5.15±99.60	3.36±93.66	hip circumference	7
0.076	0.042±0.92	0.035±0.097	waist-hip ratio	8

**Significant level (05/0 = α)*

Pre-test and post-test changes of weight, body fat percentage and BMI variables are shown in Figures 3-1.

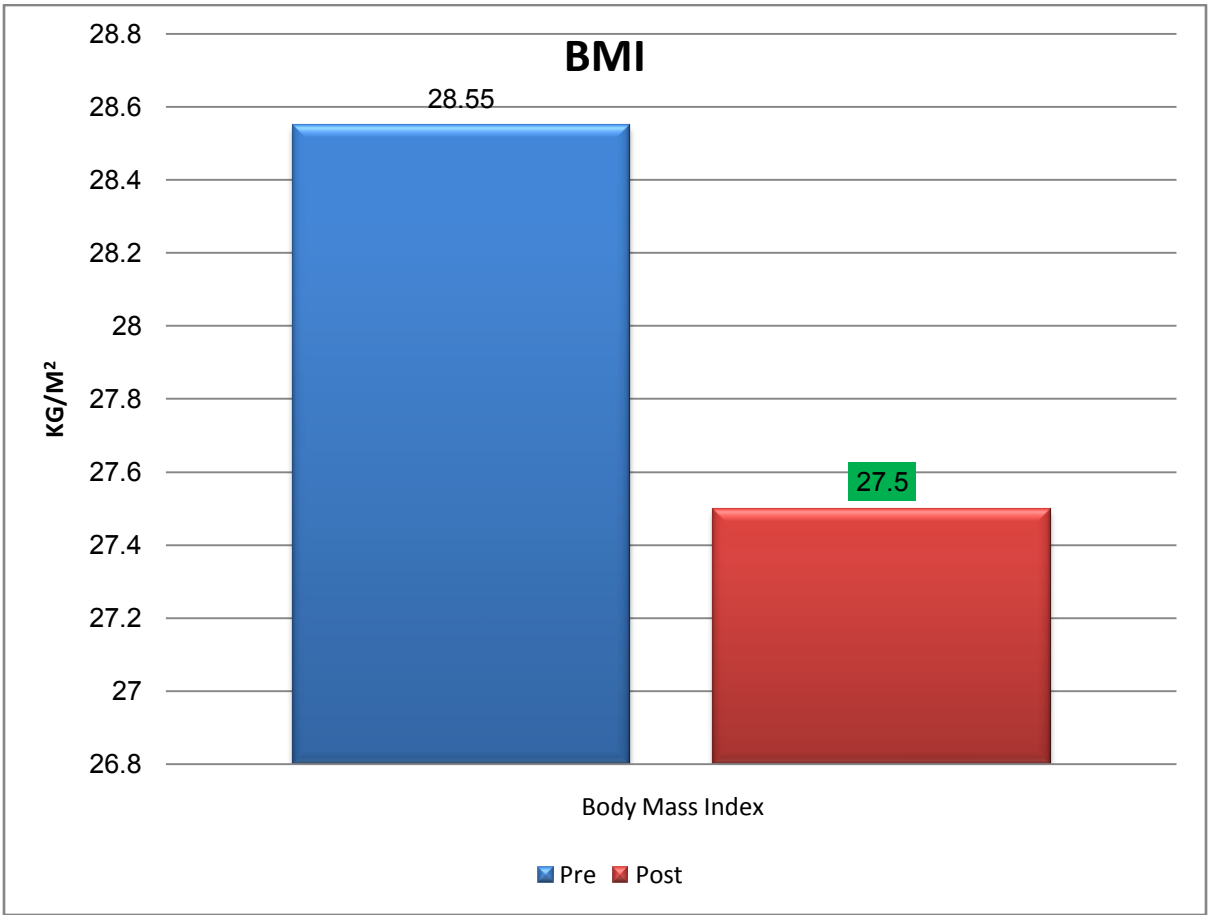

Figure 1: Changes of BMI in obese boys 10 to 12 years after the8-week aerobic training

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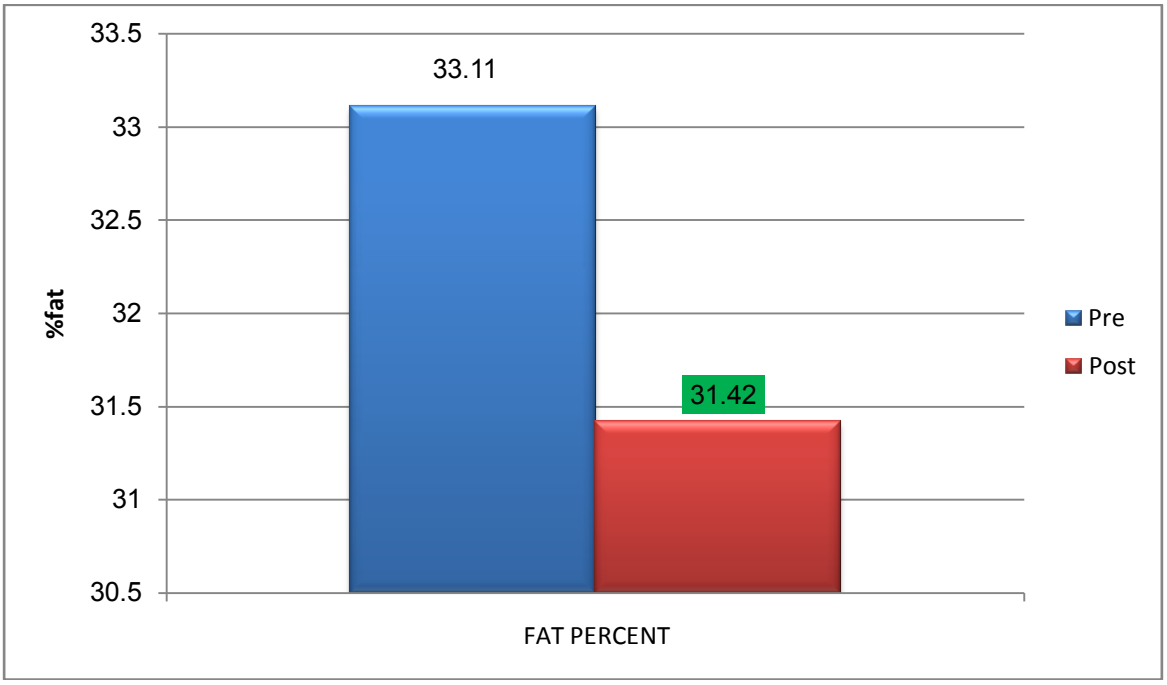

Figure 2: Changes of fat percentage in obese boys 10 to 12 years after the8-week aerobic training

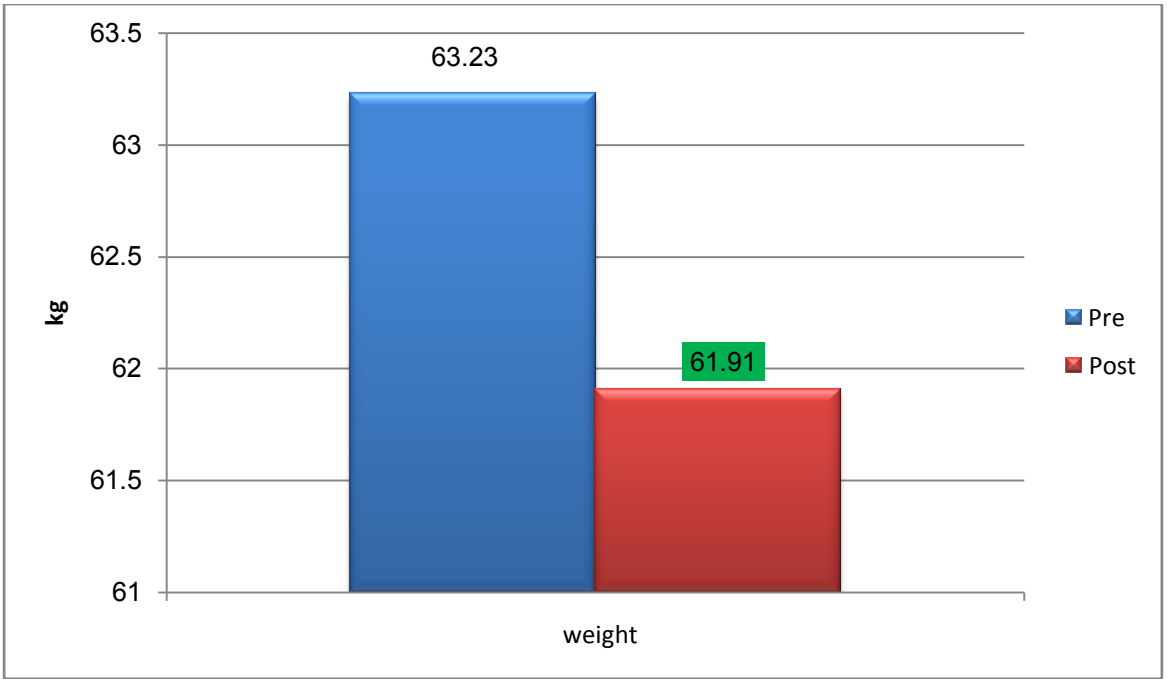

Figure 3: Changes of weight in obese boys 10 to 12 years after the8-week aerobic training

Discussion and Conclusion

In recent years, Lifestyle changes have led to different communities is faced with the problem of overweight and obesity in all age. Meanwhile, obesity in childhood and adolescence is posed as a public health problem healthy. In recent decades, growing trend of obesity in children and adolescents has drawn the attention of researchers in health sciences and this syndrome has been reported in studies of epidemiology as a global epidemic. Obese children and adolescents are at high risk of obesity in

adulthood. On the other hand, obese adults are at risk catching chronic diseases such as cardio-respiratory diseases, diabetes and some cancers. Thus, it seems that screening for adolescent, according to assess the type of obese somatic and their overweight, it is important.

Physical activity that increases the cardiovascular endurance, it is the most important part of the training program. These activities are designed in such a way that increases the capacity and efficiency of the cardiovascular, respiratory and metabolic system. Aerobic exercises also help to control body weight or reduced it. Reviewing studies of this field show that factors such as the nature, intensity, duration and type of exercise and sports activities, as well as different numbers of subjects in different age and gender, including the reasons that cause the results of studies differ or be contradict. According to results of (Svh, 2012) and (Svjvng, 2012) Aerobic exercise leads to a significant improvement in insulin resistance that, is not identical with the results of this research of (Vndrhydn, 2009) is not identical and it is identical with the result of above research in variables of weight, body mass index changes and fat percentage.

The need for prevention and control of overweight should be emphasis from early life faster. On the other hand, in case of overweight and obesity, should be counteracted by corrected eating habits, eliminate in glow-value and high-calorie foods and increasing physical activity. Obviously this require to the cooperation of all family members (Kelishadi *et al.,* 2013). Physical exercise can be considered as a public health tool that can be used to prevent and treat a variety of mental and physical diseases (MonterioPeluso and Guerra, 2005).

Generally results of this research showed that Aerobic exercise has a beneficial effect on body composition changes. These changes may be the result of engaging large muscle groups in the training period and the nature of this type of exercise in terms of training duration and the fat substrate utilization in this training period.

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