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Research Article

SINGLE BOUT EXERCISE IS ASSOCIATED WITH ALLERGIC PROPERTY IN HEALTHY OBESE MEN

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ABSTRACT
Accumulating evidence supports of obesity as a contributor to the increased prevalence of allergic disease and related diseases. In this study, we compared the concentrations of immunoglobulin E (IgE) as an allergic predictor in obese ($30 \leq BMI \leq 36$, $n = 13$) and normal weight men ($20 \leq BMI \leq 25$, $n = 13$) and also we estimated serum IgE in response to exercise test in obese subjects. Fasting serum IgE were measured in adult obese and normal weight men and were compared with each other. Serum IgE were also measured immediately after single bout exercise in obese subjects. Independent student t test was used for between groups comparison. Student's paired 't' test was applied to compare the pre and post training values in obese subjects. $P>0.05$ was considered as non-significant. IgE level in the obese and none obese subjects were almost the same ($p = 0.94$). Compared to pre-test, serum IgE increased significantly in obese group when compared to pre test ($p = 0.23$). In conclusion, exercise test for short time has a allergic or inflammatory property with emphasis on IgE in obese men.

Keywords: *Allergic diseases, Obesity, Exercise*

INTRODUCTION
Obesity is a global problem for public health and researchers in the field of health and wellbeing know obesity as one of the main causes of death. Despite the growing rise in obesity and its impacts on modern societies, the prevalence of obesity and related diseases, particularly cardiovascular disease is among the most important causes of death in developed countries (Garrow, 1999).
Review of scientific evidences shows an inter-relationship between obesity and certain respiratory diseases such as asthma; although the exact mechanism which can represent the direct relationship of these diseases and obesity has not yet been provided. Presence of certain signs in obese people (bronchial responses, ventilatory equivalent or over-ventilatory of respiratory airways or peak of ventilation), which measurement is recognized as the signs of respiratory or allergic diseases, supports somewhat the relationship between these diseases and obesity (Castro-Rodriguez *et al.*, 2001; Chinn *et al.*, 2000). Currently less study has investigated the levels of immunoglobulin E which increment is associated with allergic or respiratory diseases in obese people. Some scientific resources have reported a close relationship between IgE levels and obesity (Visness *et al.*, 2009). They state that IgE levels as an effective factor in prevalence of allergy and asthma is much higher in obese individuals than those with normal weight (Visness *et al.*, 2009). It has also been found that fat mass is a predictor of IgE levels in obese patients (Vieira *et al.*, 2005). The study of Thomas (2003) pointed out the important role of IgE in obesity-related asthma (Thomas *et al.*, 2003).
Preliminary findings of a World Health Organization study suggest that sedentary lifestyle is one of the 10 leading causes of death in the world. Hence, several studies have been carried out in the past two decades to determine the effect of regular exercise on levels of factors effective on obesity or chronic diseases. However, the impact of short-term, especially single-session exercise on serum IgE levels, particularly in obese men is less studied. In this regard, the present study aimed to investigate the immediate response of IgE to short-term exercise in obese non-athlete men.

MATERIALS AND METODS
Thirteen sedentary, healthy non-trained obese men (BMI 32 ± 3 kg/m2) and thirteen normal weight men (BMI 23 ± 3 kg/m2) matched for age, (34 ± 44 year) recruited through local advertising in present study.

In addition to compare serum IgE between two groups, main objective of present study was to determine the effect of one exercise test on serum IgE in obese subjects. All study participants completed the consent process and provided written informed consent prior to randomization. A detailed history and physical examination of each subject was carried out. Subjects were currently participating in an organized physical activity training program over the previous 6 months, and were also excluded from the study. We also excluded people who had any self reported physician diagnosed chronic disease (arthritis, stroke, diabetes, hypertension, cancer, heart attack, chronic cough, or bronchitis).

Each subject's body mass and height were measured. Body mass index (BMI) was calculated by dividing body mass (kg) by height in metres squared (m2). The waist girth was measured at the level of the umbilicus horizontally without clothing, while the hip girth was measured at the level of the greatest protrusion of the gluteal muscles with underwear. Waist-hip ratio (WHR) was calculated. All of these measurements were conducted by the same researcher. Each of these measurements was conducted two times and the average was reported.

Fasting blood shambles were obtain for measuring serum IgE and compare between obese and normal groups. In addition, serum IgE was also measured immediately after single bout exercise in obese subjects. This protocol was performed in 5 continues stage without rest between stages and each stage lasted 3 minute. In each stage, intensity was increased according to protocol guideline (Mullis *et al.*, 1999).

Data Collection

Statistical analysis was done for all the parameters. Normally distributed data were presented as means ± standard deviation of mean (SD). Normal distribution of data was analyzed by the Kolmogorov-Smirnov normality test. The Student's t-test was used to evaluate the statistical significance of differences between means when need. A P value of less than 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Anthropometric and characteristics and IgE of the study participants are described in Table 1. At baseline, there was no difference in serum IgE between obese and normal weight subjects ($p = 0.94$, Figure 1). As mentioned in methodology section, all anthropometrical markers were significantly higher in obese subjects than normal weight participants in comparison to healthy subjects at baseline ($p < 0.05$). Compared to pre-test, serum IgE increased significantly in obese group when compared to pre test (from 98 ± 76.6 to 116 ± 32, $p = 0.23$, Figure 2).

Table 1: Mean and standard deviation of anthropometric and metabolic characteristics and serum IgE of studied subjects at baseline

Variables	obese group	None-obese group
Age (year)	36 ± 3.5	37 ± 2.7
Weight (kg)	100 ± 10	69 ± 6.7
Height (cm)	176 ± 4.4	173 ± 4.3
Body Fat (%)	32 ± 3.5	21 ± 1.1
Body mass index (kg/m^2)	32.1 ± 2.56	23.1 ± 1.31
Abdominal (cm)	106 ± 4.79	87 ± 2.94
Hip (cm)	107 ± 5.1	89 ± 4.7
WHO	1.00 ± 0.27	0.98 ± 0.22
IgE (IU/ml)	98 ± 76.6	98 ± 80.2

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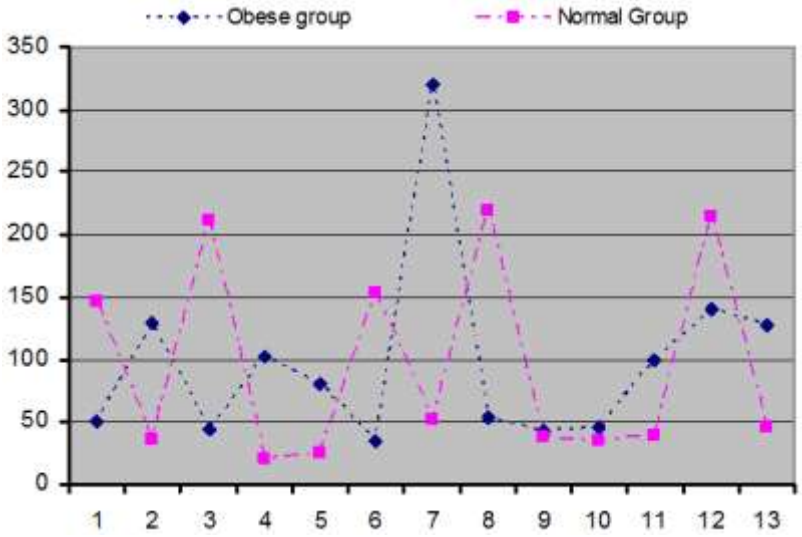

Figure 1: Serum IgE in obese and normal weight subjects (n=13, for each groups). There was no significant difference in IgE between two groups

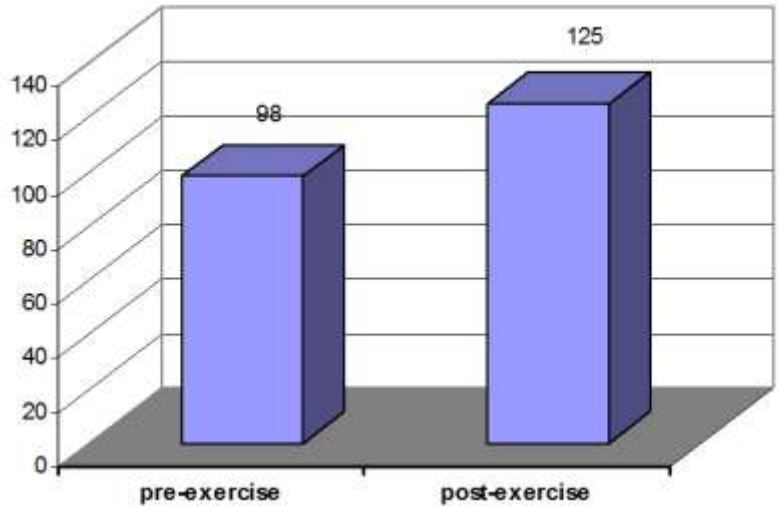

Figure 2: Serum IgE in pre-exercise and post-exercise in obese group (n=13). Exercise test resulted in significant increase in IgE when compared to pre-test

Discussion

In the present study, the levels of IgE were compared between obese adult men and those with normal weight. The study found no significant difference in IgE levels of obese and normal groups; however, the exercise led to a significant increase in IgE levels in the obese group. In other words, a single session exercise in the form of 15 minute biking had significantly increased serum IgE levels in sedentary obese men; this refers to the inflammatory effect of exercise on this allergic predictor in obese people immediately after exercise. Elevated IgE levels in obese individuals compared to normal subjects has been previously reported by certain studies. They have suggested that body fat mass is a predictor of blood IgE levels in obese patients (Vieira *et al.*, 2005).

Some other studies have also mentioned its direct association with inflammatory cytokines such as IL-6 (Deetz *et al.*, 1997). The findings of one study showed that IL-6 is a cofactor or an effective stimulator of IgE secretion from ß cells through increased IL-4 effect, emphasizing the role of inflammatory mediators

in the response of T2 cells and the presence of asthma (Deetz *et al.*, 1997). Given the close, direct relationship between the levels of IgE and inflammatory cytokines such as IL-6, it is hypothesized that their response to short- and long-term exercise programs are likely to follow a pattern. On the other hand, the immediate IgE response to a short-term one-session exercise has not been studied in obese people so far, but some studies have pointed out that a one-session exercise can significantly increase inflammatory cytokines in healthy populations, either obese or patient (Ebrahim *et al.*, 2013). In other words and based on these studies, exercise results in immediate inflammatory effects.

It should be noted that the inflammatory effect of exercise is an unstable and temporary response in this situation; because the studies which have measured the delayed response of cytokines to a one-session exercise have mentioned reduced inflammatory cytokine in the delayed period after exercise (Gleeson, 2007). In accordance to the already provided relationship between IgE and inflammatory cytokines and given their immediate increase after exercise, the significant increase in IgE after exercise in the present study can be justified. In other words, it is concluded that a one-session biking exercise can lead to a significant increase in IgE in adult obese men. Also, since the study population consisted of obese inactive men, it is possible that in addition to obesity, immobility or inactivity or low fitness of these individuals can be the reason for the rise in IgE in response to exercise which gradually increased in intensity (but not exhausting). In other words, the mentioned exercise even with a moderate intensity, rather than maximum intensity, was intolerable by non-athlete obese men.

REFERENCES

Castro-Rodriguez JA, Holberg CJ, Morgan WJ, Wright AL and Martinez FD (2001). Increased incidence of asthmalike symptoms in girls who become overweight or obese during the school years. *American Journal of Respiratory and Critical Care Medicine* **163** 1344-9.

Chinn S, Jarvis D and Burney P (2002). Relation of bronchial responsiveness to body mass index in the ECRHS. European Community Respiratory Health Survey. *Thorax* **57** 1028-33.

Deetz DC, Jagielo PJ, Quinn TJ, Thorne PS, Bleuer SA and Schwartz DA (1997). The kinetics of grain dust–induced inflammation of the lower respiratory tract. *American Journal of Respiratory and Critical Care Medicine* **155** 254-259.

Ebrahim AS, Afshar J, Adalat F and Ali Akbar M (2013). Effect of Astrand exercise test on serum interleukin-6 and C - reactive protein response in healthy inactive men. *Koomesh* **14**(2) 152-157.

Garrow JS (1999). Obesity: definition, Aetiology and Assessment. In: *Encyclopedia of Human Nutrition* (*Academic press)* **3** 1430-34.

Gleeson M (2007). Immune function in sport and exercise. *Journal of Applied Physiology* **103** 693-699.

Mullis R, Campbell IT, Wearden AJ, Morriss RK and Pearson DJ (1999). Prediction of peak oxygen uptake in chronic fatigue syndrome. *British Journal of Sports Medicine* **33**(5) 352-6.

Thomas SS and Chhabra SK (2003). A study on the serum levels of interleukin-1beta in bronchial asthma. *Journal of the Indian Medical Association* **101**(5) 282-286.

Vieira VJ, Ronan AM, Windt MR and Tagliaferro AR (2005). Elevated atopy in healthy obese women. *American Journal of Clinical Nutrition* **82**(3) 504-9.

Visness CM, London SJ, Daniels JL, Kaufman JS, Yeatts KB and Siega-Riz AM (2009). Association of obesity with IgE levels and allergy symptoms in children and adolescents: results from the National Health and Nutrition Examination Survey 2005-2006. *Journal of Allergy and Clinical Immunology* **123**(5) 1163-9.