

## An Analysis Study Describing Physical Fitness Level of Overweight Subjects

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**Abstract.** *Aim:* This study was planned to compare the physical fitness level of overweight and normal subjects. *Methods:* 50 subjects were divided into two groups: Group I (25 controls; mean age:  $29.52 \pm 7.94$  years) and Group II (25 overweight subjects; mean age:  $35.21 \pm 8.31$  years). Average of the Body Mass Index (BMI) scores of Group I and II were  $21.68 \pm 1.90$  kg/m<sup>2</sup>,  $28.35 \pm 3.24$  kg/m<sup>2</sup>, respectively. The subjects had no any health problems, such as hypertension, diabetes mellitus, and coronary heart diseases, neurological or musculoskeletal dysfunctions. All subjects were evaluated using the following physical fitness tests; Harward-Step, Push-ups, Sit-ups, Trunk Bending Forward & Backward, and Flamingo Balance. The results obtained from this study were analyzed using SPSS for windows statistical program (version 10.0). *Results:* The results showed that scores of Group II were significantly less than scores of Group I in terms of cardio-vascular endurance and a parameter of flexibility (trunk extension) ( $p < 0.05$ ). *Conclusion:* To gain weight is an important risk factor regarding healthy life, especially physical fitness level. These results show that the overweight subjects are at risk concerning cardiovascular diseases due to decreased cardiovascular endurance. Therefore, both overweight subjects and obese subjects should be evaluated using physical fitness tests in order to describe their physical health profile and to able to organize the most suitable preventive medical program to improve quality of life.

**Key words:** *excess body weight, cardiovascular disease, healthy life.*

### Introduction

Overweight refers to an excess of body weight compared to set standards. The excess weight may come from muscle, bone, fat, and/or body water. A person can be overweight without being obese, as in the example of a bodybuilder or other athlete who has a lot of muscle. However, many people who are overweight are also obese.

Obesity refers specifically to having an abnormally high proportion of body fat (1).

The definitions for overweight and obesity have varied over time, from study to study, and from one part of the world to another. Many reports in the literature use a statistically derived definition for obesity or overweight.

In 1995, the World Health Organization recommended a classification for three "grades" of overweight using BMI cutoff points of 25, 30, and 40.

These definitions are based on evidence that health risks increase shapelier in individuals with a BMI  $\geq 25$ . For example, overweight individual with a BMI of 29 does not acquire additional health consequence associated with obesity

simply by crossing the BMI threshold  $\geq 30$ . However, health risks generally increase with increasing BMI .

Overweight and obesity are found world wide and the prevalence of these conditions in the United States ranks high along with other developed nations.

Overweight and obesity are known risk factors for: diabetes, heart disease, stroke, hypertension, gallbladder disease, osteoarthritis, breathing problems, some form of cancer (2,3,4,5). Individuals with BMI between 25 and 30 are healthy; however, they have to try to avoid gaining more weight, and look into healthy ways to lose weight and increase physical activity. Physical activity helps to control weight by using excess calories that would otherwise be stored as fat. Each activity uses calories, including sleeping, breathing, and digesting food.

Balancing the calories individuals eat with the calories individuals use through physical activity will help him/her reach and maintain on healthy weight (5,6).

Physical fitness usually has been described as a multifactorial trait related to the capacity to movement. Physical fitness is “asset of attributes that individuals have or achieve that relates to the ability to perform physical activity”. These general concepts of physical fitness have been made more practical by identifying fitness components such as balance, muscular endurance, agility, which are related to one or more types of human movement. One way to establish what constitutes health-related fitness and in turn health-related physical activity among overweight subjects is to assess the relationships of physical fitness and physical activity to known adult risk factors for cardiovascular disease (2). The purpose of this study was to describe physical fitness level in overweight subjects with a BMI

greater than 25 comparing with subjects who have less than 25. In addition, on the basis of the results obtained from this study, the second aim was to show risks factors for unhealthy life style in overweight subjects.

**Materials and Method**

The total number of subjects was 50 (25 men, 25 women). The breakdown by groups is shown in Table 1. 50 subjects were divided into two groups. Subjects with a BMI less than 25 were included in group I. other 25 subjects with a BMI grater than 25 were included in group II. The subjects who have had any kind of musculoskeletal or cardio respiratory diseases were excluded from the study

**Table 1.** Descriptive Statistics of the Overweight and Healthy Subjects

Variables	Group I		Group II	
	mean	SD	mean	SD
Age,yr	29,5	7,9	35,2	8,3
Height,cm	167,4	9,1	164,0	8,8
Weight,kg	60,9	7,1	77,1	8,8
BMI,kg/m <sup>2</sup>	21,6	1,9	28,8	3,2

**Fitness Assessment**

The selection of motor and musculoskeletal 6 test items to the health-related fitness test battery was based on a literature review on the method for fitness assessment with special reference to reliability and health-related validity.

The motor and musculoskeletal tests were as follows:

**Motor Fitness:** Balance. Flamingo Balance Test (FBT) (Standing on the leg with eyes open). The FBT was used to measure the efficiency of postural control and balance ability.

**Flexibility:** Trunk-bending to the forward and backward (extension) was used to measure the total range of movement of flexion/extension of the thoracic and lumbar spine and pelvis.

Trunk Side- bending to the right or left was used to measure the total range of movement of lateral flexion of the thoracic and lumbar spine. The subjects were instrumented to bend to the right and then to the left as far as possible. The scores were recorded in cm. for both sides.

**Muscular Endurance:** Sit-ups test was used to measure the endurance capacity of the trunk flexor muscles. The subjects were instructed to repeat trunk flexion raising their arms to the knees. The number of sit-ups completed in 60 seconds was counted. A modified push-ups test was also used to measure the endurance capacity of the upper extremities extensor muscles. The subjects were instructed to do as many push-ups on they could during 60 seconds. The number of push-ups completed in 60 seconds was counted and recorded.

**Cardio-respiratory Endurance:** The Harvard-step test is commonly used as a field test in order to measure the cardio respiratory fitness. All subjects were advice to rest and relax before testing and they were informed about testing procedure. And their heart rate was counted in 60 seconds. The score of the test was calculated using the Harvard-Step formula and then was recorded.

**Statistical Analysis:** The descriptive statistics are presented as mean and standard deviation (mean±SD). Significant was set at 5% level. The data of the scores of the fitness tests were computed and calculated using a statistical program (SPSS for Windows 10.0 version).

To find any differences regarding the means of variables between the groups; the Mann Whitney-U test was used.

**Table 2.** Distributions of the physical fitness tests results

Fitness Test Item	Group I		Group II		P*
	Mean	SD	Mean	SD	
<b>Flamingo Balance Test</b> (sec.)	14.2	12.6	20.8	30.5	>0.05
<b>Trunk/Flexibility</b> (cm)					
<b>Side Bending</b>					
Right	21.5	9.04	18.9	3.2	>0.05
Left	22.1	8.1	18.9	4.04	>0.05
<b>Flexion</b>					
<b>Forward</b>	1.5	10.7	3.7	10.7	>0.05
<b>Extension</b>					
<b>Backward</b>	15.4	4.8	17.8	3.1	<0.01
<b>Muscular Endurance</b> (Repetition/1min)					
<b>Sit-ups</b>	14.3	4.2	13.8	4.4	>0.05
<b>Modified Push-ups</b>	14.8	5.3	16.6	5.4	>0.05
<b>Cardiovascular Endurance</b>					
<b>Harvard-Step Test</b> (Score of the condition)	21.01	10.6	12.5	6.05	<0.01

\* The Mann Whitney U Test was used.

### Results

Results of the fitness tests are presented comparing both groups in Table 2. The results of this study, which was planned to compare of level of physical fitness between overweight subjects with a BMI greater than 25 and healthy controls with a BMI less than 25, show that there were significant differences in terms of cardiovascular endurance (Harvard Step Test) and flexibility, especially trunk bending backward (extension) (p<0.05).

### Discussion

The prevalence of overweight and obesity worldwide is increasing at such a dramatic rate that it is now considered a global epidemic. Excess body weight is associated with increased mortality and morbidity rates. Mortality rates rise with increasing levels of obesity, particularly when body mass index (BMI) is  $\geq 35$  kg/m<sup>2</sup>. Numerous chronic and debilitating illnesses, including type II diabetes, coronary heart disease, some cancers and musculoskeletal disorders, and disorders that reduce quality of life such as

arthritis, respiratory difficulties, skin problems, sleep apnea and infertility, are more common in overweight and obese individuals. Overweight and obesity also increase the risk of a variety of psychosocial problems including body image disturbance, low self-esteem, disordered eating and depression (5, 2).

Most studies have been presented in the literature about the relation between extra weight and heart diseases show that there is a significant relation who increases of prevalence rate of heart diseases in overweight and obese subjects (7, 8, 2).

In the study of Miyatake et al. they found in abdominal obesity subjects, AST, uric acid, triglyceride and the atherogenic index were significantly higher and HDL cholesterol was significantly lower than those in normal weight subjects. In addition, triglyceride and the atherogenic index were significantly higher in abdominal obesity subjects than those in overweight subjects. They compared physical fitness, i.e. aerobic exercise level, muscle strength and flexibility. Oxygen uptake at VT was remarkably reduced in abdominal obesity subjects and overweight subjects compared with normal weight subjects. We also observed the same result about cardiovascular endurance in our overweight subjects who were evaluated in the study (9).

Similarly, Holcomb et al. reported that the subjects who met or exceeded guidelines of moderate activity 5 days per week or vigorous activity 3 days per week had significantly lower BMI, percent body fat, and WHR compared with subjects who did not meet the guidelines or were inactive in their study (8).

It is clear that physical fitness level especially cardiovascular endurance and obesity are much related to each other. Thus, as it mentioned in many studies increasing physical activity is an essential component of both weight loss and weight maintenance strategies. An education program focusing on physical activity alone can demonstrate a significant increasing, which has considerable positive effects on morbidity and mortality even in the absence of weight loss [8, 10,11].

Health providers should inform overweight subjects about risk factor of extra weight and encourage them to control their weight and physical fitness level attending in a regular physical activity program in order to achieve and maintain a healthy weight and improve their health related quality of life.

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