

## Effect of Moderate Interval Intensity Training on Quality of Life in Sedentary Obese Subjects

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### Abstract

**Background:** There is lack of awareness of the efficacy moderate interval intensity training on quality of life in sedentary obese subjects in Egypt.

**Aim of Study:** The present study was conducted to determine the effect of moderate interval intensity training on quality of life in sedentary obese subjects.

**Material and Methods:** Twenty obese male subjects participated in this study, ranged in age from 35 to 45 years who received moderate interval intensity training (MIIT). The participated subjects in this study were assessed by Short form 36 quality of life questionnaire (SF-36) and were evaluated before and after the treatment program about three sessions per week for eight weeks.

**Results:** The obtained results revealed statistical significant difference of the measured variables when compared before and after treatment.

**Conclusion:** MIIT can be added to the physical therapy program and had an effect on quality of life in sedentary obese subjects.

**Key Words:** Moderate interval intensity training – Quality of life – Obese subjects.

### Introduction

**INTERVAL** training refers to the basic concept of alternating periods of relatively intense exercise with periods of lower intensity effort or complete rest for recovery. A wide range of terms have been used by different groups to describe various interval training protocols, which has led to a dizzying array of acronyms and general lack of standardization in the literature [1].

Training-stimulated physiological benefits are primarily dependent on the volume and intensity

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of the training stimulus. A substantial number of research studies have compared the effects of short bouts of HIIT and long bouts of MIIT in athletes [2].

Recent findings suggest that when compared to more traditional forms of aerobic exercise, such as MIIT which has been shown to elicit similar and at times greater improvements in outcomes such as cardiorespiratory fitness despite often requiring less time commitment and lower energy expenditure [3].

Sedentary behavior is defined as any waking behavior characterized by energy expenditure  $\leq 1.5$  Metabolic Equivalent Tasks (MET) while in a sitting or reclining posture increased substantially over the last three decades. Older adults are the most sedentary segment of society, as many spend over 75% of their waking day in sedentary behavior [4].

Some authors suggest that prolonged SB is associated with increased rates of several chronic diseases and all cause mortality in older adults [5].

A sedentary lifestyle negatively affects cardiovascular and metabolic health and is related to risk of morbidity and mortality [6].

Studies estimate that 60% of people worldwide are insufficiently physically active to obtain health benefits [7].

This is due to their low participation in physical activity during free time, as well as a high prevalence of sedentary tasks at workplaces throughout the day. This also increases the amount of daily sedentary time and results in low expenditure of energy, contributing to obesity and cardiovascular diseases [8].

Obesity is a state of excess adipose tissue mass. In presence of nutritional abundance (excess energy intake), sedentary life style and influence importantly by genetic endowment, endocrine and neuronal system increases adipose energy store and produces adverse health consequences. Most widely used method to gauge obesity is BMI which is equal to weight in kilogram divided by height in meter square [9].

Obesity is the excessive accumulation of body fat and is considered a chronic and progressive disease because it is associated with several comorbidities. The main cause of obesity is a sedentary lifestyle, but it can be associated with factors, such as eating disorders as well as genetic, endocrine, metabolic, psychological, and sociocultural issues [10].

### Subjects and Methods

#### *Study design and participants:*

Twenty obese male subjects participated in this study and were recruited from the out-patient clinic of Faculty of Physical Therapy, Cairo University and out-patient clinics of Al-Kasr Al-Aini Hospitals, Cairo University. Their age ranged from 35 to 45 years and received MIIT. The study design was randomized control and the time length of this study was from October 2021 to February 2022. The participated subjects in this study were assessed by Short form 36 quality of life questionnaire (SF-36) and were evaluated before and after the treatment program about three sessions per week for eight weeks.

The participated subjects were enrolled based on the following inclusion and exclusion criteria:

#### (A) *Inclusion criteria:*

- 1- Sixty adults of both sexes (male and female) of age group between 30-40 years.
- 2- All participants would be clinically and medically stable and
- 3- The body mass index (BMI) of all participants would be 30-34.9 kg/m<sup>2</sup>.

#### (B) *Exclusion criteria:*

The potential participants would be excluded if they meet one of the following criteria:

- 1- Unstable angina pectoris.
- 2- Uncompensated heart failure.
- 3- Recent myocardial infarction.
- 4- Complex ventricular arrhythmia or heart block.
- 5- Cerebro-vascular disease.
- 6- Uncontrolled peripheral vascular disease.

7- Uncontrolled diabetes mellitus.

8- Uncontrolled hypertension.

#### Methods:

##### *A- Evaluation:*

Short form 36 quality of life questionnaire (SF-36): It is used for measuring health-related quality of life (HRQL) which consists of 36 questions (SF-36) (limitations on physical functioning because of health problems) [11].

##### *B- Treatment:*

Twenty obese male adults who received MIIT which is between 70 and 85% of maximal heart rate (HR max) in form of treadmill training about three times per week for eight weeks [12]. Each subject participated in the group (B) applied treadmill training for 25 minutes according to the following steps [13]:

- 1- Set the treadmill so it's flat inclination.
- 2- Walk at 2 miles per hour (mph); 3 Kilometer/hour (Km/H) for 5 minutes as warming up.
- 3- Walk at 3 to 4 mph; 6 Km/H for 30 seconds, repeat 10 times (5 minutes).
- 4- Run at 8 mph; 12.5 Km/H for 30 seconds, repeat 10 times (5 minutes).
- 5- Walk at 3 to 4 mph; 6 Km/H for 30 seconds, repeat 10 times (5 minutes).
- 6- Walk at 2 mph; 3 Km/H for 5 minutes as cooling down.
- 7- Finally, running or walking was stopped immediately when the subject felt pain, fainting or shortness of breath.

#### *Statistical analysis:*

The data were collected and analyzed through two types of statistics by using SPSS version 17 as follows:

#### *Descriptive statistics:*

The mean and standard deviation of each group were calculated for each parameter.

- Mean (X) = summation of x / number of x.
- Standard deviation (SD) = Root square of variance.

#### *Inferential statistics:*

- Comparing mean values between pre and post of each parameter within each group was done by paired *t*-test.
- Comparing mean values of each parameter between the two groups before and after three months of treatment program.

- Was done by unpaired *t*-test.
- The probability in this study was >0.05%.

**Results**

**I- General characteristics:**

The results revealed that, pre-treatment X ± SD value of BMI was 32.51±1.76, while that of post-treatment was 32.51±1.76. The significant difference was revealed (*p*=0.0001) when comparing between pre and post-treatment mean values and % of change = 6.52% (Table 1) (Fig. 1).

The results revealed that, pre-treatment X ± SD value of SF-36 was 54.58±3.97, while that of post-treatment was 61.41±3.84. The significant difference was revealed (*p*=0.0001) when comparing between pre and post- treatment mean values and % of change = 12.51% (Table 1) (Fig. 2).

Table (1): Comparing pre and post-treatment of BMI and SF-36.

	BMI		SE-36	
	Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment
X ± SD	32.51±1.76	30.39±1.78	54.58±3.97	61.41±3.84
MD		2.12		6.83
% of change		6.52%		12.51%
<i>t</i> -value		11.3		30.78
<i>p</i> -value		0.0001		0.0001
Level of Significant		S		S

X : Mean.  
 Pre : Before treatment.  
 Post: After eight weeks of treatment.  
 SD : Standard Deviation.  
 MD : Mean Difference.  
 % of change: Percentage of change.  
*t*-value : Paired *t*-test value.  
*p*-value: Probability value.  
 S : Significant.

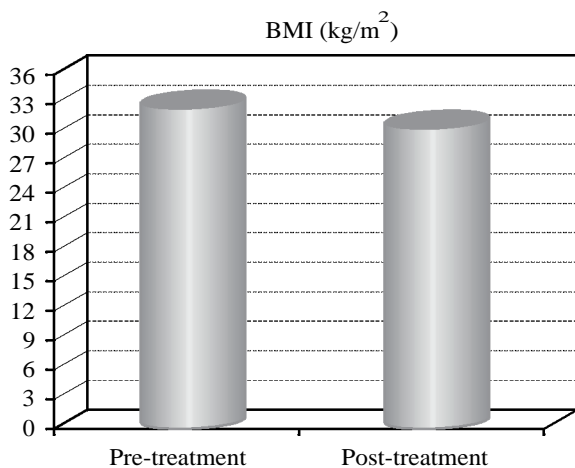


Fig. (1): Pre and post-treatment of BMI.

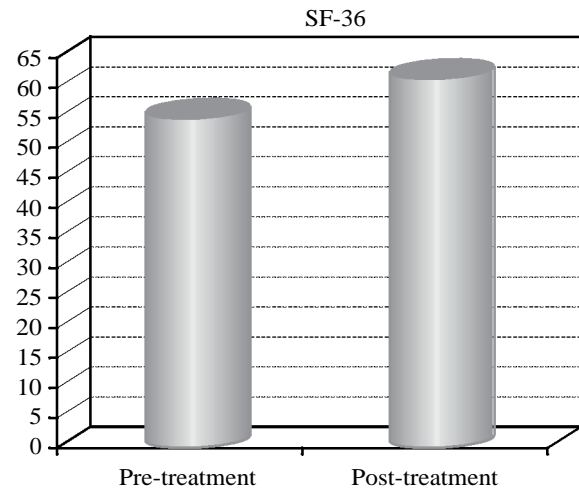


Fig. (2): Pre and post-treatment of SF-36.

**Discussion**

The current study was enrolled on the effect of moderate interval intensity training on quality of life in sedentary obese subject.

Twenty obese male subjects participated in this study, ranged in age from 35 to 45 years who received moderate interval intensity training (MIIT). The participated subjects in this study were assessed by Short form 36 quality of life questionnaire (SF-36) and were evaluated before and after the treatment program about three sessions per week for eight weeks. The obtained results revealed statistical significant difference of the measured variables when compared before and after treatment.

In the current study selection of obese male adults could be accepted with Sawyer et al., [14] who applied their study to determine effects of high interval intensity training (HIIT) and MIIT on endothelial function and cardiometabolic risk markers in obese adults.

The primary finding of this study are accepted with who proved that HIIT and MIIT produced different vascular adaptations in previously sedentary obese adults, with HIIT improving flow-mediated dilation (FMD) and MIIT increasing resting brachial artery diameter and enhancing low flow-mediated constriction (L-FMC) regard to cardiometabolic functions and endothelial function [15,16]. It is generally acknowledged that obesity is associated with impaired cardiometabolic functions and endothelial function [17]. Furthermore, it has been demonstrated that weight loss is associated with improved FMD, although this is not a universal finding [18].

Furthermore, Trapp et al., [19] compared 15 weeks of HIIT versus MIIT and found a significant decrease in subcutaneous fat and increase in fat-free mass in the HIIT group whereas no change in subcutaneous fat or fat-free mass occurred in the MIIT group.

Additionally, several recent studies that did not include a MIIT comparison group have demonstrated the ability of HIIT to reduce whole body and abdominal fat mass while increasing fat-free mass [20,21].

The previous results are agreed with Fisher et al., [22] who stated that MIT training may improve cardiometabolic risk factors in previously sedentary overweight or obese young men, with no clear advantage between these two specific regimes when the study applied on sedentary overweight or obese men after a six week exercise treatment.

Also, the present study accepted with Ballester-Garcia et al., [23] MIIT induces greater adaptations in strength, gait, CRF, static balance and BMI of middle-aged and older women. The main finding of this study was that HIIT was more effective than MIIT for improving upper limb strength in healthy middle-aged and older women. In addition, both HIIT and MIIT were also effective for improving lower limb strength, gait and cardiorespiratory fitness (CRF). The secondary analyses suggest that HIIT is an effective training method to reduce BMI after 18 weeks of training.

In the present study, the null hypothesis was rejected which stated that there would be no effectiveness of MIIT on quality of life in sedentary obese subjects.

#### Conclusion:

Based on the results of the current study, it can be concluded that MIIT can be added to the physical therapy program and had an effect on quality of life in sedentary obese subjects.

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## تأثير تدريبات الشدة المتوسطة على جودة الحياة لدى الأشخاص البدناء

الهدف: أجريت هذه الدراسة لتحديد تأثير تدريبات الشدة المتوسطة على جودة الحياة لدى الأشخاص البدناء.

الأشخاص وطرق البحث: تم إجراء هذه الرسالة على عشرون شخصاً بديناً، تتراوح أعمارهم بين ٣٥ و ٤٥ عاماً، والذين تلقوا تدريبات متوسطة الشدة. تم تقييم الأشخاص المشاركين في هذه الدراسة من خلال استبيان قصير لجودة الحياة ٣٦ وتم تقييمهم قبل وبعد البرنامج العلاج بحوالي ثلاث جلسات أسبوعياً لمدة ثمانية أسابيع.

النتائج: أظهرت النتائج وجود فروق ذات دلالة إحصائية لجميع المتغيرات عند مقارنتها قبل وبعد العلاج.

الإستنتاج: تدريبات الشدة المتوسطة يمكن إضافتها إلى برنامج العلاج الطبيعي، كما أنها لها تأثير على جودة الحياة لدى الأشخاص البدناء.