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Effect of 7-minute workout on weight and body composition.

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Abstract

BACKGROUND: The 7-minute workout composed of aerobic and resistance exercises is becoming a very popular workout. It targets individuals with time constrains and low motivation to commit to lengthy and extensive workout programs. The objective of the study is to investigate if the 7-minute workout has a 6 week effect on body weight and composition.

METHODS: The training group (n=29, age 18-30) did the 7-minute workout 7 days a week during 6 weeks while the control group (n=29) did not perform the workout. Measurements such as height, weight, body mass index, circumferences (middle upper arm, hip, and waist), blood pressure, heart rate, hand grip, and bioelectrical impedance were collected and recorded at week 1, 3 and 6.

RESULTS: Mean BMI was 24.4kg/m^2 at week 1, 24.01kg/m^2 at week 3(p=0.003). Waist circumference decreased between week 1 and 3 (p=0.003) and week 6 (p=0.01) by 4 cm on average. Hip circumference followed the same trend between week 1 and week 3 (p=-0.001). There was a decrease in fat mass and % fat mass between week 1, 3, and 6 (p=0.001). No changes were noted for mid-upper arm circumference or hand grip.

CONCLUSION: The findings of this research show that even a *very* short duration workout affect the nutritional status in normal weight individuals who did not change any of their eating habits. This implies that even in normal weight individuals who perform the 7-minute workout, improvement through a decrease in waist circumference can be achieved thus leading to a better cardio-protective nutritional status. The 7 minutes workout can be a great solution for people to get started and to plan on continuing exercising, as it is simple and of minimal constraints.

Keywords: 7-minute workout, body composition, weight, waist circumference

Introduction

According to the World Health Organization (WHO), physical inactivity along with overweight and obesity are among the leading risk factors of mortality globally (1). These factors are responsible for the increasing risk of chronic diseases such as cardiovascular diseases, diabetes, and cancer (2-6). The Centers for Disease Control and Prevention and the American College of Sports Medicine recommend that an individual between the age of 18 to 65 years should engage in a moderate intensity aerobic exercise for at least 30 minutes (2, 7, 8) 5 days a week or engage in a high intensity aerobic exercise of at least 20 minutes, 3 days a week (2, 9). Nevertheless, data from 1997 to 2014 show that more than half (52%) of adults aged 18 years or older did not meet recommendations for aerobic exercise or physical activity (10). The major reasons for physical inactivity are time constraints, the inconvenience of exercising, such as lack of space, access to gyms, budget, availability of sidewalks or bicycle trails, etc. In addition, the lack of self-motivation to exercise and to engage in long training programs is also known to be a factor(11).

To address these constraints, several workout programs including the High Intensity Circuit Training (HICT) have been developed. HICT combines aerobic and resistance training in a high-intensity, limited-rest design whereby the body weight provides the only form of resistance (12). Both concepts, which comprise HICTs program; high intensity interval training (HIIT) and using body weight for resistance, have their advantages (12-14). Several studies and meta-analysis have shown that HICT and HIIT improve VO2max when compared to endurance exercise in healthy adults (15), decrease CVD risk factors such as oxidative stress and inflammation (16). Furthermore they did decrease insulin resistance, HbA1C and fasting plasma glucose in individuals with type 2 diabetes (17). Also HIIT improved body composition and “burned fat” as they increase mitochondrial biogenesis at a cellular level (18). The HIIT is time efficient whereby it involves short bursts of high-intensity exercise followed by a short period of rest or recovery and typically takes less than 30 minutes to perform (13). The Bodyweight exercise on the other hand uses minimal equipment, which makes it inexpensive as well as practical. The immerging trend of combining the two types of workouts together is becoming a popular choice due to the aforementioned reasons (i.e. improved metabolic function, cardiovascular health and being time efficient) (13). Following that, The American College of Sports Medicine developed the HICT, which is a 7-minute workout

primarily as a convenient training for the general population. The 7-minute workout has increased in popularity and became a feasible and affordable way for the general population to exercise daily. Many phone applications have been developed recently for this workout aiming at simplifying the follow-up and motivating the participant to exercise by having reminders, including data tracking and challenges with friends ("7-minute workout Challenge by Fitness Guide Inc", "7-minute Workout by Perigee", "7-minute Workout-Fitness for women daily exercise by Fast Builder Limited", etc.). This form of workout was shown to help decrease insulin resistance and resulted in the normal uptake of glucose in overweight/obese people (12). Additionally, a recent study showed that HICT improved muscle strength, and aerobic fitness in moderately fit populations (19).

From a nutritional state, to our knowledge, there is no enough data to confirm that the 7-minute daily workout would be enough to improve body composition, boost energy metabolism and help to maintain weight in normal ranges. Studies have shown that being in the normal weight range and not being fit, is not enough to protect against diabetes and cardiovascular diseases (20).Physical inactivity is a risk factor for all-cause mortality even in normal weight-individuals (22).

We aim to investigate the 6-week effect of the 7-minute workout particularly on the nutritional status of normal weight individuals who do not exercise regularly in order to promote this simple workout as a preventive method against obesity and cardiovascular disease.

Methods

Participants

Women and men between 18 and 30 years of age were recruited on volunteer basis through local advertising. Inclusion criteria were healthy participants not following any specific diet or medical treatment and with no chronic conditions related to metabolism (e.g. diabetes) or cardiovascular health, hypertension or skeletomuscular condition (e.g. joints problems and injuries). After screening for eligibility, 33 participants were found eligible and 29 age and sex matched controls where recruited. The study was approved by the Institutional Review Board (IRB) at the Lebanese American University (LAU), Beirut, Lebanon, and written informed consents were obtained from all subjects.

Protocol

After obtaining baseline measurements (body composition, blood pressure and resting heart rate, grip strength, circumferences (middle upper arm, hip, waist), body height and body weight), subjects filled a questionnaire on exercise and dietary habits. Participants were asked to perform the 7-minute workout 7 times a week for 6 weeks. Participants were additionally asked not to alter their dietary habits. Compliance with the workout was assessed through self-report and by sending a phone message via Whatsapp once exercise is completed. Furthermore, participants were contacted once every 3 days to check for workout adherence and to follow up on the status of the training. Further measurements included weekly monitoring of body weight. At week 3 and 6, body composition, heart rate and blood pressure, grip strength, and circumference measurements (middle upper arm, hip, and waist) were repeated. Four participants withdrew from the study during the first week due to other commitments that precluded ongoing participation. Controls were recruited following the same inclusion criteria and performed the same measurements done at week 1, 3 and 6 without performing the 7-minute workout throughout the study and without changing the dietary habits.

Measurements Procedures

Anthropometry and Body Composition

Body weight and height were measured using the Detecto beam scale and stadiometer (Detecto, Webb City, USA). Circumferences (middle upper arm, hip, waist), were measured using a non-elastic measuring tape. Tanita BC-418 Segmental Body Composition Analyzer (Tanita Corporation, Tokyo, Japan) was used to measure complete body composition including body fat percentage, body fat mass, fat free mass, estimated muscle mass, total body water, and basal metabolic rate.

Handgrip Strength

Handgrip strength was assessed with the Jamar Plus Digital Hand Dynamometer (Patterson Medical, Warrenville, USA). Handgrip strength was assessed 4 times while alternating between both arms (2 measurements per hand); measurements were taken for the left hand first. The average score of each hands' grip strength measures was computed resulting in 6 measurements of grip strength. Three measurements for each hand at 3 time intervals (weeks 1, 3, and 6).

Clinical Measurements

Blood pressure and heart rate were assessed using the Digital Blood Pressure Monitor K2-1702 (Alfresa, Tokyo, Japan).

The 7-minute Workout

Participants completed the 7-minute workout according to their discretion, but withdrawal occurred when a participant exercised less than 5 times per week for 2 weeks. The research assistant first guided the 7-minute workout then participants downloaded on their phones the 7-minute workout application offered by Perigee for free. The training is a combination of aerobic and resistance exercises performed in a high-intensity and a limited-rest design (high intensity circuit training). It consists of 12 exercises developed by the American College of Sports Medicine to be done in 30 seconds each, with 10 seconds breaks between each exercise. The exercises are the following: jumping jacks, wall sit, push-ups, abdominal crunch, step-up onto chair, squats, tricep dips on chair, plank core hold, high knees/running in place, lunges, push-ups with rotation, and side planks (figure 1).

Statistical Analysis

All data analyses were conducted using SPSS statistics computing program version SPSS 22.0 (IBM Corporation, Armonk, NY, USA). Standard descriptive statistics were used to characterize the subject population. Independent sample t-tests were performed across training group and controls to determine if the groups were similar at the beginning of the study. Paired sample t-tests were used to compare changes between the pairs [week1-week 3] and [week1-week 6] for the same group. Further independent sample t-tests were done to determine differences with the control group. Alpha was set at .05 to achieve statistical significance. Analysis was performed on data from the subjects who completed the entire protocol.

Results

From the 33 initially recruited, 29 subjects completed the 6 week-study (14 males, 15 females) matching with 29 controls. Descriptive characteristics including age and anthropometric measures of the subjects and controls are presented in Table 1. There were no significant differences between the training group and the control group with regards to all variables at baseline, including heart rate and blood pressure.

There were no significant differences in responses of males vs. females over the course of the study, thus training group data included combined gender analysis.

The average BMI decreased significantly between week 1 (24.4 Kg/m^2) and week 3 (24.0 Kg/m^2) ($p=0.003$) but did not reach statistical significance with week 6 (24.1 Kg/m^2) for the training group.

In the training group, waist circumference decreased between week 1 (88.1 cm) and week 3 (84.5 cm) (p=0.003) and week 6 (85.8 cm) (p=0.01). Hip circumference followed the same trend between week 1 (100.0 cm) and week 3 (97 cm) (p=-0.001). No significant changes were noted for mid-upper arm circumference and for handgrip strength (left and right) for the training group at any stage of the study.

For the control group, none of the anthropometric variables changed during the 6 weeks.

Body composition

A decrease in fat mass (-1.8 Kg) and % fat mass (-2.1%) between week 1 and week 6 and between week 1 and week 3 was noted (Table 2).

Lean body mass average was increased between week 1 (48.1 Kg) and week 3 (51.1 Kg) and week 6 (51.6 Kg) but did not reach statistical significance.

For the control group, fat and lean mass as expressed in percentage or in Kg did not change at any point of the study (mean %, mean Kg).

Discussion

This study examined the 6-week effect of a high intensity short duration, 7-minute workout program on the general nutritional status, including body weight, body composition, as well as waist and hip circumference in normal weight individuals.

The primary findings of this research were comparable to our hypotheses showing that even a *very* short duration workout affect the nutritional status in normal weight individuals who did not change any of their eating habits. Recent studies have investigated the effect of this type of exercise mainly on fitness and strength (19) or in special population like overweight/obese individuals (24) or post-menopausal women (25), while usually using longer durations of exercise (more than 7 minutes). We aimed at investigating the effect on normal weight individuals who do not exercise regularly to see if this type of workout can be recommended simply as a preventive measure to improve body composition, protect against possible overweight and other comorbidities associated with physical inactivity. Physical inactivity and low fitness is a risk factor for all-cause mortality even in normal weight-individuals (21, 22).

The results show a significant decrease in weight between week 1 and 3, and following then a plateau effect through week 6. The decrease in BMI the first 3 weeks can be attributed to the observed loss of fat mass. In the second part of the study (week 3 to 6)

BMI did not change although the fat mass was still decreasing, probably due to an increase in muscle mass. Another interesting result is the significant decrease in waist circumference. Waist circumference, which describes fat distribution is directly associated with diabetes, and cardiovascular risks even in normal weight individuals (26, 27). The decrease that we noted due to the 7-minute workout is congruent with the changes in body composition. This implies that even in normal weight individuals who perform the 7-minute workout, improvement through a decrease in waist circumference can be achieved thus leading to a better cardio-protective nutritional status (28). The changes in body composition can be attributed on one side to the increase use of resistance (body weight) which improves lean body mass, and to the increase in cellular fatty acid oxidation on the other side; HIIT has been shown to increase mitochondrial activity and thus beta oxidation (18).

Very few people reach the recommendation for exercise per week (150 minutes) due to lack of motivation and enjoyment (10). A recent study showed that engaging in high intensity interval training triggered more enjoyment compared to the classical aerobic/resistance training (29). Whereby it also increased the motivation of the individual to continue the same exercise plan (29). Promoting physical activity in normal and overweight individuals has been recently one of the most challenging public health interventions for the prevention obesity, diabetes and cardiovascular risks (30-32). The 7-minute workout can be an excellent solution for people to get started and to plan on continuing exercising, as it is simple and of minimal constraints.

This study is the first to assess the outcome of the 7-minute workout program with regard to nutritional status improvement. Physical activity “prescription” should not tackle only overweight and obese individuals since changes in body composition and waist circumference are important protective factors even in normal weight individuals. Overall, this home-based exercise program can improve body composition and weight to a certain extent, as the intensity might not progress sufficiently enough to produce larger improvements in strength due to the very short duration. From a public health perspective, our findings have a useful importance: the workout can provide a way to initiate training, as it triggers improvements at the level of body composition and weight and thus boosts self-motivation, while at the same time, not presenting any time or money constraints. Ideally, this type of workout would be coupled with a complete exercise program. Nevertheless, individuals with time constraints can perform the 7-minute workout on days when they cannot exercise for longer periods. Limitations of the study include small

sample size and the matched controlled group. Also, we did not assess the level of intensity of the exercise relative to each individual (i.e. heart rates). Future studies should include a larger sample size, and a randomized sampling.

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Table 1. Basic characteristics of training subjects and controls

	Training subjects (n=29)	Controls (n=29)
Gender	14 M; 15 F	10 M; 19 F
Age (years)	21.3 ± 2.3	20.8 ± 1.6
BMI (Kg/m^2)	24.4 ± 3.3	24.8 ± 5.5
Waist circumference (cm)	88.1 ± 12.3	82.1 ± 14.8
Hip circumference (cm)	100.0 ± 9.1	101. ± 10.6
Grip strength	30.7 ± 10.4	28.7 ± 14.6
Body Fat (%)	24.1 ± 7.3	24.1 ± 7.4
Mid Upper Arm Circumference (cm)	28.7 ± 4.2	29.2 ±4.9

Table2. Mean differences for Body Fat

	Week 1	Week 3	p^1	Week 6	p^2
Body Fat (%)	24.1	23.1	*0.040*	22.0	*0.024*
Body Fat Mass (Kg)	15.0	14.2	*0.025*	13.2	*0.015*

p^1: comparison of means of week 1 and week 3
p^2: comparison of means of week 1 and week 6