Effect of Using Tabata Training in Weight Loss and Some Components of Physical Fitness for Women Who Age 30-35-Years

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ABSTRACT

The training seeks to make change in the patterns of behavior of the individual by directing him/her to the best methods based on the sound understanding of his/her character and the factors determining his/her behavior. Training contributes to the individual's adaptation to the circumstances surrounding him/her and to his balance with the ever-changing conditions of the environment around him. Of these modern approaches is Tabata which is a type of high-intensity, frequent exercise that depends on short-term exercise followed by a break and then resuming the exercise session for 5-20 minutes. The idea of these exercises lays in pushing the body to the need for greater amounts of oxygen, which improves the performance of the cardiovascular system, improve metabolism, increase fat burning, and the body gains high fitness. Through the researcher's notice and reading of previous studies and scientific sources about training, physical fitness, and methods used previously, the researchers used a modern training approach "Tabata". This study aims to identify the effect of Tabata exercises on some components of health fitness of women (strength, flexibility, cardiovascular endurance) in addition to weight loss.

The researchers hypothesized that there were statistically significant differences in weight loss and some health-fitness components as a result of the use of Tabata exercises for women between the pre-test and posttest group. The researcher used a one-group experimental approach. The study included a purposive sample of eight trainees who age 30-35-years who were selected from the sports activity hall at the University of Baghdad. Data were analyzed using mean, standard deviation, paired-sample T-test. The study results revealed that using Tabata exercise has a positive effect in weight loss and the development of certain components of health fitness (strength, flexibility, and fitness). The researchers suggested applying Tabata exercises to athletes in other activities and on different samples in terms of age and gender.

1. Introduction

Training; in its numerous forms, became a process that has a vital role in the modern communities according to individual's life needs. Training attempts to make changes in individuals' behavioral patterns through directing them to the best approaches that are rested on sound understanding of their personalities and the factors determining of their
behaviors. Training contributes to make individuals adapted to their surrounding environmental conditions. Of these modern approaches, is Tabata exercises which are high-intensity, frequent exercises that depend on exercising for a short-time followed by a rest and then resuming exercise in a session ranges from 5-20-minutes. The idea of these exercises is to push the body to the need for greater amounts of oxygen, which improves the performance of the cardiovascular system, improves metabolism, increases fat burning, and give the body a great fitness. This method was invented by Japanese Professor Izumi Tabata, who first introduced his idea in 1996 in a study on the Olympic Games. This approach has become available on websites in forms of video recordings and smartphones applications (22).

Physical fitness is a part of the general fitness of humans, and one of the components of the overall fitness that qualify the individual to live in the community in a balanced manner and necessary for the life of the individual, whether athlete or non-athlete. The individual's ability to meet the requirements of his life, as these requirements may be athletic or professional. Hence, the importance of research in the study of the Tabata in weight loss and some components of health fitness for trainee women.

2. Literature Review

The trainers and athletes resorted to the use of various types of exercises and training methods and modern devices to develop and improve the physical and health of the individual and the trainers have sought to diversify in the training units and time and number within the program designed to deliver trainees to the best levels of fitness and health, and through the researcher's observation and reading of previous studies And research and scientific sources of training and physical fitness and methods used previously, so the researcher decided to try a modern training approach (Tabata) for the purpose of developing some fitness capabilities, including (strength, flexibility, circulatory respiratory endurance) in addition to weight loss.

This study aims to identify the effect of using Tabata training in weight loss and developing some components of the health fitness for women age 30-35-years. The researchers hypothesized that there are statistically significant differences in weight loss and some components of the health fitness for women age 30-35-years between the pretest and posttest times.

Tabata is defined as a form of HIIT which is now recognized as the most useful type of exercise for any fitness goal. Tabata allows you to push your body to do more energy - to get the results you want while avoiding stress-based injuries and non-desired stress. Performing Tabata requires few or no equipment, and it is low in cost. Each movement takes only 4 minutes (23).

3. Method
3.1. Participants

A one-group experimental design was used to guide this study. The study population is 20 women. The study sample included a purposive sample of eight trainee women who were recruited from sport activity hall at the University of Baghdad. The study sample represents 40% of the total study population. The inclusion criteria included willingness and desire to participate in the current study and commitment and regularity in training. In order to attribute the differences to the intervention, it is necessary to assure the group homogeneity in all conditions (9). The homogeneity of the sample in terms of weight, length and general time are displayed in table (1) where the values of skewness range is (+3) which indicates homogeneity of sample in the study variables.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Measurement Unit</th>
<th>Arithmetic Mean</th>
<th>Standard Deviation</th>
<th>Median</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Year</td>
<td>32.88</td>
<td>1.808</td>
<td>33</td>
<td>.199</td>
</tr>
<tr>
<td>Height</td>
<td>Centimeter</td>
<td>161.375</td>
<td>1.685</td>
<td>161.5</td>
<td>.223</td>
</tr>
</tbody>
</table>


3.2. Materials

The research equipment include experts’ questionnaire, personal interview, Arabic and English references, and registration forms. The devices used personal computer, electronic sphygmomanometer, timer, Rstamitr for measuring height and weight. The utilities include fitness room and boxes of different heights.

3.3. Procedure

Study Tests include body weight (kg) which is conducted by a medical weight scale where each participant stands upright with bare feet on the scale until the pointer is fully seated. The body weight is recorded to the nearest (100) gram.

The stable strength test for hand grip (right-left) \(^{(14)}\) was performed by dynamometer where each participant holds the dynamometer in an attempt to display the maximum strength possible without touching any part of the body or anything external throughout performing this test. There were two attempts for the right fist and two for the left fist. The testee was given two consecutive attempts for each fist and the highest score was counted.

The Brach Index for cardiac energy (unit of measurement: degree) was performed by using electronic device for measuring blood pressure, a stopwatch, and a seat. The testee sits for (10) minutes, then the researcher puts the electronic device around her wrist to measure heart rate, systolic and diastolic blood pressure. Thereafter, the device is switched on to read the measurement via the electronic screen. The researchers used this indicator to measure the energy of the heart in pumping the blood circulation in the body (the sufficiency of the heart and circulatory system). The Brach indicator for cardiac energy is calculated by using the bellow formula:

\[
\text{Brach Index} = \frac{(\text{Systolic blood pressure} + \text{Diastolic pressure}) \times \text{Heart Rate/Min.}}{100}.
\]

The energy index for good physical fitness ranges from 110-160 to these levels set by Brach himself.

Flexibility Test \(^{(14)}\)

Trunk bending of standing to touch toes was used to determine the degree of trunk and spine flexibility measured by centimeter.

The tools used include (1) a wooden scale or ruler length of about 20 cm divided by lines on units; each unit is equal to (1) cm. It is preferable for the limits of this gradient to be in the range of 10 cm, (2) a chair or a seat or a table or a bench to withstand the weight of the testee without vibration. The testee holds the standing position on the edge of the chair or table with barefoot. The two feet are attached to the sides of the scale. The testee bends the trunk downwards so that the fingers are in front of the scale. From this position, the testee tries to slowly bend the trunk to the maximum extent possible with noting that the fingers at one level and moves down parallel to the scale. The test score is the maximum point on the scale reached from the position of bending the trunk downwards.

Pilot Tests

The pilot test id performed to inform the researchers and the assistant team of the ability and validity of the equipment used in the experiment to help them. The tests used for the research variables (muscular strength, flexibility, heart fitness) is an important process recommended by experts in scientific research. It means "Introduction to a Greater Test and Test " \(^{(12)}\)

The researchers conducted the first pilot on January 10th, 2018 at \(^{(9)}\) at the sports activity hall - University of Baghdad. This pilot was conducted on four trainees who are not included in the original study sample. The pilot study included tests of physical and health abilities (weight loss, muscle strength, flexibility, and fitness).
The goals of the pilot study were to (1) identify the degree of response of the study sample to the tests and how they interact with them, (2) identify the suitability of the tools and devices used in the research, (3) know the time taken to perform tests and implement them, (4) to avoid possible errors that may occur during the tests, and (5) know the ability of the work team assistant in terms of sufficiency and the appropriate number.

The second pilot test of the Tabata approach was conducted on the study sample \((N = 8)\) on January 11\(^{th}\), 2018 and was intended to (1) find out the exact frequency of each exercise, (2) identify the time taken for each exercise and time of work, and (3) make some adjustments to the special exercises to increase the accuracy of their purpose.

The Pretests

The pretests were performed on January 15\(^{th}\), 2018 at 10:00 a.m. in the sport activity hall at the University of Baghdad with the assistance of the assistant team. The researcher sought to record all conditions related to tests as far as possible in terms of time, devices and tools, and the way tests are performed in an attempt to create the same or similar conditions when performing post-tests.

The Main Test

The researcher prepared a "training" course containing Tabata exercises using the opinions of experts in the field of sports training and fitness. The curriculum included (24 units) for eight weeks and three units per week (Monday - Wednesday - Thursday). The exercises were prepared using the Tabata approach on January 17\(^{th}\), 2018 in the Sports Activity Hall / University of Baghdad. The training unit time lasted for 20-minutes. The components of the training load were developed according to the participants' abilities and ages according to the requirements of this approach.

Posttests

The researchers created the same conditions existed in pretests that are as similar as possible in terms of time and spatial terms, the same tools and assisting work team existed in all pretests, and after the completion of the Tabata exercises. The tests were carried out on March 12\(^{th}\), 2018.

Statistical Analyses

Data were analyzed using the statistical package for social sciences (SPSS) for windows version 24 (Chicago, IL). The arithmetic mean, median, standard deviation, skewness, and paired-sample T-test were used.

4. Results

Table (2) reveals statistically significant change in participants' weight. Moreover, there is an improvement in muscular strength.

Table 2. Arithmetic mean, standard deviation, differences and their deviations, and T-test value for the pretest and posttest

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement Unit</th>
<th>Pretest Mean</th>
<th>SD</th>
<th>Posttest Mean</th>
<th>SD</th>
<th>(F)</th>
<th>(F_{\text{calculated}})</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Weight</td>
<td>kg</td>
<td>75.46</td>
<td>13.54</td>
<td>67.66</td>
<td>11</td>
<td>8.56</td>
<td>2.78</td>
<td>10.10</td>
</tr>
<tr>
<td>Muscular Strength</td>
<td>Newton</td>
<td>24.41</td>
<td>1.96</td>
<td>26.08</td>
<td>1.68</td>
<td>1.66</td>
<td>.95</td>
<td>4.26</td>
</tr>
<tr>
<td>(Right arm)</td>
<td>Newton</td>
<td>22.66</td>
<td>2.16</td>
<td>23.83</td>
<td>2.50</td>
<td>1.16</td>
<td>.80</td>
<td>3.55</td>
</tr>
<tr>
<td>Muscular Strength</td>
<td>Centimeter</td>
<td>17.08</td>
<td>4.83</td>
<td>12</td>
<td>2.94</td>
<td>5.083</td>
<td>3.45</td>
<td>5.06</td>
</tr>
<tr>
<td>(Left arm)</td>
<td></td>
<td>115.6</td>
<td>56.94</td>
<td>148.5</td>
<td>11.26</td>
<td>33.13</td>
<td>7.559</td>
<td>4.38</td>
</tr>
</tbody>
</table>
Significant at 0.5, df = 7, df calculated = 2.36

5. Discussion and Conclusion

The main purpose behind conducting this study was to examine the effect of using Tabata exercises in weight loss and bettering some components of cardiac fitness. There was a statistically significant change in participants' weight. This finding could be attributed to the nature of the approach applied and the specificity of the exercises that were designed to help burn the fat rate in different parts of the body by increasing Calorie rate. This finding is consistent with that obtained by Al-Qassas who reported that if the daily calorie requirement (food intake) equals the daily calorie consumption rate (movement and physical activities), the thermal energy balance will be moderate. That is, the amount of energy consumed equals the energy consumed. Thus, the weight is decreased or maintained (21). Therefore, the regularity of the study subjects in exercise application led to fat burning which in turn lead to weight loss. Moreover, these exercises work according to the oxygen energy system and has been used three days a week for a half hour in high intensity. This has led to the use of fat as an energy source using oxygen. Franklin pointed out that regular exercise helps reduce body weight and increase energy exchange (10).

Moreover, there is an improvement in muscular strength. This could be explained as that the strength of muscle strength is an important indicator and a vital component of fitness for health and has evolved significantly because of exercises that generally depend on the TABATA approach. The nature of strength training represented by training by muscular contractions concentrate in the performance of the largest number of repetitions during a specific period of time. This is considered as a motive to stimulate the largest number of motor units as a result of rapid muscle contractions. This led to an adaptation the nervous system to employ the largest number of motor units. Such an adaptation is depended on in testing the maximum strength in that the maximum strength mainly depends on the largest number of motor units. This is emphasized by Majeed who stated that "The continuous training results in developing the whole athlete's body; particularly strengthens the group of working muscles." This characterizes Tabata exercises which are characterized by continuity in the performance of exercises and diversification in the intensity and non-stop. "The maximum strength is directly link to the number of muscle fibers employed to perform muscle contraction and the overall size of the fibers." The highest muscle strain can be produced by employing the largest number of motor units and increasing the neurotransmitter sequence (1).

The training program included more than physical quality in all training sessions, based on the results displayed in all studies conducted in this area. That is, "the trait is improved as training also includes exercises that work to develop other physical attributes such as strength and endurance in the same time" (3). The elements of fitness had a rapid effect in their development by considering the relationship between developing the different physical attributes when they were intended to develop certain physical characteristics" In the development of a specific physical character, the load used for the purpose of developing that capacity may contribute in some extent to the development of another physical character" (7).

The comprehensive balanced development of all parts of the body is the means that enables the individual to perform the hard work with the least effort and energy," (16). Concerning the flexibility, the effectiveness of the exercises used in the training program and their proper implementation have improved flexibility in that the individual's ability to perform movements in a wide range (11). Increasing of the difficulty or slowness of performing motor skills with insufficient flexibility leads to hindrance in competition exercises, as well as the delay in the advancement of other elements of fitness such as strength, speed, stamina, and agility. The distance of the movement decreases and therefore the speed decreases "(1). Majeed (1997) stated that "The regularity with which an individual exercises activity leads to an increase in the elasticity of the muscles and connective tissues and thus increase their elasticity "(7). "For the development of flexibility, it is necessary to increase the weights of all the motor system organs of the human body so as not to affect other components such as strength, speed, agility or stamina" (1). There are stable and mobile exercises,
weighing, and free movements which develop the flexibility (17). The researchers’ dependence on the scientific bases led to improve the levels of selected components of physical fitness (flexibility, strength, cardiac sufficiency among trainees. The stretching exercises are considered as a principal part in any program for developing the flexibility maintaining it (2).

It is important to consider the link between stretching exercises and strength exercises to ensure the balanced development of the musculoskeletal system and avoid the development of only one side. "(20). “The increase in the motor range of the joint by positive stretching necessarily means an increase in the level of stable muscle strength.” (11). The literature relevant to flexibility suggest that "the use of weights and compressed balls double the efficiency of exercise because it helps to increase the capacity of the movement in joints" (10).

Concerning the functional competence, the researchers think that this statistical change in the values of the variable indicates that using Tabata exercises to raise the level of functional competence of the trainees through individual refining of exercises aimed at increasing the level of functional competency. The trainees are also involved in a permanent motor work with the rationing of rest periods has been reflected in the statistical differences in the values between the two tests. The researchers attribute this to exercise, where the researchers considered the characteristics of training load and individual regulation, which led to an increase in the level of functional competency. This finding goes in line with what Lamb noted in 1984: "The use of aerobic exercises in a refined manner leads to the adaptation of the functional organs of the individual." (10). Such an improvement confirms the improved functioning of the heart to meet its requirements and that regular aerobic exercise helps in the prevention of heart disease (9).

References
8. Majeed K. The general theories in sport training from childhood to adolescence. Amman, Dar Al-Shurooq, 1998; P. 78