Effects of 8-week step aerobic exercise on women’s physiological characteristics, body fat percentage, and quality of life

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Abstract

The present study seeks to investigate the effects of 8-week step aerobic exercises on young women’s physiological characteristics, body fat percentage, and quality of life. In so doing, 15 active women with the mean age 26/24 ± 5/86 years, mean weight 61/26 ± 10/85kg, and mean height 160/70 ± 6/25 cm as well as 15 employed women with the mean age 25/94 ± 5/88 years, mean weight 61/60 ± 10/95 kg, and mean height 162/33 ± 6/07 cm voluntarily participated in the study. First, the participants filled out a personal information questionnaire; then, a pre-test was conducted, which incorporated tests of Profile Of Mood States (POMS) questionnaire, and tests of height, weight, subcutaneous fat, sit and reach, dyno drag, and strand to measure variables of bewilderment, vitality, fatigue, height, weight, fat percentage, flexibility of back, the strength of back muscles, and maximum oxygen uptake, respectively. Then, the participants of both groups did step aerobic exercise for 8 weeks – 3 sessions of 50 to 60 minutes per week. The same tests were embedded in the post-test. For statistical analysis, descriptive statistics and as for the comparison of the two groups, SPSS was used to perform Mann–Whitney test (p<0/05). The results confirmed that step aerobic exercises lead to a significant decrease in fat percentage (p=0/02); however, they increase flexibility (p=0/003), back muscle strength (p=0/003), and maximum oxygen uptake (p=0/000), relieve fatigue (p=0/02) and bewilderment (p=0/01), and finally boost vitality (p=0/02) as well. Generally, doing step aerobic exercises has a dramatic and positive effect on women’s physiological characteristics and the quality of their lives. Therefore, it seems necessary to repeat the exercises more and concentrate on the strength of upper body muscles.

Key words: exercise, physiological characteristics, body fat percentage, quality of life.

Introduction

Human health, a controversial issue addressed by many researchers, was defined as the overall well-being of humans by the World Health Organization (Rostami, 2001). In spite of all the numerous beneficial effects of technological advances on speed and accuracy of human tasks, they lead to a decreased mobility and inactivity; the fact which increased the risk of general health and triggered the prevalence of non-contagious diseases such as cardiorespiratory ones (Dastgerdi, 2008). Experts recommend sports and physical activities as the best cure for such diseases. The previous studies have confirmed that regular physical activities improve women’s health and prevent many fatal diseases (Zarneshan and Tartibian, 2006). Moreover, playing sports and doing physical activities is associated with a decrease in the risk of breast cancer while obesity is an important risk factor for the disease.

Kinetic exercises not only reinforce the physical strength, but also guarantee a strong growth in psychological, social, economic, moral, and cultural aspects of human life. Physical activities distract the distressing thoughts, help people develop a sense of mastery over life, build a sense of self-esteem, and increase their motivation (Alijani and Ahmadi, 2002). Nevertheless, introducing the best training strategies to get the highest feedback has been the focus of researchers’ attention.
During the recent years, many people, especially women, turned to rhythmic activities such as aerobics. Such sports bring less fatigue, thank to music; they also improve memory since they require tight coordination between rhythm and movement. (Dastgerdi, 2008) In such rhythmic sports in general and aerobics in particular, it is possible to either increase or decrease the exercise intensity level and output through changing bench height, music rhythm, and kinetic chain exercises (Kramer et al, 2001). This exercise has positive physical and mental effects on individuals (Madah and Beeta, 2009). Aerobics has a positive effect on all body organs, contributes to striking caloric balance and controlling body weight, and improves muscles, joints, and bones structure as well. It also decreases the risk of cancer and blood pressure and leads to better cardiorespiratory functions (Salimi, 2010). Therefore, athletes have more oxygen uptake, which guarantees more efficient breathing (Vilmor, 2006). The fact is also supported by the recent researches. Koutedakis et al (2007) confirmed that 3 months of aerobic and stretching exercise has a great effect on students’ physical fitness and performance. Robert (2001) found that low-impact aerobic exercises improve the cardiovascular function in middle-aged people. Another research investigated the effects of slow and fast-paced classical music on non-athletic women’s resistance against fatigue while pedaling a bicycle at workload of 20 watt and an increased workload of 10 watt per minutes. The findings of the study revealed that slow and fast-paced classical music has a significant effect on participants’ resistance against fatigue, final workload, and also their heart rate in fatigue state; however no significant difference was seen between the effects of the two types of music (Akbarpour et al., 2005).

All these findings indicate the dramatic effects of music along with body movement on physical performance efficiency and mental health. Mohebi et al (2005) considered step aerobic exercises as an effective way to increase cardiovascular endurance and decrease body fat in non-athletic women; they also believe that such activities lead to a good body composition and balance. Hassanpour and Mirnaderi (2007) showed that doing aerobic exercises decreases the feeling of depression in weak students suffering from depression. However, those who are deprived of coordination and suffer from joint disorders are unable to do kinetic and leaping movements in aerobics. Considering their heavy weight borne by joints, overweight people may also get injured during this exercise. As the previous studies show, most of the injuries in step aerobic exercises incur to leg (19%), knee (28%), waist (15%), and ankle (25%). Performing high impact aerobic exercises, the researchers came to the conclusion that the increase in the rate of heartbeat during such high impact exercises endangers vulnerable participants’ health.

Despite all the facts and potentials mentioned so far, the reason why more and more people are increasingly turning to aerobics and the reason behind the positive feeling evoked through this sport are still under question (Mirshahi, 2006). The other key issues in step aerobic exercises neglected somehow by researchers and experts of the field, concern type of training, intensity, duration, and number of training sessions determining the effect threshold of training on body organs (Dastgerdi, 2008). All the above mentioned concerns, great deal of unanswered questions regarding aerobic exercises, necessity of scientific development in the field, and lack of scientific studies on Iranian women urged the researchers to conduct the present study. In effect, it aimed to pave the way for further development in step aerobic exercises and contribute to the improvement of the level of women’s physical and mental health, based on scientific yardsticks (Kazemi, 2010).

Although the related literature incorporates some studies investigating the positive effects of physical activities and step aerobic exercises on human health, conducting the present study seems to be necessary, thank to the following reasons:

First, researches done so far less examined the effects of step aerobic exercises on individuals’ mood and psychological characteristics. In addition, the other similar studies simply indicated that Iranian women are deprived of a desirable physical status and also they do not tend to do exercise during the day. In line with these findings, it is well worth mentioning that in accordance with the anthropometric standards, Iranian women are in a poor physical condition; they are also in an average condition regarding cardiorespiratory fitness (Gharakhanlou, 2006). However, worthy of note is the fact that the potential effect of exercise on decreasing the feeling of depression is of high significance and should not be neglected since the previous studies confirmed that the higher the level of cardiorespiratory fitness is, the lower the level of depression will be (Hassanpour & Mirnaderi, 2007).

Therefore, the only solution is to motivate women to play sports, especially their favorites, including aerobics. Since this is a young science, aerobics demands a great deal of research on part of experts so that they can introduce this sport better and engage people’s interest in that, and subsequently, improve the health level of the society.

In line with what has been discussed so far as the main content and purpose of this study, the following research question is raised:
- Do 8-week step aerobic exercises influence young women’s physiological characteristics, body fat percentage, and quality of life?

Materials and Methods

This is an applied causal-comparative and semi-experimental research. The population of the study incorporates 25 to 30-year old active and inactive women in Kermanshah Province. 15 active women with 6 month of experience in playing a special sport and 15 women employed in departments and offices in Kermanshah were purposefully selected as the participants of the study. It is worth mentioning the employed women have not done any regular physical activities since 6 months ago. First, the purpose, method, and different steps of the study as well as the detail of the tests were fully explained to the participants. Then, they were asked to fill out a questionnaire on personal information. Afterwards, pre-test was conducted which comprised tests of Post MS (Profile Of Mood Status), height, weight, subcutaneous fat using skin-fold caliper (SLIM GUIDE), sit and reach using a sit and reach box made in Iran, dyno drag using Yagami dynamometer made in Japan, and strand using Monark ergometer bike to measure the variables including bewilderment, vitality, fatigue, height, weight, body fat percentage, back flexibility, strength of back muscles, and maximum oxygen uptake, respectively. The results were all recorded on special papers. Then, participants of each group took step aerobic exercise for 8 weeks – 3 sessions of 50 to 60 minutes per week. As the end, the same tests were conducted again as the post-test. Also, heart rate was controlled using a belt. For data analysis, descriptive statistics (in the format of tables and charts) was applied. As for the comparison of the two groups, SPSS was used to perform Mann–Whitney test (p<0.05).

All participants first undertook activities with 50% of their heart rate maximum. However, it reached 75% of heart rate maximum in the 8th week. Step training started with 15 min warm up exercises including simple step and stretching. Afterwards, 30 min low impact aerobic exercises were taken. In such exercises, one foot should be always placed on the floor. Low impact exercises are as follows: march in place, simple step, steps 7 and 8, forward step, backward step, mambo step, step and knees. A combination of four of the above mentioned exercises was performed in each session. At the end of each session, light and stretching activities were done for 5 min so that body can regress to the earlier state.

Results

Table 1: Mean and Standard Deviation of the Participants’ Physiological Characteristics, Body Fat Percentage, and Quality of Lives

<table>
<thead>
<tr>
<th>Variables</th>
<th>Active Women N=30</th>
<th>Inactive Women N=30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Flexibility (cm)</td>
<td>31.33 ± 7.69</td>
<td>25.90 ± 7.79</td>
</tr>
<tr>
<td>Strength of back (kg)</td>
<td>65.13 ± 18.18</td>
<td>49.53 ± 16.06</td>
</tr>
<tr>
<td>(ml/kg/min) Max Oxygen Uptake</td>
<td>34.32 ±7.54</td>
<td>21.93 ±4.30</td>
</tr>
<tr>
<td>Bewilderment</td>
<td>0.67 ± 1.86</td>
<td>1.93 ±3.06</td>
</tr>
<tr>
<td>Vitality</td>
<td>40.73 ± 7.43</td>
<td>37.53 ± 6.33</td>
</tr>
<tr>
<td>Fatigue</td>
<td>3.20 ± 2.75</td>
<td>4.53 ± 2.66</td>
</tr>
<tr>
<td>(%) Body Fat Percentage</td>
<td>19.17 ± 4.04</td>
<td>19.97 ± 3.40</td>
</tr>
</tbody>
</table>

The results confirmed that 8-week step aerobic exercises have a significant effect on young female athletes’ body fat percentage (p=0.02), flexibility (0.003), strength of back muscles (p=0.003), maximum oxygen uptake (p=0.000), vitality (p=0.02), bewilderment (p=0.01), and fatigue (p=0.02).
Table 2: The Data of Mann-Whitney U Test on the Participants’ Physiological Characteristics, Body Fat Percentage, and Quality of Lives

<table>
<thead>
<tr>
<th>Participants Variables</th>
<th>Participants</th>
<th>Total Sum of Squares</th>
<th>Mean of Squares</th>
<th>Z</th>
<th>Mann-Whitney U</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Flexibility (cm)</td>
<td>Active Women</td>
<td>281</td>
<td>18.73</td>
<td>-2.01</td>
<td>64*</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>184</td>
<td>12.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of back (kg)</td>
<td>Active Women</td>
<td>288</td>
<td>19.20</td>
<td>-2.30</td>
<td>57*</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>177</td>
<td>11.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Oxygen Uptake (ml/kg/min)</td>
<td>Active Women</td>
<td>331</td>
<td>22.07</td>
<td>-4.08</td>
<td>14</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>134</td>
<td>8.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bewilderment</td>
<td>Active Women</td>
<td>203</td>
<td>13.53</td>
<td>-1.23</td>
<td>83*</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>262</td>
<td>17.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitality</td>
<td>Active Women</td>
<td>266/50</td>
<td>17.77</td>
<td>-1.41</td>
<td>78.50*</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>198/50</td>
<td>13.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>Active Women</td>
<td>204</td>
<td>13.60</td>
<td>-1.19</td>
<td>84*</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>261</td>
<td>17.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Fat Percentage (%)</td>
<td>Active Women</td>
<td>209/50</td>
<td>13.97</td>
<td>-0.9</td>
<td>89.50 *</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Inactive Women</td>
<td>255/50</td>
<td>17.03</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion and Conclusion

The present study aimed at investigating the effects of 8-week step aerobic exercises on young women’ physiological characteristics, body fat percentage, and quality of life. The results confirmed that step aerobic exercises significantly decreased women’s body fat percentage. The data from this part of the study supports the findings of Eisenman and Gillett (2008), Hovaila et al (2007), Alijani and Ahmedi (2002). Needless to say that sport experts consider the decrease in fat percentage as one of the most decisive factors for human health since they believe obesity is the main cause of many of metabolic diseases e.g. diabetes and cancer, as well as mental diseases. The positive effects of step aerobics on body fat percentage and weight control clearly indicates a dire need for development and
prevalence of this sport among people, especially women and inactive ones. Aerobic exercises, especially aerobics contribute to fat burning; these exercises control body weight, regulating plasma leptin levels and decreasing body fat percentage. Playing fast-paced workout music at the beginning of exercise and choosing the slow-paced one for the ending section lead to more fat oxidation. Needed to say, changing workload and intensity is one of the principles of sport trainings.

The results of the data analysis revealed that step aerobic exercises significantly increases participants’ flexibility. Green et al (1995) also reported an increase in children between 6 to 7 and old women's flexibility after doing aerobic exercises. This finding is in line with the results of the works done by Elsoa et al (2003), Hovaia (2007), Isenman and Gillett (2008). Shila (2008) who investigated the effects of aerobics on middle-aged women’s flexibility. The importance of flexibility in human health, as one of the parameters of physical fitness, is known by everyone since the ability to easily move the body through Range Of Motion (ROM) is the pre-requisite of a healthy life (Gaieni et al., 2005). Moreover, some other determining factors including body composition, age, sex, physical activity, and warm up should be accounted for (Sedghi, 2011). In this regard, the previous studies show that joint warming leads to 10 to 20% increase in the Range Of Motion while when it is not no longer warm, the degree of flexibility decreases to 10 –20%. Participants of the study undertook stretching exercises in warm up and cool down (Gaieni et al., 2005). Therefore, the increase in the degree of flexibility is meaningful.

Another finding showed that step aerobic exercises increase young women’s muscle strength. Kramer (2001) reported the increase in muscle strength due to aerobic exercise, walking, and step aerobic exercise, respectively. As mentioned earlier, the increase of muscle strength is one of the necessary factors for physical health, which is confirmed by the results of the present study. Keeping the minimum level of muscle strength is of high significance for a natural living. Muscle weakness impairs body natural function and triggers body disorders as well.

The present study yielded the result that 8-week step aerobic exercise significantly increases maximum oxygen uptake in women. This fact is in line with the findings of the works done by Eisenman and Gillett (2008), and shila (2008). Most experts in sport sciences consider maximum oxygen uptake as the best factor for assessing cardiorespiratory endurance and predicting success in endurance activities since limit oxygen uptake and distribution might have a great effect on cardiorespiratory endurance. It is the ability of body to resist fatigue in long-term activities and also faster recovery after training or competition. Therefore, the higher the level of maximum oxygen uptake is, the higher cardiorespiratory endurance will be. Given the cardiovascular diseases as the main cause of death in the present era, the role of sport, especially aerobic exercises in preventing such diseases should be highlighted. It should also be known as an intrinsic part of patients’ rehabilitation program. So, needless to say, caring about cardiorespiratory fitness should be high on list of our priorities.

As aerobic system of body is active while doing step aerobic exercise, heart plays a key role, circulating blood which contains nutrients and oxygen through body. From a therapeutic point of view, step aerobic exercises can be recommended to young women and probably middle-aged ones exposed to cardiovascular diseases to help prevent such diseases.

The results revealed that step aerobic exercise significantly decreases women’s bewilderment. Gazkavskaya (2007) found that in comparison to housewives, women doing aerobics showed a decline in bewilderment after 12 sessions of training. However, Vaeez Mousavi (2003) conducted a study on the profile of mood states of 30 wrestlers invited to the national team camp. Examining their mood states both before and after the camp, he came to the conclusion that the level of their bewilderment increased after the camp. Regular training was an effective means of preventing mental disorders and maintaining mental health. The positive effect of step aerobic exercises on bewilderment makes us realize the facts that sticking to a plan and being well-organized in any realm of life keep individuals away from the feeling of bewilderment.

The process of learning step aerobics should take place step by step, that is, from simple steps to more complicated ones; there should be also coordination between hands and legs movements. Indeed, trainees will not go for the next challenging step unless they fully acquire the primary one. In other words, to stay away from bewilderment, one should not only avoid hesitation and disorders but also follow the basic and intrinsic rule of aerobics, i.e. moving step by step.

Data statistic revealed that step aerobic exercise significantly increases women’s vitality. Kenedy and Newton (1997) attested that aerobic exercises lead to an increase in vitality. The finding of their research was confirmed by the study done by Jannati et al (2008) focusing on the effects of aerobic exercise and Greek dance. They found out that both aerobics and Greek dance equally increase the feeling of vitality up to the same level.
Therefore, it is quite clear that what step aerobic exercise bestows upon its fans is the great feeling of vitality which is completely confirmed in the present study as well as those conducted in the recent years. The positive effect of step aerobic exercise on vitality is indicative of the necessity of paving the way for people of the society, especially women and individuals with mental disease to enjoy true happiness and vitality in their lives. Keeping in touch with other people, listening to music, repelling negative thoughts, and coordinating with the group while doing exercise are some reasons why step aerobic exercise increases vitality – an element making individuals feel pretty hopeful about the future.

On the other hand, it was revealed that step aerobic exercise significantly decreases women’s fatigue. This finding is in line with the works done by Lane and Lovejoy (2001), Va’ez Mousavi (2002), and Razavi (2002). The role of physical exercise in improving mental health, increasing positive emotion, and creating a good mood is undeniable. Women, especially employed ones who are over-burdened due to both house chores and work place tensions, can resort to sports in general and aerobics in particular to relieve their physical and mental tiredness. All sports, especially aerobics bring mental relaxation to humans since aerobic exercises cause the secretion of endorphin hormone in brain.

The findings of the present study indicate that physiological characteristics, body fat percentage, and quality of life are variables under the influence of step aerobic exercise. However, it can be claimed that in comparison to body fat percentage, physiological characteristics and body fat percentage are more influenced by the exercise. All in all, it should be mentioned that step aerobic exercises are useful for improving women’s physical and mental health. Highly of note is the fact that these exercises should be undertaken using training and movement patterns which involve all joints and muscles.

This research can also be replicated to investigate the difference between the other physiological characteristics, body composition, and quality of life of step aerobics athletes and those of athletes performing in the other sports, especially aerobic ones.

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