

Exercise Frequency and Physical Fitness in Women

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Abstract

Background: The advancement of technology has reduced people's energy consumption levels. Some precautions have been taken for certain age groups, nonetheless there are a few researches about how the conditions of middle-aged women are. The aim of this study was to determine the physical fitness levels of women living in Canakkale province and to find out the differences between those women in accordance with exercise frequency.

Methods: This research, which 53 voluntary, healthy and premenopausal women attended, was completed in 2010-2011. For the research, questionnaire of physical activity, waist and hip circumference measurement, biceps, triceps, subscapula, suprailiac skinfold thickness measurements, resting metabolic rate, 6 min walk test, sit and reach test and sit-to-stand on a chair test were applied, descriptive statistics of all variables were shown as the mean \pm SD, and independent samples test was used to compare the means of two independent groups.

Results: The average number of sit-to-stand for the active women was 19.33 ± 5.92 repeat whereas it was 15.63 ± 4.29 repeat for the non-active women. The difference between the two groups was statistically significant ($p < 0.05$) ($p = 0.007$).

Conclusion: Regular physical activity at least one day in a week affects the changing rate in physical fitness fewer.

Keywords: Physical activity, Exercise, Physical fitness, Women

Introduction

Obesity is known as an important health problem which expands not in one country but all over the world (WHO,2000). The prevalence of the incidence in women has been reported as greater than men in both national and international researches (James & Reeds,1997; Satman et al,2002). Furthermore, in the researches it is reported that physical inactivity is a major risk factor for many diseases (Weinstein et al,2004; Li et al,2006; Loprinzi et al,2012), and obesity in women has brought about a lot of chronic diseases(Reaven et al,1991; Fletcher et al,1992; Heinonen et al,1998; Hatemi et al,2003).

National survey data reveal that the prevalence of obesity has increased steadily over the years in our country (Satman et al,2002; Gokcel et al,2003; Erem et al,2004; Ozer et al,2010;Ustu et al,2012). Due to this prevalence with the increase of obesity and sedentary lifestyle, countries has planned their own struggle schedule with obesity, and the plans of increasing the prevalence of physical activity have included largely in this schedule. As the data belonging to our country, the prevalence of obesity differs by region and it is investigated widely (Satman et al,2002; Gokcel et al,2003; Erem et al,2004; Yalcin,2004).

Besides the obesity researches, it is considered that there are few researches that evaluate the levels of physical fitness and the parameters of physical fitness as well as obesity for regional differences should be revealed.

It is also considered that the differences between cultural habits, environmental conditions (activity area, indoor and outdoor sports facilities etc...) and dietary habits in geographical regions in our country could be effective on the parameters and frequency of physical fitness as well as the prevalence of obesity, so some different solutions should be necessary. The purpose of the research is to examine the levels of physical fitness in women and the effects of exercise frequency on physical fitness in Canakkale province.

Methods

Participants: The study population included 53 voluntary, healthy, premenopausal women who have normal menstrual cycles. The women were informed about the subject of the research and the tests by face to face technique, the oral consent was obtained, the individual program was prepared, and the measurements were made in the Laboratory of Physical Education and Sports Department, Canakkale Onsekiz Mart University. The research was supported by the Scientific Research Projects Unit, Canakkale Onsekiz Mart University (*The date of protocol: 31/December /2009, Project number: 2010/35*), permission was obtained from the Ministry of Health, Provincial Health Directorate of Health (*The date: 15/october /2010; The official number: B.10.4.ISM. 4.17.00.09/170.01.02-676/18562*). All procedures of the research were in accordance with the World Medical Association Declaration of Helsinki.

Tests and Measurements

Physical activity level: Individuals were asked how often they do physical activity in a week.

Waist-hip circumference ratio: The waist, parallel to the ground at the narrowest point of the body, and the hip, parallel to the ground at the widest point of the hip by standing beside her, were measured. Waist-hip circumference ratio was calculated by dividing the waist circumference to hip circumference (Ozer,2001).

Body Fat %: Calibration was performed by applying constant pressure through the movement angles so as to measure the skinfold thickness. Skinfold Caliper (Holtain) was used for the measurements. Biceps, triceps, subscapular, and suprailiac areas were measured and fat % was calculated by using the Siri's formula [fat %= (4.95/D-4.5) x100] (Ozer,2001).

Resting Metabolic Rate (RMR): RMR was measured by indirect calorimetry using Resting metabolic rate Cosmed Fitmate Pro: Fitness and Wellness Technology. Participants were instructed to report to the laboratory in the morning after an overnight fast and to refrain from exercise for 24 hours before the test. Smokers refrained from smoking the morning of the test.

Aerobic capacity: A 6-min walk test was applied. Cones were placed at the walking corners, and the test was applied on a flat floor, 9.14 m width, 13.72 m length. The distance that the participants can walk in 6 minutes with "Start" command was recorded. Reliability of the test is 0.91-0.97, and the validity is 0.71-0.82 'dir (Bittner et al, 1993;Rikli&Jones,1998;Enright et al,2003).

Estimated $\text{VO}_2 \text{ max (mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}) = 70.161 + (0.023 \times 6\text{MWT [m]}) - (0.276 \times \text{weight [kg]}) - (6.79 \times \text{sex, where } m = 0, f = 1) - (0.193 \times \text{resting HR [beats per minute]}) - (0.191 \times \text{age [y]})$ was calculated according to the formula (Burr et al, 2011).

Low extremity flexibility: The traditional sit-reach test was applied. The individual stretched forward as much as possible by leaning forward from her body (waist and hips) without bending her knees and her hands were in front of her body. She tried to stay in that position as long as possible. The test was repeated twice, and the highest value was recorded.

Low extremity strength: The sit-to-stand test on a chair in 30 sec was applied. In the test, the individual sat in the middle of a 43.18 m height chair without armbands as her back erect and straight, her arms crossed position on chest, her feet fully to the ground. At the time she stood up the chair, the stopwatch was started. Test score was recorded as the number of standing up correctly in 30 sec.

Statistical Analysis: Descriptive statistics all variables were shown as the mean \pm SD and independent samples test was used to compare the means of two independent groups. For all statistical analyses, p value less than or equal to 0.05 was considered to be statistically significant.

Results

Table 1: General characteristics of the women

n=53	Minimum	Maximum	Mean	Standard deviation
Age (years)	20	49	37.45	8.7
Height (cm)	144	175	159.32	7.1
Weight (kg)	49	109	68.70	12.7
BMI(kg/cm ²)	18	42	26.74	5.2
RMR kcal/day	740	1951	1367.06	299.31
Waist/hip(cm)	0.63	0.96	0.78	0.07
Fat %	19	52	35.11	7.34
Estimation VO ₂ max (mL·kg ⁻¹ ·min ⁻¹)	23.20	40.13	32.25	4.62

Anthropometric Results : These were measured that the women's fat % was 35.11±7.34; waist circumference was 82.17 ± 12.0 cm; hip circumference was 104.25 ± 9.2 cm; abdominal circumference was 93.47 ± 12.23 cm, chest circumference was 17.23 ± 8.4 cm, and the waist / hip average ratio was 0.78 cm (Table 1)

Physical fitness results: The walking distance of 6MWT was 419.77±72.31 m, the estimated VO₂ max was 32.25 ± 4.62 mL·kg⁻¹·min⁻¹, the number of sit-to-stand repeat in 30 sec was 17.58± 5.4 and flexibility was 10.4 ± 5.4 cm.

Physical Activity Frequency: As a result of the survey the women are categorized as active (53%), those who do regular exercises at least once a week, and inactive (47%), those who does not do regular exercise. There is not any significant difference between these two groups (p>0.05) in terms of age (p=0.281), weight (p=0.423), and BMI (p=0.694); there is only significant difference (p<0.05) in terms of height average (p=0.014).

The Differences between the Groups

Physical activity level and Body Mass Index (BMI), fat %: It is found out that BMI of the active women was 26.46 ± 5.37 kg/m² whereas the inactive ones was 27.04 ± 5.18 kg/m² (p=0.694),(p>0.05), fat % of the active women was % 34.07 ± 8.16 whereas the inactive ones was % 36.28 ± 6.26 (p>0.05), (p=0.279).

Physical activity and six-minute walk test (6MWT) distance and VO₂ max: It is found out that the six-minute walk test distance of the active women was 428.64 ± 78.00 m and for the inactive women it was 409.84 ± 65.51 m (p>0.05), (p=0.350), the estimated VO₂ max of the active women was 32.49 ± 4.86 mL·kg⁻¹·min⁻¹, for the inactive ones it was 31.99 ± 4.43 mL·kg⁻¹·min⁻¹ (p=0.0698), (p>0.05).

Physical activity and low extremity strength: The number of sit-to-stand for the active women was 19.33 ± 5.92 repeat, for the inactive women it was 15.63±4.29 repeat. There is a significant difference between these two groups (p=0.007), (p<0.05).

Physical activity and low extremity flexibility: Flexibility distance of the active women was 11.54±5.17cm, for the inactive ones it was 8.92±5.52 cm. There is not any significant difference between these two groups (p=0.078), (p>0.05).

Physical activity and resting metabolic rate (RMR): Resting metabolic rate of the active women was 1388.68 ± 313.83 kcal/day, whereas for the inactive ones, it was 1342.84±286.61 kcal/day (p=0.583), (p>0.05).

Discussion

Due to the advancement of technology, reducing people's energy consumption levels, and prevalence of diseases depending on sedentary life, the researchers have built up their research areas and questions such as how can we maximize the amount of human's movement. Physical activity is often measured by means of self-report. Whereas physical fitness is usually measured more objectively, physical fitness provides stronger associations with health outcomes. Moreover, the studies about raising the physical activity habit, controlling and improving physical fitness are considered to be important not only for certain age group but also for all age groups. The prevalence of obesity varies depending on the region in Turkey. The prevalence of obesity has been reported 22% with the reference of BMI in Turkey while it has been 34% based on waist circumferences (Satman et al,2002).

As another study carried out in southern Turkey, obesity and hypertension also seem to be common metabolic disorders in this area (Gokcel et al,2003). According to this study, the overall prevalence of obesity in that region was found 43.4%. The study implemented in northern Turkey the prevalence of obesity was found 23.49%. An important finding of their study was the higher prevalence of obesity among women compared with that among men (29.4% vs. 16.5%) (Erem et al,2004).

According to the survey conducted in the inner parts of Turkey in 2012, prevalence of obesity was 1450 (30.1%). Prevalence of obesity was higher in men than in women. The prevalence of overweight was 644 (34.16%) in women and 790 (26.94%) in men. The combined prevalence of both overweight and obesity was 59.87% (Ustu et al,2012). Although there are some studies on the epidemiology and the variety of obesity, the studies on ideal physical fitness, which plays a vital role for preventing obesity, or current physical fitness level in this age group are limited. The 6MWT distance of the middle-aged women living in this region was found 419.77 ± 72.31 m, the estimated VO_2 max was 32.25 ± 4.62 mL·kg⁻¹·min⁻¹, the number of sit-to-stand in 30 sec. was 17.58 ± 5.4 repeat, and the flexibility of lower extremity was 10.4 ± 5.4 cm. When the data of the women, participated in this survey, aged 37.45 ± 8.7 years has been compared with the results of the recent international researches, it is ascertained that healthy African-American and European-American women in similar age groups have more fat percentage and BMI values (Hunter et al, 2010), less oxygen capacity than Turkish women; as another survey which has revealed the ethnic differences between Latin and black women in similar age group, those black and Latin women have higher BMI than the Turkish women (Sa´nchez-Johnsen et al,2012).

When it is compared with middle-aged Spanish and Moroccan women, it has ascertained that the walking distance of the Turkish women in our research is less than those Spanish and Moroccan women. The flexibility of low extremity of the Turkish women is also less than the women in these countries; but the Turkish women are better in terms of fat percentage, BMI and low extremity strength (Aparicio et al,2012). Compared with African women in same age group, BMI and oxygen consumption capacity of the African women are better than Turkish women (Christensen et al,2012), the BMI of the Japanese women is less, but VO_2 max is higher than the Turkish women (Cao et al,2010).

American College of Sports Medicine (ACSM) and the American Heart Association have emphasized that in order to develop and maintain their health, all healthy adults aged 18-65 ought to participate at least 30 minutes moderate-intensity aerobic physical activity 5 days a week, or at least 20 minutes vigorous intensity aerobic physical activity 3 days a week (ACSM,2007). Whereas the women participated this study did not meet the recommended amount of activity, they made regular physical activity one day a week. When we evaluate the results in terms of the women who exercise regularly and those who do not, it is determined that the BMI and % fat values of the women who exercise regularly were less than the other women group. When the physical fitness parameters have been examined, the average distance of six-minute walk test, VO_2 max, flexibility and resting METs are more than inactive women, but this difference is not statistically significant; the estimated VO_2 max of the active women is higher than the inactive ones, but it is not a statistically significant difference ($p > 0.05$). The only statistically difference between these two groups are determined in low extremity strength ($p < 0.05$).

By looking over the limited number of studies, it could be said subjectively that we are in good condition in terms of BMI and fat %. It is also considered that specific normative values for middle-aged Turkish women should be made up in terms of physical fitness parameters. 6 MWT is of moderate-to-vigorous intensity and may be useful in the classification of aerobic fitness, which is associated with health outcomes (Burr et al,2011). VO_2 max is the most important parameter of individual fitness and an objective and independent parameter cardiovascular disease prognosis (Kubozono et al,2008). Comparing the values of VO_2 max, the results of our research seems similar with the other studies (Herdy & Uhlendorf,2011). Alternating environmental conditions, eating habits and perhaps climatic conditions and technological development are considered to have an effect on individual physical fitness, so these issues need to be paid attention and the researches which identifies the reference values should be updated while referring the publications as a reference.

In prevention of cardiovascular risk factors, lifestyle interventions directed at increasing physical activity and hereby enhancing physical fitness may improve the cardiovascular risk profile. In a newly published researched, leisure-time physical activity has been reported to be linked to the length of life (Janssen et al,2013). Accordingly, it is considered that the situation related to health which has revealed a significant difference is ipso facto related with the exercise frequency.

In spite of that, unfortunately, our women are improving their physical fitness only an average with one hour regular exercise, and the frequency of regular exercise should be increased for the major changes related to regular exercise. Compared with the international data, it is considered that the methods of measurement, the group and cultural habits, making the women of the world profile with the region-specific same standards measurements, not only child, young (Trang et al,2013) old and postmenopausal (Swift et al,2012) population, but also a detailed examination of the middle aged population could be restored the delay in the old age period.

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