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7-WEEK STEP-AEROBICS EXERCISES' EFFECT ON SEDENTARY WOMEN'S BODY COMPOSITION

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Abstract: To the study which is conducted to determine the 7-week step-aerobics exercises' effect on sedentary women's body composition, 20 female individuals with no health issues, who have just started exercising at Temel Reis Fitness Club in Niğde province, whose mean age is 31 ± 70, mean height164 ± 60, and mean weight 67 ± 88 voluntarily participated. The participants were subjected to step-aerobic exercises three times a week for 40-50 minutes, the volume of which is %60-70. The participants' body composition measurements, which are height, weight, fat and muscle ratios, body liquid levels, were conducted before and after the exercise program with Bioimpedance measurement tool. The analysis of the obtained data is done by using the SPSS 21.00 package program on a personal computer. Paired t-test method was used in the comparison of the pre and post-test values of the participants. As a result of the conducted study, it is seen that there is a significant decrease ($p<0,05$) in the percentage of the body weight and body fat percentages of the participants. As a result, it is determined that regularly and long-term conducted step-aerobics exercises have effects on sedentary females' body composition in a positive way.

Key Words: Exercise, Sedantary, Body Compositions

7 HAFTALIK STEP-AEROBİK EGZERSİZLERİNİN SEDANTER KADINLARIN VÜCUT KOMPOZİSYONLARINA ETKİSİ

Özet: Yedi haftalık Step-Aerobik egzersizlerinin sedanter kadınların vücut kompozisyonlarına etkisini incelemek amacı ile yapılan bu çalışmaya; Niğde ili Temel Reis Fitness Club 'da egzersizlere yeni başlayan, yaş ortalamaları 31 ± 70, boyları 164 ± 60, vücut ağırlıkları 67 ± 88 olan ve herhangi bir sağlık problemi olmayan 20 kadın birey gönüllü olarak katılmıştır. Araştırmada yer alan bireylere haftada 3 gün 40-50 dakikalık süre ile antrenman şiddeti %60-70 oranında olan step ve aerobik egzersiz çalışmaları yaptırıldı. Katılımcıların egzersiz programı öncesi ve sonrasında sırasıyla; boy, vücut ağırlık ölçümleri, yağ ve kas oranları, vücut sıvı düzeyleri Biyoempedans ölçüm aleti ile vücut kompozisyon ölçümleri yapıldı. Elde edilen verilerin analizleri kişisel bilgisayarda SPSS 21.00 paket programında yapıldı. Katılımcıların ön ve son test değerlerine ait karşılaştırmalarda paired t-testi yöntemi kullanıldı. Yapılan araştırma sonunda katılımcıların vücut ağırlıkları ve vücut yağ yüzdelerinde anlamlı bir şekilde azalma olduğu ($p<0,05$) görülmüştür. Sonuç olarak düzenli ve uzun süre yapılan step- aerobik egzersizlerinin sedanter kadınların vücut kompozisyonlarına olumlu yönde etkileri olduğu tespit edilmiştir.

Anahtar kelimeler: Egzersiz, Sedan ter, Vücut kompozisyonları

INTRODUCTION AND AIM

Although each and every healthy person has the ability to move, to what extent he can develop his ability is different (Kurt et al., 2010). Due to the changes in the organism from the infancy to the aging process, the force and durability, which are some of the different motor characteristics, may lead to regression or progress according to the living standards we live in and the quality of life. When the human organism continues its life without moving for a long time, it has been reported that the functional properties of the body will gradually decrease and it may be exposed to many diseases due to this functional deficiencies (Çolakoğlu and Karacan, 2006).

In order for the human body to remain healthy and healthy at all times, it is necessary to perform exercise exercises regularly. For this reason, exercising reduces health risks and has an important place in the prevention of osteoporosis, especially leading to the reduction of important diseases such as obesity, cardiovascular diseases, type-2 diabetes, stroke and cancer which are the most important health problems of today (Yiğit, 2018). As the age increases, a decrease in the blood pressure, loss in muscle and bone mass, increase in flexibility and balance, decrease in risk of falling and injury, protection of ideal weight, improvement in sleep pattern and stress, and long and healthy life are ensured. Regular and appropriate exercises will contribute to their happiness by ensuring that middle and advanced elderly people stay healthy and vigorous, live a higher quality life, become spiritual and socially strong and participate (Aksoydan, 2010). In addition, exercise, stress, anxiety, and depression have a positive effect on the maintenance of mental health and social health, and it is important to adopt and implement exercise as a lifestyle (Özden, 2016).

Sedentary behavior is a Latin word and "sedere" means "sitting" (Gibbs et al.,2018). Sedentary behavior includes activities such as sitting, sleeping, watching TV, using computers, using the means of access to the shortest distance, spending more energy on resting level, but without increasing energy expenditure (Pate, Neill and Lobelo, 2008). In sports literature, the term "sedentary" is defined to express that there is no moderate physical activity and an individual who does not perform the physical activity at the recommended level (Sedantery B. R. N,2012). While sedentary life brings various health problems for all age groups, the organism should be more fit and healthy in order to get rid of the negativities caused by the sedentary lifestyle. For this reason, life-long sport, sports for a healthy life, step-aerobic, and fitness activities are increasing. Especially in developed or developing societies, the need for increasing movement causes individuals to apply different exercise methods, one of them is Step-Aerobic exercises and has become an irreplaceable element of sports centers. What makes these exercises irreplaceable is that they are constantly on the move and that individuals get a weight gain and lose weight, and that the whole body and muscle groups work.

In order to learn the benefits of these exercises to individuals, we can follow the body composition measurements. Body composition is used extensively in the definition, classification or comparison of physical structures of people. Just as genetic factors affect the body structures of people and the sports branches or activity levels they are dealing with also affect this situation. In this study, while it is important to know the extent of the changes in body composition as a result of the step-aerobic exercise applied to women between the ages of 20 and 40; the study is conducted with the aim of investigating the effect of seven-week step-aerobics exercises on body composition in sedentary women.

MATERIAL AND METHOD

Participants: To the study 20 female individuals with no health issues, who have just started exercising at Temel Reis Fitness Club in Niğde province voluntarily participated.

Applied Exercise Programme: The inability of women to participate in sports or whether they have any other health disabilities were taken into account. Measurements were taken before starting aerobic exercises. The resting pulses were taken before the subjects were applied to the measuring device. All measurements applied to the study group were taken twice at the beginning of the 7th week and at the end of the 7th week. Before the measurements were taken, women ate at least 1,5 hours before the exercise, they did not consume caffeine, they had not

applied any other exercise before the measurement and they were told to come out with bare feet without any metal objects on them before they went to the device and this is watched out. This study was conducted as pre-test and post-test. Age, height, body weights, fat and muscle ratios, body fluid percentages of participants were obtained by Bioimpedance measurement instrument. Resting pulses were taken from a single phone with a stopwatch. In the research, they were asked to perform Step-aerobic exercises between 3 and 50 minutes for 3 days per week for 7 weeks. The exercises were carried on with the female coach surveillance. The participation of women participating in the exercise regularly during the study was taken into consideration. First of all, warm-up exercises were made and the body was prepared for step exercises. Immediately after the first 15 minutes they, slow and medium choreographies were made with music that the participants were familiar with. After 15 minutes, the existing tempo was raised and continued with choreographies that included faster and more movement. Regular fluid consumption was provided for women between choreographies.

Body Composition Measurements

Stopwatch: Time measurements of the participants were done with a digital stopwatch.
Bioempedance Device: The basic operating principle of this device is to determine the resistance to tissues in the body and to calculate the body components accordingly.
Statistical Analysis: Data obtained after measurement were recorded immediately. In all data arithmetic mean and standard deviations (standard errors) were calculated. Comparative analysis of the pre and post test values of the research group were made by Paired Samples t test method and the level of significance was evaluated as $p < 0.05$.

FINDINGS

Table 1. Descriptive Statistics of the Participants

Variables	N	Minimum	Maximum	±	Std. D.
Age	20	22	40	31,70	6,562
Height	20	158	175	164,60	4,695
Weight	20	56	96	67,88	9,810

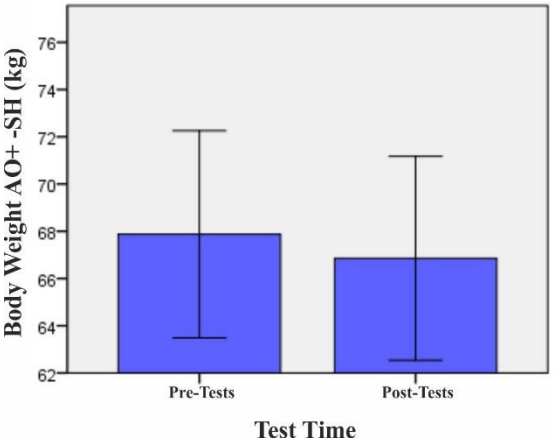
Table 2. Comparison of Pre and Post Exercise- Weight, BMR, Body Fat Percentages of the Participants

Variables	**Paired Group**	**N**	$\overline{x}$	**Std. D.**	**t**	**p**
Weight(kg)	Ön Test	20	67,87	9,81	3,301	0,004**
	Son Test	20	66,86	9,65		
Basal Metabolic Rate (kcal)	Ön Test	20	1419,70	132,26	-0,632	0,535
	Son Test	20	1424,10	130,83		
Fat (%)	Ön Test	20	30,85	4,99	3,148	0,005**
	Son Test	20	29,47	5,63		

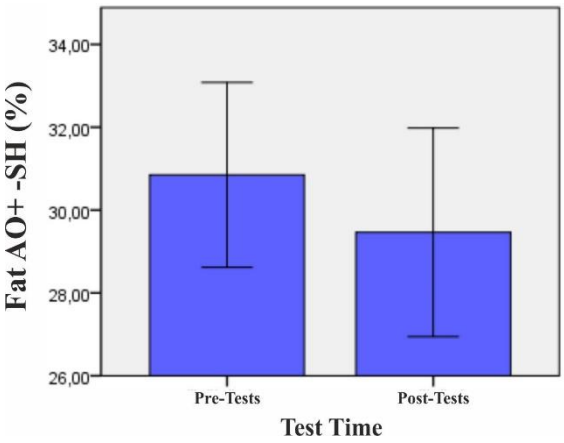
**p<0,01,* Fat=Fat Percentage

In the study, when the weight values of the participants before and after the exercise program were examined, the body weights of 67,87 ± 9,81 kg before the exercise program decreased to 66,86 ± 9,65 kg after the program and the difference was statistically significant (p <0,01).). While there was no significant difference in basal metabolic rate, the percentage of fat before

the exercise program decreased to 29.47 ± 5.63 (%) after the program, and the difference was statistically significant (p <0). , 01).



Graphic 1: Graph of change in body weight of research group



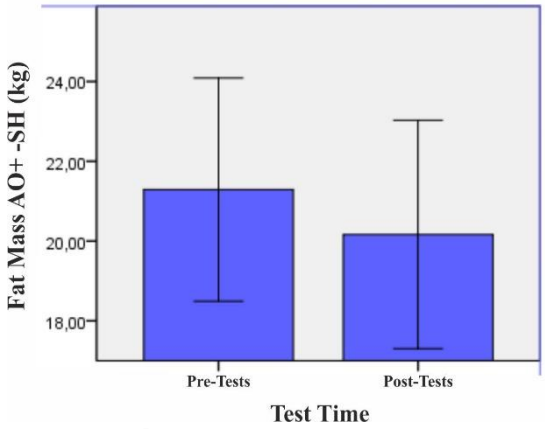
Graphic 2: Graph of change in the fat percentage of the research group

Table 3. Comparison of the Participants' Pre and Post Test Values About Body Fat Mass, Muscle Mass and Fluid Amount

Variable	Paired-Group	N	$\overline{x}$	Std. D.	t	p
Fat Mass (kg)	Pre Test	20	21,29	6,26	3,455	0,003**
	Post Test	20	20,17	6,40		
Muscle Mass (kg)	Pre Test	20	46,59	4,40	-1,152	0,264
	Post Test	20	46,92	4,35		
Fluid Amount (kg)	Pre Test	20	34	3,22	-1,055	0,305
	Post Test	20	34,34	3,19		

**p<0,01 *FFM=Muscle Mass,*TBW=Fluid Amount

In the study, it was seen that the difference between the fat masses of 21,29 ± 6,26 kg before the exercise program decreased to 20,17 ± 6,40 kg before the exercise program and the difference was statistically significant (p <0, 01). There were no significant differences in muscle mass and fluid amount.



Graphic 3: Change Graphic in Fat Mass Measurements of the Research Group

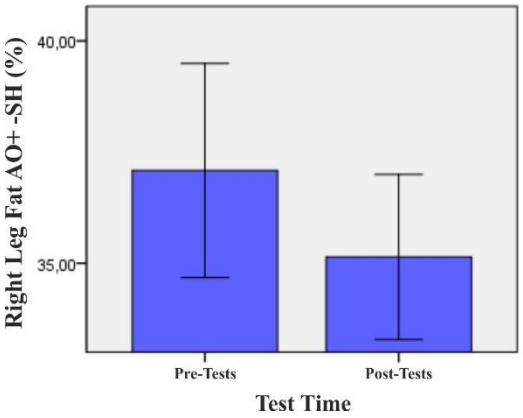
Table 4. Comparison of Pre and Post-Test Values of Fat, Mass and Muscle Measurements of the Right and Left Leg, Arm and Body of the Participants

Variable	Paired Group	N	$\overline{x}$	Std. D.	t	p
Right Leg Fat (kg)	Pre Test	20	36,16	3,72	3,385	0,003**
	Post Test	20	35,06	4,25		
Right Leg Mass(kg)	Pre Test	20	4,49	1,00	3,601	0,002**
	Post Test	20	4,31	1,05		
Right Leg Muscle (kg)	Pre Test	20	7,35	0,72	-1,476	0,156
	Post Test	20	7,41	0,66		
Left Leg Fat (kg)	Pre Test	20	37,09	5,38	2,106	0,049*
	Post Test	20	35,14	4,16		
Left Leg Mass(kg)	Pre Test	20	4,22	1,19	-0,130	0,898
	Post Test	20	4,25	1,04		
Left Leg Muscle (kg)	Pre Test	20	7	0,69	-1,685	0,108
	Post Test	20	7,28	0,66		
Right Arm Fat (kg)	Pre Test	20	30	6,97	2,970	0,008**
	Post Test	20	28,91	7,16		
Right Arm Mass(kg)	Pre Test	20	1	0,42	3,684	0,002**
	Post Test	20	1,01	0,43		
Right Arm Muscle (kg)	Pre Test	20	2	0,24	-1,000	0,330
	Post Test	20	2,21	0,26		
Left Arm Fat (kg)	Pre Test	20	31	6,26	3,244	0,004**
	Post Test	20	29,87	6,66		
Left Arm Mass(kg)	Pre Test	20	1	0,44	3,577	0,002**
	Post Test	20	1,06	0,44		
Left Arm Muscle (kg)	Pre Test	20	2	0,28	-0,698	0,494
	Post Test	20	2,20	0,29		
Body Fat (kg)	Pre Test	20	27	5,92	1,336	0,197
	Post Test	20	26,18	7,03		
Body Mass(kg)	Pre Test	20	10	3,47	-0,620	0,542
	Post Test	20	12,01	12,66		

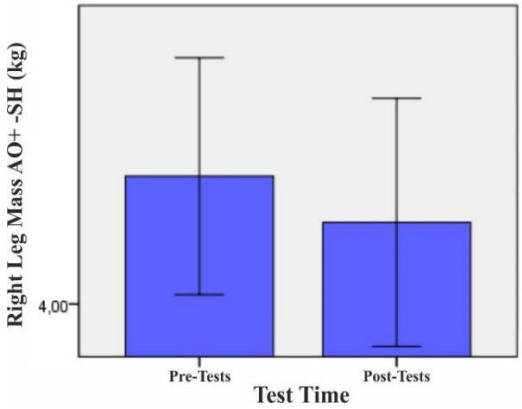
Body Muscle (kg)	Pre Test	20	25	2,32	-1,713	0,103
	Post Test	20	25,58	2,35		

*p<0,05, **p<0,01

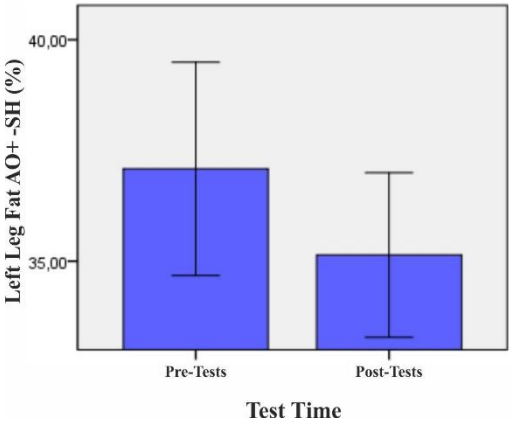
When Table 3 is examined, it was found that the parameters of right leg fat (kg), left leg fat (kg), right arm fat (kg) and left arm fat (kg) before and after exercise program statistically decreased in the post-test (p <0). , 01); statistically, right leg mass (kg), right arm mass (kg), left arm mass (kg) parameters were found to increase significantly (p <0.01).



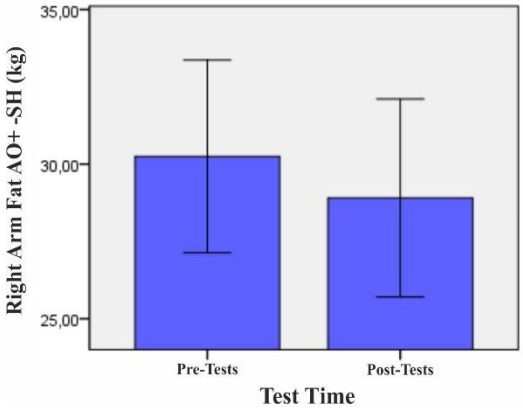
Graphic 4: Change Graph in Right Leg Fat Percentage of the Research Group



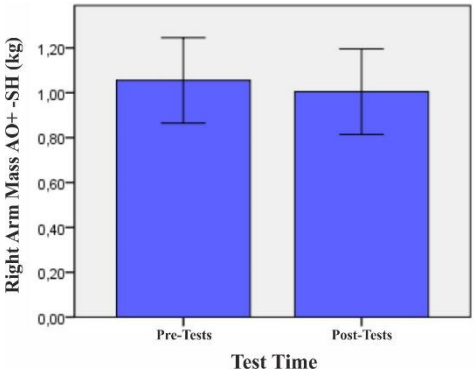
Graphic 5: Change Graph in Right Leg Fat Mass of the Research Group



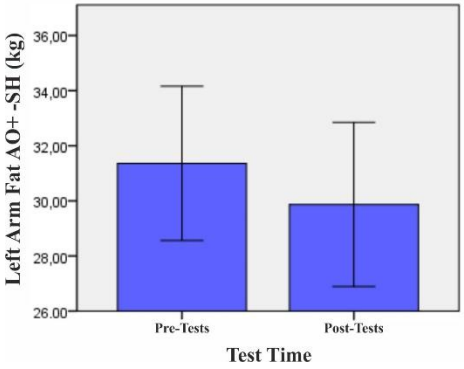
Graphic 6: Change Graph in Left Leg Fat Percentage of the Research Group



Graphic 7: Change Graph in Right Arm Fat Percentages of the Research Group

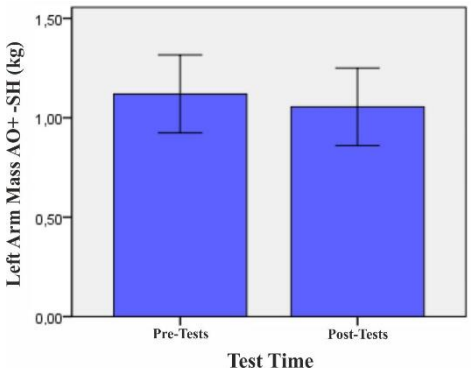


Graphic 8: Change Graph in Right Arm



Graphic 9: Change Graph in Left Arm

Fat Mass Percentages of the Research Group Fat Percentages of the Research Group



Graphic 10: Change Graph in Left Arm Fat Mass Percentages of the Research Group

DISCUSSION AND RESULT

In this study which was conducted with the aim of investigating the effect of seven-week Step-Aerobic exercises on body composition of sedentary women, the body weight of the study group was 67.87 ± 9.81 kg before the 7-week step-aerobic exercise program and 66.86 ± 9.65 kg after the exercise program. There was a statistically significant difference (p <0.01) between body weight averages before and after exercise.

In a study, (Biçer et al., 2009) nvestigated the effect of 8-week aerobic dance exercises on some physiological parameters in adult females found a significant decrease in body weight of the subjects. In a similar study (Kafkas et al., 2009) found that 12 weeks of regular walking exercises in females with heart patients whose mean age of 40-60 years led to a decrease in body weights and body mass indexes. (Gönül Ateş et al.,2010), (Elmacı et al., 1993), in their study consisting 8 women and 2 men- a total of 10- in the experimental group 8 weeks, as a result of the workout of the experimental group participating in the exercise program body, observed that there was a significant weight loss of 5 kg. Similarly (Karacan and Çolakoğlu, 2003), they obtained similar results in a study they conducted. However, it is revealed that long-term and a protective exercise program leads to body fat mass by causing regulation in an anabolic, catabolic hypothalamic neuropeptide oscillation, the fact that it decreases the level of the insülin and plasma leptin as a result of the study conducted on the rats (Christa et al., 2008).The results obtained in this study are consistent with the literature.

While there was no significant difference between basal metabolic rate values of the study group, the percentage of fat program decreased to 29.47 ± 5.63 (%) after the program which was 30.85 ± 4.99 (%) before the exercise; it was found that the difference is statistically significant in favor of the participants (p<0,01).

At the end of the different types of exercise programs performed in most of the studies; it is a general opinion that there is a positive reduction in body fat percentage (Kurt et al., 2010). In another study, it was seen that step-aerobic exercises resulted in a significant decrease in body weight and body fat percentage (p <0.05) compared to some exercises pilates (Pınar, Çetin and Aktop,2017). When the fat masses before and after the exercise program of the group were examined, the fat masses, which were 21,29 ± 6,26 kg before the exercise program, decreased to 20,17 ± 6,40 kg after the program and the difference was statistically significant (p <0,01), no significant difference was found in the body muscle mass and fluid amount of the group

(Kyle et al.,2006). Found no statistically significant difference in body fat percentages and body mass index values of women in the long-term study in which they investigated adult women's body composition (Ransdell et al., 2004). Found that there was a decrease in body fat percentage values at the end of the exercise program applied to improve physical fitness in females. The results found in this study are consistent with the literature.

The end of the pre- and post-test measurements applied to the participants; right leg fat, left leg fat, right arm fat and left arm fat values were significantly lower in favor of participants in the final test. In the same way, the right leg mass, right leg muscle, right arm mass and left arm mass values of the participants were found to be significantly increased in favor of the participants. According to the statistical data in the study, it was seen that the fat parameters of the participants decreased statistically significantly ($p < 0.01$) in the post-test, there was a significant increase in the muscle mass test in the post-test ($p < 0.01$).

Similar studies have shown that aerobic exercise positively affects the fat percentage and fat mass locally (Zorba,2001), (Amano et al.,2001) found the body fat percentage as before exercise 29.6 ± 1.3% and 26.6 ± 1.3% after the exercise; fat mass as 21,7±0,9 kg before the exercise and 18.6 ± 1.0 kg after the exercise; lean body weight as 52,4±2,5 kg before the exercise and 51,7± 2,6 kg after the exercise; and they determined that there is a significant decrease compared to the pre-exercise findings ($p < 0.05$). In addition, in the study (Kafkas et. al., 2009). studied the effect of regular aerobic exercises on body composition in middle-aged men and women for 12 weeks, they stated that regular aerobic studies have positively affected body weight and body mass index values. In a similar study, 24 in experimental and 12 individuals in control group, for 10-12 weeks three times a week for 20-30 minutes supervised, the effect of the aerobic exercise program on body weight and composition was examined and the body fat profiles of the subjects participating in the exercise program were found to change (Winningham et al., 1989). In another study conducted to determine the effect of aerobic exercise on body fat mass in adult men and women, weight loss after aerobic exercise training was found to be more meaningful in favor of males leastwise (Ballor and Keesey, 1991). While the body fat ratios and fat percentages of the participants decreased significantly, there was no decrease in right leg muscle mass, left leg muscle mass, right arm muscle mass, left arm muscle mass and trunk muscle mass.

As a result; step-aerobic exercises three times in a week for 40-50 minutes, the volume of which is %60-70 causes a decrease in weight, body fat percentage and fat mass; regularly and long-lasting exercises may be said to have positive effects on body compositions of the sedentary females**.**

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