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THE EFFECT OF 8 WEEKS STEP-AEROBİC EXERCİSE PROGRAM ON BODY COMPOSİTİON AND SLEEP QUALİTY OF SEDANTERY WOMEN

ENGİZN GEZER[1], EVRİM ÇAKMAKÇI[2]
[1]Mustafa Kemal University, Higher School of Physical Education and Sports, Hatay/TURKEY
[2]Selçuk University, Higher School of Physical Education and Sports, Konya/TURKEY

ABSTRACT

Objective: The purpose of this study was to determine the effects of 8 weeks step-aerobic exercise program on body composition and sleep quality of sedantery women.

Material: 70 women volunters (age 35,1 ± 9,11, weight 68,55 ±6,72, height 160,59 ± 5,20) with stable general health were included into this study. Their sleep qualities were assessed by Pitsburg Sleep Quality Index (PSQI). Also to understand the body composition of the women; flexibility, body fat percentage, body weight and body height were assessed. As statistical anlysis of datas were done by t test ($p < 0.05$) for understand the differences between test before exercise (TBE) and test after exercise (TAE) on body composition and quality of sleep areas.

Method: During 8 weeks , women participated in a step-aerobic exercise program during 30 minutes and 3 times per week. Before the exercise program and at the end of the program measurements of flexibility, body fat percentage, body weight, body height and the ındex of quality of sleep were assessed.

Conclusion: According to the analysis, the general results of the present study indicated that there was a significant relationship between the body composition and quality of life areas in test before exercise and test after exercise, especially body fat percentage.

Key Words: Sedantery Women, Step-Aerobic Exercise Program, Body Composition, Quality Of Sleep.

Introductıons

Physical exercise is commonly accepted to be an important aid in the promotion of sleep (JA Horne 1981, SD, Youngstedt 2005) Epidemiological studies have generally shown positive associations between physical exercise and sleep (MT Mello, et all 2000, I, Vuori et all, 1988). Additionally, exercise is recommended by the American Sleep Disorders Association (American Sleep Disorders 1991) as a non-pharmacological intervention to improve sleep.

Investigations into the determinants of poor sleep quality are important for two major reasons. First, complaints about sleep quality are common and second, poor sleep quality can be an important symptom of many medical disorders.

Sleep problems usually take one or more of the following forms: delay of sleep onset, difficulty staying asleep, or awakening too early. Inadequate quantity and quality of sleep have long been observed to be concomitants of a variety of clinical medical and psychiatric conditions. Poor sleep is prospectively associated with an increased risk of myocardial infarction, particularly when combined with increasing resting heart rate (P Nilson 2001)

Poor sleep is also prospectively related to fatal accidents at work and accident risk is considerably increased in relation to irregular work hours (T Akerstedt 2002). Good sleep quality has been associated with better physical health (J Barton et all, 1995, DS Lewin and RE Dahl 1999) and greater psychological well being (JL Shaver and VM Paulsen 1993 NG Bliwise1992) Therefore, factors that affect sleep quality could also influence the general well being of individuals.

There is growing scientific evidence that regular exercise will help you sleep better. But emphasize that a good night’s sleep is linked to many other factors to which you should pay attention. The National Sleep Foundation reports that 74% of adults in the United States experience a sleeping problem a few nights a week or more, 39% get less than 7 hours of sleep each weeknight, and 37% are so sleepy during the day that it interferes with daily activities (DM. David 2005)

According to a report issued by the National Commission on Sleep Disorders Research, 30% to 40% of people in the United States have insomnia within any given year, defined by the National Institutes of Health as ‘‘an experience of inadequate or poor quality sleep’’ (National Center on Sleep Disorder 1998)

Materıal

The choice of subjects

70 sedantery women whose mean age was: 35.10 ± 9.11 years, mean height: 160,59 ± 5.20 cm and average body weight (BW) was : 68.55 ± 6.72 kg, taking part in the step aerobic

exercise program run by KOMEK(Konya Vocational Course) were included in the study.

The subjects were informed about the parameters and their written consents were obtained and then examined physically. The completely healthy individuals who had no diabetic, cardiac and chronic systemic and metabolism diseases, and the diseases affecting immune functions in their clinical examinations and history were included in the study. The subjects were asked to follow their usual normal nutrition habits and to avoid excessive physical activities during the study.

Method

We had the subjects do warm-up exercises for 10 minutes, active step aerobic exercises for 45 min. and finally stretching cooling exercises for 10 min. at the 60-70% severity of their target pulse rate three days a week for 8 weeks, and the rates before and after the exercises were recorded. The severity of the aerobic exercise was determined according to Karvonen protocol.

Pulse Rate (PR)= 60-70% PR(PR max-PR min)+PR

Maximal PR=220- age (K.Özer,2006).

Measuring/measurement means:

Before the subjects started training, the initial tests and at the end of the training after 8 weeks the final tests of height(H), body weight(BW), systolic blood pressure (SBP), diastolic blood pressure (DBP), body fat percentage (BFP), waist and hip rate (WHR), elasticity (E), body mass index (BMI) and Pitsburg Sleep Quality Index (PSQI) Turkish version were obtained and recorded.

Anthropometric Measurements:

The body weights of the individuals included in the study were measured in kilogram (kg) with NAN scale in their casual home clothes with bare feet before the exercises began. Their heights were measured in meters with studio meter and recorded. Body mass index (BMI) was calculated with Weight / height² (kg/m^2) formula. The contour of the body was measured in cm. with a fiberglass tape measure which is 0.6cm wide, rigid but flexible. The steps taken during the measurements were mentioned below.

Waist circumference was measured horizontally from the narrowest point of the distance between ksifoid prominence and umbilicus, and hip circumference was measured from the trochanters horizontally as the widest diameter while the legs were 20-30cm apart. Moreover, the values of waist and hip circumferences were divided to each other and waist/hip rat was obtained. The thickness of skin pleat was measured from triceps, biceps, subscapular and suprailiac zones using Holtain T/W Skinfold Caliper. In order to measure the thickness of the skin pleat, the fold between thumb and index finger was separated from the muscular tissue removing the skin with its hypodermic fat tissues and slightly compressing it between the ends of caliper and the values on the dial was read and recorded.

Total Body Fat Percentage:

Body density was calculated using Durnin-Womersley formula with triceps, biceps, subscapular and suprailiac SF Total body fat percentage was calculated applying Siri equation to this body density.

Durnin-Womersley Formulas:

Female=1,1581- (0,0720x(LOĢ□ (triceps, biceps, subscapular and suprailiac SF) (J.V.Durnin and J. Womersley, 1974)

Total Body Fat Percentage= (4.95/body density - 4.50) x 100 Siri (Siri, 1956)

Blood Pressures: the SBP and DBP of the subjects were taken in mmHg with stethoscope and sphygmomanometer (B.N.Roohi, 2008).

Sit and Reach Test was used to measure the elasticity of the individuals. The test was repeated twice and the highest score was recorded (K.Tamer, 2000).

Measuring the quality of life: Pitsburg Sleep Quality Index (PSQI) Turkish version was used to measure the sleep quality of the individuals. The test was used before and at the end of 8 weeks.

Statistic Analyzes: The arithmetic means and standard deviations of all statistical data in the study were calculated with SPSS 15.0 packet program. The comparison of test assessments of the subjects with each other before the training and after 8-week training was performed with Paired Samples t-test.

Results

Table 1:

	Mean	Std. Deviation	T	P
Age (year)	**35.10**	**9.11**		
Height(cm)	**160.59**	**5.20**		
BW(kğ)1	**68.55**	**6.727**	**7.376**	**.000***
BW 2	**66.00**	**6.164**		
BMI 1 (kg/m2)	**26.57**	**2.257**	**7.502**	**.000***

BMI 2 (kg/m2)	**25.58**	**2.027**		
WHR 1(%)	**,7919**	**,05723**	**2,092**	**,046***
WHR2 (%)	**,7744**	**,04781**		
BFP1(%)	**36.12**	**2.739**	**5.448**	**.000***
BFP 2 (%)	**33.41**	**3.772**		
Elasticity (cm)1	**28.90**	**5.492**	**-2.727**	**.011***
Elasticity(cm2	**30.07**	**5.675**		

In Table 1, according to the values of first and last tests of the subjects, there was significant difference in the parameters of BW, BMI, WHR, BFP, E, respectively in favor of the last tests (Table: 1 P<0.05*)

Table2:

Pitsburg Sleep Quality Index (PSQI)	Mean	Std. Deviation	T	P
Subjective sleep quality 1	**1.39**	**0.84**	**4.543**	**.000***
Subjective sleep quality 2	**0.94**	**0.92**		
Sleep latency, min 1	**39.65**	**28.45**	**9.247**	**.127**
Sleep latency, min 2	**38.48**	**31.38**		
Sleep duration, hr 1	**6.58**	**1.27**	**5.368**	**.215**
Sleep duration, hr 2	**6.51**	**1.41**		
Habitual sleep efficiency 1	**1.11**	**1.22**	**1.268**	**.728**
Habitual sleep efficiency 2	**1.24**	**1.31**		
Sleep disturbances 1	**1.37**	**0.66**	**1.357**	**.814**
Sleep disturbances 2	**1.36**	**0.61**		
Daytime dysfunction 1	**1.09**	**0.69**	**2.014**	**.035***
Daytime dysfunction 2	**1.42**	**0.72**		
Use of sleep medication 1	**0.49**	**0.92**	**0.728**	**.185**
Use of sleep medication 2	**0.48**	**0.83**		
Global score (range 0–21) 1	**13.32**	**2.32**	**0.516**	**.020***
Global score (range 0–21) 2	**14.48**	**2.66**		

In Table 2, according to the values of first and last tests of the subjects, there was significant difference in the parameters of SSQ, SL, SD, HSE, DD, USM, GS respectively in favor of the last tests (Table: 2 P<0.05*)

Discussion

Scientists have shown that people who exercise regularly do indeed spend more time in slow wave sleep (K.A Kubitz et all, 1996, S. Tworoger et all, 2003). In a study conducted at Stanford University, physically inactive older adults were assigned to exercise or nonexercise groups for 16 weeks (A. King et all, 1997) Subjects in the exercise group engaged in low-impact aerobics and brisk walking for 30 to 40 minutes, 4 days per week. Exercise training led to improved sleep quality, longer sleep, and a shorter time to fall asleep. A year-long study of postmenopausal women showed that those exercising moderately in the morning for 3 to 4 hours per week had less trouble falling asleep compared with those exercising less (S. Tworoger et all, 2003).

Poor sleep quality is a common and distressing problem for cancer patients. Patients with cancer often report that their sleep is disturbed during the stressful periods associated with diagnosis, treatment side effects, and physical discomfort (C.A, Espie, et all, 2008).

Such sleep disturbance may be related to psychiatric disorders such as depression and anxiety (M.A Andrykowski, et all, 1998, R.C, Wang et all, 2007); however, regardless of cause, sleep disturbance is often unrecognized or poorly managed (M.J Sateia and P..D Nowell 2004, J, Savard and C.M, Morin 2001).

Exercise as an intervention has been suggested as having the potential to improve sleep quality (D.L, Sherrill, et all, 1998). In large surveys, up to 80% of people spontaneously report exercise as a factor that promotes sleep quality (C.M Shapiro and D, Bachmayer ., 1988).

In a randomized controlled trial, Singh et al. tested the effect of a weight training program on sleep for depressed elders. The study found that weight lifting was effective in improving subjective sleep quality, depression, strength, and quality of life, without significantly changing activity levels. King et al. explored the effects of moderate-intensity exercise training on sleep quality among healthy older adults and found that exercise training improved sleep quality.

A recent study by Yeh et al. examined the effects of a Tai Chi exercise program on sleep in patients with chronic heart failure and found that Tai Chi exercise enhanced sleep stability. However, in another study, Tworoger et al. found little effect from aerobic exercise on sleep outcomes. Exercise is widely recommended as an onpharmacological intervention to improve sleep (DL, Sherrill et all, 1998) and depression (DA Lawlor and SW Hopker 2001).

A Review of the literature on experimental evidence for whether or not exercise promotes sleep (HS, Driver and SR Taylor 2000) concluded that overall the effects were modest.

However, the studies included in the review employed small sample sizes and primarily recruited good sleepers, limitations that make the clinical relevance of these findings unclear. Although exercise has been consistently associated with better sleep in epidemiologic studies, there are a number of limitations and potential confounding factors in the literature (SD Youngstedt and CE Kline 2006).

Many of the epidemiologic studies relied on measures of exercise and sleep with unknown validity. There are no prospective epidemiologic studies of exercise and sleep.

So yes, exercise should help you sleep better. There is some evidence, however, that exercising and sweating close to bed time can have an adverse effect on sleep quality for both fit and sedentary subjects (National Sleep Foundation 2004, A. King et all, 1997, S. Tworoger et all, 2003).

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