

EFFECTS OF REGULAR AEROBIC EXERCISE ON PHYSICAL CHARACTERISTICS, BODY IMAGE SATISFACTION AND SELF-EFFICACY OF MIDDLE-AGED WOMEN

Nilgün VURGUN

School of Physical Education and Sports, Celal Bayar University, Ahmet Bedevi District, Manisa, Turkey

ABSTRACT

This study examined the effects of regular aerobic exercise on physical variables, body image satisfaction and self-efficacy levels of sedentary women. An exercise group and a control group consisted of 25 and 20 middle-aged women respectively. The exercise group participated in a 14-week aerobic training programme, whereas the control group did not participate in any special kind of physical activity. In addition to administering the Body Image Satisfaction Questionnaire and the Self-efficacy Scale, anthropometric variables were assessed before the commencement of the study and again immediately afterwards. The data were analysed by a one-way ANCOVA. The main results revealed significant decreases in body mass, body fat, waist-to-hip ratio, as well as significant improvements in body image satisfaction and self-efficacy scores, with large effect sizes after the intervention for the exercise group. Regular aerobic exercise had a positive effect on body image satisfaction and self-efficacy of middle-aged women. This could possibly be due to improvements in their physical characteristics that resulted from the exercise programme.

Key words: Aerobic exercise; Body fat; Body Mass Index; Body image satisfaction; Self-efficacy.

INTRODUCTION

An effective way to deal with the physical and psychological problems caused by the frantic modern lifestyle is to exercise regularly (McDonald & Hodgdon, 1991; Hausenblas & Fallon, 2006). Among middle-aged women, there is a decline in both metabolic rate and activity levels. This causes deterioration in physical and functional capacity and increases body mass (BM) and total body fat (BF). It has been reported that regular exercise does not only improve body composition by reducing BM and BF (Forbes, 1991), but that it also reduces depression, anxiety and stress. In addition, exercise improves self-image, self-respect and self-confidence that lead to a positive effect on general well-being (Long, 1983).

A person's perception of his/her body is referred to as body image satisfaction (BIS), which is part of one's ego and affects a person's sense of self-efficacy (Atwater, 1990). Many studies have indicated that people who participate in sports have higher BIS than those who do not engage in sport (Cok, 1990; Asci *et al.*, 1993; Martin *et al.*, 2000; Asci, 2004a). For example, McDonald and Hodgdon (1991) conducted a meta-analysis of 37 studies that had investigated the effect of aerobic exercise and concluded that physical self-perception of

persons in a variety of age groups, changed positively after exercise interventions. Koksall *et al.* (2006) also reported that aerobic exercises has positive effects on physical self-perception, and concluded that these positive outcomes were not affected by whether or not people had previously participated in exercise programmes.

The concept of self-efficacy relates to a person's confidence to perform a specific task successfully (Bandura, 1982). According to Bandura (1997), people with a strong sense of self-efficacy do not avoid new experiences and are typically determined to complete any activity. Bandura (1982) believes the most important source of self-efficacy is experiencing success.

RESEARCH PROBLEM

The purpose of this study was to investigate the effects of participation in an aerobic exercise experience on the physical characteristics, body image satisfaction and self-efficacy of middle-aged previously sedentary women. The main hypothesis was that regular exercise would improve the body image satisfaction and self-efficacy levels of the participants. The second hypothesis was that there is a relationship between the changes in body composition and the scores of the two psychological variables.

METHODOLOGY

Participants

Healthy middle-aged female participants (N=45) volunteered to participate in the investigation. They had not engaged in any type of structured training programme for at least 10 months prior to the study. The exercise group (EG) consisted of 25 women (aged 40.5 ± 12.1 years). The control group (CG) was randomly selected from the EG's friends of similar age ($n=20$; aged 36.3 ± 8.5 years).

The EG participated in a 1-hour aerobic training routine 3 days per week for a period of 14 weeks. The CG did not perform any kind of structured physical activity. Participants gave written consent to take part in the study. They were informed of the experimental procedures and asked not to change their regular daily diet regimen throughout the study. Furthermore, the EG was instructed not to engage in additional exercises, while the CG was asked not to participate in any structured physical activity throughout the study period. The Body Image Satisfaction Questionnaire (BISQ) and the Self-efficacy Scale were administered and anthropometric measurements were taken prior to the start of the study and immediately after the completion of the 14-week training period. The study started with 50 participants. Because of health and family problems, 5 participants withdrew from the study. Missing more than 2 training sessions automatically disqualified participants from further involvement in the study.

Exercise programme

The aerobic training programme consisted of traditional step-aerobic type exercises that included dynamic leg and arm movements, step-ups with music and dynamic core-

strengthening exercises (crunches, push-ups, sit-ups, lunges, squats, etc.). The heart rate (HR) of each EG participant was monitored continuously and recorded with a Polar Heart-rate Monitor during each 1-hour session of aerobic training for the 14 weeks. The exercise intensity of each participant was determined by using the target heart-rate method (Kenney *et al.*, 1995). The target heart rate of participants ranged between 120 and 150 beats per minute.

Measures

Physical parameters

The same researcher carried out the anthropometric measurements on all subjects according to the *Anthropometric Standardization Reference Manual* (Lohman *et al.*, 1988).

- The body mass index (BMI) was calculated by the formula: mass (kg)/height (m²).
- The waist-to-hip ratio (W/H) was calculated by measuring waist and hip circumferences.
- Nine (9) skinfolds (triceps, biceps, subscapula, mid-axilla, suprailiac, abdomen, thigh, knee and calf), were taken with a Holtain skinfold calliper in triplicate on the right side of the body.
- Body density (Db) and the body-fat ratio (BF) were calculated using the following equations (Ratamess, 2012:457):
Db = 1.1422 – 0.0544 × log (biceps + triceps + subscapular + suprailiac)
BF = 100 × (5.01 × Db⁻¹ – 4.57).

Body Image Satisfaction Questionnaire (BISQ)

Berscheid *et al.* (1973) developed the BISQ. The validity of the Turkish translation of the questionnaire, which comprises 25 items, was assessed and confirmed by Cok (1990). The BISQ was constructed to measure body satisfaction, somatic problems, general physical appearance and conformity with body mass and body height. The Cronbach's alpha value of the questionnaire was calculated to be 0.91.

General Self-efficacy Scale

This scale was developed by Schwarzer and Jerusalem (1995) and adapted into Turkish by Luszczynska *et al.* (2004). Each of the 10 items has four possible answers. The Cronbach's alpha coefficient of internal reliability was calculated to be 0.82 (Schwarzer & Jerusalem, 1995; Luszczynska *et al.*, 2004).

Statistical analysis

Shapiro–Wilk W-test and skewness-kurtosis values were used to test for the normality of the data. Assumption of homogeneity of variances was checked using Levene's test. According to test results, dependent variables were analysed with parametric tests, except sum of the skinfold measurement.

Baseline measures of dependent variables were compared between CG and EG by unpaired Student's t-test. Group (EG/CG) was the between-participant factor, and Time (0 Week/14 Week) was the within-participant factor. The main effects and the interaction effect of these

factors on dependent variables were assessed by 2 x 2 (Group x Time) two-factor mixed-design analysis of variance (ANOVA). After the verification of the homogeneity of regression slope assumption, a 1-way ANCOVA was performed to compare the percentage changes of the dependent variables between groups (controlling for the baseline measures of these variables). One-way ANOVA results were reported for variables that contradicted the homogeneity of regression slope assumption. The effect size of the difference (which is an important determinant of practical significance and post-hoc statistical power), was also reported. The relationships among variables were evaluated by means of the Pearson product-moment correlation coefficient. The significance level was set at $p \leq 0.05$ for all analyses.

RESULTS

A comparison of baseline measures of the dependent variables between exercise and control groups is presented in Table 1.

TABLE 1. COMPARISON OF BASELINE MEASURES BETWEEN GROUPS

Variables	EG (n=25)	CG (n=20)	p	ES	1- β
BM (kg)	69.0	63.6 \pm 9.2	0.040*	0.624	0.529
†SS (mm)	186 [129–235] ^M	186 [129–235] ^M	<0.001*	1.440	0.996
BF (%)	23.8	21.7	0.030*	0.610	0.511
W/H	0.794	0.743	0.010*	0.809	0.750
BMI (kg·m ⁻²)	25.1	24.0	0.311	0.291	0.158
BIS	82.6	89.2	0.095	0.510	0.383
SE	30.1	31.7	0.417	0.252	0.130

Descriptive statistics: Mean \pm SD; CG= control group; EG= exercise group; * $p < 0.05$; 1- β = post-hoc statistical power ES= unbiased effect size (Hedge's d : < 0.2 = trivial, $0.2 \leq d \leq 0.5$ = small, $0.5 \leq d \leq 0.8$ = medium, > 0.8 = large effect); †Analysed with Mann-Whitney U-Test; M= median [percentiles 25–75].

BM= body mass; SS= sum of 9 skin folds; BF= body fat %; W/H= waist-to-hip ratio; BMI= body mass index; BIS= body image satisfaction; SE= self-efficacy.

A significant main effect for Time was found in BM ($p=0.038$, $\eta_p^2=0.096$, power= 0.551); BF ($p=0.033$, $\eta_p^2=0.101$, power= 0.575); W/H ($p=0.012$, $\eta_p^2=0.139$, power= 0.732); BMI ($p=0.046$, $\eta_p^2=0.090$, power= 0.521); BIS ($p < 0.001$, $\eta_p^2=0.453$, power= 1.000); and SE ($p < 0.001$, $\eta_p^2=0.325$, power= 0.994).

A significant main effect for the Group factor emerged only for W/H ($p=0.028$, $\eta_p^2=0.108$, power= 0.606). No significant main effect was detected for BM ($p=0.086$, $\eta_p^2=0.067$, power= 0.403); BF ($p=0.088$, $\eta_p^2=0.066$, power= 0.401); BMI ($p=0.506$, $\eta_p^2=0.010$, power= 0.101); BIS ($p=0.550$, $\eta_p^2=0.008$, power= 0.091); and SE ($p=0.135$, $\eta_p^2=0.051$, power= 0.319).

A significant Group x Time interaction effect was found in all dependent variables: BM ($p < 0.001$, $\eta_p^2=0.249$, power= 0.958); BF ($p=0.004$, $\eta_p^2=0.176$, power= 0.842); W/H ($p=0.012$, $\eta_p^2=0.138$, power= 0.728); BMI ($p < 0.001$, $\eta_p^2=0.243$, power= 0.953); BIS ($p < 0.001$, $\eta_p^2=0.241$, power= 0.951); and SE ($p < 0.001$, $\eta_p^2=0.348$, power= 0.997), indicating

that these variables showed different change patterns between the EG and CG over the course of the exercise intervention.

TABLE 2. COMPARISON OF CHANGES IN DEPENDENT VARIABLES BETWEEN GROUPS

Test & Group			Mean±SD	¹ Δ (Po-Pre)	² ΔEG-ΔCG	p	ES	1-β
BM (kg)	CG	Pre	63.6±9.2	1.00±3.42	2.87±0.87†	0.002*	1.190	0.972
		Post	64.1±8.2					
	EG	Pre	69.0±7.9	-2.54±2.45				
		Post	67.2±7.4					
‡SS (mm)	CG	Pre	123±22	-0.180±4.424	5.56±4.47	<0.001*	1.170	0.968
		Post	123±21					
	EG	Pre	185±58	5.93±5.62				
		Post	173±53					
BF (%)	CG	Pre	21.7±1.9	0.491±3.178	3.16±1.05†	0.005*	0.929	0.857
		Post	21.8±1.9					
	EG	Pre	23.8±4.2	-2.64±3.41				
		Post	23.2±4.3					
W/H	CG	Pre	0.743±0.048	-0.020±1.123	1.96±0.81†	0.020*	0.738	0.671
		Post	0.743±0.051					
	EG	Pre	0.794±0.071	-1.88±3.16				
		Post	0.779±0.075					
BMI (kg·m ⁻²)	CG	Pre	24.0±3.6	1.00±3.42	3.28±0.86†	<0.001*	1.190	0.972
		Post	24.1±3.3					
	EG	Pre	25.1±3.8	-2.54±2.45				
		Post	24.5±3.7					
BIS	CG	Pre	89.2±13.9	2.63±3.56	-11.2±2.6	<0.001*	-1.170	0.968
		Post	91.7±15.8					
	EG	Pre	82.6±11.7	13.8±12.2				
		Post	93.5±13.3					
SE	CG	Pre	31.7±6.0	-0.989±4.000	-32.0±6.8	<0.001*	-1.230	0.980
		Post	31.5±6.6					
	EG	Pre	30.1±6.4	31.0±33.9				
		Post	37.7±4.1					

CG = control group; EG = exercise group; *p < 0.05.

¹ Mean±SD; ² Mean±Std error of mean; ‡ Wilcoxon Signed Rank Test; † difference ANCOVA results; Δ = % change; ES = unbiased effect size (Hedge's d: <0.2 = trivial, 0.2 ≤ d ≤ 0.5 = small, 0.5 ≤ d ≤ 0.8 = medium, >0.8 = large effect); 1-β = post-hoc statistical power.

BM = body mass; SS = sum of 9 skin folds; BF = body fat %; W/H = waist-to-hip ratio; BMI = body mass index; BIS = body image satisfaction; SE = self-efficacy.

The exercise group demonstrated reductions in BM, BF, SS and BMI, whereas the control group experienced slight increases in these variables. These changes revealed significant overall differences. Among the exercise group, W/H decreased significantly to a greater extent compared to the control group. In addition, an increase in BIS among the exercise group was statistically greater than that in the control group. Similarly, the difference between the increase in BIS and the slight increase among the control group was statistically significant (Table 2). All of these significant differences also produced large effect sizes.

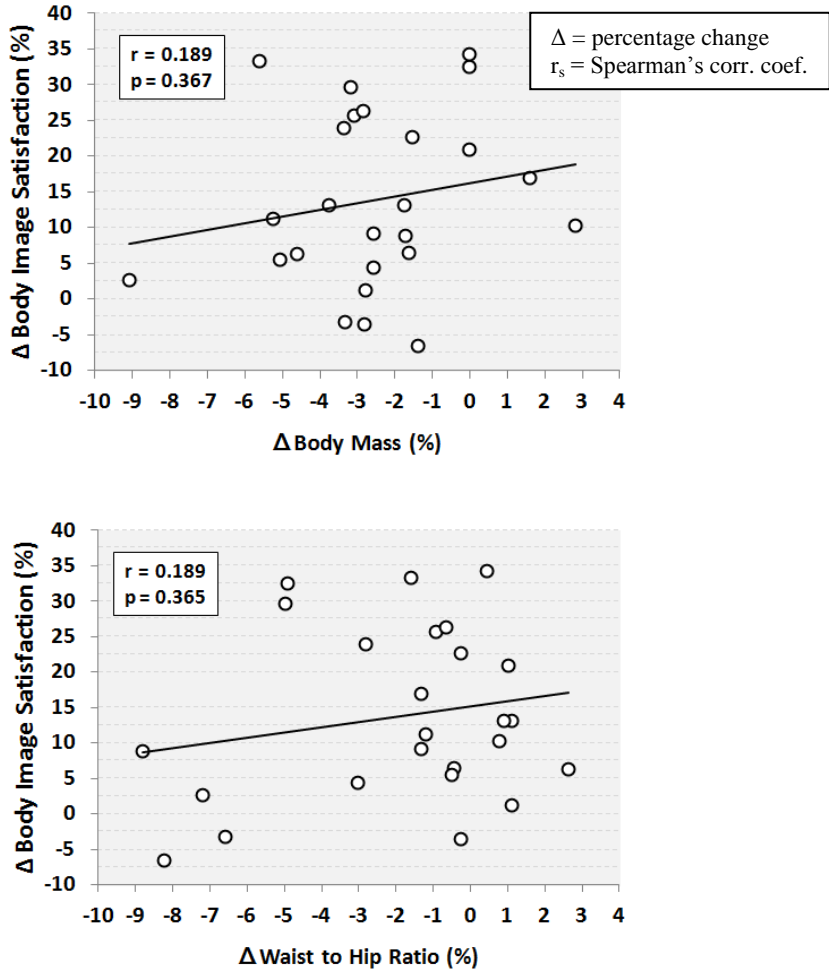


FIGURE 1. EG: RELATIONSHIP BETWEEN PERCENTAGE CHANGE IN BODY IMAGE SATISFACTION & ANTHROPOMETRIC MEASURES

Continued

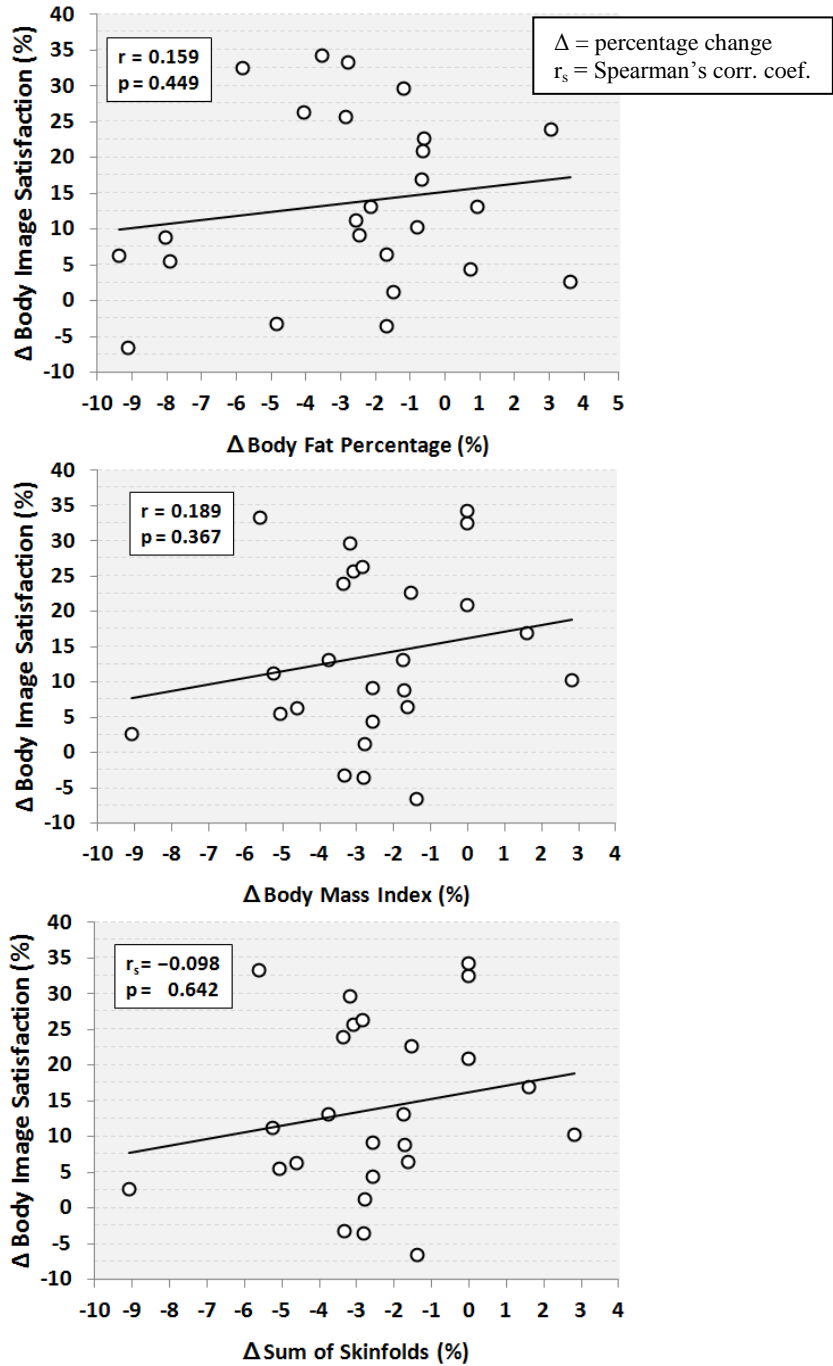


FIGURE 1. EG: RELATIONSHIP BETWEEN PERCENTAGE CHANGE IN BODY IMAGE SATISFACTION & ANTHROPOMETRIC MEASURES (cont.)

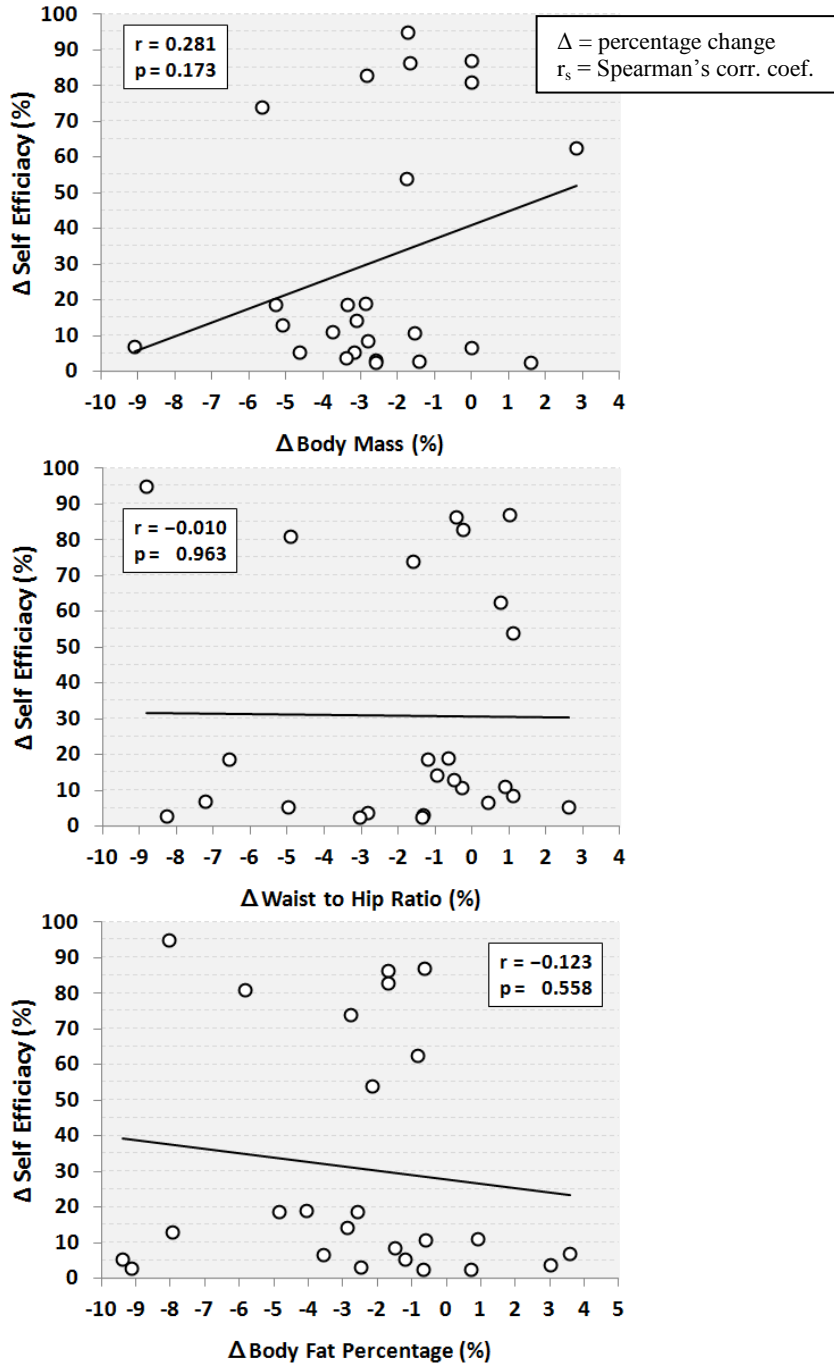


FIGURE 2. EG: RELATIONSHIP BETWEEN PERCENTAGE CHANGE IN SELF-EFFICACY & ANTHROPOMETRIC MEASURES (continued next page)

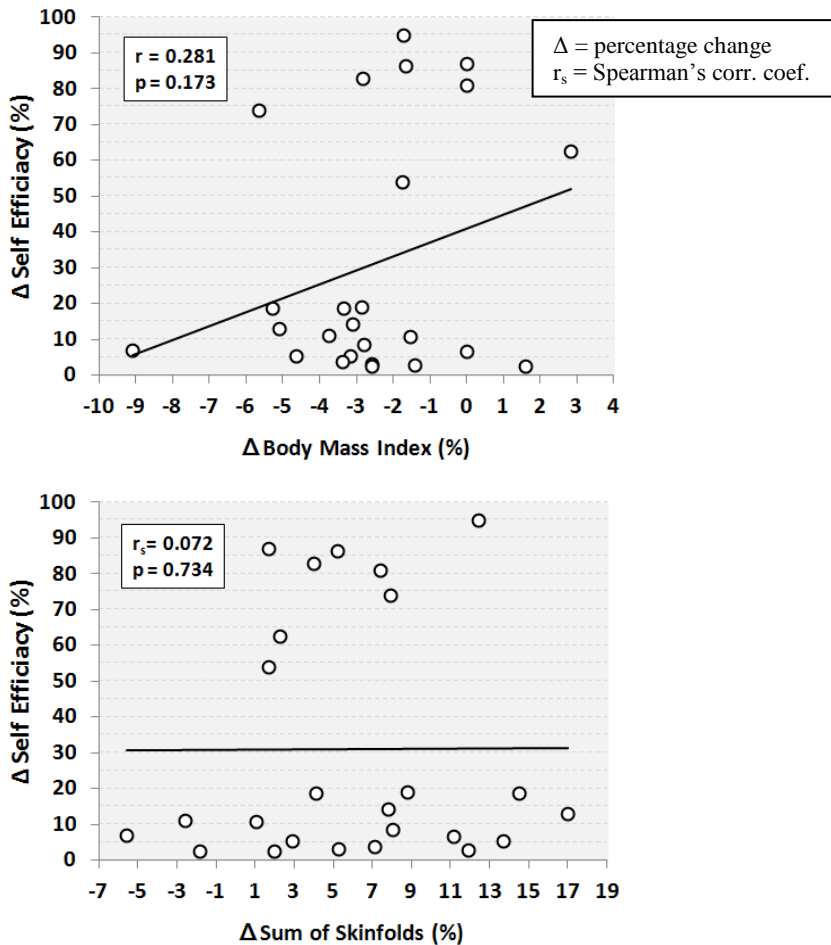


FIGURE 2. EG: RELATIONSHIP BETWEEN PERCENTAGE CHANGE IN SELF-EFFICACY & ANTHROPOMETRIC MEASURES (cont.)

No statistically significant relationship was found between percentage change in the anthropometric measures and body image satisfaction or self-efficacy among the EG after the 14-week aerobic training period.

DISCUSSION

Regularly performed exercises help people attain their ideal body mass and play quite a significant role in helping them maintain their Body Mass Index at normal levels. The study by Kurt *et al.* (2010) of middle-aged women revealed a similar effect with an eight-week sub-maximal step-aerobic exercise programme. Significant improvements were observed in the participants' physical characteristics. Similarly, in another study, pre- and post-menopausal women showed a significant reduction of body fat after a 12-week aerobic regimen

(Imamoglu *et al.*, 1999). Karacan and Colakoglu (2003) found a significant decrease in body mass, body fat percentage, body fat mass and body mass index after a 12-week jog-walk exercise programme among middle-aged women.

When participants in the EG were compared with those in the CG during the initial measurements of the current study, those who intended to exercise were found to have greater BM and more BF compared to the other participants. This difference between these two groups might be considered as the reason why the group was willing to participate in a fitness intervention activity.

The willingness to adopt an exercise programme is influenced by an individual's self-efficacy (Dutton *et al.*, 2009), self-perception and personal well-being (Asci *et al.*, 1998; Daley & Buchanan, 1999; Fox, 2000; Asci, 2004b; Hausenblas & Fallon, 2006). Investigations have also revealed that exercising women are more satisfied with their body image compared to sedentary women (Snyder & Spreitzer, 1977; Lindwall & Lindgren, 2005). Furthermore, BMI was found to be the strongest predictor of body satisfaction for female participants (Hausenblas & Fallon, 2002).

Initially in the current study, there were no significant differences between the two groups regarding body image satisfaction and self-efficacy. However, the body image satisfaction and self-efficacy of the exercise group changed positively. Their more favourable perception of their bodies (after benefiting from the exercise programme), might be the reason for their improved sense of self-efficacy. This supports the findings of Berscheid *et al.* (1973) who showed that regularly performed physical activities have physical, psychological and social benefits. They also reported a positive relationship between these benefits and body image satisfaction. Similarly, Tok *et al.* (2007) also found that women exercising regularly have a higher body image satisfaction score than sedentary women.

Moreover, in the study of Utku *et al.* (2006), with a similar objective, the effect of eight weeks of fitness exercise on the women's body image and self-efficacy beliefs was investigated through surveys. They found links between body satisfaction and somatic characteristics. In contrast to the current study, their exercise programme did not produce any significant change in the self-efficacy of the participants. The fact that these researchers used a survey, instead of an intervention, might account for their different findings.

In another study, Williams and Cash (2001) examined the effect of a six-week weight-lifting programme on the body images of university students. Their results showed that the lower and upper extremity power of students increased along with their assessments of appearance and their scores of satisfaction with their body characteristics. Their scores were also found to be significantly higher when compared to the scores of control group.

In the present study, the change in self-efficacy among the participants of the EG could be ascribed to the effect of the 14-week exercise programme. In contrast, possible changes among the participants in the CG were so minimal that they did not have any observable impact on body image or self-efficacy of the non-exercising women in the study.

Despite the expectation of a significant correlation between percentage change in the body composition variables and the BIS or SE variables in this study, it was not the case. Although it was concluded that the 14-week intervention increased the self-efficacy of the participants, it is not clear whether it was due to *participation* in physical activity or *change in physical fitness*.

Some research (Kaplan *et al.*, 1994) supports the role played by exercise interventions in influencing self-efficacy, as well as efficacy being an important correlate of physical health. In related studies, elderly patients suffering from coronary artery disease (Gulanick, 1991) and chronic obstructive pulmonary disease (Kaplan *et al.*, 1994) or young obese women (Annesi, 2010), completed self-efficacy measures and exercise testing at baseline, before and after a training regimen. The results showed that self-efficacy increased significantly among the exercise group participants at the end of intervention.

In a healthy population, the effects of exercise on self-efficacy were assessed in several studies but the results were vague. For example, in a two-year study, Elavsky (2010) examined the exercise–self-esteem relationship among middle-aged women and reported increases in physical activity and self-efficacy and reductions in BMI. On the other hand, in a similar study (Utku *et al.*, 2006), the effect of an eight-week exercise programme on women’s self-efficacy beliefs was investigated through surveys and found no significant changes in self-efficacy. It is speculated that the conflicting results were due to the different types of study populations, duration and type of the physical activity or using a survey instead of field application.

Consequently, it is difficult to compare the results of the current study with those of other investigations. Notwithstanding, it is well known that body image is related to attractiveness and self-esteem. At the same time, it is an evaluation tool for physical power and attractiveness. It is reasonable to expect that women who exercise regularly would perceive their bodies positively.

LIMITATIONS

The small and unequal sample size of the two groups was the most important limitation of this study. Although this issue generally limits the statistical power of the parametric tests, the post-hoc power analysis indicated a high level of statistical power and effect sizes that were also large. Studies with larger sample sizes could provide future related studies with more refined findings. Therefore, well-structured similar studies should be conducted on large samples as well as on different populations (for example, elderly people, adolescents, males, etc.).

REFERENCES

- ANNESI, J.J. (2010). Relations of changes in self-regulatory efficacy and physical self-concept with improvements in body satisfaction in obese women initiating exercise with cognitive-behavioural support. *Body Image*, 7(4): 356-359.
- ASCI, F.H. (2004a). Physical self-perception of elite athletes and non-athletes: A Turkish sample. *Perceptual and Motor Skills*, 99(3): 1047-1052.

- ASCI, F.H. (2004b). Comparison of physical self-perception according to gender and level of physical activity. *Journal of Sports Sciences*, 15(1): 39-48.
- ASCI, F.H.; GOKMEN, H.; TIRYAKI, G.; ASCI, A. & ZORBA, E. (1993). Effect of participation in sports on satisfaction of male high-school students with their body characteristics. *Journal of Sports Sciences*, 3: 38-47.
- ASCI, F.H.; KIN, A. & KOSAR, S.N. (1998). Effect of participation in an 8-week aerobic dance and step aerobics program on physical self-perception and body image satisfaction. *International Journal of Sport Psychology*, 29(4): 366-375.
- ATWATER, E. (1990). *Psychology of adjustment: Personal growth in a changing world*. Upper Saddle River, NJ: Prentice-Hall.
- BANDURA, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37(2): 122-147.
- BANDURA, A. (1997). *Self-efficacy: The exercise of control* (1st ed.). New York, NY: WH Freeman.
- BERSCHIED, E.; WALSTER, E. & BOHRNSTEDT, G. (1973). The happy American body: A survey report. *Psychology Today*, 7: 119-131.
- COK, F. (1990). Body image satisfaction in Turkish adolescents. *Adolescence*, 25: 409-414.
- DALEY, A.J. & BUCHANAN, J. (1999). Aerobic dance and physical self-perceptions in female adolescents: Some implications for physical education. *Research Quarterly for Exercise and Sport*, 70(2): 196-200.
- DUTTON, G.R.; TAN, F.; PROVOST, B.C.; SORENSON, J.L.; ALLEN, B. & SMITH, D. (2009). Relationship between self-efficacy and physical activity among patients with type 2 diabetes. *Journal of Behavioural Medicine*, 32(3): 270-277.
- ELAVSKY, S. (2010). Longitudinal examination of the exercise and self-esteem model in middle-aged women. *Journal of Sport and Exercise Psychology*, 32(6): 862-880.
- FORBES, G.B. (1991). Exercise and body composition. *Journal of Applied Physiology*, 70(3): 994-997.
- FOX, K.R. (2000). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology*, 31(2):228-240.
- GULANICK, M. (1991). Is phase 2 cardiac rehabilitation necessary for early recovery of patients with cardiac disease? A randomized, controlled study. *Heart and Lung*, 20(1): 9-15.
- HAUSENBLAS, H.A. & FALLON, E.A. (2002). Relationship among body image, exercise behavior, and exercise dependence symptoms. *International Journal of Eating Disorders*, 32(2): 179-185.
- HAUSENBLAS, H.A. & FALLON, E.A. (2006). Exercise and body image: A meta-analysis. *Psychology and Health*, 21(1): 33-47.
- IMAMOGLU, O.; ALTUN, P.; CEBI, M. & KISHALI, N.F. (1999). The effects of a 3-month exercise on body composition, serum lipids, lipoproteins and physical fitness in pre- and post-menopausal sedentary women. *Ataturk University Journal of Physical Education and Sport Sciences*, 1(1): 25-29.
- KAPLAN, R.M.; RIES, A.L.; PREWITT, L.M. & EAKIN, E. (1994). Self-efficacy expectations predict survival for patients with chronic obstructive pulmonary disease. *Health Psychology*, 13(4): 366-368.
- KARACAN, S. & COLAKOGLU, F.F. (2003). The effects of aerobic exercise on the body composition and blood lipids in middle aged and young women. *Sportmeter Journal of Physical Education and Sport Sciences*, 1(2): 83-88.
- KENNEY, W.L.; HUMPHREY, R.H. & BRYANT, C.X. (1995). *ACSM's guidelines for exercise testing and prescription* (5thed.). Baltimore, MD: Williams & Wilkins.

- KOKSAL, F.; KORUC, Z. & KOCAEKSI, S. (2006). Effect of participation in an 8-week step-aerobic dance on physical self-perception in women. 9th International Sports Sciences Congress Proceedings (1033-1035). Mugla, Turkey. 3-5 November 2006.
- KURT, S.; HAZAR, S.; İBİS, S.; ALBAY, B. & KURT, Y. (2010). Evaluation of the effects of eight-week step-aerobic exercise program on some fitness parameters at middle aged sedentary women. *International Journal of Human Sciences*, 7(1): 665-674.
- LINDWALL, M. & LINDGREN, E.C. (2005). The effects of a 6-month exercise intervention programme on physical self-perceptions and social physique anxiety in non-physically active adolescent Swedish girls. *Psychology of Sport and Exercise*, 6: 643-658.
- LOHMAN, T.G.; ROCHE, A.F. & MARTORELL, R. (1988). *Anthropometric standardization reference manual*. Champaign, IL: Human Kinetics.
- LONG, B.C. (1983). Aerobic conditioning and stress reduction: Participation or conditioning? *Human Movement Science*, 2: 171-186.
- LUSZCZYNSKA, A.; GIBBONS, F.X.; PIKO, B.F. & TEKOZEL, M. (2004). Self-regulatory cognitions, social comparisons, perceived peers' behaviors as predictors of nutrition and physical activity: A comparison among adolescents in Hungary, Poland, Turkey and USA. *Psychology and Health*, 19(5): 577-593.
- MARTIN, K.A.; SINDEN, A.R. & FLEMING, J.C. (2000). Inactivity may be hazardous to your image: The effects of exercise participation on impression formation. *Journal of Sport and Exercise Psychology*, 22(4): 283-291.
- MCDONALD, D.G. & HODGDON J.A. (1991). *The psychological effects of aerobic fitness training: Research and theory*. New York, NY: Springer-Verlag.
- RATAMESS, N.A. (2012). *ACSM's foundations of strength training and conditioning*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins.
- SCHWARZER, R. & JERUSALEM, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (35-37) Windsor, UK: Nfer-Nelson.
- SNYDER, E.E. & SPREITZER, E. (1977). Participation in sport as related to educational expectations among high school girls. *Sociology of Education*, 50(1): 47-55.
- TOK, S.; MORALI, S. & TATAR, A. (2007). Examination of social physique anxiety and body image satisfaction in university students engaged and not engaged in elite sports (in Turkish). *Ege University Journal of Performance*, 13(1-2): 7-11.
- UTKU, B.; KORUC, Z. & KOCAEKSI, S. (2006). Effect of an eight-week fitness programme exercise on body image and self-efficacy beliefs of women. 9th International Sports Sciences Congress Proceedings (941-942). Mugla, Turkey, 3-5 November 2006.
- WILLIAMS, P.A. & CASH, T.F. (2001). Effects of a circuit weight training program on the body images of college students. *International Journal of Eating Disorders*, 30(1): 75-82.