Progress in Nutrition 2021; Vol. 23, Supplement 1: e2021159 DOI 10.23751/pn.v23iS1.11590

Original article

Investigation of stress levels according to the exercise behavior change stages of women

Semra Çetin[1], *Osman İmamoğlu*[2]

[1]Faculty of Sport Sciences, Sakarya University of Applied Sciences, Sakarya, Turkey; [2]Yaşar Doğu Faculty of Sport Sciences, Ondokuz Mayıs University, Samsun, Turkey

Abstract. *Study Objectives:* The aim of this study was to investigate the stress levels according to the exercise behavior change stages of sedentary women. *Methods:* Four hundred and sixty sedentary women who completed the surveys in Sakarya were included in the study. Perceived stress level and change in exercise behavior survey were applied. One-way ANOVA, LSD test, and independent sample t test were used in the study. *Results:* The mean age of sedentary women were 31.59 years. The health status of sedentary women was founded with19.78% very good, 44.78% good, 24.35% middle, and 11.9% bad. Sedentary women's stress points were found to be 29.33 points for those with good health and 36.00 points for those with bad ones. Sedentary women's stress scores were 31.84 before the trend, they were 28.03 in the continuity phase. In sedentary women, the stress scores of the pre-trend and post-shift stages were significantly higher than those of the exercise and behavioral stages ($p<0.05$). Stress scores of participants in regular physical activity for the last 6 months and 3 years were found to be lower than those who did not participate ($p <0.05$). *Conclusion:* The perceived stress levels of sedentary women according to their exercise behavior change stages were high before the tendency and low during the exercise during continuity. Sedentary women should increase the percentage of continuity in exercise behaviors steps to reduce perceived stress levels. Stress level according to exercise behavior change stages should be investigated in a large number of sedentary women in different regions in Turkey and they should be trained on exercise planning.

Key Words: Sedentary Woman, Stress, Exercise Behaviour

Introduction

According to research, it was stated that being physically active has a positive effect on overcoming psychological and social problems (1). Studies in the literature suggest that individuals participating in physical activity at an insufficient level are shier than individuals participating in regular physical activity. Physical inactivity among women people is a serious cause for concern (2). Physically inactive individuals stay away from many health-related benefits than physical fitness (3). Many factors enable individuals to participate in physical activity. These are being healthy, losing weight, looking good, social interaction, being popular, etc. (4,5). More stationary lifestyles on females are available in Turkey (6,7). Participation in physical activity has decreased among adult people. The prevalence of the number of health problems has increased, especially in industrialized countries (8, 9). In turkey, the participation rate in exercise or regular physical activity was increased today from 3.5% to 33% (10). This percentage for 33% are at the same time the lowest for participation level in regular physical activity compared to European Countries (11). Various theories and models have been used to healthy behaviors (12). According to one theoretical Model, people's attitudes toward exercise are classified into five different phases of change. In the Pre-contemplation phase are found people with no intention to exercise. In the Contemplation phase are found

people to exercise but not in action. In the Preparation phase are found people who intend to take action in the next months. In the Action phase are finding people who participate in regular exercise for fewer than six months. In the Maintenance phase's individual are finding who participate in regular exercise for more than six months (13). Stress is a phrase that is used to define the body's psychological and/or physiological reaction to circumstances that require behavioral readjustment (14). Stress is formed as pressure and anxiety and the situation of trying to protect the inner balance. Stress is the cause of mental and physical tension. The perceived level of stress is determining related to how people giving meaning to them and how to giving explanations (15). Stress is considered a critical factor in the onset, course, and aggravation of many diseases. Many cardiovascular diseases, many immune-related disorders, trauma, depression, and it has been related to higher overall mortality for humans (16-18). Overall, perceived stress is linked to reduced life satisfaction (19).

Persons perceives a situation as stressful when he or she believes that there was a disagreement between the demands of the situation and the actual psychosocial resources and competences. There be presently found different potential areas for the effect of psychological distress on physical and mental health for humans. These physiological responses may guidance to disturbances of mental and physical functioning for humans over the long term. Many stress state for people may occasion an array of problems having behavioral, physical, mental consequences (20,21). There are emerging concerns about the associations between stress and related conditions, such as cardiovascular disease, depression, and cancer (22,23). Control of stress an important role in the development or fall out of stress coping skills (20,24). Individual factors, human beliefs, experiences, personalities, and also genetic factors seem to have an impact on stressful events, altering their response to the person (25). A stressful factor can affect the immune system either by the emergence of any kind of health for humans (26). Stress and its consequences on health for humans have been a major research topic. According to resultants, there are finding positive intercourse between sensed stresses and frequent of serious or unserious illness (27). Also, conducted studies determined that there was an association between health behaviors for humans and perceived stress (28,29). Many studies have shown an inconsistent of the effects of external stressors on health; therefore, recent studies have emphasized stress reaction, principally perceived stress (30). It is thought that the level of stress will change according to the stages of behavior change in sedentary women. For this purpose, the level of stress of sedentary women was examined according to the exercise behavior change stages.

Materials and Methods

Design of Research

Research population, while representing women doing sports in Turkey, while the sample of women who do sports are living in Sakarya province. Four hundred and sixty women who completed the questionnaires correctly and who were not active athletes were subjected to statistical procedures. Measurement to be included in the study were sedentary females, no sight or hearing impairment, and no permanent illness. The following questionnaires and scales were applied for data collection. In the personal information survey, the age, height, and body weights of the women were asked.

Data collection scales

Perceived Stress Scale: In Turkey, this scale was validity and reliability studies were done by Erci (31). Then were adapted to the Turkish's community again by Bilge et al. (32). This scale has comprised 10 items and items are scored between 1-5 points. These are never (1), almost never (2), sometimes (3), fairly often (4), very often (5). The scale is easily understandable. The 4 items are scored as positive (Items: 4, 5, 7, 8). The 6 items for scale are scored as negative (Items: 1, 2, 3, 6, 9, 10). In total, it can get a total score from 0 to 50. The main purpose of the scale is to measurement the level of stress for humans. If the total score is low, the stress level is low. The higher the scale score, the

higher the stress level (33). In the present study, the perceived Stress Scale had Cronbach's alpha of α=0.75.

Physical Activity Stages of Change Questionnaire (PASCQ): The PASCQ evaluates male and females' exercise stages on their physical activity behaviors. The criterion validity of the Turkish version by Cengiz et al. (34) was made. Questions have been measured with yes/no. The survey uses a scoring algorithm to classify individuals into 5 different phages of change. According to Marcus & Lewis (35), these are namely Pre-Contemplation, Contemplation, Preparation, Action, and Maintenance. In the pre-contemplation phase, is individuals do not change their high risk behavior in the foreseeable future (6 months). In the Contemplation phase, people seriously intended to change their behavior in the next six months. In the preparation, individuals intend to take action soon and usually in less than 6 months. In the action phase, individuals have made overt behavior changes within the past 6 months. In the maintenance phase, individuals have changed their behavior for more than 6 months (34). It was answered either "yes" or "no" based on their participation in physical activity for each question. Using the following scoring patterns, the behavioral tendency for 5 different exercises is made (10). Behavior change categories in the form of scoring: for questions: Yes (1) or No (0).

Pre-contemplation stage: If question 1 and question 2 is no

Contemplation stage: If question 1 yes and question 2 is no

Preparation stage: If question 1 yes and question 3 is no

Decision/action stage: If question 1 yes question 3 yes, and question 4 is no

Maintenance stage: If question 1, 3 and question 4 is yes (35). The scale validity applied in this study is 0.82.

Statistical analysis

The data were analyzed using the Statistical Package for Social Sciences Statistics (Version 23.0 for Windows; IBM). According to Shapiro Wilk's test, the data has shown a normal distribution. Comparisons of two variables were performed using independent t-test, others ANOVA and LSD test.

Results

Figures

The health condition for women was very good with 19.78% and was bad with 11.9%. The health condition for women was good the highest rate with 44.78% (Figure 1). According to the stages of behavior change, the number of women was different. The women who were in the pre-contemplation phase and 23.26% were in the Maintenance phase were 16.52% (Figure 2).

Sedentary women included in the study were on mean 31.59 years old. Body mass indexes were found to be 22.16 kg / m^2 (Table 1).

The stress points of sedentary women are the highest with 36.00 points in the ones who stated their

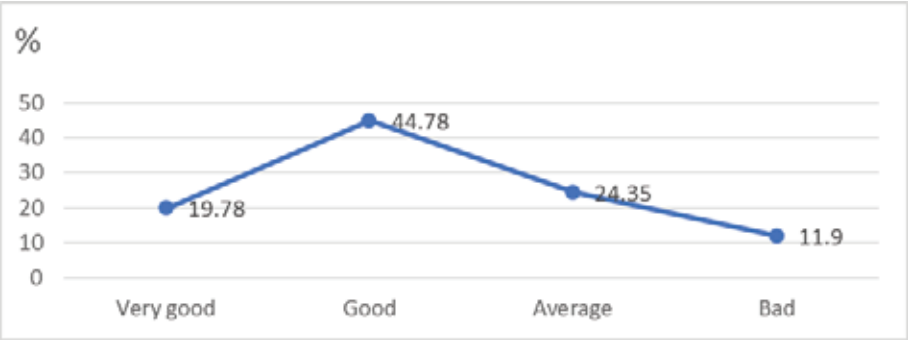

Figure 1. Sedentary women according to their phrase of health status percentage distribution

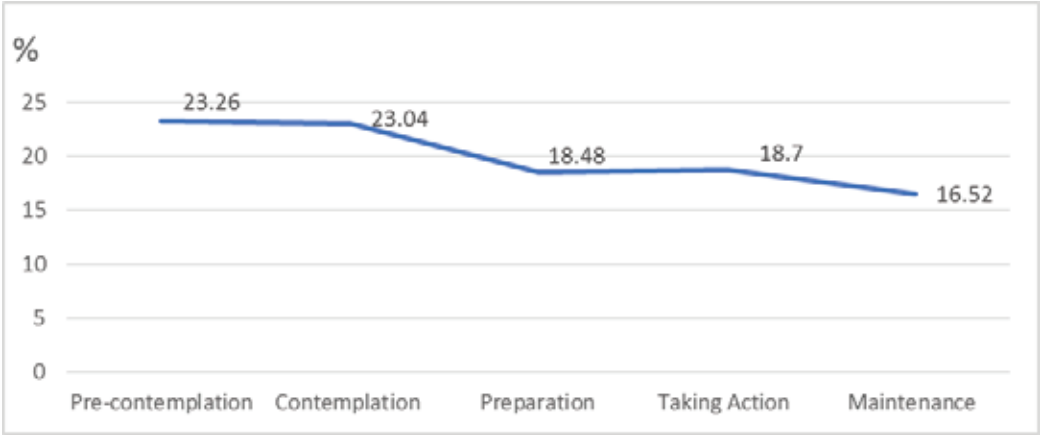

Figure 2. Percentage distribution of sedentary Women according to Behavior change stages

Table 1. Anthropometric Characteristics of Sedentary Women

Parameter	Mean	Std. D.
Age (years)	31.59	6.64
Body Height (cm)	164.26	5.13
Body weight (kg)	61.10	9.64
BMI (kg/m²)	22.16	3.29

Table 2. Stress Point of Sedentary Women according to General Health Status

Parameter	n	Mean	Std. D.	F/LSD
Very good (1)	91	29.33	4.64	3.11* 1,2<4
Good (2)	206	29.75	5.82	
Middle (3)	112	30.94	5.76	
Bad (4)	51	36.00	6.63	
Total	460	29.95	5.66	

*p<0.05

health as bad. The lowest stress score was found with 29.33 points in the ones who stated that health status was very good. This point difference in the health status was statistically significant (p <0.05; Table 2).

According to the behavioral change stages, stress scores were 31.84 at the Pre-contemplation phase and 31.18 at the Contemplation stage. At the stage of the Taking Action, it fell to 28.70 points and at the Maintenance stage 28.03 points. This point difference in the behavior stages was statistically significant (p <0.05) (Table 3).

Table 3. Distribution of Stress Points According to Women's Behavioral Change Stages

Phase	n	Mean	Std. D.	F/LSD
Pre-contemplation (1)	107	31.84	5.12	3.82* 1,2>4,5
Contemplation (2)	106	31.18	5.63	
Preparation (3)	85	30.02	5.54	
Taking Action (4)	86	28.70	5.22	
Maintenance (5)	76	28.03	6.23	
Total	460	29.95	5.66	

*p<0.05

The stress score of those who have participated in regular physical activity for the last 6 months and last 3 years is lower than those who do not participate in regular activities. The difference between the participants who did attend the physical activity for the last 6 months and those who did not participate in the physical activity was significant at 0.05 level. The difference between the participants who did attend the physical activity for the last 3 years and those who did not participate in the physical activity was significant at 0.01 level (Table 4).

Discussion and Conclusion

In this study, the mean age of sedentary women was 31, 59 years, Body height 164.26 cm, Body weight 61.10 kg, and BMI (Body Mass Index) 22.16 kg/m2

Table 4. Stress Points of Participants in Regular Physical Activity at the Last 6 Months and 3 Years

	Regular activity	n	Mean	Std. D.	t-test
Stress point (6 months)	Yes	96	27.89	6.24	-2.57*
	No	364	30.39	5.43	
Stress point (3 Years)	Yes	76	26.90	6.92	-3.48**
	No	384	30.21	5.41	

*p<0.05; **p<0.01

(Table 1). This study, were founded their health status of sedentary women 19.78% very good, 44.78% good, 24.35% middle, and 11.9% bad (Figure 1).

The Perceived Stress Scale is a well-established self-report measure based on the psychological conceptualization of stress. The scale defines the degree to which situations in one's life are appraised as stressful (36). Considering the highest score that can be obtained from Perceived Stress Scale was 50 and upwards scores indicated elevated levels of stress perception. In this study, the mean Perceived Stress Scale scores of the sedentary female was middle as 29.95. This scores suggest that sedentary women generally do perceive themselves as lower stressed. It is known that perception of stress can be affected by many factors. These can personal and environmental (32). Deryahanoğlu et al. (15) in a study, according to doing sport or not perceived stress, depression, and self-perception of the scale body design, it was determined that there was a significant difference. In this study, sedentary women's stress points were found to be 29.33 points for those with very good health and 36.00 points for those with bad ones (Table 2). In this study, sedentary women whose health status is very good and good have lower stress scores. Those with poor health status had a high stress score. This difference was statistically significant (p<0.05). Sedentary women should have good health conditions to reduce stressful situations. Future studies on women's Physical activity behaviors should be structured using the stages of change levels.

In other studies, these variables include age, educational level, and the perceived benefits of physical activity, lifestyle, motivation, and opportunities to participate in physical activity (13). In this study, Physical Activity Stages of Change were differences: Pre-contemplation (23.26%), Contemplation (23.4%), Preparation (18.48%), Action (18.70%) and Maintenance (16.52%), (Figure 2). When total stress scores were analyzed in terms of the stages of behavior change, the highest mean was found in those within the pre-contemplative stage with 31.84, while the lowest mean was found in those within the maintenance state with 16.52. The scores of those within the stage of pre-contemplation decrease as the stages advance to contemplation, preparation, action, and maintenance. In this study, according to Behavioral Change Stages were found in the phase of Pre-contemplation 31.84 and the phase of Maintenance of 28.03 stress points (Table 3). The stress scores of the Pre-contemplation and Contemplation were significantly higher than those of the in phase of Action and Maintenance stages (p<0.05). In that case, the sporting activity decreases the stress score.

Physical activity or exercise has numerous health benefits among persons. Specifically, it reduces the risk of obesity and the development of chronic diseases, such as diabetes (37). Exercise or physical activity reduced cardiovascular disease, and all-cause mortality (38). Physical activity or exercise strengthens bones and muscles, improves mental health and mood, decreases depression and anxiety, promotes social (39). Physical activity or exercise is psychological well-being and improves academic performance (40). Yıldırım et al. (7) in a study, in the Turkish context, women who live in low socio-economic environments neighborhoods tended to have a higher risk of physical inactivity. Dilek et al. (41) in their study, the aggression levels of university student football spectators were found to decrease as the level of activity increased according to the stages of behavior change. Çiçek et al. (42) in a study, at the end of regular cardio Bosu exercises, the second measurement of stress value was reduced. This measured not

statistically significant although it was lower than the first measurement. Karadağ (43) in a study reported, those young people having sports showed low stress scores. In this study, the stress scores of participants in regular physical activity for the last 6 months and 3 years were found to be lower than those who did not participate ($p < 0.05$). Health programs for women should be developed and administered upon taking the level of physical activity, exercise stages into consideration. Sports activities can reduce perceived stress. A study, found Pilates and aerobic exercises contributed positively to the body image in obese women (44).

Consequently; the perceived stress levels of sedentary women according to their exercise behavior change stages were high before the tendency and low during the exercise during continuity. Sedentary women should increase the percentage of continuity in exercise behaviors steps to reduce perceived stress levels. Stress level according to exercise behavior change stages should be investigated in a large number of sedentary women in different regions in Turkey and they should be trained on exercise planning.

Conflicts of interest: The authors declare that there is no conflict of interest in this manuscript.

Acknowledgement: This study was obtained from Semra ÇETİN's doctoral dissertation.

References

1. Bandura A. Perceived self-efficacy in cognitive development and functioning. Educ Psychol 1993; 28(2): 117-48.
2. Page RM, Zarco EP. Hyness, physical activity, and sports team participation among Philippine high school students. Child Study Journal 2001; 31(3): 193-204.
3. Korepanova YA, Panachev VD. Students' healthy life -style components study. Russ J Phys Educ Sport 2014; 9(2): 32–8.
4. Alemdağ C, Alemdağ S, Özkara AB. Physical activity as a determinant of subjective happiness. Balt J Sport Heal Sci 2016; 4(103): 2–10.
5. Allender S, Cowburn G, Foster C. Understanding participation in sport and physical activity among children and adults: A review of qualitative studies. Heal Educ Res Theory Pract 2006; 21(6): 826–35.
6. Aktener AY, Dulger Hİ, Erkayhan GE, et al. Obesity prevalence in reproductive age and postmenopausal women aged between 20-64 years in a semi-urban area. Medical Journal of Trakya University 2006; 23(3): 119-126.
7. Yıldırım G, İnce ML, Müftüler M. Physical Activity and Perceptions of Neighborhood Walk Ability among Turkish Women in Low and High Socio-Economic Environments: An Exploratory Study. Perceptual & Motor Skills: Exercise & Sport 2012; 115(2): 661-675.
8. Abraham C, Graham-Rowe E. Are worksite interventions effective in increasing physical activity? A systematic review and meta-analysis. Health Psychology Review 2009; 3(1): 108-144.
9. Dugdill L, Brettle A, Hulme C, et al. Workplace physical activity interventions: a systematic review. International Journal of Workplace Health Management 2008; 1(1): 20-40.
10. Ceker A, Cekin R, Ziyagil MA. Stages of exercise behavior changes in male and females from different age groups. CBU Physical Education and Sports Sciences 2015; 8(1): 11-20.
11. Aksoy Y, Ziyagil MA. Effects of education and socioeconomic status on regular physical activity levels in males and females, NewTrends and Issues Proceedings on Humanities and Social Sciences 2017; 59-65.
12. Prochaska JO, DiClemente CC, Norcross JC. Changing for good: the revolutionary program that explains the six stages of change and teaches you how to free yourself from bad habits. New York: W. Morrow, 1994.
13. Marcus BH, Forsyth BH. Motivating people to be physically active. (2nd ed.) Champaign, IL: Human Kinetics, 2008.
14. Nakao M. Work-related stress and psychosomatic medicine. Bio Psycho Social Medicine 2010; 4(4): 2-8.
15. Deryahanoğlu G, İmamoğlu O, Yamaner F, et al. Anthropometric characteristics of sedentary women and comparison of their psychological states, Journal of Human Sciences 2016; 13(3): 5257-5268.
16. Bachen EA, Cohen S, Marsland AL. Psycho neuro immunology. In: Baum A, Newman S, Weinman J, West R, McManus C, editors. Cambridge Handbook of Psychology, Health and Medicine. Cambridge, UK: Cambridge University Press, p. 167–72, 2007.
17. Wiegner L, Hange D, Björkelund C, et al. Prevalence of perceived stress and associations to symptoms of exhaustion, depression and anxiety in a working age population seeking primary care-an observational study, BMC Fam Pract 2015; 16(1): 38.
18. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. JAMA. 2007; 298(14):1685–7.
19. Nielsen NR, Kristensen TS, Schnohr P, et al. Perceived stress and cause-specific mortality among men and women: results from a prospective cohort study. Am J Epidemiol 2008; 168(5): 481–91.
20. Kadzikowska-Wrzosek R. Perceived stress, emotional ill-being and psychosomatic symptoms in high school students: the moderating effect of self-regulation competences. Archives of Psychiatry and Psychotherapy 2012; 3: 25-33.
21. Güleryüz E, Aydın O. Job control and control at the request of the relationship between burnout and physical health). Turkish Journal of Psychology 2006; 21(58): 59-71.

22. Richardson S, Shaffer JA, Falzon L, et al. Meta-analysis of perceived stress and its association with incident coronary heart disease. Am J Cardiol 2012; 110: 1711-6.
23. Chen YH, Lin HC. Increased risk of cancer subsequent to severe depression: a nationwide population-based study. J Affect Disord 2011; 131: 200-206.
24. Ravazi D, Delvaux N. Communication skills and psychological training in oncology. Eur J Cancer 1997; 33(6): 15-21.
25. Hammen C. Stress Generation in Depression: Reflection on Origins, Research and Future Directions. Journal of Clinical Psychology 2006; 62(9): 1065-1082.
26. Lorentz M. Stress and Psychoneuroimmunology Revised: Using Mind-Body Intervention to Reduce Stress. Alternative Journal of Nursing 2006; 11.
27. Taylor S. Health psychology. New York: McGraw Hill, 2003.
28. Hughes RB, Taylor HB, Robinson WS, et al. Stress and women with physical disabilities: identifying correlates. Women's Health Issues 2005; 15: 14-20.
29. Kemeny ME. The Psychobiology of Stress. Current Directions in Psychological Science 2003; 12 (4): 124-129.
30. DeLongis A, Folkman S, Lazarus RS. The impact of daily stress on health and mood: psychological and social resources as mediators. J Pers Soc Psychol 1988; 54: 486-95.
31. Erci B. Reliability and validity of the Turkish version of perceived stress scale. Journal of Anatolia 2006; 9(1): 58-63.
32. Bilge A, Öğce F, Genç RE, et al. Psychometrıc Properties of a Turkish Version of the Perceived Stress Scale, Ege Universty Nursing College Sciences 2009; 25(2): 61-72.
33. Eskin M, Harlak H, Demirkiran F, et al. The adaptation of the perceived stress scale into Turkish: a reliability and validity analysis. In New Symp J 2013; 51(3): 132-140).
34. Cengiz C, Ascı FH, Ince ML. Exercise stages of Change Questionnaire: its reliability and validity. Türkiye Klinikleri Journal of Sports Sciences 2010; 2(1): 32-37.
35. Marcus BH, Lewis BA. Physical activity and stages of change of motivational readiness for change model. President's Council on Physical Fitness and Sport Research Digest 2003; 4(1): 1-8.
36. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983; 24: 385–96.
37. World Health Organization. Global recommendations on physical activity for health. Geneva, 2010.
38. Tremblay MS, Leblanc AG, Kho ME, et al. Systematic review of sedentary behavior and health indicators in school-aged children and youth. International Journal of Behavioral Nutrition & Physical Activity 2011; 8(1): 1–22.
39. Hallal PC, Victora CG, Azevedo MR, et al. Adolescent physical activity and health: A systematic review. Sports Medicine 2006; 36(12): 1019-1030.
40. Rasmussen M, Laumann K. The academic and psychological benefits of exercise in healthy children and adolescents. European Journal of Psychology of Education 2013; 28(3): 945–962.
41. Dilek AN, İmamoğlu O, Erkin A. Aggression Levels of Spectators in Terms of Stages of Behavior Change and Gender, International Journal of Cultural and Social Studies (IntJCSS) 2017; 3 (Special Issue): 73-82.
42. Çiçek G, İmamoğlu O, Yamaner F, Türk N. Psychological Effects of Cardio Bosu Exercise on Sedentary Women, International Journal of Sports, Exercise and Training Science 2017; 3(3): 69–75.
43. Karadağ Ö. Evaluation of sociodemographic characteristics and physical activity level of adolescents living in orphanages in Ankara in terms of mental symptoms and quality of life, Ankara: Hacettepe University, Master Thesis, 2008.
44. Çetinkaya G, İmamoğlu G. Investigation of The Effect of Plates-Aerobic Exercises on Body Composition and Body Image In obesity Female, The Journal of International Social Research 2018; 11(59): 1451-1456.

Correspondence:
Semra Cetin
Faculty of Sports Sciences,
Sakarya University of Applied Sciences, Sakarya Turkey
E-mail: scetin@subu.edu.tr