

The investigation of relation between Anxiety and Syndrome Metabolic profiles after 12 Months Aerobic Exercise whit Moderate Intensity in 50-65 Years Old Women with Syndrome Metabolic

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Research

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Abstract

Background and purpose The aim of this research was to investigate the effect of twelve Month aerobic exercise whit moderate intensity on anxiety in 50-65 years old women with syndrome metabolic and relation between anxiety and Syndrome Metabolic profiles.

Materials and methods 24 women with syndrome Metabolic participated voluntarily in this investigation and divided in two-group MetS exercise (ME), MetS control (MC). ME group participated in an aerobic exercise training (AT) program (12 Month), three session per week, each session contained three performing parts and two rest part. Also, Beck anxiety questionnaire and blood samples were conducted before and after training for evaluating levels of anxiety. Data were analyzed using Pried-sample T-Test, Independent samples T-Test, and Pearson correlation.

Results anxiety after 12-month aerobic exercise significantly decreased ($P \leq 0.05$), and there was a significant relation between improvement of syndrome metabolic and decreasing of anexxiety.

Conclusion These findings indicate that 12-month aerobic exercises induce to decrease anxiety and ameliorate syndrome metabolic. Moreover, we can say ameliorating in Syndrome Metabolic profiles maybe related to decreasing in anxiety levels.

Background

Aging is an inevitable reality and increasing the elderly population around the world is a matter of attention and it is very important that the World Health Organization has estimated the total number of seniors in 2006 for about 700 millions in the next 40 years and this number will be 2 times in Iran, as well as the population of 60 will be around 10 million years until the year 2020 and 2050 to more than 26 million people (2). Increasing age is associated with increasing the risk of metabolic syndrome (3). Due to change in life style, the prevalence of metabolic syndrome in today's society has increased (4). Metabolic syndrome can have a negative effect on physical performance, mental state, personal, familial and social relationships, and general health and feeling of well-being of patients. Metabolic syndrome was defined according to the criteria of the NCEP/ATP III to include individuals with any three or more of the following five components:(1) Waist circumference > 94 cm; (2) high TG ≥ 150 mg/dl; (3) low HDL-C < 40 mg/dl; (4) high blood pressure (systolic BP ≥ 130 mm Hg or diastolic BP ≥ 85 mm Hg or treatment of hypertension, and (5) high FBG ≥ 6.1 mmol/L (4, 5) Stress caused by social issues and the absence of a family member leads to increase in anxiety and worry in the person (6). Chronic anxiety and the stress caused by the society cause bulimia and the cause of metabolic syndrome (7). Diseases are the cause of increasing stress and cause anxiety. The results of some fundamental research such as Carroll et al. (2009),and Kai et al. (2015) refers to the positive relationship between anxiety and metabolic syndrome (8, 9). In another study, there has been a relationship between anxiety and metabolic syndrome indexes. In particular, they noted a strong relationship between the size of waist cercomfrences, triglyceride and blood pressure (10). While Takeuchi et al. (2009) refers to the presence of a positive and meaningful

(significantly) relationship between depression and metabolic syndrome and lack of meaningful (significantly) relationship with metabolic syndrome (11). The research of Vogelzangs et al. (2007) noted that anxiety in old men was significantly related to metabolic syndrome, which was not significant in women, and the cause of lack of meaningful (significantly) relationship was related to the impact of the stress which caused by the society which women experience this problem less than men. The question is suggested whether social stress is associated with metabolic syndrome or other variables in that role (12). We will review the research history that has examined the impact of exercise on anxiety reduction. Kargarfard et al. (2011) examined the effect of eight weeks of training on the anxiety of hemophilia patients (13). Salehpoor et al (2015) studied the effect of exercise on the anxiety of young people who had mental disorders (14). Also, Sardari et al. (2009) investigated the effect of 8 weeks of aerobic training on anxiety in patients with type 2 diabetes (15). Given that the previous research has examined the impact of exercise training on anxiety in people with different diseases and so far, there was no research that examined the effect of exercise on anxiety in patients with metabolic syndrome and since the prevalence of metabolic syndrome is much more than other fears. It is a high importance for the research to eliminate the physical and mental problems of these patients.

The aim of this study was to investigate the relationship between metabolic syndrome indices and anxiety of 50–65 year old patients with metabolic syndrome after 12 months of aerobic exercise. Considering that, the origin of stress and anxiety of this participant is a lack of spouse of the martyrs inevitably has been involved with social issues. the martyr's widows have been involved with social issues. According to the results mentioned fundamental research can be said of this process, affecting their stress and anxiety disorder is metabolic syndrome. The question is, in the mind of the researcher, does the choice of exercise reduce the level of anxiety in martyrs' wife and what is the relationship of anxiety with the indicators of metabolic syndrome after 12 months of aerobic exercise? Many studies have examined the effect of aerobic exercise on metabolic syndrome. But so far, research investigating the association of anxiety with metabolic syndrome indices after 12 months of aerobic exercise in women who have lost their spouses for more than 30 years has not been investigated.

Methods

Participants

The same-experimental method was applied and the research design consisted of pre-test and post-test with a control group and an experimental group. Forty-four females with metabolic syndrome ages aged 60–65 years participated in this research after giving written informed consent. This research was conducted according to the guidelines laid down in the Declaration of Helsinki and was approved by the ethics committees of Semnan University of Medical Sciences and Health Services (IR.SEMUMS.REC.1396.107). It should be noted that four subjects were excluded from the study due to absence of regular exercise and two control subjects due to absence of post-test. Finally, 24 subjects were included in the statistical analysis. The exclusion criteria for absenteeism were more than three sessions out of twelve sessions.

Metabolic Syndrome Definition

Metabolic syndrome was defined according to the criteria of the NCEP/ATP III to include individuals with any three or more of the following five components: (1) Waist circumference > 94 cm; (2) high TG \geq 150 mg/dl; (3) low HDL-C < 40 mg/dl; (4) high blood pressure (systolic BP \geq 130 mm Hg or diastolic BP \geq 85 mm Hg or treatment of hypertension, and (5) high FBG \geq 6.1 mmol/L (5).

Exercise protocol

Each subject walked or ran at 65–75% heart rate reserve (HRR) on a treadmill for 3 · 12–17 min. Over the 12-months treatment, each week, one minute was added to each set, beginning with 8 minutes, so that the duration of each training set at the 12 week was 19 minutes. After the 12 weeks, the training set times did not change. Each session consisted of three sets of consecutive sessions with a 5-minute rest interval between the sets. Heart Rate was monitored during the test using heart rate monitoring devices (Polar M400; Finland).

Measurement of biochemical parameters

Fasting venous blood samples were taken from the antecubital vein 24 hours before (Fasting blood samples were taken at 9am) and after exercise (It should be noted, however, that in order to eliminate the acute effects of exercise such as delayed fatigue and possible minor damage to muscle structure on blood variables, post-test blood sampling was performed four days after the last training session) (17, 18).

For measuring serum blood markers, the samples were allowed to clot for 30 min at room temperature and then centrifuged at 3000 rpm for 10 min at 4 °C. Obtained serums were dispensed into micro tubes and stored at – 80 °C until the measurement of blood parameters. For measuring plasma blood markers, blood samples collected into tubes containing ethylene diamine tetra acetic acid (EDTA) were immediately centrifuged and stored at – 80 °C until the assay.

Blood glucose levels were measured by glucose oxidase method and fat levels were measured by standard enzymatic method using Kobas Mira model biochemical autoanalysis device.

How to calculate body fat percentage

The body fat percentage of the subjects was calculated using the German-made OMRON BF500 body composition.

How to calculate caloric intake

Subjects were recorded daily food intake on the note sheet and food consumed at breakfast, snack, lunch and dinner was calculated by N4 software.

Statistical analysis

Data were presented as mean \pm SD. The Kolmogorov-Smirnov test was used to check for normality of distribution of all blood parameters. The distribution of these parameters did not differ significantly from normal.

Independent t-test and dependent t-test were used to evaluate changes. Pearson correlation test was used to examine the relationship between the dependent variables ($P \geq 0.05$). Statistical significance was set at $P < 0.05$. Data analysis was performed using SPSS version 18 software.

Results

In Table 1, the intra-group comparison of metabolic syndrome Index, weight, fat percentage, BMI and anxiety of EM and CM groups were noted. The results of paired T-test showed a significant effect of 12 months aerobic exercise on reducing blood pressure, triglyceride, waist circumference, BMI, weight, body fat percentage and anxiety (Table 1).

Table 1

) values of methabolic syndrome indexes, wheight, BMI, and Body fat comparing intergra group of EM and CM

Group				Time Measurment	Index
Sig	CM	Sig	EM		
567.0	63.05 ± 26.161	008.0	.3207 ± 37.158	Pre-test	SBP (mmHg)
	58.07 ± 87.159		.713 ± 43.121	After 12 months	
832.0	84.04 ± 98.103	003.0	.3205 ± 78.104	Pre-test	Waist circumferents (cm)
	75.05 ± 21.104		.6103 ± 52.93	After 12 months	
378.0	27.42 ± 58.174	005.0	65.32 ± 84.182	Pre-test	Glucose (mg/dl)
	03.64 ± 98.170		.7310 ± 63.115	After 12 months	
238.0	53.45 ± 08.264	001.0	34.74 ± 32.256	Pre-test	Triglyceride (mg/dl)
	74.68 ± 87.260		23.12 ± 84.143	After 12 months	
074.0	46.04 ± 23.45	327.0	45.12 ± 36.41	Pre-test	HDL (mg/dl)
	84.06 ± 64.46		82.04 ± 47.53	After 12 months	
427.0	38.05 ± 49.34	000.0	54.04 ± 63.33	Pre-test	BMI (kg.m-2)
	35.08 ± 32.34		62.03 ± 43.27	After 12 months	
341.0	73.07 ± 08.79	000.0	43.06 ± 04.80	Pre-test	Weight (kg)
	68.09 ± 88.80		04.04 ± 83.70	After 12 months	
742.0	89.07 ± 87.37	000.0	34.08 ± 56.36	Pre-test	Body fat (%)
	97.09 ± 76.38		72.04 ± 42.28	After 12 months	
253.0	33.06 ± 25.25	000.0	76.05 ± 64.24	Pre-test	Anxiety
	91.07 ± 78.24		24.06 ± 84.09	After 12 months	
BMI, Body Mass Index; SBP, Systolic Blood Pressure; HDL, High-density lipoprotein					

The subjects of my group participated in 12 months of exercise with adherence to 91% in the study. According to both groups, in terms of total calorie intake, calorie intake of protein, carbohydrate and fat, fat percentage and body mass index were homogeneous, although no significant difference was observed in independent T-test results, so we did not consider any of the variables as a confounding variable (Table 2).

Table 2

) Results of comparing the pre-test nutrition indecis among tested two syndrome groups of metabolic exprecise and metabolic control

Sig	Leven's Test		CM	EM	
	Sig	F			
307.0	476.0	153.0	28.437 ± 98.2654	54.287 ± 43.2754	Total calorie intake
702.0	532.0	167.0	23.70 ± 65.545	48.89 ± 60.523	Total calories intake from protein
165.0	389.0	712.0	33.71 ± 72.1295	27.74 ± 52.1325	Total calories intake from Carbohydrates
734.0	568.0	023.0	31.55 ± 22.815	98.49 ± 56.906	Total calories intake from fat
471.0	674.0	001.0	89.07 ± 87.37	34.08 ± 56.36	fat percentage
566.0	365.0	024.0	38.05 ± 49.34	54.04 ± 63.33	BMI

Table 3

) Comparison between the levels of anexity in-group after 12-months

Sig	CM	EM	
007.0	58.07 ± 87.159	71.3 ± 43.121	SBP (mmHg)
000.0	75.05 ± 21.104	61.03 ± 52.93	Waist circumferents (cm)
746.0	03.64 ± 98.170	73.10 ± 63.115	Glucose (mg/dl)
000.0	74.68 ± 87.260	23.12 ± 84.143	Triglyceride (mg/dl)
003.0	84.06 ± 64.46	82.04 ± 47.53	HDL (mg/dl)
000.0	35.08 ± 32.34	62.03 ± 43.27	BMI (kg.m ²)
000.0	68.09 ± 88.80	04.04 ± 83.70	Weight (kg)
000.0	97.09 ± 76.38	72.04 ± 42.28	Body fat (%)
000.0	91.07 ± 78.24	24.06 ± 84.09	Anexity
BMI, Body Mass Index; SBP, Systolic Blood Pressure; HDL, High-density lipoprotein			

The results of independent T-Test showed that there is a significant difference in the level of anxiety in the trained group compared to the control group, which is statistically significant. There is a significant correlation between anxiety/blood pressure, waist circumference and glucose (Table 4).

Table 4

) The result of Pearson correlation coefficient

HDL	Glucose	Triglyceride	Waist circumferents	SBP	
654.0	538.0-	845.0-	548.0-	763.0-	Correlation of anxiety with
009.0	025.0	000.0	000.0	005.0	Sig

Discussion

The American Diabetes Association recommended the intensity and duration of physical activity in this study in 2002, which recommended aerobic exercise with a intensity of 50 to 80% of the maximum aerobic power in three to four weeks (19). Based on the findings, anxiety was significantly reduced after 12 months of aerobic exercise ($P \leq 0.05$). The correlation of anxiety with blood pressure, waist circumference and glucose was positive and significant ($P \leq 0.05$).

The results of the investigation of Smits et al. (2008), Broman et al. (2008), Andreas et al. (1998), Kargarfard et al. (2011), Salehpour et al. (2015) and Salehpour et al. (2015) were consistent with the result of present research (13–15, 20–22). Considering that several fundamental studies have pointed out the relationship between anxiety and metabolic syndrome (8–10, 12) 6 none of the existing research has the effect of aerobic exercise on anxiety and metabolic syndrome. For example, Smits et al. (2008) pointed out that exercise with a intensity of 70–90% of the maximum heart rate for 20 minutes and three times per week significantly reduces anxiety (20). Also Broman et al. (2008) had reported 20 minutes of exercise was effective in reducing anxiety in people who had more anxiety intensity than 28 (21). Andreas and associates (1998) reported 10 weeks of aerobic training effective in reducing severe anxiety (22). Kargarfard and associates (2011) examined the effect of eight weeks of training on the anxiety of hemophilia patients (13). Salehpour et al. (2015) examined the effect of training on the anxiety of young people who had mental disorders (14). Also Sardari et al. (1388) investigated the effect of 8 weeks of aerobic training on anxiety in patients with type 2 diabetes (15). Considering that there is still no precise mechanism regarding the effects of exercise in improving anxiety, it is likely that the cause of anxiety reduction in the impact of exercise on the development of overall health and fitness and increasing social relationships of individuals (13, 15, 20–22).

The causes of anxiety seem to be different at every stage of life. Martyr wives early due to stress and anxiety caused by social issues and concerns for the success of the children suffered alone. It can be said that the cause of metabolic syndrome is related to chronic anxiety of martyr's wives. Given that at this stage in the life of all the offspring are in good working and social positions, the cause of stress and anxiety of their can no longer be related to it. Most likely, the metabolic syndrome and the relative lack of health are the cause of anxiety for martyr's wives. Due to the increasing level of knowledge and awareness of the type of disease and their importance in anxiety, we can mention metabolic syndrome as the cause of current anxiety of martyr's wives. Aerobic exercise for 12 months with moderate intensity

significantly reduced blood glucose, blood pressure, waist circumference, triglyceride, body fat percentage and BMI of 50–65 year old martyrs' wives. Reduced Blood glucose, blood pressure, waist circumference, triglyceride, body fat percentage, and BMI were significantly associated with reduced anxiety. On the other hand, increased endorphin secretion through regular exercise, which has a positive effect on relief, relaxation and happiness, may be one of the reasons for decreased anxiety.

Conclusions

improvement of metabolic syndrome after 12 months of moderate intensity exercise, they can be attributed to the reduction of anxiety and it can be suggested that aerobic exercises as a non-invasive strategy in the treatment of anxiety in women aged 65 – 50 years with metabolic syndrome.

Abbreviations

AT

Aerobic Exercise Training

CM

Metabolic Syndrome Control

EM

Metabolic Syndrome exercise

MetS

Metabolic Syndrome

SBP

systolic blood pressure

Declarations

Ethics approval and consent to participate

Bonab University Review Board for the protection of human subjects (Approval date, 2018-July-17) approved this study.

Consent for publication

All participants were aware during the informed consent process that the results of this study may be published.

Competing interests

The authors declare that they have no competing interests.

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Contributions

The study was designed by OA; data were collected and analyzed by OA; data interpretation and manuscript preparation were undertaken by OA.

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Availability of data and materials not applicable. Conclusions of the manuscript are based on relevant data sets available in the manuscript.

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