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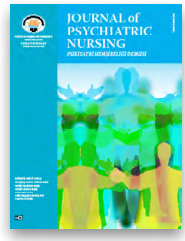

Original Article

Aerobic exercise for individuals with depression

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Abstract

Objectives: This study is an intervention study conducted to determine the effect of aerobic exercise program on the quality of life, self-esteem, and depression level of individuals diagnosed with depression.

Methods: The sample of the study consisted of a total of 60 patients, 30 of whom were in the study group, 30 of whom were in the comparison group, followed up with a diagnosis of depression in the psychiatry outpatient clinic. Research data were collected using the sociodemographic data form, WHOQOL-BREF Quality of Life Scale, Rosenberg Self-Esteem Scale, and Beck Depression Scale. To both groups, sociodemographic data form, WHOQOL-BREF Quality of Life Scale, Rosenberg Self-Esteem Scale, and Beck Depression Scale were applied at the beginning of the study, and scales were applied repeatedly at the end of the 1st month, 2nd month, and 3rd month. To the working group in the research, a 45-min aerobic exercise program was applied 3 days a week for 12 weeks. Research data – it was evaluated by Chi-square test and two-way analysis of variance in repeated measures.

Results: After the aerobic exercise program, it was determined that the quality of life and self-esteem scores of the patients in the study group increased, and their body mass index (BMI) and depression levels decreased. After the aerobic exercise program, the BMI values of the individuals in the study group decreased significantly, BMI according to age, gender, marital status, occupation, and disease duration, between the quality of life and depression level, between the quality of life and depression level according to education level, the number of self by gender and occupation. It was found that there was a statistically significant difference between the scores.

Conclusion: Aerobic exercise program – it was determined that it increased the quality of life and self-esteem scores of individuals and decreased their depression levels and BMI values.

Keywords: Aerobic exercise; depression; psychiatric nursing; quality of life; self-esteem.

Depression is an affective disorder in which the individual cannot have the same pleasure from situations and ordinary events as previously, manifesting itself with the loss of interest in these situations and events, with feelings of grief and sorrow as well as depression and pessimism.[1,2] One in every 10 people worldwide has poor mental health, and one in every four people has a mental disorder at some point in their life and it is stated that more than 264 million people suffer from depression.[3,4] According to the data of the World Health Organization, depression accounts for 20% of mental disorders, compared to 26% in some countries.[3,4] In our country, this rate is between 3 and 12% for men and 10–26% for women.[5,6] It is emphasized that there will be a global crisis due to depression by 2030 in terms of its burden.[3]

Depression is an individual and social health issue causing significant losses of workforce and decreases in quality of life, with its prevalence, high chronicization, and recurrence rates posing significant risks for suicide.[7] Depression is one of the

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most important mortality and morbidity causes worldwide.[7] Compared to other chronic diseases, depression causes direct and indirect economic losses due to the deterioration in social agreement, significant deterioration in quality of life, decrease in self-esteem, loss of labor, and treatment costs.[7,8] One of the losses caused by depression is the deterioration in quality of life.

Quality of life, which is the apparent physical and mental fitness of individuals including the resources, places where they live, physical, social, environmental, and psychological conditions they have at a certain time. Loss of function in depression affects the patient in multiple ways reducing quality of life. Deterioration in the quality of life of the patient can cause problems in caregiving, and the patient may experience inadequacy.[8]

Depression is a decrease in self-esteem in another area causing significant losses in the life of the individual. Turk (2007) reported that Coopersmith described self-esteem as "the personal judgment of the value expressed by one's attitude about him/her".[9] Feeling valued, revealing abilities, and achievements, being liked and loved in public, accepting, and adopting own bodily characteristics are effective in the formation and development of self-esteem.[9-11] The decrease in self-esteem may be in the form of worthlessness feelings, feeling inadequate, not having realistic attitudes in evaluating one's own value.[8,9] It was stated that there is an inverse relation between self-esteem and depression, and depression increases as self-esteem decreases.[10,11]

In maintaining the well-being of the depressed individual, whose quality of life and self-esteem are negatively affected; exercise has a significant effect. It is stated that exercise should be included in the recovery of depression. In the study conducted by Knapen and Vancampfort (2014), it has been determined that exercise is an effective treatment in mild and moderate depression and a complementary therapy that helps other treatments in severe depression.[11] Regular aerobic exercise has mental effects such as increasing self-esteem, avoiding negative thoughts, improving sleep, adapting to stress, and reducing the risk of depression.[12] Aerobic exercises such as pilates are activities that provide oxygen to the body and increase the rate of use of oxygen. Aerobic exercises are long-term exercises performed between 60 and 90% of the maximum heart rate. Non-aerobic exercise consists of strength training, relaxation, coordination, and flexibility training.[13-15] Cadent and regular aerobic exercise and walking program lead to positive developments in patients with depression by accelerating blood circulation.[15,16]

Exercise has an important place in therapeutic settings in psychiatry clinics. Exercise programs that psychiatric nurses apply together with patients contribute to the treatment processes of patients and support their compliance and motivation to treatment.[15,16] For this reason, exercise programs include psychologically problematic individuals in hospital and after discharge together with other care practices to reduce disease symptoms and improve quality of life, self-esteem, and health

What is presently known on this subject?

- Depression is an individual and social health problem that causes significant loss of workforce and a decrease in quality of life and poses a significant risk for suicide with its prevalence, high chronicity, and recurrence rates.
- Compared to other chronic diseases, depression causes significant economic losses directly and indirectly due to deterioration in social cohesion, significant deterioration in quality of life, decrease in self-esteem, loss of workforce, and treatment expenses.

What does this article add to the existing knowledge?

- Research shows that individuals with mental problems need support to reduce their symptoms and improve their quality of life, self-esteem, and health in hospital and after discharge.
- Research also demonstrates the importance of exercise that is inexpensive, effective, and easy to implement and that makes the individual feel good.

What are the implications for practice?

- The research will provide an understanding of the effects of physical exercise on maintaining mental health and well-being, and ways to educate the patient diagnosed with depression and their family on participation awareness and maintaining physical activities.
- The findings presented in the research will shed light on the support of individuals with a low level of education, who do not have a regular job, or who work to freely use the resources in the society, in maintaining physical exercise, and the creation of exercise programs that will enable individuals to gain habits.

applied regularly. Exercise is cheap, effective, and easy-to-apply and makes the individual feel good. However, it was determined that studies showing that nurses use aerobic exercises therapeutically in patients diagnosed with depression are in a very limited number. Studies on aerobic exercise will contribute to the therapeutic use of exercise by psychiatric nurses supporting the well-being of the patient. The present study was conducted to examine the effects of aerobic exercises on the quality of life, self-esteem, and depression levels of individuals diagnosed with depression.

Research Questions

1. Is there a difference between the quality of life of individuals with depression and those who do not have an aerobic exercise program?

2. Is there a difference between the self-esteem levels of individuals with depression and those who do not have an aerobic exercise program?

3. Is there a difference between the depression levels of depressed individuals with and without aerobic exercise program?

4. Is there a difference between the variables of age, gender, education level, occupation, marital status, quality of life, and self-esteem levels of depressed individuals with and without aerobic exercise program?

Materials and Method

Type of the Study

The research was carried out methodologically.

The Universe of the Study

The population of the study consisted of individuals who were diagnosed with depression and followed up in Tokat Cevdet Aykan Mental Health and Diseases Hospital between January 1, 2016, and December 31, 2016.

The Sampling of the Study

There were 728 individuals followed up with the diagnosis of depression in Tokat Cevdet Aykan Mental Health and Diseases Hospital between January 1, 2015, and December 31, 2015. Based on this data, sample calculation was made with G*POWER-powerful statistical analysis and calculations program, 30 studies with 80% power and 5% margin of error, 30 comparison groups, a total of 60 individuals were determined as study sample. The sampling of the study consisted of 60 patients, 30 of whom were followed up with depression in the psychiatric clinic between March 01, 2016, and June 30, 2016, who were between 18 and 65 years of age, who had no physical disease, who were treatment-compliant, who were admitted to participate in the study, who were diagnosed with depression, who were literate, who did not have any communication disabilities, and who did not have a second psychiatric disease diagnosis (30 in the study group and 30 in the comparison group).

Data Collection Tools

The study data were collected using "Sociodemographic Data Form," "WHOQOL-BREF Quality of Life Scale," "Rosenberg Self-Esteem Scale," and "Beck Depression Scale."

Sociodemographic data form

The sociodemographic data form was developed by the researcher after a literature review, and there were 16 questions to determine the sociodemographic characteristics of patients, such as age, gender, marital status, and education levels.[1,2,7,8,11-13]

Body mass index (BMI)

In the evaluation of the data, BMI was calculated based on the weight and height data.

Quality of life scale (WHOQOL-BREF)

The WHOQOL-BREF Quality of Life Scale was developed by the World Health Organization in 1996 to measure the quality of life in adults in a comprehensive way. Its validity and reliability study was conducted in 1999 by Fidaner et al.[17] in our country. WHOQOL-BREF subscales: physical domain (3rd, 4th, 10th, 15th, 16th, 17th, 18th question), spiritual domain (5th, 6th, 7th, 11th, 19th, 26th question), social area (20th, 21st, 22nd question), and environmental area (8th, 9th, 12th, 13th, 14th, 23rd, 24th, 25th questions). Questions 3, 4, 26, and 27 in the scale are negative questions. For this reason, the scores of the answers given to these questions are calculated inversely. Each item is a five-point Likert score, with a score between 1 and 5. After the scores from the subgroups are added, they are converted into scores between 4 and 20 according to the conversion table. The higher the score obtained from the scale, the higher the quality of life.[17,18] The Cronbach's alpha (internal consistency) values of the scale were found as physical area 0.83, spiritual area 0.66, social area 0.53, and environmental area 0.73.[17,18] In this study, the Cronbach's alpha value was determined as 0.94 at the beginning of the study, 0.95 in the 1st month of the study, 0.95 in the 2nd month of the study, and 0.96 in the 3rd month of the study.

Rosenberg self-esteem scale

The Rosenberg Self-Esteem Scale was developed by Morris Rosenberg in 1963 to measure self-esteem of adults. The validity and reliability study of the scale was conducted in 1986 by Çuhadaroğlu in our country. The total score range is between 0 and 30, while a score between 15 and 30 indicates sufficient self-esteem, while a score below 15 indicates low self-esteem.[19] The validity coefficient of the scale was determined to be 0.71, and the reliability coefficient of the scale was determined to be 0.75 using the Test-Retest Reliability Method.[19] In this study, the Cronbach's alpha value was determined to be 0.79 at the beginning of the study, 0.83 in the 1st month of the study, 0.78 in the 2nd month of the study, and 0.85 in the 3rd month of the study.

Beck depression scale

Beck Depression Scale was developed in 1961 by Beck to measure the risk of depression, the level of depressive symptoms, and the change of violence in adults. Its Turkish validity and reliability study was conducted by Hisli in 1989. The total score on the scale ranges between 0 and 63. If the score is between 0 and 9, there is no depression, 10–16 points indicate mild, 17–24 points moderate, and 25 and above indicate severe depressive symptoms.[20,21] The reliability coefficient of the scale was calculated as 0.80 with the Item Analysis Method and as 0.74 with the Equivalent Tests Method. In this study, the Cronbach's alpha value was determined to be 0.79 at the beginning of the study, 0.84 in the 1st month of the study, 0.83 in the 2nd month of the study, and 0.84 in the 3rd month of the study.

Developing the Aerobic Exercise Program

The Aerobic Exercise Program that would be applied to the individuals who were diagnosed with depression was developed in line with literature data.[22-26] Support was obtained from two faculty members of Physical Education and Sports in the development of the Aerobic Exercise Program, which was prepared to ensure that patients can apply in their daily lives and maintain the safety of the individual. Exercise program – it was done for 12 weeks, 3–3 days a week (Monday, Wednesday, and Friday) as recommended in the NICE guideline.[26]

The Implementation

The implementation of the data collection forms

Information about the study was provided to the individuals who met the criteria of being included in the study by the researcher before starting the study; and oral and writ-

ten consents of the patients who agreed to participate in the study were obtained. The patients who were included in the sampling were divided into Study and Comparison Groups according to their application status, and sociodemographic data form was applied to the study and comparison group in the first meeting.

The WHOQOL-BREF Quality of Life Scale, Rosenberg Self-Esteem Scale, and Beck Depression Scale were applied at the beginning of the study, in the 4th, 8th, and 12th week of the study to the study and comparison group. The patients in the study group were given an exercise program 3 days a week (Monday, Wednesday, and Friday) in a sports center located in the city center by a physical education teacher under the supervision of the researcher. Each training session – warm-up (5 min), aerobic exercise (20 min), pilates (15 min), and cool-down (5 min) exercises took a total of 45 minutes. No interventions were made to the patients in the Comparison Group.

Ethical Aspect of the Study

Before starting the implementation of the study, written permission was obtained from the Cumhuriyet University Non-Clinical Research Ethics Committee (dated February 19, 2016, numbered 2016-02/03) and the institution (dated February 23, 2016, numbered 9691). Written consent was obtained with the Informed Consent Form prepared by explaining the purpose of the research to the individuals participating in the research.

Evaluation of the Data

The data of the study were evaluated in a computer medium with the SPSS 22.0 Program. Descriptive analyses were made to provide data about the general characteristics of the groups in the study. The data for the continuous variables were given as mean±standard deviation, and the data on categorical variables were given as n (%). Cross-tables and Chi-square test were used to determine whether there were relations between qualitative variables. Two-way variance analysis was used in repetitive measurements to show the effect of the groups on measurements, the effect of time, and the interaction of time with the group. The p values were considered to be statistically significant when calculated <0.05.

Results

Individuals in the comparison group – the mean age was 34.43±10.73, 50% were in the 36–65 age group, 63.3% were women, 70% were married, 40% were primary school graduates, 53.3% were unemployed, 33.3% were housewives, 93.3% live with their family/relatives, 53.3% have children, 66.7% have a monthly income of 1001–5000 TL, 53.3% have a 0–5-year disease duration, and 66.7% are psychiatric. It was determined that there was no hospitalization in the past year due to the diagnosis. There was no statistically significant difference between the variables of age, gender, marital status, educational status, employment status, occupation, cohabitants, having children, duration of illness, and hospitalization in the past year between the individuals in the study and comparison groups (p>0.05) were determined. The two groups are similar to each other in terms of age, gender, marital status, educational status, employment, occupation, people living together, having a child, duration of illness, and hospitalization in the past year of the individuals in the study and comparison groups.

It was determined in cross-group evaluations that there is a statistically significant difference among the BMI, total quality of life, and depression scores of the individuals included in the study and the comparison group (p<0.05). It was determined that the number of repetitive measurements of the individuals in the study group decreased especially in the 3rd month, and their total quality of life scores increased. It was determined

Table 1. Comparison of the Individuals mean BMI, Quality of Life, Self-Esteem and Depression Repetitive Measurement Scores

Scales	Group	n	Initial	4. Week	8. Week	12. Week	Test	
Body Mass Index	Study Group	30	27.78±4.45[a]	27.44±4.17[b]	27.15±4.01[c]	26.89±4.1[d]	F=21.70; p=0.001*	F=18.49; p=0.001*
	Comparison Group	30	26.62±4.96	26.71±4.76	26.78±4.87	26.79±4.89	F=1.25; p=0.296	
Quality of Life Total Score	Study Group	30	50.33±9.64[a]	50.7±9.79[a]	55.33±8.36[b]	59.1±7.22[c]	F=49.05; p=0.001*	F=29.50; p=0.001*
	Comparison Group	30	41.33±6.23	39.6±5.7	39.2±4.93	40.1±5.39	F=2.14; p=0.142	
Self-Esteem Score	Study Group	30	12.1±4.2[a]	14.97±4.41[b]	15.3±3.27[b]	19.3±4.96[c]	F=22.49; p=0.001*	F=1.45; p=0.231
	Comparison Group	30	10.3±2.93[a]	11.3±3.34[a]	12.03±3.77[a]	15.73±3.29[b]	F=43.22; p=0.001*	
Depression Score	Study Group	30	19.13±5.74[a]	15.03±4.54[b]	10.77±3.21[c]	7.77±3.11[d]	F=107.83;p=0.001*	F=8.13; p=0.001*
	Comparison Group	30	23.73±7.08[a]	23.97±5.46[b]	20.5±4.92[c]	17.83±4.28[d]	F=15.16; p=0.001*	

* The difference between the groups was found to be statistically significant, p<0.05 was taken as significant. In repetitive measurements, Variance Analysis, There was no difference between the groups with the same upper index.

Table 2. BMI, Quality of Life, Self Esteem, and Depression Scores of the Individuals by Age Groups

Scales	Measurement	18-35 age		36 age +	
		Study (n=14) X̄±SD	Comparison (n=15) X̄±SD	Study (n=16) X̄±SD	Comparison (n=15) X̄±SD
Body Mass Index	Initial	26.13±4.28	25.20±4.01	29.22±4.21[a]	28.05±5.52
	4. Week	26.04±4.22	25.33±3.86	28.66±3.84[b]	28.09±5.29
	8. Week	25.78±3.96	25.44±4.08	28.36±3.78[c]	28.11±5.34
	12. Week	25.58±4.14	25.38±4.12	28.04±3.82[d]	28.19±5.32
	Test	F1=1.385; p=0.259		F1=10.639; p<0.001*	
		F2=4.495; p=0.022*		F2=16.815; p<0.001*	
Quality of Life					
Physical Area	Initial	13.21±2.42[a]	11.20±2.57[a]	12.19±2.48[a]	10.53±2.39
	4. Week	13.79±1.85[a]	9.53±2.42[b]	12.63±2.73[a]	9.40±2.23
	8. Week	15.07±1.77[b]	9.40±1.80[b]	14.19±2.29[b]	9.20±2.37
	12. Week	15.93±1.59[b]	9.60±2.29[ab]	15.44±2.37[c]	9±2.27
	Test	F1=5.543; p=0.007*		F1=5.266; p=0.011*	
		F2=24.818; p<0.001*		F2=21.635; p<0.001*	
Quality of Life					
Spiritual Social Area	Initial	12.07±2.27[a]	9.27±2.63	11.44±3.60[a]	10.20±2.08
	4. Week	12.93±2.56[a]	8.80±2.04	12.31±2.89[a]	9.47±1.77
	8. Week	14.64±2.24[b]	8.80±1.78	14.19±2.64[b]	9.33±1.99
	12. Week	15.36±2.06[b]	9±2.14	15.25±2.29[c]	9.33±1.63
	Test	F1=8.447; p=0.001*		F1=8.452; p=0.002*	
		F2=11.007; p<0.001*		F2=18.163; p<0.001*	
Quality of Life	Initial	12.57±3.37[ab]	9.80±1.97	12.31±3.32	9±2.65
Social Area	4. Week	12.43±3.82[a]	9.87±1.92	11.50±3.79	9.13±2.23
	8. Week	13.29±3.79[ab]	10.13±2.36	12.50±2.92	8.67±2.53
	12. Week	14.07±3.97[b]	10.73±2.31	13.38±2.47	8.93±2.87
	Test	F1=5.556; p=0.005*		F1=1.671; p=0.195	
		F2=24.818; p<0.001*		F2=21.635; p<0.001*	
Quality of Life	Initial	13.57±2.14[ab]	11.33±1.4	13.44±2.99[ab]	11.33±1.88
Environmental Area	4. Week	13±1.71[a]	11.47±1.41	13±2.76[a]	11.53±1.36
	8. Week	13.50±1.95[b]	11.27±1.22	13.44±2.10[a]	11.6±1.18
	12. Week	14.29±2.02[b]	11.80±1.37	14.56±1.9[b]	11.8±1.52
	Test	F1=4.741; p=0.008*		F1=5.648; p=0.007*	
		F2=1.580; p=0.210		F2=2.525; p=0.093	
Total Quality of Life	Initial	51.43±8.70[a]	41.60±6	49.38±10.59[a]	41.07±6.66
	4. Week	52.14±8.63[a]	39.67±5.98	49.44±10.84[a]	39.53±5.62
	8. Week	56.50±8.02[b]	39.60±4.67	54.31±8.79[b]	38.80±5.32
	12. Week	59.64±7.70[c]	41.13±5.04	58.63±7[c]	39.07±5.70
Self Esteem	Initial	13±5.22[a]	11.33±2.92[a]	11.31±3.03(a)	9.27±2.63[a]
	4. Week	16.57±4.15[a]	11.60±4.07[a]	13.56±4.26(a)	11±2.54[a]
	8. Week	16.07±3.02[a]	12.67±4.47[a]	14.63±3.42(a)	11.40±2.95[a]
	12. Week	20.86±5.02[b]	16.47±3.48[b]	17.94±4.64(b)	15±3.020[b]
	Test	F1=23.971; p<0.001*	F1=29.889; p<0.001*		
		F2=1.670; p=0.199	F2=0.292; p=0.733		
Depression	Initial	18.71±6.51[a]	25.07±6.4[ab]	19.50±5.16(a)	22.40±7.68[a]
	4. Week	15.21±4.74[b]	25.60±4.26[a]	14.88±4.50(b)	22.33±6.15[a]
	8. Week	10.93±3.63[c]	21.47±4.10[b]	10.63±2.92(c)	19.53±5.59[ab]
	12. Week	8.14±4.13[d]	18.53±3.7[c]	7.44±1.93(d)	17.13±4.81[b]
	Test	F1=35.846; p<0.001*		F1=37.989; p<0.001*	
		F2=2.447; p=0.100		F2=6.006; p=0.004*	

Same upper index shows statistical insignificance. *p value is significant at 0.05. F1: Repetitive Measurements Two-Way Variance Analysis was used (between measurements). F2: Repetitive Measurements, Two-Way Variance Analysis was used (between groups).

in the repetitive measurements of the study group that there is a statistically significant difference between total quality of life, self-esteem, and depression scores of the individuals ($p<0.05$). In the repetitive measurements of the comparison group, a statistically significant difference was detected between self-esteem and depression scores of the individuals ($p<0.05$) (Table 1).

In the evaluation between the groups, in the study and comparison groups, in repeated measurements, according to age, a statistically significant difference was found between the BMI, physical, mental, and social subgroups of the quality of life scale, and the total quality of life and depression scores of individuals aged 18–35 to 36 and over ($p<0.05$). In repeated measurements of individuals aged 18–35 and 36 and over in the study group, BMI score decreased and physical, mental, and social aspects of quality of life and total quality of life scores increased. Depression scores decreased in repeated measurements in the age group of 36 and above. In the repeated measurements of the study group, individuals by age group; it was determined that there was a statistically significant difference ($p<0.05$) between the subgroups, self-esteem and depression scores of the quality of life scale outside the social domain. In the repetitive measurements of the comparison group, a statistically significant difference was detected between self-esteem and depression scores of the individuals according to the age groups ($p<0.05$) (Table 2).

In the evaluation between the groups, in the study and comparison groups, in repeated measurements, according to gender, a statistically significant difference was found between the BMI, physical, mental, and environmental subgroups of the quality of life scale and the total quality of life, self-esteem, and depression scores of men and women ($p<0.05$). In repeated measurements of male and female individuals in the study group, BMI and depression scores decreased, while physical and mental aspects of quality of life and total quality of life scores increased. In women, the environmental domain score of quality of life increased in repeated measurements. It was determined that the self-esteem scores of men increased in repeated measurements. In the repeated measurements of the study group, individuals according to gender, a statistically significant difference was found between the subgroups of BMI, quality of life scale and total quality of life, self-esteem, and depression scores ($p<0.05$). In the repeated measurements of the comparison group, according to gender, it was determined that there was a statistically significant difference between the physical field score of the quality of life scale and the self-esteem and depression scores ($p<0.05$) (Table 3).

According to marital status in repeated measurements in the study and comparison group in the evaluation between the groups, it was determined that there was a statistically significant difference between the BMI, physical, mental, social subgroups of the quality of life scale, and the total quality of life score and depression scores of married and single individuals ($p<0.05$). In repeated measurements of both married and single individuals in the study group, BMI and depression scores decreased, while physical and mental aspects of quality of life and total quality of life scores increased. In married individuals, the social domain subgroup score of the quality of life scale increased in repeated measurements. In the repeated measurements of the study group, individuals according to marital status, a statistically significant difference was found between all subgroups of BMI, quality of life scale and total quality of life, self-esteem, and depression scores ($p<0.05$). In the repeated measurements of the comparison group, individuals according to marital status, it was determined that there was a statistically significant difference between the physical field score of the quality of life scale and the self-esteem and depression scores ($p<0.05$) (Table 4).

In the evaluation between the groups, in the study and comparison groups, in repeated measurements, according to the education level, it was determined that there was a statistically significant difference between BMI, physical, mental, environmental subgroups of the quality of life scale, and total quality of life scores and depression scores in individuals with primary, secondary, and university education ($p<0.05$). In the repeated measurements of primary, secondary, and university-educated individuals in the study group, physical and mental aspects of quality of life and total quality of life scores increased. In repeated measurements, BMI score decreased in individuals with primary and secondary education, depression score decreased in individuals with primary education, and environmental field score of quality of life increased in individuals with university education. In the repeated measurements of the study group, according to the educational status of the individuals, a statistically significant difference was found between all subgroups of BMI, quality of life scale and total quality of life, self-esteem, and depression scores ($p<0.05$). In the repeated measurements of the comparison group, according to the educational status of the individuals, it was determined that there was a statistically significant difference between the physical field score of the quality of life scale and the self-esteem and depression scores ($p<0.05$) (Table 5).

According to occupations in repeated measurements in the study and comparison group in the evaluation between groups, it was determined that there was a statistically significant difference between the BMI, physical, and mental domain subgroups of the quality of life scale and the total quality of life, self-esteem, and depression scores of students, housewives, and those with and without a permanent job ($p<0.05$). In the repeated measurements of the students, housewives, those who have a permanent job and those who do not have a permanent job, the physical and mental aspects of quality of life and total quality of life scores increased. In housewives and individuals who do not have a permanent job, BMI scores decreased in repeated measurements, self-esteem scores increased, and depression scores decreased in individuals with permanent job. In the repeated measurements of the study group, individuals according to occupations, a statistically significant difference was found between the subgroups of BMI,

Table 3. BMI, Quality of Life, Self Esteem, and Depression Scores of the Individuals by Gender

Scales	Measurement	Women		Male	
		Study (n=22) X̄±SD	Comparison (n=19) X̄±SD	Study (n=8) X̄±SD	Comparison (n=11) X̄±SD
Body Mass Index	Initial	28.20±4.90	27.35±5.53	26.62±2.81[(a)]	25.36±3.67
	4. Week	27.93±4.53	27.43±5.30	26.07±2.73[(b)]	25.46±3.53
	8. Week	27.68±4.27	27.50±5.43	25.72±2.99[(b)]	25.52±3.57
	12. Week	27.44±4.32	27.54±5.45	25.37±3.15[(b)]	25.49±3.59
	Test	F1=3.120; p=0.059		F1=10.368; p<0.001*	
		F2=8.582; p=0.001*		F2=16.058; p<0.001*	
Quality of Life	Initial	12.68±2.68[(a)]	10.16±2.17	12.63±1.92[(ab)]	12.09±2.55[(a)]
Physical Area	4. Week	13.18±2.42[(a)]	8.84±1.95	13.13±2.47[(a)]	10.55±2.50[(b)]
	8. Week	14.59±2.22[(b)]	8.84±1.92	14.63±1.77[(bc)]	10.09±2.17[(b)]
	12. Week	15.73±2.12[(c)]	9.05±1.72	15.50±1.85[(c)]	9.73±3.04[(b)]
	Test	F1=9.323; p=0.001*		F1=4.223; p=0.018*	
		F2=22.602; p<0.001*		F2=27.361; p<0.001*	
Quality of Life	Initial	11.64±3.20[(a)]	9.68±2.60	12±2.62[(a)]	9.82±2.04
Spiritual Social Area	4. Week	12.59±2.94[(a)]	9.11±1.91	12.63±2.13[(a)]	9.18±1.99
	8. Week	14.27±2.64[(b)]	9.05±1.99	14.75±1.83[(b)]	9.09±1.76
	12. Week	15.27±2.27[(c)]	9.16±1.80	15.38±1.92[(b)]	9.18±2.09
	Test	F1=11.250; p<0.001*		F1=5.739; p=0.011*	
		F2=18.350; p<0.001*		F2=10.254; p=0.001*	
Quality of Life	Initial	12.64±3.32[(ab)]	9.53±2.27	11.88±3.36	9.18±2.52
Social Area	4. Week	12.41±3.92[(a)]	9.74±2.02	10.63±3.16	9.09±2.21
	8. Week	13.32±3.33[(bc)]	9.63±2.75	11.63±3.16	9±2.10
	12. Week	14.09±3.13[(c)]	10.11±2.92	12.63±3.42	9.36±2.38
	Test	F1=4.675; p=0.009*		F1=1.941; p=0.158	
		F2=1.732; p=0.179		F2=1.133; p=0.335	
Quality of Life	Initial	13.77±2.58[(a)]	11±1.56	12.75±2.6[(a)]	11.91±1.64
Environmental Area	4. Week	13.23±2.45[(a)]	11.37±1.5	12.38±1.77[(a)]	11.73±1.1
	8. Week	13.77±2.07[(a)]	11.26±1.19	12.63±1.6[(a)]	11.73±1.19
	12. Week	14.59±1.89[(b)]	11.53±1.35	14±2.07[(b)]	12.27±1.49
	Test	F1=6.545; p=0.002*		F1=4.018; p=0.021*	
		F2=3.720; p=0.029*		F2=0.961; p=0.402	
Total Quality of Life	Initial	50.73±10.01[(a)]	40.37±6.10	49.25±9.13[(ab)]	43±6.39
	4. Week	51.41±10.70[(a)]	39.05±5.45	48.75±6.96[(a)]	40.55±6.27
	8. Week	55.95±9.21[(b)]	38.79±4.53	53.63±5.58[(b)]	39.91±5.74
	12. Week	59.68±7.85[(c)]	39.84±5.04	57.50±5.26[(c)]	40.55±6.19
	Test	F1=9.323; p=0.001*		F1=4.223; p=0.018*	
		F2=22.602; p<0.001*		F2=27.361; p<0.001*	
Self Esteem	Initial	12.64±3.82[(a)]	9.53±2.89[(a)]	10.63±5.10[(a)]	11.64±2.58[(a)]
	4. Week	14.59±4.85[(a)]	11.11±3.40[(a)]	16±2.88[(b)]	11.64±3.38[(a)]
	8. Week	14.59±3.32[(a)]	11.47±3.55[(a)]	17.25±2.31[(b)]	13±4.12[(a)]
	12. Week	18.27±5.30[(b)]	15.42±3.49[(b)]	22.13±2.30[(c)]	16.27±30[(b)]
	Test	F1=27.581; p<0.001*		F1=50.019; p<0.001*	
		F2=0.080; p=0.929		F2=10.009; p=0.001*	
Depression	Initial	18.95±5.59	25±7.32	19.63±6.50[(ab)]	21.55±6.36
	4. Week	14.95±4.45	24.58±5.34	15.25±5.09[(a)]	22.91±5.75
	8. Week	10.86±3.34	20.74±5.28	10.50±3.02[(b)]	20.09±4.44
	12. Week	7.77±3.38	18±4.71	7.75±2.43[(c)]	17.55±3.59
	Test	F1=3.120; p=0.059		F1=10.368; p<0.001*	
		F2=8.582; p=0.001*		F2=16.058; p<0.001*	

Same upper index shows statistical insignificance. *p value is significant at 0.05. F1: Repetitive Measurements Two-Way Variance Analysis was used (between measurements). F2: Repetitive Measurements Two-Way Variance Analysis was used (between groups).

Table 4. BMI, Life Quality, Self Esteem and Depression Scores of the Individuals by Marital Status

Scales	Measurement	Married		Single	
		Study (n=22) X̄±SD	Comparison (n=21) X̄±SD	Study (n=22) X̄±SD	Comparison (n=21) X̄±SD
Body Mass Index	Initial	28.54±4.69(a)	26.29±4.64	25.71±3.08	27.40±5.86
	4. Week	28.17±4.29(ab)	26.33±4.34	25.40±3.20	27.60±5.81
	8. Week	27.93±4.06(b)	26.35±4.49	25.03±3.19	27.76±5.81
	12. Week	27.68±4.07(c)	26.41±4.54	24.73±3.54	27.66±5.81
	Test	F1=6.378; p=0.004*		F1=2.410; p=0.120	
		F2=10.823; p<0.001*		F2=7.645; p=0.004*	
Quality of Life	Initial	12.86±2.51(a)	10.10±2.23	12.13±2.42(a)	12.67±2.06(a)
Physical Area	4. Week	13.45±2.42(a)	9.05±2.31	12.38±2.26(a)	10.44±2.01(b)
	8. Week	14.77±2.07(b)	9.05±2.18	14.13±2.17(b)	9.89±1.76(b)
	12. Week	15.95±2.08(b)	9.05±2.13	14.88±1.73(b)	9.89±2.57(b)
	Test	F1=9.409; p<0.001*		F1=3.950; p=0.029*	
		F2=24.600; p<0.001*		F2=28.746; p<0.001*	
Quality of Life	Initial	11.59±3.23(a)	9.81±2.62	12.13±2.47	9.56±1.81
Spiritual Social Area	4. Week	12.64±3(a)	9.24±1.92	12.50±1.85	8.89±1.96
	8. Week	14.59±2.67(b)	9.05±1.91	13.88±1.64	9.11±1.90
	12. Week	15.59±2.28(c)	9.38±1.66	14.50±1.60	8.67±2.35
	Test	F1=15.592; p<0.001*		F1=2.536; p=0.100	
		F2=23.230; p<0.001*		F2=6.306; p=0.007*	
Quality of Life	Initial	12.36±3.70(ab)	9.48±2.58	12.62±1.92	9.22±1.71
Social Area	4. Week	12.09±4.23(a)	9.57±2.20	11.50±2.20	9.33±1.87
	8. Week	12.95±3.78(ab)	9.38±2.55	12.62±1.60	9.44±2.55
	12. Week	13.68±3.65(b)	10.00±2.77	13.75±0.67	9.44±2.70
	Test	F1=4.729; p=0.008*		F1=1.580; p=0.223	
		F2=1.752; p=0.174*		F2=1.299; p=0.288	
Quality of Life	Initial	13.77±2.62(ab)	11.1±1.73	12.75±2.49(ab)	11.89±1.27
Environmental Area	4. Week	13.36±2.50(a)	11.38±1.43	12±1.20(a)	11.78±1.20
	8. Week	13.77±2.07(a)	11.43±1.16	12.63±1.6(ab)	11.44±1.33
	12. Week	14.59±1.99(b)	11.71±1.38	14±1.77(b)	12±1.58
	Test	F1=7.391; p=0.001*		F1=3.755; p=0.028*	
		F2=2.255; p=0.111		F2=2.110; p=0.129	
Total Quality of Life	Initial	50.59±10.45(a)	40.48±6.84	49.63±7.56(abc)	43.33±4.18
	4. Week	51.55±10.91(a)	39.24±6.15	48.38±5.66(a)	40.44±4.72
	8. Week	56.09±9.16(b)	38.90±5.04	53.25±5.60(b)	39.89±4.91
	12. Week	59.82±7.84(c)	40.14±5.26	57.13±5.08(c)	40±6.02
	Test	F1=18.020; p<0.001*		F1=4.500; p=0.028*	
		F2=18.774; p<0.001*		F2=9.720; p=0.001*	
Self Esteem	Initial	11.95±3.76(a)	9.67±3.07(a)	12.50±5.53(ab)	11.78±1.99(a)
	4. Week	14.50±4.76(a)	11.19±3.64(a)	16.25±3.15(ab)	11.56±2.70(a)
	8. Week	14.86±3.45(a)	11.62±3.99(a)	16.50±2.51(a)	13±3.20(a)
	12. Week	18.68±5.31(b)	15.95±3.51(b)	21±3.59(b)	15.22±2.82(b)
	Test	F1=38.263; p<0.001*		F1=16.421; p<0.001*	
		F2=0.296; p=0.753		F2=3.098; p=0.077	
Depression	Initial	18.77±4.95(a)	24.52±7.81(a)	20.13±7.85(a)	21.89±4.86(ab)
	4. Week	14.18±3.65(b)	23.86±5.95(a)	17.38±6.07(a)	24.22±4.38(b)
	8. Week	10.32±2.71(c)	19.67±4.98(b)	12±4.28(b)	22.44±4.42(b)
	12. Week	7.14±2.34(d)	17.33±4.66(b)	9.50±4.38(b)	19±3.12(a)
	Test	F1=59.683; p<0.001*		F1=19.835; p<0.001*	
		F2=3.502; p=0.034*		F2=7.243; p=0.004*	

Same upper index shows statistical insignificance. *p value is significant at 0.05. F1: Repetitive Measurements Two-Way Variance Analysis was used (between measurements). F2: Repetitive Measurements Two-Way Variance Analysis was used (between groups).

Table 5. BMI, Life quality, self-esteem, and depression scores of the individuals by educational status

Scales	Measurement	Primary school		Secondary school		University	
		Study (n=11) X̄±SD	Comparison (n=12) X̄±SD	Study (n=12) X̄±SD	Study (n=11) X̄±SD	Comparison (n=12) X̄±SD	Study (n=12) X̄±SD
Body Mass Index	Initial	29.59±3.95[a]	29.36±5.39	27.85±4.81[a]	22.69±2.39	24.83±3.36	28.12±3.15
	4. Week	29.21±3.76[ab]	29.20±5.27	27.30±4.37[ab]	23±2.35	24.88±3.48	28.27±3
	8. Week	28.77±3.53[bc]	29.24±5.39	26.99±4.41[bc]	22.96±2.33	24.89±3.27	28.55±3.11
	12. Week	28.48±3.56[c]	29.23±5.44	26.73±4.50[b]	23.01±2.38	24.68±3.54	28.54±3.15
	Test	F1=9.806; p=0.001*		F1=4.814; p=0.019*		F1=1.122; p=0.353	
		F2=6.750; p=0.005*		F2=14.506; p<0.001*		F2=1.896; p=0.170	
Quality of Life Physical Area	Initial	12.45±2.73[a]	10.58±2.71	12.58±2.19[a]	11.36±2.62	13.14±2.79[ab]	10.57±1.90[a]
	4. Week	13.18±2.89[a]	9.67±2.50	13.25±2.18[a]	10±2.24	13±2.24[b]	8.29±1.80[b]
	8. Week	14.36±2.46[b]	9.58±1.88	15±1.86[b]	9.91±2.12	14.29±1.98[b]	7.86±1.86[b]
	12. Week	15.55±2.58[c]	9.33±2.15	15.92±1.78[b]	10±2.68	15.43±1.62[a]	8.14±1.35[b]
	Test	F1=4.131; p=0.031*		F1=4.535; p=0.020*		F1=6.053; p=0.002*	
		F2=16.185; p<0.001*		F2=14.683; p<0.001*		F2=19.198; p<0.001*	
Quality of Life Spiritual Social Area	Initial	11.18±3.31[a]	9.67±2.71	11.17±2.76[a]	10.09±2.12	13.57±2.57	9.29±2.43
	4. Week	12.18±3.49[a]	9.67±1.92	12.83±2.21[b]	9.45±1.75	12.86±2.41	7.71±1.6
	8. Week	14.09±3.18[b]	9.25±1.86	14.75±1.96[c]	9.82±1.94	14.29±2.06	7.57±0.79
	12. Week	15.18±2.71[c]	9.25±1.82	15.67±1.92[c]	9.91±1.64	14.86±1.68	7.86±1.86
	Test	F1=8.175; p=0.002*		F1=13.930; p<0.001*		F1=2.674; p=0.062	
		F2=13.517; p<0.001*		F2=14.851; p<0.001*		F2=4.044; p=0.014*	
Quality of Life Social Area	Initial	11.82±3.54	9.25±1.86	12.67±3.82	8.64±2.69	13±1.83[ab]	10.86±2.04
	4. Week	11±4.60	9.42±1.68	12.67±3.75	9.09±2.59	12.14±2.19[a]	10.29±1.89
	8. Week	11.82±3.68	9.08±2.07	13.58±3.45	8.55±2.46	13.29±2.36[a]	11.29±2.63
	12. Week	12.91±3.56	9.58±2.27	14.25±3.47	8.91±2.66	14±2.24[b]	11.71±2.93
	Test	F1=2.243; p=0.113		F1=1.708; p=0.174		F1=3.044; p=0.041*	
		F2=1.475; p=239		F2=1.887; p=0.141		F2=0.055; p=900	
Quality of Life Environmental Area	Initial	13.09±3.02	11.58±1.38	13.25±2.34[ab]	11.27±2.2	14.57±2.30[abc]	11±1
	4. Week	13.09±2.88	11.67±1.37	12.75±2.22[a]	11.45±1.37	13.29±1.50[a]	11.29±1.50
	8. Week	13.36±2.20	11.58±1.08	13.25±2.09[ab]	11.55±1.21	14±1.63[b]	11±1.41
	12. Week	14.36±1.86	11.67±1.37	14±1.95[b]	12.09±1.64	15.29±1.98[c]	11.57±1.27
	Test	F1=2.828; p=0.077		F1=3.989; p=0.020*		F1=5.118; p=0.012*	
		F2=2.431; p=0.107		F2=0.548; p=0.609		F2=3.141; p=0.037*	
Total Quality of Life	Initial	48.55±10.99[a]	41.08±6.60	49.67±9.26[a]	41.36±7.3	54.29±8.14[abc]	41.71±4.35
	4. Week	49.45±12.39[a]	40.42±6.29	51.50±9.23[a]	40±5.81	51.29±6.90[a]	37.57±4.69
	8. Week	53.64±10.13[b]	39.50±4.44	56.58±7.65[b]	39.82±5.88	55.86±7.17[b]	37.71±4.54
	12. Week	58±8.72[c]	39.83±5.15	59.83±6.32[c]	40.91±6.07	59.57±7[c]	39.29±5.31
	Test	F1=7.183; p=0.004*		F1=10.898; p<0.001*		F1=6.931; p=0.015*	
		F2=11.134; p<0.001*		F2=12.216; p<0.001*		F2=5.128; p<0.033*	
Self Esteem	Initial	11±3.32[a]	10.08±2.27[a]	11.75±4.67[a]	10.55±3.39[a]	14.43±4.28	10.29±3.55[ab]
	4. Week	14.64±4.82[ab]	10.75±3.39[a]	14.75±4.99[a]	11.36±2.50[a]	15.86±2.85	12.14±4.60[a]
	8. Week	14.55±2.94[ab]	11.58±3.48[a]	15.83±3.97[a]	12.27±3.55[a]	15.57±2.57	12.43±5[ab]
	12. Week	17.82±5.08[b]	15.08±3.37[b]	20.08±5.58[b]	15.82±1.83[b]	20.29±3.55	16.71±4.89[b]
	Test	F1=20.164; p<0.001*		F1=20.435; p<0.001*		F1=11.460; p=0.001*	
		F2=1.305; p=0.281		F2=1.088; p=0.345		F2=0.070; p=0.911	
Depression	Initial	19.64±4.84[a]	23.92±8.36	18.50±6.88[a]	25.36±7.24[ab]	19.43±5.65[a]	20.86±3.44[ab]
	4. Week	14.45±4.30[b]	23.83±6.75	14.83±4.59[b]	25.36±4.39[a]	16.29±5.25[a]	22±4.47[a]
	8. Week	10.73±2.33[c]	22.25±5.55	10.50±3.40©	20.45±3.88[bc]	11.29±4.39[b]	17.57±4.39[ab]
	12. Week	7.45±2.16[d]	20±3.91	7.58±2.31[d]	17.73±4[c]	8.57±5.32[c]	14.29±3.09[b]
	Test	F1=19.884; p<0.001*		F1=31.349; p<0.001*		F1=31.750; p<0.001*	
		F2=5.619; p=0.007*		F2=1.245; p=0.298		F2=2.416; p=0.082	

Same upper index shows statistical insignificance. *p value is significant at 0.05. F1: Repetitive measurements two-way variance analysis was used (between measurements). F2: Repetitive measurements two-way variance analysis was used (between groups).

Table 6. BMI, quality of life, self-esteem, and depression scores of the individuals by professions

Scales	Measurement	Student		House Wife		With permanent jobs		With no permanent jobs	
		Study (n=4) X̄±SD	Comparison (n=5) X̄±SD	Study (n=10) X̄±SD	Comparison (n=10) X̄±SD	Study (n=4) X̄±SD	Comparison (n=5) X̄±SD	Study (n=10) X̄±SD	Comparison (n=10) X̄±SD
Body Mass Index	Initial	25.34±3.76	26.03±5.36	31.06±4.76$^{(ab)}$	28.96±6.46	27.52±3.40	25.89±3.30	25.43±3.07$^{(a)}$	24.96±3.19
	4. Week	25.16±3.63	26.36±5.08	30.64±4.28$^{(a)}$	28.89±6.22	27.09±3.20	25.80±3.07	25.16±2.90$^{(a)}$	25.16±3.19
	8. Week	24.91±3.42	26.61±5.36	30.13±4.03$^{(b)}$	28.82±6.42	27.08±3.13	25.87±3.01	24.90±3.01$^{(a)}$	25.27±3.26
	12. Week	24.39±3.64	26.44±5.57	29.98±3.96$^{(b)}$	28.97±6.34	26.89±3.29	25.93±3.06	24.57±3$^{(b)}$	25.20±3.19
	Test	F1=1.065; p=0.370		F1=6.150; p=0.011*		F1=1.146; p=0.326		F1=3.705; p=0.048*	
		F2=3.490; p=0.060		F2=5.378; p=0.018*		F2=1.205; p=0.312		F2=11.262; p=0.001*	
Quality of Life Physical Area	Initial	13.50±0.58$^{(ab)}$	11±1.58$^{(a)}$	12.30±3.06$^{(a)}$	9.90±2.64	12.14±3.08$^{(abc)}$	13.80±2.39	13.11±1.83(ab)	10.30±1.64$^{(a)}$
	4. Week	13.75±2.22$^{(a)}$	8.80±2.05$^{(b)}$	13±2.94$^{(a)}$	9.30±2.11	12.57±2.30$^{(a)}$	12.20±2.59	13.56±2.13$^{(b)}$	8.60±1.51$^{(b)}$
	8. Week	15.50±1.73$^{(ab)}$	8.60±1.14$^{(ab)}$	14.50±2.51$^{(b)}$	9.80±1.81	13.86±2.19$^{(b)}$	11.60±2.19	14.89±1.69$^{(ac)}$	8±1.56$^{(c)}$
	12. Week	16±1.83$^{(b)}$	8.80±0.45$^{(ab)}$	15.30±2.58$^{(b)}$	9.60±1.96	15.86±1.95$^{(c)}$	12±2.92	15.78±1.72$^{(c)}$	7.90±1.52$^{(bc)}$
	Test	F1=2.981; p=0.049*		F1=5.169; p=0.018*		F1=3.272; p=0.035*		F1=2.972; p=0.040*	
		F2=14.006; p<0.001*		F2=5.405; p=0.015*		F2=10.599; p=0.003*		F2=33.127; p<0.001*	
Quality of Life Spiritual Social Area	Initial	12.25±1.50	10.20±2.28	11.50±2.8$^{(a)}$	9.30±2.98	9.43±3.55$^{(a)}$	10.60±1.52	13.56±2.3$^{(ab)}$	9.50±2.27
	4. Week	13.75±1.26	8.60±1.52	12.60±3.63$^{(a)}$	9.70±2.26	11.71±2.06$^{(ab)}$	10.20±1.30	12.78±2.59$^{(a)}$	8.30±1.70
	8. Week	15±0	8.20±1.64	14.20±3.43$^{(b)}$	9.70±2.26	13.86±2.19$^{(bc)}$	9.80±1.92	14.78±1.99$^{(ab)}$	8.50±1.35
	12. Week	15.50±1.29	8.20±0.84	15.50±2.76$^{(c)}$	9.90±1.85	14.86±2.19$^{(c)}$	9.80±1.92	15.33±1.94$^{(b)}$	8.60±2.07
	Test	F1=0.828; p=0.493		F1=9.388; p=0.001*		F1=7.257; p=0.001*		F1=5.751; p=0.002*	
		F2=11.311; p=0.001*		F2=5.620; p=0.012*		F2=13.631; p=0.001*		F2=6.596; p=0.001*	
Quality of Life Social Area	Initial	13±1.41	10.80±2.17	12.90±4.07	8.50±2.17	10.29±3.59$^{(a)}$	10±2.45	13.33±2.18	9.30±2.41
	4. Week	12.75±1.71	11.20±1.30	11.90±5.40	9.30±2.26	11.43±3.69$^{(ab)}$	9.80±2.05	12±2.60	8.70±1.95
	8. Week	13.25±2.06	12±2.65	13±4.19	8.10±2.23	12±4.24$^{(ab)}$	9.80±1.64	13.22±2.05	9.20±2.30
	12. Week	14.25±1.50	12.20±3.03	13.90±3.70	8.80±2.66	12.86±4.78$^{(b)}$	10.80±1.10	13.89±1.83	9.20±2.62
	Test	F1=2.342; p=0.102		F1=1.179; p=0.322		F1=3.036; p=0.044*		F1=2.582; p=0.084	
		F2=0.294; p=0.829		F2=2.762; p=0.071		F2=1.145; p=0.333		F2=0.761; p=0.486	
Quality of Life Environmental Area	12.75±2.22	11.20±1.48	13.30±3.40$^{(ab)}$	10.90±1.60	13.29±2.29	12.20±2.17	14.22±2.11$^{(ab)}$	11.40±1.51	
	4. Week	12.50±1.29	11.80±1.64	13.20±3.33$^{(a)}$	11.40±1.43	12.57±1.90	12±1.41	13.33±1.66$^{(a)}$	11.20±1.23
	Initial								
	8. Week	13.25±1.71	11.80±1.10	13.60±2.76$^{(a)}$	11.30±1.16	13.29±1.98	12±1	13.56±1.33$^{(ab)}$	11.10±1.37
	12. Week	13.50±1.73	12.20±1.79	14.40±2.27$^{(b)}$	11.60±1.43	14±2.31	11.60±1.52	15.22±1.09$^{(b)}$	11.90±1.37
	Test	F1=2.010; p=0.169		F1=3.761; p=0.038*		F1=0.841; p=0.482		F1=6.581; p=0.001*	
		F2=0.477; p=0.635		F2=1.068; p=0.350		F2=2.346; p=0.093		F2=1.198; p=0.320	
Total Quality of Life	Initial	51.50±2.38$^{(ab)}$	43.20±5.26	50±12.17$^{(a)}$	38.60±6.55	45.14±9.58$^{(a)}$	46.60±6.19	54.22±7.64$^{(abc)}$	40.50±5.15
	4. Week	52.75±4.79$^{(a)}$	40.40±4.56	50.70±14.28$^{(a)}$	39.70±6.4	48.29±8.24$^{(a)}$	44.20±5.63	51.67±7.12$^{(a)}$	36.80±4.44
	8. Week	57±4.55$^{(a)}$	40.60±4.04	55.30±11.76$^{(b)}$	38.90±4.68	53±8.29$^{(b)}$	43.20±5.07	56.44±5.61$^{(b)}$	36.80±4.64
	12. Week	59.25±4.86$^{(b)}$	41.40±3.36	59.10±9.37$^{(c)}$	39.90±5.32	57.57±8.72$^{(c)}$	44.20±5.81	60.22±4.60$^{(c)}$	37.60±5.30
	Test	F1=4.658; p=0.012*		F1=6.053; p=0.001*		F1=11.112; p<0.001*		F1=7.875; p=0.003*	
		F2=7.858; p=0.008*		F2=4.530; p=0.024*		F2=22.438; p<0.001*		F2=8.864; p=0.001*	
Self Esteem	Initial	15±7.35$^{(ab)}$	10.40±3.13	11.60±3.31$^{(a)}$	9.90±3.28$^{(a)}$	11±5.29$^{(a)}$	12±2.92	12.22±2.22$^{(ab)}$	9.80±2.57$^{(a)}$
	4. Week	17.75±3.50$^{(ab)}$	9.60±4.51	15±6.07$^{(b)}$	11.90±2.64$^{(a)}$	13.57±4.04$^{(a)}$	10.80±3.70	14.78±2.54$^{(a)}$	11.80±3.39$^{(a)}$
	8. Week	15.25±2.50$^{(a)}$	9.20±3.56	15±3.56$^{(b)}$	13±3.02$^{(a)}$	14.43±2.64$^{(a)}$	12.20±3.63	16.33±3.87$^{(ab)}$	12.40±4.43$^{(a)}$
	12. Week	21±4.24$^{(b)}$	14.20±2.86	17.60±5.66$^{(b)}$	15.90±3.41$^{(b)}$	20.43±3.31$^{(b)}$	15.40±2.41	19.56±5.66$^{(b)}$	16.50±3.87$^{(b)}$
	Test	F1=6.162; p=0.021*		F1=12.247; p<0.001*		F1=16.210; p<0.001*		F1=24.980; p<0.001*	
		F2=0.567; p=0.643		F2=0.224; p=0.773		F2=3.003; p=0.046*		F2=0.285; p=0.696	
Depression	Initial	16±7.07$^{(a)}$	22.20±5.12	18.20±5.67$^{(a)}$	28.10±8.31	21.86±5.90$^{(a)}$	19.40±5.18	19.44±5.08$^{(a)}$	22.30±5.79
	4. Week	14±4.90$^{(b)}$	25.40±5.77	13.60±4.03$^{(b)}$	25.40±5.21	18.29±4.19$^{(a)}$	21.40±3.36	14.56±4.64$^{(a)}$	23.10±6.40
	8. Week	9.50±3.11$^{(c)}$	19.80±4.09	10.10±2.60$^{(c)}$	22.30±4.72	13±3.46$^{(b)}$	21±4.42	10.33±3.35$^{(b)}$	18.80±5.69
	12. Week	7.50±2.89$^{(d)}$	17±2.83	6.90±1.10$^{(d)}$	19.20±4.61	9±4.76$^{(c)}$	20.20±3.19	7.89±3.37$^{(c)}$	15.70±4.35
	Test	F1=16.062; p<0.001*		F1=22.458; p<0.001		F1=17.235; p<0.001*		F1=27.953; p<0.001*	
		F2=1.571; p=0.226		*F2=0.375; p=0.664		F2=20.089; p<0.001*		F2=3.097; p=0.056	

Same upper index shows statistical insignificance. *p value is significant at 0.05. F1: Repetitive Measurements two-way variance analysis was used (between measurements). F2: Repetitive measurements two-way variance analysis was used (between groups).

quality of life scale and total quality of life, self-esteem, and depression scores ($p<0.05$). In the repeated measurements of the comparison group, individuals according to occupations, it was determined that there was a statistically significant difference between the physical field score and the self-esteem score of the quality of life scale ($p<0.05$) (Table 6).

Discussion

In the present study, in which aerobic exercise, which is considered as a supportive method for the treatment of depression, was used, the BMI levels of individuals decreased. It is stated that depression is both a cause and a result in the increase of BMI. In the studies conducted previously in depressed individuals who engaged in regular physical activity, BMI was lower than in depressed individuals who did not perform regular physical activity.[27-30] This finding of our study supports the literature.

In repetitive measurements, it was observed that the quality of life scores of individuals in the study group increased compared to individuals in the comparison group. There are various studies examining the effects of exercise on quality of life in depression. At the end of the study, in which an exercise program that lasted for 12 weeks, 30–45 min a day, 5 days a week, was applied to the depressed study group, it was determined that the quality of life social domain score increased.[31] In another study, in which an 8-week aerobic and dance exercise program was applied 3 days a week, 45 min a day, with depressed individuals, it was determined that the quality of life social domain score increased.[32] Considering the studies conducted with groups not diagnosed with depression, it has been determined that the quality of life level of individuals who do aerobic exercise is higher than the level of quality of life of individuals who do not do aerobic exercise.[33,34] This result of our research is compatible with the literature.

In the study, the environmental area score of the quality of life increased in women according to gender, in university-educated individuals according to education level, and in individuals who do not work according to occupation. The environmental field is a field that questions the cultural, social, societal opportunities, and transportation possibilities of individuals. Women, who are more likely to be outside the home than men, individuals who do not work due to economic problems, and university-educated individuals, who are almost all working and have limited time outside of work, may not be able to benefit from cultural, social, and social opportunities sufficiently. It can be thought that allocating time for aerobic exercise 3 days a week increases the peripheral area scores. In the study, the social domain score of the quality of life scale increased in married individuals. Home and family responsibilities cause married individuals to take on different roles compared to single individuals, causing married individuals to not be able to spare enough time for their social environment and activities they enjoy. It can be thought that the fact of regularly spending time outside the home and family environment for the aerobic exercise program helps to increase the social domain scores of married individuals. In a study comparing marital status and quality of life, it was determined that marital status had no effect on quality of life.[35]

The self-esteem scores of the individuals, which was below 15 points before the exercise program, which is considered "low self-esteem," increased with the exercise program. In studies examining the effects of aerobic exercise on self-esteem in individuals with depression, it was determined that individuals doing aerobics had a higher level of self-esteem than individuals who did not do aerobics.[36-41] The study findings are parallel to the literature. In the present study, the score of self-esteem in male patients increased. Higher expectations within the society than men compared to women can create pressure on men reducing self-confidence. It can be considered that continuing the aerobic exercise program regularly, completing the program, feeling an improvement in physical appearance by being successful, and that the men proven themselves to the environment increases self-esteem. The self-esteem scores increased in individuals who had permanent jobs, in the study. Isaacson and Brown (1997) reported that individuals with working in a permanent job contribute to the development of the self-esteem of individuals, individuals who work and produce feel valuable, and self-esteem is strengthened.[36]

In the present study, although the depression scores of the individuals before exercise were in the range of points considered "moderate depression," at the end of the study, the level of depression of the individuals who exercised was lower than the level of depression of individuals who did not exercise and decreased to below 10 points that were not considered depressive. There are several studies examining the effects of exercise on depression symptoms. At the end of the study, aerobic exercise was performed in the depressed study group and routine intervention was performed in the depressed comparison group. The individuals who participated in aerobic exercise had a significant decrease in depression levels.[42-44] In the study in which aerobic exercise was applied in one group and relaxation training was applied to the other group, it was determined that the depression score of the aerobic exercise group fell further than the other group.[45] It was determined at the end of the study that in the depressed study group for which aerobic exercise was applied, and psychotherapy to the depressed comparison group, the decrease in depression levels in both groups was close to each other, and the aerobic exercise was as effective as psychotherapy intervention.[13,46,47] At the end of studies in which aerobic exercise was applied to the depressed study group, and anaerobic exercise (weightlifting) was applied to the depressed comparison group, significant reductions were detected in the level of depression in both groups and these reductions were close to each other.[48-50] In studies in which only drug treatment was applied for the first group with depression, only exercise was applied in the second group with depression, and the third group with depression, both the drug and the effect of exercise were applied for 4 months; and, although the drug treatment had a

faster effect on reducing the symptoms of depression, no differences were detected between the groups in the 4th month, and in the 10th month, the group that had greater reduction in symptoms of depression was the group that performed aerobic exercise only.[49,50] The study findings are in line with the literature.

The depression scores decreased in individuals who were aged 36 and over and who participated in the exercise program in the study. Since being productive is a need for individuals who are aged 35 and over, who made up the middle-aged adult group, to be efficient and creative, the likelihood of middle age depression increases in cases where this requirement cannot be covered.[1,2] Buschert et al.[51] (2019) found that adults with a diagnosis of depression who participated in the exercise program felt better cognitively, and their depressive symptoms and tension were reduced. It can be considered that the aerobic exercise program provides a positive contribution to physical fitness by ensuring the mobility of individuals in this age group reducing depressive symptoms.

In the study, depression scores of individuals with primary education were significantly lower than those with secondary education and university education. BMI of individuals with primary and secondary education has decreased significantly compared to individuals with university education. With the effect of weight loss after aerobic exercise program, it can be thought that positive body image helps to decrease depression score.

In the study, the depression score decreased in individuals with permanent job. Studies showed that individuals who do not have a permanent job/who do not work experience more desperation than individuals with permanent jobs and had higher depressive symptoms.[52-54]

It was found that there was a significant difference between the quality of life of individuals with depression who did and did not receive an aerobic exercise program; it was determined that the total quality of life score of the individuals in the study group increased. It was determined that there was no difference between the self-esteem levels of individuals with depression who had and were not applied an aerobic exercise program. It was found that there was a significant difference between the depression levels of individuals with depression who did and did not receive an aerobic exercise program; it was determined that the depression scores of the individuals in the study group decreased in repeated measurements.

Conclusion

It has been determined that the quality of life and self-esteem of individuals who do aerobic exercise increase, and the level of depression and BMI decrease.

After aerobic exercise, the BMI of the 36 and over age group, men, married people, primary and secondary education educated, housewives and individuals who do not have a permanent job has decreased, and the quality of life score of all age groups, women and men, both married and single, all education levels and all occupational groups has increased. The self-esteem scores of men and individuals with permanent job increased, and the depression score of the 36 and over age group, women and men, both married and unmarried, primary school-educated individuals, and individuals with a permanent job decreased.

In line with these results, the patient with a diagnosis of depression and his family were evaluated by psychiatric nurses; it is recommended to provide education on the effects of physical exercise on maintaining mental health and well-being, to raise awareness about participating and maintaining physical activities, and to plan studies with larger sample groups that include longer duration and different exercises to create a standard aerobic exercise program.

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References

1. Öztürk OM, Uluşahin A. Ruh sağlığı ve bozuklukları. 11. baskı. Ankara: Nobel Yayıncılık; 2008.
2. World Health Organization. Mental Health Atlas. 2014. Available at: https://apps.who.int/iris/bitstream/handle/10665/178879/9789241565011_eng.pdf;jsessionid=9AF30B1732F9D5D32B4854A6BF8E5C77?sequence=1. Accessed May 2, 2020.
3. World Health Organization. Depression. 2020. Available at: https://www.who.int/news-room/fact-sheets/detail/depression. Accessed Feb 25, 2021.
4. Turkish Psychiatric Association. What You Want to Know About Depression? 2021. Available at: https://www.psychiatry.org.tr/halka-yonelik/24/depresyon- Konusunda-bilmek-isteçiler#:. Accessed Feb 26, 2021.
5. Lawlor DA, Hopker SW. The effectiveness of exercise as an intervention in the management of depression: Systematic review and meta-regression analysis of randomised controlled trials. BMJ 2001;322:763–7.
6. Celik FH, Hocaoglu C. Major depressive disorder definition, etiology and epidemiology: A review. J Contemp Med 2016;6:51–66.
7. Mead GE, Morley W, Campbell P, Greig CA, McMurdo M, Lawlor DA. Exercise for depression. Cochrane Database Syst Rev 2008:CD004366.
8. Videbeck S. Mood disorders and suicide. psychiatric-mental health nursing. 5th ed. Copyright. Philadelphia: Lippincott Williams & Wilkins; 2011. p.334–66.
9. Turk E. Evaluation about the Self-Esteems respect of the vis-

ually impaired students who attend or do not attend to sports teams. Master Thesis. Adana: Çukurova University Social Sciences Institute, Department of Primary Education; 2007.
10. Celikkol A. Exercise and self concept. Kocaeli: Social Psychiatry Congress; 2008.
11. Knapen J, Vancampfort D, Moriën Y, Marchal Y. Exercise therapy improves both mental and physical health in patients with major depression. Disabil Rehabil 2015;37:1490–5.
12. Martinsen EW, Medhus A, Sandvik L. Effects of aerobic exercise on depression: A controlled study. Br Med J (Clin Res Ed) 1985;291:109.
13. Martinsen EW, Hoffart A, Solberg O. Comparing aerobic with nonaerobic forms of exercise in the treatment of clinical depression: A randomized trial. Compr Psychiatry 1989;30:324–31.
14. Craft LL, Perna FM. The benefits of exercise for the clinically depressed. Prim care companion J Clin Psychiatry 2004;6:104–11.
15. Zorba E. Yaşam ve Egzersiz. Gazi Haber Derg [Article in Turkish] 2008;1:44–7. Available at: https://doczz.biz.tr/doc/133506/ilgili-döküman-veya-slaytı-yüklemek-için-tıklayınız Accessed May 2, 2020.
16. Perham A, Accordino MP. Exercise and functioning level of individuals with severe mental illness: A comparison of two groups. J Ment Health Couns 2007;29:350–62.
17. Fidaner H, Elbi H, Fidaner C, Eser SY, Eser E, Göker E. Yaşam kalitesinin ölçülmesi, WHOQOL-100 ve WHOQOL-BREF. 3P Derg 1999;7:5–13.
18. Fidaner H, Elbi H, Fidaner C, Eser SY, Eser E, Göker E. WHOQOL-100 ve WHOQOL-BREF'in psikometrik özellikleri. 3P Derg 1999;7:23–40.
19. Çuhadaroğlu F. Adolesanlarda benlik saygısı. Uzmanlık tezi. Ankara: Hacettepe Üniversitesi, Tıp Fakültesi; 1986.
20. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561–71.
21. Hisli, N. Beck Depresyon envanterinin geçerliliği üzerine bir çalışma. Türk Psikoloji Derg 1988;22:118–22.
22. Plonczynski DJ. Measurement of motivation for exercise. Health Educ Res 2000;15:695–705.
23. Cohen GE, Shamus E. Depressed, low self-esteem: What can exercise do for you? Internet J Allied Health Sci Pract 2009;7:1–5.
24. Scottish Intercollegiate Guidelines Network. Treating depression without using prescribed medication Booklet for patients and carers. 2010. Available at: https://www.sign.ac.uk/assets/pat114_large_print.pdf. Accessed Nov 20, 2023.
25. Pryjmachuk S. Mental health nursing an evidence-baced introduction. 1st ed. New York: SAGE Publications; 2011. p.131–45.
26. Cooney GM, Dwan K, Greig CA, Lawlor DA, Rimer J, Waugh FR, et al. Exercise for depression. The Cochrane Collaboration. New York: JohnWiley & Sons; 2013. Available at: https://baycrest.echoontario.ca/wp-content/uploads/2018/02/Exercise-for-depression.pdf. Accessed Nov 10, 2023.
27. Boyce RW, Boone EL, Cioci BW, Lee AH. Physical activity, weight gain and occupational health among call centre employees. Occup Med (Lond) 2008;58:238–44.
28. Jensen MK, Chiuve SE, Rimm EB, Dethlefsen C, Tjønneland A, Joensen AM, et al. Obesity, behavioral lifestyle factors, and risk of acute coronary events. Circulation 2008;117:3062–9.
29. Alves JG, Gale CR, Mutrie N, Correia JB, Batty GD. A 6-month exercise intervention among inactive and overweight favela-residing women in Brazil: The Caranguejo Exercise Trial. Am J Public Health 2009;99:76–80.
30. Mota-Pereira J, Silverio J, Carvalho S, Ribeiro JC, Fonte D, Ramos J. Moderate exercise improves depression parameters in treatment-resistant patients with major depressive disorder. J Psychiatr Res 2011;45:1005–11.
31. Gomersall SR, Dobson AJ, Brown WJ. Weight gain, overweight, and obesity: Determinants and health outcomes from the Australian longitudinal study on women's health. Curr Obes Rep 2014;3:46–53.
32. de la Cerda P, Cervelló E, Cocca A, Viciana J. Effect of an aerobic training program as complementary therapy in patients with moderate depression. Percept Mot Skills 2011;112:761–9.
33. Işık Ö, Gümüş H, Okudan B, Yilmaz M. Evaluation of the effects of the quality of life levels of university students upon their depression levels. Int J Sci Culture Sport 2014;2:836–43.
34. Kızar O, Kargün M, Togo OT, Biner M, Pala A. The examining of the physical activity level of the university students. Marmara Univ J Sport Sci 2016;1:61–72.
35. Okyay P, Atasoylu G, Onde M, Dereboy C, Beşer E. How is quality of life affected in women in the presence of anxiety and depression symptoms?. Turk Psikiyatri Derg [Article in Turkish] 2012;23:178–88.
36. Isaacson LE, Brown D. Career information, career counseling and career development. Boston: Allayn and Bacon; 1997.
37. Annesi JJ. Relations of body esteem factors with exercise session attendance in women initiating a physical activity program. Percept Mot Skills 2005;100:995–1003.
38. Ekeland E, Heian F, Hagen KB. Can exercise improve self esteem in children and young people? A systematic review of randomised controlled trials. Br J Sports Med 2005;39:792–8.
39. Annesi JJ, Westcott WL. Relations of physical self-concept and muscular strength with resistance Exercise-induced Feeling State scores in older women. Percept Mot Skills 2007;104:183–90.
40. Elavsky S, McAuley E. Exercise and self-esteem in menopausal women: A randomized controlled trial involving walking and yoga. Am J Health Promot 2007;22:83–92.
41. Callaghan P, Khalil E, Morres I, Carter T. Pragmatic randomised controlled trial of preferred intensity exercise in women living with depression. BMC Public Health 2011;11:465.
42. Doyne EJ, Chambless DL, Beutler LE. Aerobic exercise as a treatment for depression in women. Behav Ther 1983;14:434–40.
43. Azar D, Ball K, Salmon J, Cleland VJ. Physical activity correlates in young women with depressive symptoms: A qualitative study. Int J Behav Nutr Phys Act 2010;7:3.
44. Marzolini S, Swardfager W, Alter DA, Oh PI, Tan Y, Goodman JM. Quality of life and psychosocial measures influenced by exercise modality in patients with coronary artery disease. Eur J Phys Rehabil Med 2015;51:291–9.

45. Roth DL, Holmes DS. Influence of aerobic exercise training and relaxation training on physical and psychologic health following stressful life events. Psychosom Med 1987;49:355–65.
46. Greist JH, Klein MH, Eischens RR, Faris J, Gurman AS, Morgan WP. Running as treatment for depression. Compr Psychiatry 1979;20:41–54.
47. Fremont J, Craighead LW. Aerobic exercise and cognitive therapy in the treatment of dysphoric moods. Cognit Ther Res 1987;11:241–51.
48. Doyne EJ, Ossip-Klein DJ, Bowman ED, Osborn KM, McDougall-Wilson IB, Neimeyer RA. Running versus weight lifting in the treatment of depression. J Consult Clin Psychol 1987;55:748–54.
49. Blumenthal JA, Babyak MA, Moore KA, Craighead WE, Herman S, Khatri P, et al. Effects of exercise training on older patients with major depression. Arch Intern Med 1999;159:2349–56.
50. Babyak M, Blumenthal JA, Herman S, Khatri P, Doraiswamy M, Moore K, et al. Exercise treatment for major depression: Maintenance of therapeutic benefit at 10 months. Psychosom Med 2000;62:633–8.
51. Buschert V, Prochazka D, Bartl H, Diemer J, Malchow B, Zwanzger P, et al. Effects of physical activity on cognitive performance: A controlled clinical study in depressive patients. Eur Arch Psychiatry Clin Neurosci 2019;269:555–63.
52. Leana CI, Feldman D. Predictors of coping behavior after a layoff. J Organ Behav 1998;19:85–97.
53. Özgür G, Gümüş AB, Palaz C. Investigation of depressive symptom levels and the effective factors of obese individuals. Anatol J Nurs Health Sci 2008;11:77–85.
54. Cengiz Özyurt B, Deveci A. The relationship between domestic violence and the prevalence of depressive symptoms in married women between 15 and 49 years of age in a rural area of Manisa, Turkey. Turk Psikiyatri Derg [Article in Turkish] 2011;22:10–6.