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The effects of 8 weeks of exercises applied to female convicts in prisons on BMI change, happiness, psychological stability, hopelessness and anxiety

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ABSTRACT

The main purpose of this study is to examine the effects of exercise on the individual to preserve and improve the current state of both mental and physical health that women convicts need during the prison process and after release in social life. Beck Hopelessness Scale, Happiness Level Scale, Psychological Resilience Scale, State Anxiety Scale, and demographic information form were used to collect the study's data. A pilates exercise test was applied to female convicts in prison in the study, and measurements were made before and after the experiment. The study was tested using the one-way analysis of variance (OneWay ANOVA) and independent single sample test (T-test). The research population consists of 16 women. Pearson Correlation analysis was used to examine the relationship between continuous variables. SPSS 24.0 statistical package program was used for data analysis, and the statistical significance level was accepted as 0.05. The study results showed a positive change in the scores obtained from the psychological scales applied with the pre-study anthropometric measurements of the female prisoners in the Closed Penitentiary Institution, but when the pre-test and post-test averages were compared, it was observed that there was no significant change.

Keywords: Woman, prisoner, pilates, exercise.

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INTRODUCTION

Prison can be defined as an environment where individuals who have committed crimes are both deprived of their liberty and faced with psychological and physical deprivation (Özkürkçügil, 1998). An individual who enters the prison may have to get away from his daily life, family, home, and many essential stimuli and be with people who have similar problems.

According to the World Health Organization (2013) data, the number of people staying in prisons worldwide has increased exponentially in the last decade.

Prisoners' health status is worse compared to the general population, with a higher risk of morbidity, mortality, and mental impairment due to drug, alcohol, and smoking and a significant reduction in physical activity. Prison conditions can lead to negative situations such as anxiety, depression, despair, loneliness, and suicide (Deaton et al., 2009-2010; Keaveny and Zauszniewski, 1999; Özkürkçügil, 1998).

The insufficient opportunities to exercise regularly prevents prisoners from enjoying the positive results of physical activity. Most prisoners have low motivation for sports activities, and it is difficult to say that prisoners' awareness of this issue is high. As a result, there is a high risk of developing diseases such as obesity, heart diseases, hypertension, and diabetes, which are closely related to inactivity among those staying in prison.

In addition, research has shown that lack of physical activity negatively affects the psychological state of prisoners. High rates of anxiety, stress and depression, and low self-esteem have been reported among prisoners. Moreover, prisoners' aggression and antisocial behaviour are common (Honey, 1995). High levels of boredom, loneliness, and insecurity, self-harm, and suicide are common among prisoners.

It has been found that regular physical exercise has many psychological benefits along with its physiological effects. For examined 36 randomized controlled studies and found a positive relationship between physical activity and mood. It is emphasized that regular exercise reduces stress and anxiety symptoms, and negative emotions such as anger and aggression provide emotional control and improves sleep quality. It has been reported that physical exercise has positive effects on many clinical diseases such as anxiety disorders, somatoform disorders, substance abuse among mental problems.

Experimental studies have shown that exercise is also very effective in reducing anxiety and also reduces the recurrence rate of panic attacks and agoraphobia (Thachuk and Martin, 1999).

One of the emotional states positively affected by exercise is psychological resilience. Previous studies support the positive relationship between psychological resilience and physical activity. Current studies in this area are now aimed at understanding physical activity behaviour and contributing positively to psychological well-being by increasing this behaviour (Sebire et al., 2008). Studies on the mental health benefits of exercise have shown that exercise increases positive emotions such as vitality, pleasure, and energy and reduces anxiety, tension, fatigue, and anger (Öztürk, 1997; Alper, 1999). Physical activity increases psychological resilience, makes individuals show fewer stress symptoms, and supports psychological resilience.

Hopelessness is defined as the expectation that important consequences will not happen or that negative consequences will occur. Other findings accompanying hopelessness are feelings of worthlessness, helplessness, unhappiness, indecision, inability to act, inability to continue their work, and guilt (Melges and Bowlby, 1969). In addition to the psychological effect of hopelessness, it can be said that it affects physical exhaustion. In the study conducted by Şarvan and Delen, as the level of physical activity increases, the level of hopelessness decreases, or as the level of hopelessness increases, the level of physical activity decreases (Şarvan and Delen, 2019). Gür et al. (2017) stated that the hopelessness scores of the hearing impaired individuals who participated in physical activity decreased and that physical activity contributed positively to the hopelessness in the hearing-impaired individuals. In the study conducted by Taliaferro et al. (2009), it was stated that physically active men experienced less hopelessness, depression, and suicidal behaviour than their inactive colleagues.

Studies show that regular participation in sports activities also contributes to improving psychological health in the prison environment. Bataglia et al. (2015) found that moderate-intensity exercise reduces depression and anxiety and supports psychological well-being for male prisoners who are in a high-risk group for mental disorders. In addition, it has been stated that sports activities positively affect increasing the self-esteem level of prisoners and decreasing the level of loneliness (Başaran, 2016). Those who did aerobic or anaerobic exercise showed significantly lower levels of depression, stress, and anxiety than other prisoners. It has been reported that sports help to solve sleep problems and improve sleep quality in prison (Elger, 2009). These results showed that exercise is an effective strategy in dealing with imprisonment (Buckaloo et al., 2009).

In a study conducted on 914 prisoners in Australia, the relationship between physical exercise and mental health levels was examined, and a significant inverse relationship was found between exercise and hopelessness levels. It has been concluded that the exercise can contribute to reducing the prisoners' sense of hopelessness (Cashin et al., 2008).

In a study investigating the effect of exercise on body mass index on male prisoners, it was found that while there were a decrease in body mass index (BMI) values of prisoners who were subjected to an intense exercise program, there was no change in the control group.

In general, exercise is associated with improving the quality of life components of prisoners; it has been found that prisoners who exercise have a higher perception of overall quality of life than those who do not (Obadiora, 2016). Both physical and mental components of prisoners 'quality of life were found to be associated with high levels of physical activity.

When the literature is examined, it is seen that the main problems that occur in most of the prisoners and convicts in prisons are the lack of physical activity, health problems, and psychological problems that arise due to these problems. These problems are not limited to the period of imprisonment, but it is known that they continue outside at the end of prison life. For this reason, it is very important to preserve the current state of both mental and physical health that women prisoners need during the prison process and after their release in social life and to improve them to a better level. However, there is not enough research on this subject in Turkey, and when the studies are examined. it is seen that it is not done. It is insufficient. The main purpose of the research is that the exercise of female prisoners. It is the investigation of its effect on the levels. The forward-looking aim of the study is to develop institutional and individual recommendations to improve the health level of imprisoned women and to create data for future studies.

MATERIALS AND METHODS

Research model

This analysis of the study was made on quantitative data. One of the experimental models, the "one group pre-test-post-test model," semi-experimental was used in the study. The research was carried out in 2019 and was carried out in Nevşehir Type E Closed Penitentiary Institution. The dependent variables of the research are height, body weight, body mass index, hopelessness level, happiness level, psychological resilience, and anxiety level, and the independent variable of the research is an 8-week Pilates exercise.

Research population and sample

The research was carried out in 2019, and the population of the research consists of 16 women who are detained and convicted in Nevşehir E Type Closed Penitentiary Institution. While choosing the research group, convenience sampling was preferred among non-random sampling methods. In this way, it is aimed to overcome the existing limitations in terms of time, money, and labour. Only convicted and detained women who agreed to participate in the study on a voluntary basis were included in the sample. It was ensured that 16 women in the sample filled out the personal information form and scales completely. Sample selection was made by the pilates instructor herself.

Data collection tools

In this section, as a data collection tool, personal information form, BMI measurement form, Beck hopelessness scale, Oxford happiness scale, Psychological resilience scale, and State-trait anxiety scale were used.

Personal information form

The personal information form was prepared by the researcher and aimed to collect information about the individuals constituting the research group. In the personal information form, information related to the age, place of birth, educational status, marital status, number of children, occupation, income status, total punishment duration, anthropometric measurement values, disease status, drug use, smoking, psychological disorders, how often they exercise and the type of sport that is being exercised has been obtained.

BMI measurements

Circumference-Diameter measurements were calculated by measuring the height, body weight, body mass index (BMI), neck, waist, and hip of the participants before and after the exercise program.

After these two measurements were made, the body mass index was calculated. Body mass index was calculated by dividing body weight by the square of height in meters (BMI = kg/m^2).

Beck hopelessness scale

The Cronbach alpha reliability coefficient was reported as 0.85 in the Turkish adaptation of the Beck Hopelessness Scale (BHS), which is developed by Beck et al. (1974) (Seber et al., 1993). In this study, Beck Depression Scale (BDI), Beck (1961) developed by, consisting of 21 items; it is a self-assessment type scale. emotional, cognitive and measures motivational symptoms. Each item's behavioral trait associated with depression was determined. Items 0 to 3 ranked according to the severity of the depression. The purpose of the scale is not to diagnose depression, it is to objectively quantify the degree of symptoms. The validity and reliability of the scale studies have shown high values (Teğin, 1980). The internal consistency reliability of the scale was found as 0.617. Negative expectations of the participants in BHS and the degree of hopelessness for the future have been evaluated over the answers given as "Yes - No," consisting of 20 items. BHS scores range from 0 to 20 in total, considering the reverse-scored items (1, 3, 5, 6, 8, 10, 13, 15, 19). A high score indicates a high degree of hopelessness or negative expectations for the future. For easier interpretation of the BHS scores, researchers suggest levels of hopelessness by categorizing it into score ranges as for the 0-3 interval as "normal range," 4-8 interval for "mild hopelessness," 9-14 interval for "moderate hopelessness" 14-20 interval for "severe hopelessness" (Tanaka et al., 1998).

Oxford happiness scale short form (OHS-SF)

The Oxford Happiness Inventory (OHI), prepared by Hills and Argyle (1989), was revised in 2002, and the 8-item Oxford Happiness Scale (OME) was developed in a 6-point Likert type. The internal consistency reliability Cronbach alpha coefficient of the scale was found as 0.92. In Turkish adaptation studies of the scale, a single-factor structure with a self-value of 2.782 and explaining 39.74% of the total variance was obtained as a result of the factor analysis, and the reliability Cronbach alpha coefficient was found as 0.74 (Doğan and Çötok, 2016). In this study, the internal consistency reliability Cronbach alpha coefficient of the scale was found as 0.738. In the Turkish adaptation of OHS-SF, the participants were evaluated on a 5-point Likert-type scale consisting of 7 items and varying between "I do not agree at all (1)" and "I completely agree (5)". OHQ-SF scores range from 7 to

35, considering the reverse-scored items (1, 7). A high score indicates that the person's level of happiness is high (Doğan and Çötok, 2016).

Brief psychological resilience scale (BPRS)

In the Turkish adaptation studies of the Brief Psychological Resilience Scale (PSS) developed by Smith et al. (2008), a single-factor structure that explains 54.66% of the total variance was obtained according to the factor analysis, and the reliability coefficient was reported as 0.83 (Doğan, 2015). In this study, the internal consistency reliability Cronbach alpha coefficient of the scale was found as 0.717. The psychological resilience levels of the BPRS participants were evaluated on a 5-point Likert-type scale consisting of 6 items and ranging from "Not Suitable (1)" to "Completely Suitable (5)". BPRS scores range from 6 to 30, considering the reverse-scored items (2, 4, and 6). A high score indicates that the individual's psychological resilience level is high (Doğan, 2015). Firstly, Bruce W. Smith was contacted for the Turkish translations of the KPSÖ and the necessary permissions were obtained. The translation process into Turkish was done. These resulting translations were reviewed and expressed in the best way. Obtained Turkish forms were viewed before It was translated back into its original language, English, by two translations that have not yet seen it. The implementation of accepting equivalent to the Turkish form was started. After the research-related training, the students are given face-to-face training. In the analysis of the data, exploratory and confirmatory factor analysis, internal perspective, test repetition test reliability and criterion-related validity were used. SPSS 15 and Lisrel were carried out with 8.7 programs.

State-trait anxiety scale

The adaptation and standardization of the scale to Turkish was made by Necla Öner and Ayhan Le Compte. The state-trait anxiety scale is a Likert-style scale consisting of 40 items, 20 for the state anxiety scale and 20 for the trait anxiety scale. The Alpha reliability coefficient for the state anxiety scale is between 0.94 and 0.96, and the Alpha reliability coefficient for the trait anxiety scale is between 0.83 and 0.87. In this study, the internal consistency reliability Cronbach alpha coefficient of the scale was found as 0.867. There are straight and inverted items on the scale. Straight items indicate a negative state, and reversed items indicate a positive state. There are 10 reversed items on the state anxiety scale. These are 1st, 2nd, 5th, 8th, 10th, 11th, 15th, 16th, 19th and 20th items. On the other hand, there are 7 on the trait anxiety scale. These are the 21st, 26th, 27th, 30th, 33rd, 36th and 39th items. The total score obtained from each scale is between 20 and 80 points. The higher the score indicates, the higher the anxiety level (Öner, 2012).

Data collection

Before starting the research, consent was obtained from the Scientific Research and Publication Ethics Committee of the Cappadocia University for conducting the study code: 295333901-903.07.01-15069. The study was carried out in 2019, and it was applied on the voluntary basis of detained and convicted women in Nevşehir E Type Closed Penitentiary Institution. Before applying the measurement tool, validity and reliability were ensured. Individuals were given both verbal and written information for the study, and the participants who wanted to participate voluntarily were asked to sign the ethical consent forms. However, questions were asked by the researcher for the illiterate individuals who voluntarily wanted to participate in the study, and a 30-minute period was allowed for the other participants to fill in the scales.

Data analysis

The normality test was examined by applying the Kolmogorov-Smirnov Test to the happiness, psychological resilience, hopelessness, and anxiety scores of the Pilates exercise applied to female convicts in prison. Evaluating the normality of distributions and homogeneity of variances, it was concluded that the distributions exhibit parametric properties. According to this, the scores of VAI, FCI and ANXI, BHS, OHQ-SF and SPSS showed normal distribution ($P > 0.05$). The differences between the variables of the group of the participants were tested using the one-way analysis of variance (One Way ANOVA) method, and in-group paired comparisons of significant differences were made with the Turkey test. Among the participants, Hopelessness, Happiness, and Psychological Resilience and Anxiety variables were compared using an independent single sample test (T-test). Pearson Correlation analysis was used to examine the relationship between continuous variables. SPSS 24.0 statistics package program was used for data analysis. The statistical significance level was accepted as 0.05.

FINDINGS

The participants' demographic information is primarily included in this section, where the data related to the research are expressed (Table 1).

The ages of convicted women in prison who participated in the study ranged from 25 to 47, and the average age of the participants was 35. The women

participating in the research have an average of 2 children. The height of the women participating in the research varies between 150 and 170 cm, and the average height of the participants is 161 cm.

As shown in Table 2, 68.8% of the participants who participated in the study were born in the province, and 31.3% were born in the district. While 18.8% of the participants participating in the research are illiterate, 63% of them are literate. 25% of the participants are primary school graduates, 12.5% are middle school graduates, and 37.5% are high school graduates. 43.8% of the women participating in the study are single, and 43.8% are married. Also, 2 persons did not state their marital status. 87.5% of the women participating in the study have children. 6.3% of the participants participating in the study have a bad income, 68.8% have a medium-income, and 25% have a good income. 50% of the women participating in the research are convicts, 43.8% are detainees, and 6.3% are life sentence convicts.

When the disease status of the women participating in the study was examined, it was found that 56.3% were physically sick. In addition, 62.5% of the participants stated that they used medication. When the drugs they use were examined, it was stated that dyderal, secida, topamax, glyphosphen, gurufen, insulin, kepro, travozol, asthma, heart pill, and stomach medicines were used for sedatives, diabetes, asthma, heart, and allergy diseases. When the mental illness was examined, it was found that 6.3% of the participants had a psychological illness, and this psychological illness was determined as a panic attack. 81.3% of the participants smoke and 12.5% of them consume alcohol. It was determined that 68.8% of convicted women in prison do sports occasionally, 12.5% do sports every day, and 18.8% do not do any sports at all. It has been observed that convicted women in prison were mostly doing jogging, squatting, Pilates, and walking.

Comparison of pre-test and post-test in anthropometric measurement values

To compare the pre-test and post-test values in terms of anthropometric measurement values of the exercise program applied to the women participating in the study, t-test statistics were applied. The results obtained as a result of the analysis are shown in Table 3.

When the anthropometric measurement values were examined, the pre-test average body weight of the participants was 71.40 kg, while the post-test body weight decreased to 69.67 kg. While the pre-test average BMI value of the participants was calculated as 27.55, it is seen that the post-test BMI value decreased to 26.87. While the pre-test average waist circumference of the participants was 93.40 cm, it was observed that the post-test waist circumference decreased to 91.73 cm. While the pre-test average hip circumference of the participants was 106.90 cm, the post-test waist circumference decreased to 103.80 cm. While the pre-test average neck circumference of the participants was calculated as 39.20 cm, the post-test neck circumference was measured as 39.20 cm, and it was observed that there was no change.

As a result of the analysis, it is seen that there is no significant difference between the anthropometric measurement values of the participants before and after exercise ($p > 0.05$). It can be said that although the Pilates exercise program applied to the convicted women participating in the study caused a decrease in the anthropometric measurement values, the exercise program applied was not effective enough to create a significant difference in the decrease in the anthropometric measurement values.

Comparison of pretest and posttest of participants in scales

T-test statistics were applied to determine whether there was a significant difference between the pre-test and post-test in terms of SAI, TAI and ANXIETY, BHS, OHQ-SF, and BPRS scores with the Pilates exercise program applied to the convicted women participating in the study. The results obtained as a result of the analysis are shown in Table 4.

As seen in Table 4, while the participants' pre-test average score of SAI was 48.1250, the average post-test score of SAI increased to 48.6875. While the participants' pre-test average score of TAI was 51.6875, the post-test average score of the TAI decreased to 49.75. While the pre-test anxiety average score of the participants was 99.8125, the anxiety post-test average score decreased to 98.4375. While the pre-test average BHS score of the participants was 35.8750, the BHS post-test average score increased to 36.8125. While the average pre-test score of OHQ-SF of the participants was 25.4375, the average score of the OHQ-SF post-test increased to 26. While the pre-test BPRS average score of the participants was 20.3750, the BPRS post-test average score increased to 21.8125.

It is observed that there is no significant difference between pre-exercise and post-exercise scores of Pilates exercise applied to female convicts in prison in terms of SAI, TAI and ANXIETY, BHS, OHQ-SF and BPRS ($p > 0.05$).

With the Pilates exercise program applied to convicted women participating in the study, trait anxiety scores decrease, general anxiety scores decrease, happiness levels increase, and psychological resilience levels increase. However, it can be said that the applied exercise program was not effective enough to create a significant difference in the changes in the values of SAI, TAI and ANXIETY, BHS, OHQ-SF and BPRS.

Table 1. Distribution of participants according to continuous independent variables.

Independent variables	Number (N)	Average	SD	Min.	Max.
Age	16	35.13	6.936	25	47
Number of children	16	2.06	1.413	0	4
Height	15	161.00	4.785	150	170

Table 2. Distribution of the participants according to demographic characteristics.

Independent variables	Number (N)	Percentage (%)
Place of birth		
Province	11	68.8
District	5	31.3
Educational status		
Illiterate	3	18.8
Literate	1	6.3
Primary school	4	25.0
Middle School	2	12.5
High school	6	37.5
Marital status		
Single	7	43.8
The married	7	43.8
Unanswered	2	12.5
Having children status		
Yes	14	87.5
No	2	12.5
Number of children		
0	2	12.5
1	5	31.3
2	3	18.8
3	2	12.5
4	4	25.0
Profession		
Chef	2	12.5
Farm owner	1	6.3
Handicrafts	1	6.3
Housewife	9	56.3
House cleaning / Servant	2	12.6
Unanswered	1	6.3
Income status		
Bad	1	6.3
Middle	11	68.8
Good	4	25.0
Penalty status		
Convict	8	50.0
Prisoner	7	43.8
Life Sentence	1	6.3
Total	16	100.0

Table 3. Anthropometric measurement values of the participants.

Variables	Testler	Particiapnts (n:32)			
		$\bar{X}$	SD	T test	P
Body weight (kg)	Pre-Test Post-Test	71.40 69.67	15.633 15.403	0.306	0.762
BMI (kg/m^2)	Pre-Test Post-Test	27.5509 26.8706	5.85495 5.73176	0.322	0.750
Waist circumference (cm)	Pre-Test Post-Test	93.40 91.73	15.357 14.878	0.302	0.765
Hip circumference (cm)	Pre-Test Post-Test	106.93 103.80	13.941 12.295	0.653	0.519
Neck circumference (cm)	Pre-Test Post-Test	39.20 39.20	4.724 2.808	0.000	1.000

P < 0.05; $\bar{X}$: Average; SD: Standard Deviation.

Table 4. Participants' SAI, TAI and ANXIETY, BHS, OHQ-SF and BPRS measurement values.

Variables	Test	Participants (n:32)			
		$\bar{X}$	SD	T-Test	P
State Anxiety Inventory (SAI)	Pre-Test Post-Test	48.1250 48.6875	7.57958 6.97346	-0.218	0.829
Trait Anxiety Scale (TAI)	Pre-Test Post-Test	51.6875 49.7500	8.85226 6.81665	0.694	0.493
Anxiety Scale	Pre-Test Post-Test	99.8125 98.4375	13.52636 11.95530	0.305	0.763
Beck Hopelessness Scale (BHS)	Pre-Test Post-Test	35.8750 36.8125	2.39096 1.47054	-1.336	0.192
Oxford Happiness Scale Short Form (OHQ-SF)	Pre-Test Post-Test	25.4375 26.0000	5.36617 7.69415	-0.240	0.812
Brief Psychological Resilience Scale (BPRS)	Pre-Test Post-Test	20.3750 21.8125	3.94757 5.58831	-0.840	0.407

*P < 0.05; $\bar{X}$: Average; SD: Standard Deviation.

Comparison of participants' scales and independent variables

Because the study's independent variables which include the place of birth (Province, District), marital status (single, married), having a child status, having illness and psychological illness, drug use, smoking, alcohol consumption status (yes, no) and the scales have two variables and are normally distributed, t-test statistics were applied. Since income status, duration of punishment, and the frequency of doing sports have more than 2 variables, ANOVA analysis was performed, and Tukey test was conducted for in-group paired comparisons of significant differences.

It has been determined that whether the convicted women participating in the study were born in the

province or the district, their marital status, whether they have children, their sickness status, drug use, smoking, and alcohol use are not effective to create a significant difference in the values of SAI, TAI and ANXIETY, BHS, OHQ-SF, and BPRS. A significant correlation was found between some dependent variables of the study and the state of punishment, psychological illness, and the frequency of doing sports. Findings regarding these are shown in Table 5.

As shown in Table 5, no significant difference was found between the levels of SAI, BHS, OHQ-SF, and BPRS depending on the punishment status of women in prison.

According to their punishment status, a statistically significant difference was found in the trait anxiety scores and general anxiety scores of the women participating in the study. It was observed that the trait anxiety scores of women with a convicted sentence period were higher than women with a term of detention. Similarly, it was observed that the total anxiety scores of the women with a sentence period of convict were higher than the women with a term of detention (Table 6).

Convicted women who participated in the study had lower state anxiety scores, lower trait anxiety scores, lower general anxiety scores, higher levels of hopelessness, lower happiness, and higher psychological resilience than those without psychological disorders. It was observed that the psychological disorders of the participants were not effective enough to create a significant difference in the changes in the values of SAI, TAI and ANXIETY, OHQ-SF and BPRS. It has been determined that the psychological disorders of convicted women in prison have only an effect on their level of hopelessness.

According to Anova results, no significant difference was found between the levels of SAI, TAI, ANXIETY and BPRS, according to the frequency of doing sports in prison women.

A statistically significant difference was found in the hopelessness and happiness scores of the women in prison who participated in the study, according to the frequency of doing sports. It was observed that the hopelessness scores of women who did not do sports at all were higher than those who did an exercise once in a while or every day. It was observed that the happiness scores of women who did not do sports at all were lower than those who did an exercise once in a while or every day. It was determined that the hopelessness levels of women who do sports are statistically significantly lower, and their happiness levels are higher than the others.

Table 5. Results of variance analysis (ANOVA) applied to scales based on punishment situation.

Scale		Sum of squares	S.D.	Average squares	F	P	Post Hoc (Tukey HSD) analysis results
	Between Groups	285.790	2	142.895	3.168	.057	
SAI	Within Groups	1307.929	29	45.101			NS
	Total	1593.719	31				
	Between Groups	528.254	2	264.127	5.574	.009*	
TAI	Within Groups	1374.214	29	47.387			Convict>Detainee
	Total	1902.469	31				
	Between Groups	1557.643	2	778.821	6.750	.004*	
ANIEXTY	Within Groups	3345.857	29	115.374			Convict>Detainee
	Total	4903.500	31				
	Between Groups	6.067	2	3.033	.738	.487	
BHS	Within Groups	119.152	29	4.109			NS
	Total	125.219	31				
	Between Groups	119.817	2	59.908	1.445	.252	
OHS	Within Groups	1202.652	29	41.471			NS
	Total	1322.469	31				
	Between Groups	45.924	2	22.962	.990	.384	
BPRS	Within Groups	672.795	29	23.200			NS
	Total	718.719	31				

*P<0.05; NS: Not Significant.

Table 6. Measurement Values of SAI, TAI and ANXIETY, BHS, OHQ-SF, and BPRS, according to the psychological disease status of the participants.

Variables	Psychological disorder status	Participants (n:16)			
		$\bar{X}$	SD	T-Test	P
State Anxiety Inventory (SAI)	Yes	43.6667	15.04438	-1.148	0.260
	No	48.5357	5.96584		
Trait Anxiety Scale (TAI)	Yes	44.3333	10.96966	-1.481	0.149
	No	51.3571	7.51894		
Anxiety Scale	Yes	88.0000	26.00000	-1.594	0.122
	No	99.8929	10.58069		
Beck Hopelessness Scale (BHS)	Yes	38.3333	.57735	4.387	0.020*
	No	36.1071	2.02465		
Oxford Happiness Scale Short Form (OHQ-SF)	Yes	25.6667	8.32666	-0.038	0.970
	No	25.8214	6.59996		
Brief Psychological Resilience Scale (BPRS)	Yes	23.0000	6.08276	0.777	0.443
	No	20.7143	4.73644		

*P < 0.05; $\bar{X}$: Average; SS: Standard Deviation.

While a statistically significant relationship was found between the anthropometric measurement values among themselves, there was no statistically significant relationship between the participants' SAI, TAI, ANXIETY, BHS, OHQ, and BPRS scores and their anthropometric measurement values.

It can be said that the age of the participants, the number of children they have, and the anthropometric measurement values do not affect the anxiety, hopelessness, happiness, and psychological resilience levels of the women in prison.

DISCUSSION

The findings of our study show that more than half of the convicted women (56.3%). In addition, 62.5% of the participants stated that they used medication. When we look at the types of diseases, it is seen that stomach problems, diabetes, asthma, heart, and allergy diseases come to the fore. When the psychological illness was examined, it was found that 6.3% of the participants had a psychological illness, and this psychological illness was determined as a panic attack.

The findings of our study on the illness and psychological disorders of female prisoners are in line with the results of the studies in the literature. Keaveny and Zauszniewski (1999) reported that female prisoners experience depression and anxiety well above the population average.

It was observed that the mental problems of female prisoners were 5 to 10 times higher than the general average of society. When convicted women in European countries were examined, psychotic problems of women were reported as 5%, and depression or anxiety disorders were reported as 25%. According to the results of a study conducted on female prisoners in Australia, the most common ailments in women were psychiatric disorders, including substance abuse, depression, anxiety, personality disorders, and schizophrenia (Lewis and Hayes, 1997).

In our study, it was determined that 81.3% of the participants smoke, and 12.5% of them consume alcohol. In the study of Young et al. (2005), it was determined that the smoking rate of female prisoners was very high, such as 82.9%. The findings of the study on substance use are in line with the results of previous studies.

As a result of the analysis, it is seen that there is no significant difference as a result of the comparison of the anthropometric measurement values of the participants before and after the exercise. Although the Pilates exercise program applied to the convicted women participating in the study caused a decrease in the anthropometric measurement values, it is understood that the decrease was not effective enough to create a significant difference.

In the literature, a decrease was observed in the anthropometric measurement values of the prisoners who were applied for an exercise program. In a study investigating the effect of exercise on body mass index on male prisoners, it was found that while there was a decrease in body mass index (BMI) values of prisoners

who were subjected to an intense exercise program, there was no change in the control group.

The literature findings reveal the positive effect of exercise on individuals' physical and mental health and show that these effects are also valid for female prisoners. Based on the idea that exercise is determinative on the psychological perception of prisoners in the prison environment, it was aimed to determine the effect of the positive effects of exercise on this sample group.

With the Pilates exercise program applied to the convicted women participating in the study, state anxiety scores, beck hopelessness scores, happiness levels, and psychological resilience increase, while trait anxiety scores and general anxiety scores decrease. The results of the research reveal that although the exercise program applied causes positive changes, this effect is not statistically significant. Although the positive effect of the applied exercise program on female prisoners was not statistically significant, it can be said that it has an important effect on the prisoner women.

Although the findings of the study point out results in the same direction as the studies in the literature, they do not provide strong support in terms of statistics. Many studies have shown that exercise has positive effects on both physical and psychological disorders in the literature. It has been reported that exercise reduces depression and anxiety and supports psychological well-being (Bataglia et al., 2015), has a positive effect on increasing self-esteem and decreasing loneliness (Başaran, 2016), and has a positive effect on prisoners' health and behaviour (Gallant, 2015), increases mental and physical health of prisoners and has a greater effect on mental health, especially of substance addicts (Ghanbarzadeh and Mohamadi, 2012). Those who exercised showed significantly lower levels of depression, stress, and anxiety, and hopelessness (Cashin et al., 2008) compared to other prisoners. These results showed that exercise is an effective strategy in dealing with imprisonment (Buckaloo et al., 2009).

In addition, in a study that reached similar results to our study, it was observed that prisoners who exercise have reported lower levels of depression and anxiety, and their psychological well-being levels have increased. However, these differences were not statistically significant (Enez Darcin, 2016).

It is considered that the lack of meaningful results of the research may be related to the small sample size and some unique characteristics of the group. There are many different difficulties encountered in prison life, and the psychology of prisoners is negatively affected by these stimuli. Further studies with broader participation in which these stimuli are detected and controlled will be able to produce more precise results.

The study observed that the trait anxiety scores and the total anxiety scores of convicted women were higher than those of the detainee women. Considering that a certain period should pass before women are convicted, this period may have enabled them to adapt to prison conditions and not feel the same level of distress. Studies show that as the staying duration of convicts in prison increases, their depression and anxiety levels decrease. On the other hand, considering that uncertainties cause people to experience more psychological distress and whether or not to be sentenced to prisoners and the duration of the punishment creates uncertainty and increases their anxiety levels. The elimination of these uncertainties for convicted women may have reduced the level of anxiety. A final sentence period may have resulted in the psychological preparation of the prisoners according to this period and conditions, and as a result, the level of anxiety decreased.

According to the research findings, the psychological distress of convicted women in prison affects their level of hopelessness. It was determined that prisoners who reported that they are having psychological illness had higher levels of hopelessness.

In the study, it was observed that the hopelessness scores of women who did not do sports at all were higher than those who did sports once in a while or every day. It has been observed that the happiness scores of women who do not do sports at all are lower than those who do sports once in a while or every day. In other words, it has been determined that the hopelessness level of the convicted women who do sports is low, and their level of happiness is high.

The lower levels of hopelessness and higher levels of happiness among prisoners who reported doing sports confirms the previous research findings. Numerous studies have found that sports reduce depression and anxiety (Cashin et al., 2008) and turn mood into positive, supports psychological well-being (Bataglia et al., 2015), has a positive effect on the health and behaviour of prisoners (Gallant, 2015), and increases the mental and physical health of prisoners (Ghanbarzadeh and Mohamadi, 2012).

While statistically significant relationship was found between the anthropometric measurement values among themselves, there was no statistically significant relationship between the participants' SAI, TAI, ANXIETY, BHS, OHQ, and BPRS scores and their anthropometric measurement values.

Conclusion

The results of the study showed that supervised physical activity partially improved the BMI values, anxiety, happiness, hopelessness, and psychological health levels of female prisoners, but these results were not statistically supported. The improved health status of prisoners is expected to reduce the use of medicines and medical aid in prison and to result in a significant reduction in public expenditure. In addition, physical activity can be a useful solution for the use of leisure time, which is a serious problem in prison. It is known that

prisoners experience many health problems due to a sedentary lifestyle and malnutrition. It seems that quite easily applicable and low-cost exercise programs effectively eliminate these problems and improve the mental and physical health of prisoners.

For this reason, it is considered that conducting future studies on a larger sample group, controlling the factors arising from prison conditions, and using research models aimed at directly determining the effects of exercise on prisoner health will contribute to the expansion of scientific knowledge in the field.

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