Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XXVI, ISSUE 1, 2026, Romania
The journal is indexed in: ERIH PLUS, Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST, DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XXVI, ISSUE 1, 2026
January 2026, 26 (1): 28-38
Original article: https://www.doi.org/10.61801/OUA.2026.1.06

EFFECTS OF A 10-WEEK AEROBIC EXERCISE ON WEIGHT LOSS, PERFECTIONISM AND PSYCHOLOGICAL WELL-BEING IN OBESE INDIVIDUALS

CINAR YASIR[1], UNVANLI YASIN[2]

Abstract

Aim. The aim of this study was to facilitate weight loss among high school students with obesity through aerobic exercise and to examine this process in relation to various variables. Furthermore, the study sought to determine whether there was a significant difference between the levels of physical perfectionism and psychological well-being of obese students who participated in an aerobic exercise program (experimental group) and those who did not (control group).

Methods. A total of 20 high school students voluntarily participated in the study, including 6 males and 4 females in the experimental group and 6 males and 4 females in the control group. The research employed a pre-test–post-test experimental design with a control group, which is one of the quantitative research methods. Through this experimental method, the effects of the independent variable (aerobic exercise) on the dependent variables (physical perfectionism, psychological well-being, body mass index, time spent in physical activity, and time spent playing digital games) were analyzed using pre-test and post-test measures via the SPSS 26.0 software.

Results. The normality analysis indicated that the distribution was normal. To identify differences between the experimental and control groups, Independent Samples t-tests were conducted; Cohen's d was calculated to determine effect size, and Pearson correlation analysis was employed to examine relationships between the variables. The pre-test and post-test comparisons revealed that while the experimental and control groups exhibited similar characteristics in the pre-test, significant differences in favor of the experimental group emerged in the post-test following the implementation of the exercise program.

Conclusions. After the 10-week intervention, students who participated in aerobic exercise activities showed negative outcomes in concern over imperfection, but positive outcomes in hope for perfection and psychological well-being when compared to the control group.

Keywords: Obesity, aerobic exercise, lose weight, psychological well-being.

Introduction

The World Health Organization (WHO) defines obesity as the abnormal or excessive accumulation of fat in the body, adversely affecting health. This chronic condition arises from an imbalance between energy intake and expenditure, leading to an increase in body fat mass compared to lean body mass (WHO, 2025). Additionally, obesity is recognized as a multifactorial syndrome involving social, biochemical, metabolic, physiological, psychological, and anatomical factors (Finkelstein et al., 2012).

According to WHO (2021), global obesity prevalence has nearly tripled since 1975, with over 1.9 billion adults aged 18 and above identified as overweight and over 650 million individuals classified as obese in 2016. This corresponds to 39% of adults being overweight and 13% falling into the obese category (Okunogbe, Nugent, Spencer, Ralston & Wilding 2021). The Economic Cooperation and Development (OECD) report of 2019 reveals that the United States has one of the highest obesity prevalence among adults (37.3%), projected to reach 47% by 2030, surpassing other countries. In Türkiye, the obesity rate among adults is reported as 33% (OECD, 2019).

Obesity and overweight are primarily attributed to an imbalance between calorie intake and expenditure. Global factors such as increased consumption of high-fat and high-sugar foods, sedentary lifestyles due to technological advancements, changes in transportation, and urbanization contribute to the reduction in physical activity (WHO, 2025). Moreover, age, race, smoking, gender, and genetic factors are also associated with the development of obesity (Owen, Healy, Matthews & Dunstan, 2010; Schuch et al., 2017). Obesity, a significant public health problem, is influenced by biological, psychosomatic, and environmental factors (Resch, Haasz & Sido, 1998). Beyond medical complications such as diabetes and hypertension, obesity in individuals is associated with depression and psychological disorders, often overlooked and underestimated. Meta-analyses demonstrate a positive relationship between obesity and depression, indicating a higher tendency for obesity in individuals with depression (de Wit et al., 2010; Johnson et al., 2013).

Obesity has become a global health concern, with rising prevalence and associated risks for various chronic conditions. Addressing obesity requires a multifaceted approach, including lifestyle interventions such as physical activity. Aerobic exercise has been identified as an effective component in weight management and overall health improvement. The daily

[1] (PhD candidate) Physical Education and Sports Teaching Department, Graduated School of Education Sciences, Gazi University., Ankara, Gazi Üniversitesi Rektörlüğü Tarihi Bina, 06500, Teknikokullar, Ankara., Türkiye;

[2] (Lecturer, PhD) Sivas Police Vocational School, Turkish National Police Academy., Polis Akademisi Başkanlığı Eymir Mahallesi, Cemil Yıldırım Caddesi, No:27/40, 06834, Gölbaşı, Ankara., Türkiye; Corresponding author: yasinunvanli@gmail.com.

energy consumption of individuals has been decreasing annually. In countries where obesity is prevalent, insufficient physical activity and exercise are identified as the primary causes of being overweight (Akkurt, 2012). Being overweight can lead to the development of obesity, which is a significant health concern in both developed and developing nations. Obesity is the excessive increase in the ratio of body fat mass to lean mass, resulting in body weight above the desired level according to height (HSGM, 2023). The number of calories taken in is greater than the number of calories burned during the day, leading to weight gain in the human body. To maintain a healthy body, improve quality of life, and burn fat, it is recommended that individuals incorporate low-intensity and long-term exercises into their lifestyle (Bloom, Fields, McGrath & Draper 2018). Aerobic exercises, which involve working large muscle groups, increase the amount of oxygen consumed (Howley, 2001), thereby raising heart rate and energy expenditure (Booth & Thomason, 1991; Sundell, 2011). Examples of aerobic exercises include walking, cycling, slow dancing, jogging or running at different paces, rowing, swimming, skating, tennis, basketball, soccer, hiking, and skiing. Regular aerobic exercise is expected to result in physical changes in the body, which in turn are anticipated to enhance an individual's self-esteem.

Physical activity is defined as all bodily movements involving skeletal muscles resulting in energy expenditure, including walking, cycling, sports, recreational activities, and games (Garber et al., 2011). Despite technological advancements improving various aspects of life, they have led to an increase in sedentary behavior (SB) (Proper, Singh, Van Mechelen & Chinapaw, 2011). The 2013 Türkiye Chronic Diseases and Risk Factors Frequency Study reports that only 13% of women in Türkiye engage in sufficient physical activity (Unal, Ergor, Dinc-Horasan, Kalaca & Sozmen 2013). Increased sedentary behavior is associated with various health problems, including metabolic syndrome, stress, and depression (Nam et al., 2017). SB is now recognized as a significant determinant of health, independent of physical activity levels. SB is defined as any waking behavior characterized by an energy expenditure (≤1.5) metabolic equivalent task (MET) while sitting, reclining, or lying down (Tremblay et al., 2017). Numerous studies have shown that sedentary behavior is a crucial factor in all-cause mortality, emphasizing the need for public health programs to focus not only on increasing physical activity but also reducing sitting time (Paffenbarger, Hyde, Wing & Hsieh, 1986; Lee, Hsieh & Paffenbarger, 1995; van der Ploeg, Chey, Korda, Banks & Bauman 2012).

In this context, perfectionism may play a role in shaping individuals' engagement in physical activity or sedentary behaviors, as the pursuit of high personal standards can influence their motivation to maintain an active lifestyle. The concept of perfectionism is defined as an individual's constant setting of high standards in their life, the worry about being flawless, and the continuous concern about the criticism from people around them (Flett & Hewitt, 2002). People may strive for perfectionism in both psychological and physical aspects. It is expected that feeling good physically can also influence one's psychological well-being (Yalcin & Ayhan, 2020). Furthermore, having positive feelings about one's body is considered important for the development of personal identity and self-confidence (Stoeber & Stoeber, 2009).

Given this connection between physical self-perceptions and psychological outcomes, it is essential to consider how psychological well-being is in interaction with self-confidence in shaping individuals' behaviors and social experiences. Psychological well-being is closely related to experiencing positive emotions (Antaramian, Huebner, Hills & Valois 2010). Being in a state of positive emotions psychologically has a favorable impact on an individual's self-confidence (Kurtuldu, 2007). Individuals who feel a lack of self-confidence often experience anxiety about entering social environments and fear constant criticism. Psychological well-being and physical self-admiration are closely linked to self-confidence (Kirk, 2012).

A review of the literature reveals several studies examining the effects of aerobic exercise on variables such as quality of life, respiratory function and aerobic capacity, exercise capacity, and psychological well-being (Baskilic, 2016; Camcioglu, 2017; Isleyen, 2018). Although these studies are thematically similar to the present research, they differ in terms of their sample groups. While the Physical Perfectionism Scale and the Psychological Well-Being Scale used in this study have been widely applied in previous research, no study was found that employed these instruments within a pre-test–post-test experimental design involving overweight students. This gap suggests that the current study may contribute to the literature in terms of its originality.

Objectives

The aim of the present study is to investigate the effects of a 10-week aerobic exercise program on physical perfectionism and psychological well-being in obese individuals and to compare the findings with a control group using various variables.

Methods

This study employed a pre-test–post-test control group experimental design, one of the quantitative research methods. Quantitative research requires researchers to identify the research problem, formulate hypotheses regarding the relationships among variables, and test these hypotheses using statistical procedures (Golafshani, 2003). The pre-test–post-test control group design is considered one of the most robust approaches for assessing the effects of an intervention. In this design, at least two groups are formed: the experimental group, which receives the intervention, and the control group, which does not (Stanley & Campbell, 1963; Creswell, 2017). By comparing the pre-test and post-test scores of

both groups, the differential impact of the intervention can be evaluated, allowing causal inferences to be drawn regarding its effectiveness (Gurbuz & Sahin, 2004).

Participants

The study group consisted of 20 high school students enrolled in a High School during the 2022–2023 academic year. The experimental group included 6 male and 4 female students, while the control group comprised 6 male and 4 female students. Initially, it was planned to assign all obese students to the experimental group; however, due to various reasons, some students did not participate in the intervention. These students were therefore allocated to the control group. Accordingly, the participants were selected through a convenience sampling method, and group assignment was carried out using a non-randomized design based on students' voluntary participation in the intervention.

Table 1. Descriptive statistics for pre- and post-test scores of experimental and control groups

Variables	Groups		Pretest		Posttest	
		N	X	Sd	X	Sd
Age	Experimental	10	15.9	1.52	15.9	1.52
	Control	10	15.5	1.08	15.5	1.08
Height (cm)	Experimental	10	172.2	8.36	172.2	8.36
	Control	10	168.6	8.54	168.6	8.54
Weight (kg)	Experimental	10	97.5	9.23	86.8	7.45
	Control	10	90.9	15.62	92.5	15.21
BMI	Experimental	10	32.95	3.2	29.34	2.7
	Control	10	31.76	2.83	32.32	2.61
Duration of Participation in Daily Physical Activity (Hours)	Experimental	10	42	18.59	133.5	27.69
	Control	10	39	12.43	27.5	13.38
Daily Digital Game Playing Time (Hours)	Experimental	10	129.5	39.05	71.5	25.61
	Control	10	129	52.96	139	67.9

Table 1 presents the number of participants, mean, and standard deviation scores for the pre- and post-tests of the experimental and control groups.

Data collection process and tools

At the high school where the research was conducted, a total of 696 students are enrolled. To identify overweight students, the research team consulted with the Physical Education and Sports Department and reviewed the school's Physical Fitness Report. Through this process, 28 obese students with a body mass index (BMI) of +30 were identified. Following interviews with the participants, 10 obese students voluntarily agreed to participate in the study, while 18 students declined due to various reasons. The 10 volunteer students formed the experimental group. Out of the 18 students who did not wish to participate in the intervention program, 10 volunteered to be part of the control group. The sampling method used here is purposive sampling, combined with voluntary response sampling for selecting participants.

Initially, both the experimental and control groups were administered the Physical Perfectionism Scale (Kolsallayan & Kazak, 2021) and the Psychological Well-being Scale (Telef, 2013). The experimental group underwent an intervention program for 10 weeks, while the control group did not receive any intervention.

During the research process, to ensure regular monitoring of the students' physical characteristics, consultations were held with a dietitian and a physiotherapist from the municipal health center in the city where the study was conducted. Through the dietitian, objective measurements such as height, weight, and body mass index were obtained weekly. Additionally, weekly meetings with the dietitian and physiotherapist were arranged for the participants to maintain high levels of motivation.

The experimental group underwent an exercise program three days a week, with each session lasting an average of 70 minutes. Height and weight measurements were taken weekly with the assistance of a dietitian and physiotherapist. The exercise sessions included: the first 10 minutes for warm-up, 50 minutes for a general program consisting of endurance, strengthening exercises, and aerobic exercises (25 minutes of abs, leg, and hip exercises, 25 minutes of equipment exercises with small weights, walking, and cycling), and the final 10 minutes for cool-down and relaxation exercises.

Personal information form

The form created by the researchers includes information on age, gender, daily physical activity duration, and daily digital game playing time.

Physical appearance perfectionism scale

The adaptation of the Physical Appearance Perfectionism Scale (PAPS) developed by Yang and Stoeber (2012) into Turkish was conducted by Kolsallayan and Kazak (2021). Eight studies were carried out to assess the validity and

reliability of the scale, administered to a total of 2316 students. The scale comprises two subscales: Worry About Imperfection (WAI) (Cronbach's alpha .88) and Hope for Perfection (HFP) (Cronbach's alpha .84). The two-dimensional structure was confirmed through exploratory and confirmatory factor analyses. The two factors demonstrated a positive correlation (r=.20, p<.05). At the end of the factor analysis procedures, it was revealed that the total explained variance was 40.6%. The factor loadings of items in the PAPS scale ranged from .53 to .87. Additionally, according to the test-retest reliability of the Physical Appearance Perfectionism test, there was a high level of positive and significant relationship (r=.86, p<.001). Furthermore, the sub-dimensions of the Physical Appearance Perfectionism scale, namely Fear of Flaws and Hope for Perfection, also exhibited high levels of positive and significant relationship according to the test-retest reliability (r=.82, r=.80, p<.001). The items of Physical Appearance Perfectionism are responded to on a 1-5 scale ranging from 'Strongly Disagree' to 'Strongly Agree' (Yang & Stoeber, 2012).

Psychological well-being scale

The Psychological Well-Being scale (PWS), complementing existing measures of well-being, was developed by Diener, Scollon and Lucas (2009) to assess socio-psychological well-being. The adaptation of the PWS into Turkish was carried out by Telef (2013). The total explained variance was found to be 42% according to the results of exploratory factor analysis. The factor loadings of items ranged from .54 to .76. The PWS was found to be significantly associated with autonomy (.30), environmental mastery (.38), personal growth (.29), self-acceptance (.53), positive relations with others (.29), purpose in life (.56), and overall psychological well-being (.56), which are subscales of the Psychological Well-Being scale. Additionally, significant associations were found between autonomy (.30), relatedness (.57), competence (.69), and total need satisfaction (.73), which are subscales of the Need Satisfaction Scale. The Cronbach's alpha coefficient for internal consistency reliability was calculated as .80. According to the results of the test-retest analysis, there was a high and significant positive relationship between the first and second administrations of the scale (r=.86; p<.001). The item-total correlations of the PWS ranged from .41 to .63, and the t-values were found to be significant (p<.001). Responses to PWS items are rated on a scale from 'Strongly Disagree' (1) to 'Strongly Agree' (7). All items are positively stated. Scores on the scale range from 8 to 56, indicating the individual's access to various psychological resources and influences.

Data analysis

The data collected within the scope of the study were initially transferred to Microsoft Excel. After necessary adjustments and data cleaning, the dataset was prepared and subsequently imported into SPSS 26 for statistical analysis. First, the normality of the data distribution was tested. Based on the skewness and kurtosis values, the variables were found to conform to a normal distribution (see Table 2; Table 3). To determine whether there were significant differences between the experimental and control groups, Independent Samples T-Test analyses were conducted. In addition, effect sizes for the significant differences were calculated using Cohen's d. According to Cohen (1988), effect sizes are interpreted as small (d = 0.20), medium (d = 0.50), and large (d = 0.80). To examine the relationships among the study variables (daily physical activity duration, body mass index [BMI], daily digital gaming time, worry about imperfection, hope for perfection, and psychological well-being), Pearson correlation analysis was performed.

Results

Table 2. Descriptive and normality statistics for scales – pre-test

Scales	Groups	n	$\overline{X}$	Sd	Skewness	Kurtosis
WAI	Experimental	10	31.5	2.99	1.3	-1.39
	Control	10	26.6	4.62	.37	-1.05
HFP	Experimental	10	8.1	1.85	.44	-.41
	Control	10	10.1	1.79	.97	.998
PWB	Experimental	10	25.4	4.35	1.12	.29
	Control	10	27.1	3.45	.55	.22

WAI: Worry About Imperfection; HFP: Hope for Perfection; PWB: Psychological Well-being; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation

Table 2 displays the skewness and kurtosis values obtained from the normality test for the pre-test scores of the scales. The skewness values ranged from 0.44 to 1.30, while the kurtosis values ranged from –1.39 to .998. Considering the relevant references, it was determined that the data fell within the range specified by Tabachnick and Fidell (2013) (–1.5 to +1.5), indicating a normal distribution.

Table 3. Descriptive and normality statistics for scales – post-test

Scales	Groups	n	$\overline{X}$	Sd	Skewness	Kurtosis
WAI	Experimental	10	15.3	3.94	1.85	1.13
	Control	10	30.4	2.87	1.86	-1.20
HFP	Experimental	10	203	2.11	.90	-.76
	Control	10	8.7	1.57	-.07	-.03
PWB	Experimental	10	47.2	2.39	1.70	-1.45
	Control	10	22.3	4.88	.21	.77

WAI: Worry About Imperfection; HFP: Hope for Perfection; PWB: Psychological Well-being; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation

Table 3 presents the skewness and kurtosis values obtained from the normality test for the post-test scores of the scales. The skewness values ranged from –.07 to 1.86, while the kurtosis values ranged from –1.45 to 1.13. Based on the relevant references, the data were found to fall within the acceptable range defined by Tabachnick and Fidell (2013) (–1.5 to +1.5), suggesting a normal distribution.

Table 4. Independent samples t-test for pre-test scores by groups

Scales	Groups	n	$\overline{X}$	Sd	t	p
WAI	Experimental	10	31.5	2.99	2.814	.11
	Control	10	26.6	4.62		
HFP	Experimental	10	8.1	1.85	-2.454	.25
	Control	10	10.1	1.79		
PWB	Experimental	10	25.4	4.35	-.968	.34
	Control	10	27.1	3.45		

WAI: Worry About Imperfection; HFP: Hope for Perfection; PWB: Psychological Well-being; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation; t: t-value; p: Reliability level

Table 4 shows the pre-test comparisons of the concern over mistakes, hope for perfection, and psychological well-being scales between the experimental and control groups. No statistically significant differences were observed in the mean scores for any of the variables ($p > .05$).

Table 5. Independent samples t-test for post-test scores by groups

Scales	Groups	n	$\overline{X}$	Sd	t	p	Cohen d
WAI	Experimental	10	15.3	3.94	-9.78	.000*	.43
	Control	10	30.4	2.87			
HFP	Experimental	10	20.3	2.11	13.954	,000*	.62
	Control	10	8.7	1.57			
PWB	Experimental	10	47.2	2.39	14.492	.000*	.64
	Control	10	22.3	4.88			

WAI: Worry About Imperfection; HFP: Hope for Perfection; PWB: Psychological Well-being; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation; t: t-value; p: Reliability level; *p<.001

Table 5 presents the post-test comparisons of the concern over mistakes, hope for perfection, and psychological well-being scores between the experimental and control groups. Statistically significant differences in favor of the experimental group were found for all three scales ($p < .001$). The effect sizes for these differences were small for concern over mistakes (Cohen's $d = .43$), moderate for hope for perfection (Cohen's $d = .62$), and psychological well-being (Cohen's $d = .64$).

Table 6. Independent samples t-test for pre-test BMI, physical activity, and digital game time by group

Variables	Groups	n	$\overline{X}$	Sd	t	p
BMI	Experimental	10	32.94	32.20	.882	.38
	Control	10	31.75	2.83		
Duration of Participation in Daily Physical Activity (min)	Experimental	10	42.0	18.5	.424	.67
	Control	10	39.0	12.4		
Daily Digital Game Playing Time (min)	Experimental	10	129.5	39.04	.024	.98
	Control	10	129.0	52.95		

BMI; Body Mass Index; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation; t: t-value; p: Reliability level

Table 6 displays the pre-test comparisons of body mass index (BMI), daily physical activity duration, and daily digital game playing time between the experimental and control groups. No statistically significant differences were found for any of these variables ($p > .05$).

Table 7. Independent samples t-test for post-test BMI, physical activity, and digital game time by group

Variables	Groups	n	$\overline{X}$	Sd	t	p	Cohen d
BMI	Experimental	10	29.34	2.7	-2.51	.022*	1.60
	Control	10	32.32	2.61			
Duration of Participation in Daily Physical Activity (min)	Experimental	10	133.5	27.69	10.9	.000**	1.48
	Control	10	27.5	13.38			
Daily Digital Game Playing Time (min)	Experimental	10	71.5	25.61	-2.94	.009***	.38
	Control	10	139	67.90			

BMI: Body Mass Index; n: Sample size; $\overline{X}$: Mean; Sd: Standard Deviation; t: t-value; p: Reliability level *p<.05; **p<.001; ***p<.01

Table 7 shows the post-test comparisons of BMI, daily physical activity duration, and daily digital game playing time between the experimental and control groups. Significant differences were found in favor of the control group for BMI ($p < .05$) and daily digital game playing time ($p < .001$), and in favor of the experimental group for daily physical activity duration ($p < .001$). The effect sizes were large for BMI (Cohen's $d = 1.60$) and daily physical activity duration (Cohen's $d = 1.48$), and small for psychological well-being (Cohen's $d = .38$).

Table 8. Correlation analysis – experimental Group (Post-Test)

Post-Test	n	1	2	3	4	5	6
1- Duration of Participation in Daily Physical Activity	10	1					
2- BMI	10	-.44	1				
3- Daily Digital Game Playing Time	10	.12	.43	1			
4- WAI	10	-.54	.59	.31	1		
5- HFP	10	.68**	-.76**	-.17	-.85**	1	
6- PWS	10	.62	-.65**	-.18	-.92*	.89**	1

BMI: Body Mass Index; WAI: Worry About Imperfection; HFP: Hope for Perfection; PWB: Psychological Well-being; n: Sample size; *p<.001; **p<.05

As shown in Table 8, following the post-test in the experimental group, a moderate positive correlation was found between the HFP and daily physical activity duration ($r = .68$, $p < .05$). A strong negative correlation was found between hope for perfection and BMI ($r = –.76$, $p < .05$). PWS were moderately and negatively correlated with BMI ($r = –.65$, $p < .05$). Hope for perfection scores were strongly and negatively correlated with concern over mistakes scores ($r = –.85$, $p < .05$). PWS were strongly and negatively correlated with WAI ($r = –.92$, $p < .001$). Finally, PWS were strongly and positively correlated with HFP ($r = .89$, $p < .05$).

Discussions

According to the pre-test findings presented in Table 4, no significant differences were observed in the mean scores of the Worry About Imperfection (WAI), Hope for Perfection (HFP), and Psychological Well-being Scale (PWS) between the experimental and control groups. However, the post-test results (Table 5) indicated significant differences in favor of the experimental group, specifically in the subdimensions of worry about imperfection, hope for perfection, and psychological well-being. These results suggest that aerobic exercise positively influenced participants' levels of worry about imperfection, enhanced their hope for perfection, and improved their overall psychological well-being. The pre–post-test comparison further revealed that weight loss achieved by the experimental group contributed to a reduction in their worry about imperfection, likely by decreasing negative perceptions of physical flaws. This finding aligns with Hicks et al. (2003), who reported that regular physical activity provides important benefits for both physical and psychological well-being. Similarly, the observed increase in hope for perfection among participants may be interpreted as an indication that aerobic exercise fostered positive self-perceptions and future-oriented motivation.

An enhanced sense of physical self-acceptance appears to have translated into improved psychological well-being, as demonstrated by the higher PWS scores of the experimental group compared to the control group. This result is consistent with Kolsallayan (2017), who found that exercise participation significantly affects both physical appearance perfectionism and psychological well-being. Likewise, Akbulut (2011) reported that regular and long-term aerobic exercise leads to positive changes in body composition, which may reduce body dissatisfaction and, in turn, promote psychological health. The present findings are also supported by Basar (2018), who conducted a controlled experimental study and showed that individuals engaging in regular exercise reported higher levels of psychological well-being compared to non-exercisers. Similarly, Kusan (2017) demonstrated significant reductions in body mass index following structured exercise interventions, indicating that improvements in physical health markers can contribute to psychological gains. Beyond these studies, recent research has reinforced the idea that exercise-induced improvements in body image are closely linked to reductions in maladaptive perfectionism and enhanced well-being (Chang, Pan & Shu, 2018; Vicent Sanmartín, Gonzálvez, Vásconez-Rubio & García-Fernández 2021).

As shown in Table 6, no significant differences were observed between the experimental and control groups in terms of body mass index (BMI), daily physical activity duration, and daily digital gaming time at the pre-test stage. However, the post-test results presented in Table 7 indicated significant differences: BMI decreased significantly in favor of the experimental group, daily physical activity duration increased significantly in favor of the experimental group, and daily digital gaming time decreased significantly in favor of the experimental group when compared with the control group. These findings suggest that participation in aerobic exercise was associated with improvements in BMI and a shift toward more active lifestyle behaviors. The significant reduction in BMI among participants in the experimental group reflects the effectiveness of aerobic exercise in supporting physical health outcomes. This result is consistent with previous findings. For example, Szmedra, Lemura, and Shearn (1998) reported significant reductions in BMI following a 6-week treadmill exercise intervention, while Amano, Kanda and Maritani (2001) found that 12 weeks of aerobic exercise (three sessions per week, 30 minutes per session) produced meaningful decreases in BMI among obese men and women. Similarly, systematic reviews indicate that exercise interventions, particularly those combining aerobic components, are effective in reducing BMI and body fat percentage in overweight and obese individuals (Shaw, Gennat, O'Rourke & Del Mar, 2006; Swift, Johannsen, Lavie, Earnest & Church 2013).

The increase in daily physical activity duration observed in the experimental group may be attributed to the structure of the program, which incorporated regular aerobic exercise sessions. This suggests that structured exercise interventions not only promote immediate physical activity but may also foster more active lifestyle habits, contributing to sustained behavioral change. This aligns with research emphasizing that participation in exercise interventions can enhance intrinsic motivation for physical activity, leading to long-term adherence and positive health outcomes (Deci & Ryan, 2000; Teixeira, Carraça, Markland, Silva & Ryan 2012). Furthermore, while no significant differences were observed between groups in daily digital gaming time at the pre-test, the post-test results revealed a significant reduction for the experimental group compared to controls. This indicates that engaging in regular aerobic exercise may substitute sedentary behaviors, particularly screen-based activities such as digital gaming. Tekkursun Demir and Cicioglu (2019) similarly found that higher motivation for physical activity participation was associated with lower motivation for digital gaming among high school students. This substitution effect highlights the broader psychosocial benefits of structured physical activity, reducing sedentary habits that are often associated with obesity and poorer psychological health outcomes (Przybylski, 2014).

The Pearson correlation analysis conducted for the post-test results of the experimental group (Table 8) revealed several noteworthy relationships among the study variables. First, a positive correlation was found between daily physical activity duration and the HFP subdimension. This indicates that as participants increased their engagement in physical activity, their sense of hope for perfection also increased. Considering the well-documented benefits of physical activity for health (Warburton, Nicol & Bredin, 2006; Dhuli et al., 2022), this finding is meaningful. Regular physical activity contributes to greater strength, flexibility, and fitness, which may enhance individuals' confidence in their ability to improve their physical appearance and, consequently, foster more adaptive perfectionistic beliefs (Vicent et al., 2021).

A second important finding was the negative correlation between BMI and HFP. This suggests that increases in BMI were associated with decreases in hope for perfection. Since weight gain and rising BMI are often linked to perceived physical deterioration (Segal & Gunturu, 2024), individuals who experience such changes may be less optimistic about attaining their desired physical ideals. This result is consistent with research demonstrating the adverse psychological effects of increased BMI, including diminished self-perception and self-esteem (Atlantis & Baker, 2008). These results are supported by previous studies in the literature. Karacam and Pulur (2019) reported significant differences between physical well-being and BMI, confirming the negative implications of higher BMI for physical and psychological health. Similarly, Kusan (2017), in a study involving obese children aged 13–15, found a negative relationship between BMI and psychological well-being after a 12-week exercise program, reinforcing the conclusion that reductions in BMI are associated with improvements in body image and mental health. More broadly, recent research underscores the mediating role of body image in the relationship between physical activity and psychological outcomes, showing that improvements in fitness and reductions in body fat can buffer against the harmful psychological effects of high BMI (Mond, van den Berg, Boutelle, Hannan, & Neumark-Sztainer, 2011; Vani, Murray & Sabiston, 2021).

Another notable finding of the correlation analysis was the strong positive relationship between psychological well-being and HFP. This highlights the close connection between individuals' belief in their capacity to achieve goals and their psychological resilience. Individuals with higher levels of psychological well-being are more likely to perceive themselves as capable and determined, while those with lower psychological strength may struggle to maintain motivation and perseverance across different areas of life.

Conclusions

When the pre-test results of the experimental and control groups were compared, the groups were found to have largely similar characteristics, with some results even favoring the control group. However, following the 10-week aerobic exercise intervention, the post-test outcomes demonstrated significant improvements in favor of the experimental group. Specifically, the post-test revealed significant differences favoring the experimental group in the mean scores of worry about imperfection, hope for perfection, and psychological well-being. Furthermore, during the intervention process, aerobic exercise activities were shown to positively influence body mass index (BMI), daily physical activity duration, and daily digital gaming time, with all outcomes favoring the experimental group. These findings indicate the effectiveness of low-intensity, long-duration aerobic exercises in promoting both physical and psychological improvements among obese individuals. The consistent progression of the experimental group from pre-test to post-test underscores the cumulative benefits of structured exercise programs. Taken together, the findings of this study suggest that aerobic exercise not only contributes to physical health by facilitating weight loss but also reduces maladaptive perfectionistic concerns and strengthens psychological well-being. These outcomes highlight the multidimensional benefits of aerobic exercise and support its use as a non-pharmacological intervention for improving both mental and physical health in obese individuals.

Recommendations

In this study, the aerobic exercise interventions produced the expected outcomes in the pre-test and post-test results. It is considered that experimental studies examining aerobic exercise in relation to different variables would be beneficial. The present research did not address the issue of causality in relation to weight gain among obese individuals. Conducting a qualitative study on the causality of weight gain is expected to contribute to the literature. Furthermore, high school students were selected as the sample group in this study. Future research is recommended to examine the effects of aerobic exercise on physical appearance perfectionism and psychological well-being in different populations and to compare the findings with those of existing studies.

References

Akbulut, E. (2011). *The effects of aerobic exercises on body composition and blood lipids in sedentary women* (Master's Thesis, Selçuk University, Türkiye).

Akkurt, S. (2012). Obesity and exercise treatment. *Turkish Journal of Sport Medicine, 47*(4), 123-130.

Amano, M., Kanda, T., & Maritani, T. (2001). Exercise training and autonomic nervous system activity in obese individuals. *Medicine Science in Sports Exercise*, *33*(8), 1287–1291.

Antaramian, S. P., Huebner, E. S., Hills, K. J., & Valois, R. F. (2010). A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning. *Am J Orthopsychiat, 80*(4), 462-472.

Atlantis, E., & Baker, M. (2008). Obesity effects on depression: systematic review of epidemiological studies. *Int J Obes (Lond), 32*(6), 881-91. doi: 10.1038/ijo.2008.54. PMID: 18414420.

Basar, S. (2018). The effect of regular exercise on depression, happiness and mental well-being. *Inonu University, Journal of Physical Education and Sport Sciences (IUJPESS), 5*(3), 25-34.

Baskilic, H. R. (2016). *The effect of exercise on body composition and life quality of obese individuals* (Master's Thesis, Gaziantep University, Türkiye).

Bloom, O. J., Fields, K. B., McGrath, T. M., & Draper, T. R. (2018). Exercise prescription and physiology. *Netter's Sports Medicine, 17*, 117-123.

Booth, F. W. & Thomason, D. B. (1991). Molecular and cellular adaptation of muscle in response to exercise: perspectives of various models. *Physiol Rev*, *71*, 541–85.

Camcioglu, B. (2017). *Effects of upper extremity aerobic exercise training on functional exercise capacity in patients with pulmonary arterial hypertension (*Master's thesis, Gazi University, Türkiye).

Chang, C. C., Pan, M. C., & Shu, S. T. (2018). Relationship between self-presentation, exercise dependence, and perceived body image. *International Journal of Sport and Exercise Psychology*, *17*(6), 617–629. https://doi.org/10.1080/1612197X.2018.1444078.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J. W. (2017). *Karma yöntem araştırmalarına* giriş (Trans. Edt. M. Sozbilir). Ankara: Pegem Academy.

de Wit, L., Luppino, F., van Straten, A., Penninx, B., Zitman, F., & Cuijpers, P. (2010). Depression and obesity: a meta-analysis of community-based studies. *Psychiatry Research*, *178*(2), 230-235, https://doi.org/10.1016/j.psychres.2009.04.015.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268.

Diener, E., Scollon, C. N. & Lucas, R. E. (2009). The evolving concept of subjective well-being: the multifaceted nature of happiness. In: Diener, E. (Ed), *Assessing Well-Being. Social Indicators Research Series, vol 39* (pp. 67-100). Dordrecht: Springer. https://doi.org/10.1007/978-90-481-2354-4_4.

Dhuli, K., Naureen, Z., Medori, M. C., Fioretti, F., Caruso, P., Perrone, M. A., Nodari, S., Manganotti, P., Xhufi, S., Bushati, M., Bozo, D., Connelly, S. T., Herbst, K. L., & Bertelli, M. (2022). Physical activity for health. *J Prev Med Hyg*, *17*(63), E150-E159. doi: 10.15167/2421-4248/jpmh2022.63.2S3.2756. PMID: 36479484.

Finkelstein, E. A., Khavjou, O. A., Thompson, H., Trogdon, J. G., Pan, L., Sherry, B., & Dietz, W. (2012). Obesity and severe obesity forecasts through 2030. *Am J Prev Med.*, *42*(6), 563-70. doi: 10.1016/j.amepre.2011.10.026. PMID: 22608371.

Flett, G. L., & Hewitt, P. L. (2002). Perfectionism and maladjustment: An overview of theoretical, definitional, and treatment issues. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 5–31). American Psychological Association. https://doi.org/10.1037/10458-001.

Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I.-M., Nieman, D. C., & Swain, D. P. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine & Science in Sports & Exercise*, *43*(7), 1334-1359. https://doi.org/10.1249/MSS.0b013e318213fefb.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report, 8*(4), 597-606.

Gurbuz, S., & Sahin, F. (2014). *Sosyal bilimlerde araştırma yöntemleri, felsefe-yöntem-analiz (2nd ed.).* Ankara: Seckin Publication.

Hicks, A. L., Martin, K. A., Ditor, D. S., Latimer, A. E., Craven, C., Bugaresti, J., & McCartney, N. (2003). Long-term exercise training in persons with spinal cord injury: effects on strength, arm ergometry performance and psychological well-being. *Spinal cord, 41*(1), 34-43.

Howley, E. T. (2001). Type of activity: resistance, aerobic and leisure versus occupational physical activity. *Med Sci Sports Exerc, 33*, 364–9.

HSGM. (2023). *Obezite Nedir?* Retrieved from https://hsgm.saglik.gov.tr/tr/obezite.

Isleyen, G. (2018). *The effect of aerobic exercise on pulmonary function and aerobic capacity in sedentary men* (Master's thesis, Gaziantep University, Türkiye).

Johnson, C. L., Paulose-Ram, R., Ogden, C. L., Carroll, M. D., Kruszan-Moran, D., Dohrmann, S. M., & Curtin, L. R. (2013). *National health and nutrition examination survey. Analytic guidelines 1999-2010*. 2(161). National Center for Health Statistics. Vital Health Stat 2(161). Washington, DC.

Karacam, A., & Pulur, A. (2019). Academic optimism, psychological well-being and physical self-esteem as a predictor of success perceptions of physical education teachers. *Kastamonu Education Journal, 27*(1), 209-218. DOI: 10.24106/kefdergi.2474

Kirk, D. (2012). Empowering girls and women through physical education and sport. *UNESCO: United Nations Educational, Scientific and Cultural Organisation.* Retrieved from https://coilink.org/20.500.12592/m08982.

Kolsallayan, A. (2017). *Effects of the exercise participants physical appearance perfectionism ve psychological well-being levels on exercise participation motivation.* (Master's Thesis, Ege University, Türkiye).

Kolsallayan, A., & Kazak, Z. (2021). The physical appearance perfectionism scale: a psychometric evaluation for Turkish exercise participants. *Turkiye Klinikleri Journal of Sports Sciences, 13*(2), 201-2O8.

Kurtuldu, P. S. (2007). *The relationship between self-confidence and leadership levels of primary school managers*. (Master's Thesis, Yeditepe University, Türkiye).

Kusan, O. (2017). *Body image perception and psychological well-being levels of 13-15 years old obese boys after 12 weeks of physical activity* (Doctoral Thesis, Dumlupınar University, Türkiye).

Lee, I. M., Hsieh, C. C., & Paffenbarger, R. S. (1995). Exercise intensity and longevity in men: the Harvard alumni health study. *Jama*, *273*(15), 1179-1184.

Mond, J., van den Berg, P., Boutelle, K., Hannan, P., & Neumark-Sztainer, D. (2011). Obesity, body dissatisfaction, and emotional well-being in early and late adolescence: findings from the project EAT study. *J Adolesc Health*, *48*(4), 373-8. doi: 10.1016/j.jadohealth.2010.07.022. PMID: 21402266.

Nam, J. Y., Kim, J., Cho, K. H., Choi, J., Shin, J, & Park, E-C. (2017). The impact of sitting time and physical activity on major depressive disorder in South Korean adults: a cross-sectional study. *BMC Psychiatry*, *17*(274). https://doi.org/10.1186/s12888-017-1439-3.

OECD. (2019). *The heavy burden of obesity: the economics of prevention, OECD Health Policy Studies*. Paris: OECD Publishing. https://doi.org/10.1787/67450d67-en.

Okunogbe, A., Nugent, R., Spencer, G., Ralston, J., & Wilding, J. (2021). Economic impacts of overweight and obesity: current and future estimates for eight countries. *BMJ Global Health*, *6*(10). https://doi.org/10.1136/bmjgh-2021-006351.

Owen, N., Healy, G. N., Matthews, C. E., and Dunstan, D. W. (2010). Too much sitting: The population health science of sedentary behavior. *Exercise and Sport Sciences Reviews*, *38*(3), 105-113. https://doi.org/10.1097/JES.0b013e3181e373a2.

Paffenbarger, R. S., Hyde, R. T., Wing, A. L., & Hsieh, C. C. (1986). "Physical activity, all cause mortality, and longevity of college alumni." *New England Journal of Medicine*, *324*(10), 605–613.

Proper, K. I., Singh, A. S., Van Mechelen, W., & Chinapaw, M. J. M. (2011). Sedentary behaviors and health outcomes among adults. *American Journal of Preventive Medicine*, *40*(2), 174-182. https://doi.org/10.1016/j.amepre.2010.10.015.

Przybylski, A. K. (2014). Electronic gaming and psychosocial adjustment. *Pediatrics*, *134*(3): e716-22. doi: 10.1542/peds.2013-4021. PMID: 25092934.

Resch, M., Haász, P., & Sidó, Z. (1998). Obesity as psychosomatic disease. *European Psychiatry*, *13*(4). doi:10.1016/S0924-9338(99)80652-X.

Schuch, F., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P., Reichert, T., Bagatini, N. C., Bgeginski, R., & Stubbs, B. (2017). Physical activity and sedentary behavior in people with major depressive disorder: a systematic review and meta-analysis. *Journal of Affective Disorders*, *210*, 139-150. https://doi.org/10.1016/j.jad.2016.10.050.

Segal, Y., & Gunturu, S. (2024). *Psychological issues associated with obesity*. In: StatPearls. Treasure Island (FL): StatPearls Publishing. PMID: 38753901.

Shaw, K., Gennat, H., O'Rourke, P., & Del Mar, C. (2006). Exercise for overweight or obesity. *Cochrane Database Syst Rev*, *18*(4). doi: 10.1002/14651858.CD003817.pub3. PMID: 17054187.

Stanley, J. C., & Campbell, D. T. (1963). *Experimental and quasi-experimental designs for research.* Chicago: R. McNally.

Stoeber, J., & Stoeber, F. S. (2009). Domains of perfectionism: prevalence and relationships with perfectionism, gender, age, and satisfaction with life. *Personality and Individual Differences*, *46*(4), 530.

Sundell, J. (2011). Resistance training is an effective tool against metabolic and frailty syndromes. *Adv Prev Med*, 984683. doi:10.4061/2011/984683.

Szmedra, L., Lemura, L. M., & Shearn, W. M. (1998). Exercise Tolerance, body composition and blood lipids in obese African–American woman following short–term training. *The Journal of Sports Medicine and Physical Fitness*, *38*, 59–65.

Swift, D. L., Johannsen, N. M., Lavie, C. J., Earnest, C. P., & Church, T. S. (2013). The role of exercise and physical activity in weight loss and maintenance. *Prog Cardiovasc Dis.*, *56*(4), 441-7. doi: 10.1016/j.pcad.2013.09.012. PMID: 24438736.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics (sixth ed.).* Boston: Pearson.

Tekkursun Demir, G., & Cicioglu, H. I. (2019). The relationship between motivation for physical activity participation and motivation for digital gaming. *Spormetre*, *17*(3), 23-34. DOI: 10.33689/spormetre.522609.

Telef, B. B. (2013). The adaptation of psychological well-being into Turkish: a validity and reliability study. *Hacettepe University Journal of Education*, *28*(3), 374-384.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. *Int J Behav Nutr Phys Act*, *9*(78). https://doi.org/10.1186/1479-5868-9-78.

Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., Chastin, S. F. M., Altenburg, T. M. and Chinapaw, M. J. M. (2017). Sedentary behavior research network (SBRN) – Terminology consensus project process and outcome. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 75. https://doi.org/10.1186/s12966-017-0525-8.

Unal, B., Ergor, G., Dinc-Horasan, G., Kalaca, S., & Sozmen, K. (2013). *Chronic diseases and risk factors survey in Turkey.* Ankara: Anıl Publication.

Van der Ploeg, H. P., Chey, T., Korda, R. J., Banks, E., & Bauman, A. (2012). Sitting time and all-cause mortality risk in 222497 Australian adults. *Archives of internal medicine*, *172*(6), 494-500.

Vani, M.F., Murray, R.M., & Sabiston, C.M. (2021). Body image and physical activity. In Z. Zenko & L. Jones (Eds.), *Essentials of exercise and sport psychology* (pp. 150–175). Society for Transparency, Openness, and Replication in Kinesiology. https://doi.org/10.51224/B1000.

Vicent, M., Sanmartín, R., Gonzálvez, C., Vásconez-Rubio, O., & García-Fernández, J. M. (2021). Perfectionism, motives, and barriers to exercise from a person-oriented approach. *International Journal of Environmental Research and Public Health*, *18*(15), 8125. https://doi.org/10.3390/ijerph18158125.

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*, *174*(6), 801-809; DOI: https://doi.org/10.1503/cmaj.051351.

WHO. (2021). Obesity. Retrieved from https://www.who.int/news-room/facts-in-pictures/detail/6-facts-on-obesity.

WHO. (2025). Obesity and overweight. Retrieved from https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight.

Yalcin, I., & Ayhan, C. (2020). The effect of physical appearance perfectionism and psychological well-being on self-confidence in women participating in sportive recreational activities. *Spormetre*, *18*(1), 205-212.

Yang, H., & Stoeber, J. (2012). The physical appearance perfectionism scale: development and preliminary validation. *Journal of Psychopathology and Behavioral Assessment*, *34*(1), 69-83.