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The Effect of Pilates Exercises on Health Beliefs Attitudes, Body Image and Body Composition in Sedentary Women

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ABSTRACT

The aim of this research is to examine the effects of pilates exercises on health beliefs, attitudes towards exercise, body image perception and body composition in sedentary individuals. The sample of the study consisted of 30 female participants (n=30) between the ages of 24-55 (24/55=34.83±8.91). Sample size was determined by G-power analysis. Participants were given 1-hour reformer pilates group exercises 3 times a week for a total of 12 weeks. Health Beliefs Models Scale Towards Exercise (HBM) and Body Image Scale (BIS) were used. Tanita and tape measure were used for body and girth measurements. Nonparametric Wilcoxon rank signs and Kruskal-Wallis tests were used to determine significant differences. To test correlational hypotheses, Spearman correlation analysis was used to determine strong or weak relationships between variables. In the study, .05 was determined as the limit value for significance.In the research findings, it is seen that there is a significant difference in the fat percentage of the participants before and after pilates training (z=-4.623, p<.001). HBM scale health development sub-dimension scores before pilates training [x^2 (sd= 4, n=30) = 6.770, p>05] and after [x^2 (sd= 4, n=30) = 3.190, p>05] did not show any significant difference. Between BIS and educational status, the participants' BIS scores before the training [x^2 (sd= 4, n=30) = 4.133, p>05] and after [x^2 (sd= 4, n=30) = 4.607, p>05] depended on their educational status. did not show any significant difference. When the correlation results were examined, it was seen that there was no significant relationship between the last measurements of the participants' fat percentage and the scale scores (p>.05). As a result, it was determined that the participants in the study had improvements in their variables as a result of 12 weeks of pilates exercises.

Keywords: Body composition, body image, health beliefs, pilates, sedentary individuals

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INTRODUCTION

Today, the fast pace and advanced opportunities of modern life lead individuals to sedentary lifestyles and trigger physical health problems. As sedentaries, these individuals often fail to perform adequate physical activity in their daily lives and maintain healthy educational qualifications. Sedentary lifestyle has become a global health problem. According to the World Health Organization's "Physical Activity and Sedentary Life Guide" reports, a sedentary lifestyle; It is an important risk factor that becomes chronic, such as obesity, type 2 diabetes, deaths from chronic diseases and some types of cancer. The importance of this regular, regular physical activity becomes even more evident. Sedentary is a serious risk factor that can pave the way for psychological and social health problems as well as chronic diseases (İlhan, 2010). At this point, it is accepted that regular exercise is a basic element of a healthy lifestyle and pilates exercises can be recommended for all these purposes. It is a good type of exercise. Pilates exercises are an effective exercise method that has increased in popularity in recent years and can provide a number of benefits both mentally and physically (Bulut, 2013).

Pilates exercises are an exercise method developed by Joseph Pilates and designed to improve body mechanics, gain flexibility and strengthen muscles. It is defined as a mind-body exercise that requires core stability, strength and flexibility, and pays attention to muscle control, posture and breathing. These exercises aim to increase the stabilization of the transversus abdominus, multifidus, diaphragm and pelvic floor muscles, known as the core muscles, and strengthen these muscles, to lengthen and stretch the lumbar spine muscles, thus reducing the weight on the joints and the tilt in the pelvis (Gladwell et al., 2006) Joseph H. Pilates used this method to heal the bodies of German soldiers and those injured in sports performed mainly by men, such as self-defense, boxing and wrestling. However, today Pilates exercises are more of a way to treat chronic waist and pelvic girdle pain and are an exercise only for women. However, Pilates is recommended for both men and women to improve core stability and especially control the core-pelvic floor muscles.

It is thought that Pilates can positively affect physical and mental health in sedentary individuals. However, a comprehensive and detailed research on the effects of Pilates exercises on health belief models, body image and body composition in sedentary individuals is limited in the literature. Considering the limited number of studies examining the relationship between sedentary, body image and exercise-related health beliefs in more depth, it can be said that this research will help provide new perspectives to improve the quality of life of sedentary individuals.

At the center of this research is the interaction of pilates exercises with health beliefs, attitudes, body image and body composition in sedentary individuals. This research, which aims to determine the potential benefits of regular pilates exercise while raising awareness about the health risks caused by sedentary lifestyle, addresses the role of pilates as an effective intervention against health problems caused by a sedentary lifestyle.

For this purpose, participants' health beliefs, body image and body composition evaluations regarding exercise will be compared before and after the study. Evaluating the potential positive effects of pilates exercises on sedentary individuals' health beliefs, body image perception and body composition may be an important step in improving both physical and psychological health.

MATERIALS AND METHODS

Participants and Protocol

The research is an experimental design with a pretest-posttest control group. The sample group of the research consisted of a total of 30 female volunteer participants (n=30; 24/55=average). The sample size in the research was determined by G-Power analysis. This research, as a research project of Kırıkkale University Institute of Health Sciences, was found to be in compliance with the ethical principles with the evaluation of the Non-Interventional Research Ethics Board and the board decision with the meeting date of 20.06.2023, meeting number 2023/06 and decision number 2023.06.15. Research Ethics Board and the board decision with the meeting date of 20.06.2023, meeting number 2023/06 and decision number 2023.06.15.

Data Collection Tools

The data collection tools in the study are the Health Beliefs Attitudes Scale Towards Exercise (HBM) developed by Caz and Paktaş (2023) and the Body Image Scale (BIS) developed by Secord and Jouard (1953) and adapted into Turkish by Hovardaoğlu (1993) used. Tanita and tape measure were used for body composition assessment. Weight and body fat ratio were measured with Tanita, and right arm, left arm, chest, waist, abdomen, hip, right leg and left leg circumferences were measured with a tape measure. The mentioned scales and measurements were carried out in the form of pretest-posttest. A polar watch was used to determine the heart rate intervals of the participants.

Exercise Protocol

Aerobic exercise pulse ranges were calculated individually for each participant in the study. Pilates aerobic exercises were performed at a range of 40-60% of the maximum heart rate of the exercise intensity (moderate intensity). For moderate-intensity cardiovascular exercise, it was calculated with the karvonen formula, taking into account the maximum heart rate (MHR). Karvonen formula 220 - age, Target Heart Rate = (THR-Resting Heart Rate) x (40-60%) + Resting Heart Rate (Fox, Bowers, Foss, Cerit, Yaman, 1999) was performed. The participants were given Reformer Pilates exercises in the form of group training, under supervision, 3 times a week for a total of 12 weeks. Each exercise session was planned for 1 hour. The exercise program consisted of 10 minutes of warm-up, 40 minutes of reformer exercises and 10 minutes of stretching-cooling periods. Approximately 30-40 movement flows were detected for each lesson. Exercises were performed with 8-

10 repetitions. When individuals were able to continue the series properly while maintaining their strength and alignment while performing the movements, the degree of difficulty was gradually increased (approximately every 3 weeks) and more complex and difficult movements were added to the program, which started with movements suitable for the beginner level, as experience gained.

In addition, the participants were informed about their nutrition and circadian rhythms, as well as the exercise program, in order to achieve full results in achieving their goals in exercising.

Statistical Analysis

In this research, it was aimed to obtain reliable results with meticulous steps taken during the data analysis process. IBM SPSS 26 package program was used to examine the research hypotheses and data. The normality distribution of the data was examined according to kurtosis-skewness values. ±1 was taken as the limit for kurtosis-skewness values (Büyüköztürk, 2020). When examining the normality distribution, it was seen that the data was not normally distributed. If the variables do not show a normal distribution and the number of samples is limited, it is recommended to use non-parametric tests (Büyüköztürk, 2020; Can, 2020). In this context, in this study, nonparametric Wilcoxon ordered signs and Kruskal-Wallis tests were used to determine significant differences in the context of hypotheses. To test relational hypotheses, it is necessary to determine strong or weak relationships between variables. For this purpose, relationships between variables were evaluated using Spearman correlation analysis. In the study, .05 was determined as the limit value for significance.

RESULTS

	Pretest		Posttest	
measurements	**S**	**$\bar{X}$**	**S**	**$\bar{X}$**
age	24.0	55.0	34.833	8.9137
height	153.0	180.0	163.467	6.2958
weight	7.877	65.667	6.065	61.293
Fat rate	6.451	31.053	4.732	26.377
Right arm	4.781	32.383	3.553	30.083
Left arm	4.689	31.867	3.440	29.9
chest	8.009	94.750	6.269	91.6
waist	9.532	79.983	8.503	74.417
abdomen	10.002	98.167	7.468	91.233
Right leg	7.029	60.667	5.624	57.983
Left leg	7.031	60.017	111.765	57.9
hip	11.373	105.550	7.095	98.470

Table 1. Findings of Participants' Pretest and Posttest Measurements

When **Table 1** was examined, the participants' standard deviation (S) and arithmetic mean ($\bar{X}$) scores of the measurements taken before and after the pilates training are seen.

Pretest-posttest	n	Rank average	Rank total	Z	P
Negative rank	28	14.50	406	-4.623	.000***
Positive rank	0	.00	.00		
Equel	1				

***p<.001; Based on positive ranks

Table 2. Wilcoxon Signed Rank Test Results Between Pretest-Posttest Fat Ratios

The analysis results show that there is a significant difference in the fat percentages of the participants in the study before and after pilates training (z=-4.623, p<.001). The observed difference appears to be based on positive ranks. That is, the participants' posttest fat ratio averages ($\bar{X}$= 26.377) are lower than their pretest fat ratio averages ($\bar{X}$= 31.462). Accordingly, pilates training has a significant effect on reducing the fat content of participants (Green & Salkind, 2005).

	Educational status	n	Rank average	sd	x^2	p
Health development (protest)	Primary	2	14.75	4	6.770	.149
	Secandary	7	15.21			
	High school	15	18.67			
	University	3	11			
	Post graduate	3	5.33			
Health development (posttest)	Primary	2	15.00	4	3.190	.526
	Secondary school	7	10.71			
	High school	15	17.53			
	Uviversity	3	17.67			
	Post graduate	3	14.67			

Table 3. Results of performance measures for diabetes prediction of the models

The analysis results showed that the participants in the study had scores on the HBM scale health development sub-dimension both before the pilates training [x^2 (sd= 4, n=30) = 6.770, p>05] and after [x^2 (sd= 4, n=30) = 3.190, p>05] does not show a significant difference according to educational status. According to this; The pretest and posttest scores of the participants in the health development subscale of the HBM scale do not differ according to their educational status.

	Educational status	n	Rank average	sd	x^2	P
BIS (protestt	Primary	2	24,50	4	4.133	.388
	Secondary school	7	11,57			
	High school	15	15,03			

	University	3	17,83			
	Post graduate	3	18,67			
BIS (posttest)		2	21,00	4	4.607	.330
	Primary	7	11,71			
	High school	15	14,67			
	University	3	23,17			
	Post graduate	3	17,17			

Table 4 Pretest-Posttest Kruskal-Wallis Test Results Between BIS and Educational Status

The analysis results showed that the BIS scores of the participants in the study were both before and after pilates training [χ2 (sd= 4, n=30) = 4.607, p>05.] does not show a significant difference according to educational status. According to this; Participants' BIS pretest and posttest scores do not differ according to their educational status.

variables	1	2	3	4	5
1=Fat percentage	-				
2=Health improvement subfactor	-0.009	(.931)			
3=Cognitive health subfactor	0.204	.705**	(.827)		
4=Continuity subfactor	0.163	.483**	.501**	(.910)	
5=Body image scala	0.114	-0.278	-0.170	-0.359	(.946)

**p<.01; Values in parentheses indicate Cronbach's Alpha values.

Table 5. Correlation Results for Participants' Last Measurements

The correlation results of the participants' post-test fat ratio, HBM Scale health development, cognitive health, continuity sub-factors and HBM are given in Table 5. When the table is examined, it is seen that there is no significant relationship between the last measurements of the participants' fat percentage and the scale scores (p>.05). The health development sub-dimension shows a high level positive relationship with cognitive health (r= .705, p<.01) and a moderate positive relationship with continuity (r= .483, p<.01). The cognitive health subscale shows a moderate positive relationship with the continuity subscale (r= .501, p<.01). The final measurement score of BIS does not show a relationship with other variables (p>.05). Cronbach's Alpha values show that the measurements are quite reliable (Büyüköztürk, 2020).

DISCUSSION

This research was conducted to evaluate the effects of pilates exercises on health beliefs, attitudes towards exercise, body image perception and body composition in sedentary individuals.

Participants were given Reformer Pilates exercises in the form of group training, 3 times a week for a total of 12 weeks. Each exercise session was planned for 1 hour. The exercise program consisted of 10 minutes of warm-up, 40 minutes of reformer exercises and 10 minutes of stretching-cooling periods. Pretest-posttest measurements were made for some variables; Firstly, the participants' body circumference measurements taken before and after the pilates training were examined. Then, the average fat percentage measured as pretest-posttest, the relationship between the HBM health development sub-dimension and educational status, the relationship between BIS and educational status, and the correlation results regarding the participants' last measurements were examined. It was observed whether there was a significant change in the pretest and posttest results of the measured cases.

Looking at Table 2 in line with the analysis results, the posttest fat ratios of the participants are lower than the pretest fat ratios. In other words, there is a significant difference in the fat percentage of the participants before and after pilates training ($z=-4.623$, $p<.001$). Body fat ratio is an important data in determining the health and fitness level of the individual (Kocakulak, Özdemir, 2024). Accordingly, we can conclude that pilates training has a significant effect on reducing participants' body fat levels, which is one of the components of physical fitness (Vaquero-Cristobal et al., 2015).

In Table 3, the participants' HBM performance health development sub-dimension scores are shown both before the pilates training [$\chi 2$ (sd= 4, n=30) = 6.770, p>05] and after [$\chi 2$ (sd= 4, n=30)]. = 3.190, p>05] It does not show a significant difference according to educational change. According to this; We can see that the pretest and posttest scores of the sub-dimension of HBM scale health development do not differ according to the maintenance of education (Sarıdede, 2019; Arslangörur and Çavuşoğlu, 2023).

Table 4 shows that, according to the analysis results, the participants' BIS scores between BIS and educational status both before [$\chi 2$ (sd= 4, n=30) = 4.133, p>05] and after [$\chi 2$ (df= 4, n=30) = 4.607, p>05] showed that there was no significant difference according to educational status. According to this; We conclude that the participants' BIS pretest and posttest scores do not differ according to their educational status (Karagöz and Karagün, 2015).

Table 5 shows the correlation results of the participants' post-test fat ratio, HBM health development, cognitive health, continuity sub-factors and HBM. When the table is examined, it is seen that there is no significant relationship between the last measurements of the participants' fat percentage and the scale scores ($p>.05$). The health development sub-dimension shows a high level positive relationship with cognitive health ($r= .705$, $p<.01$) and a moderate positive relationship with continuity ($r= .483$, $p<.01$). The cognitive health subscale shows a moderate positive relationship with the continuity subscale ($r= .501$, $p<.01$). The final measurement score of BIS does not show a relationship with other variables ($p>.05$). Cronbach's Alpha values show that the measurements are quite reliable (Büyüköztürk, 2020).

Küçükapan and Civan (2021) concluded in their study that Pilates exercises have a positive effect on body image.

Aladro, Gonzalvo et al. (2012) found that regular participation in an exercise training program leads to positive changes in body composition, including a decrease in body fat percentage and an increase in lean body mass, and that these changes vary in frequency, intensity, duration, etc. They found that it depends on the variables.

The final result shows that the 12-week pilates exercise in this study resulted in a significant difference in the fat ratios of the participants before and after the pilates training, and that the health development sub-dimension has a high level positive relationship with cognitive health and a moderate positive relationship with continuity. The cognitive health subscale shows a moderate positive relationship with the persistence subscale. This result shows us that Pilates exercise in all age groups supports positive changes in participants' physiological, belief and perception aspects. In this context, it can be recommended that people do aerobic pilates exercises in a certain and regular period in order to ensure positive progress in terms of their physical fitness levels and belief and perception dimensions.

CONCLUSIONS

To summarize, while Reformer Pilates workouts considerably increase physical parameters such as body fat percentage, their effect on psychological parameters such as health beliefs and body image perception appears to be limited. Thus, for physical health advantages, it is advised that Reformer Pilates be included in exercise programmes; however, for significant improvements in health beliefs and body image judgments, further or different interventions could be needed.

Author Contributions

Conceptualization, S.N.Y. methodology, S.N.Y., A.G.; formal analysis, A.G.; investigation, A.G.; data curation, S.N.Y. writing–original draft preparation, S.N.Y., A.G.; writing–review and editing, S.N.Y., A.G.

Informed Consent Statement:

The research was conducted in line with the Declaration of Helsinki.

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Conflicts of Interest:

The authors declare that no conflicts interest.

REFERENCES

Aladro-Gonzalvo, A.R., Machado-Díaz, M., Moncada-Jiménez, J., Hernández-Elizondo, J., and Araya-Vargas, G. (2012). The effect of Pilates exercises on body composition: a systematic review. Journal of bodywork and movement therapies, 16 (1), 109-114.

Arslangörur, A., & Çavuşoğlu, S. B. (2023). Examination of Communication Skills and Perceived Stress Levels of Women Practicing the Pilates Exercise Method. Çanakkale Onsekiz Mart University Journal of Sports Sciences, 6(3), 102-117.

Bulut, S. (2013). A social determinant of health; physical activity. Turkish Journal of Hygiene and Experimental Biology, 70(4), 205-214.

Büyüköztürk, Ş. (2020). Handbook of data analysis for the social sciences (28th). Pegem Academy. https://doi.org/10.145279789756802748

Can, A. (2020). Quantitative data analysis in the scientific research process with SPSS. In Pegem Citation Index (9th ed.). https://doi.org/10.14527/9786053644484

Caz, Ç., & Paktaş, Y. (2023). Validity and Reliability Study of the Health Beliefs Attitude Scale Towards Exercise. Ege University Faculty of Nursing Journal, 39(1), 115-124.

Fox, E. L., Bowers, R. W., Foss, M. L., Cerit, M., & Yaman, H. (1999). Physiological foundations of physical education and sports. Bağırgan Publishing House.

Gladwell, V., Head, S., Haggar, M., & Beneke, R. (2006). Does a program of Pilates improve chronic non-specific low back pain? Journal of sports rehabilitation, 15(4), 338-350.

Green, S., & Salkind, N. (2005). Using SPSS for Windows and Macintosh: Understanding and analyzing data. In Upper Saddle River, NJ, PrenticeHall (4th ed.).

Hovardaoğlu, S. (1993). Body perception scale. Journal of Psychiatry, Psychology, Psychopharmacology (3P), 1(1), 26.

İlhan, L. (2010). The culture of still lives and what it brings with it. Productivity journal, (3), 195-210.

Karagöz, N., & Karagün, E. (2015). A Descriptive Study on the Body Image of Professional Athletes. Sport Sciences, 10(4), 34-43.

Kocakulak, N. A., & Özdemir, N. (2024). Do Reformer Pilates Exercises Affect Body Fat Ratio?. Journal of Sport and Performance Research, 15(1), 91-101.