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THE EFFECT OF PHYSICAL ACTIVITY AND NUTRITION AWARENESS EDUCATION ON THE LEVEL OF PHYSICAL FITNESS AND NUTRITION KNOWLEDGE IN WOMEN AGED 50-60

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ABSTRACT
Purpose: The aim of this study was to examine the effect of physical activity and nutrition awareness training on the motor skills and nutrition awareness of individuals related to healthy living in sedentary women aged 50-60 years.
Material and Methods: The study included 15 healthy sedentary women on voluntary basis; participants were divided into 2 groups as experimental (n=8) and control (n=7) groups by random sampling method. Participants in the experimental group were given physical activity 2 days a week (60 min/day) for 6 weeks and nutrition education 1 day a week (30 min/day). In the training programs applied during the week, strength was applied on the first day and aerobic exercise was applied on the second day. Age-appropriate motor skill tests (arm curl test, back scratch test, two-minutes step, 8 food up and go test, chair stand test, sit and reach test) and the "Nutrition Knowledge Level Scale for Adults" questionnaire were applied as pre-test and post-test. Whether the data obtained at the end of the study were normally distributed was determined by Shapiro-Wilks test, Paired Samples T-Test was used for intra-group comparisons of physical fitness tests before and after exercise, and Independent Samples T-Test was used for inter-group comparisons. Wilcoxon Test was used in the pre-test and post-test intra-group comparisons and Man Whitney U Test was used in inter-group comparisons of the parameters related to nutritional knowledge levels.
Results: As a result of the analysis, statistically significant improvements were found in the performance parameters of the participants in the experimental group in arm curl, back scratch, 2-min step and 8 food up and go test (p<0.05). In addition, the participants in the experimental group statistically significantly improved their 2-min step, 8 food up and go, chair sit and reach, chair stand tests and basic nutrition knowledge level scores compared to the participants in the control group (p<0.05).
Conclusion: In conclusion, it was determined that regular physical activity programs and regular nutrition education improved the health-related motor skill parameters and nutrition knowledge levels of sedentary women.

Keywords: Exercise, Nutrition, Physical Activity, Women

INTRODUCTION
Sedentary lifestyle has a negative impact on parameters related to physical fitness as it negatively affects mental, physical, and social well-being (1).

Sedentary life, which is seen as one of the leading causes of premature death and chronic diseases, is a phenomenon that affects large masses in terms of public health in individuals over middle age (2).

Nutrition and physical activity are seen as the main factors to maintain existing health, minimize health-related risk factors and age healthily (1,3 4,5). In this direction, the World Health Organization recommends that individuals should do physical activity at least 2 days a week regarding sedentary life (6). When the parameters of relations with health are evaluated, it can be stated that bad eating habits and chronic diseases are more common in individuals with sedentary behavior (7). Changes in lifestyle, which are a result of modern life, are associated with sedentary life. In addition to long working hours and lack of physical activity, dietary habits seem to be a determining factor of sedentary behavior (8). In this context, physical activity is of great importance in preventing a sedentary life largely due to malnutrition and inactivity (9).

In addition to sedentary lifestyle, malnutrition also lies at the basis of health-related chronic diseases. Today, the general idea about healthy living is that exercise should be supported by regular nutrition programs and these programs should be followed in a healthy way (10). However, the lack of nutrition education and nutritional awareness causes unbalanced and inadequate nutrition in individuals and the consequences become more apparent (11, 12). Nutritional awareness refers to people's food intake and consumption habits independent of their physical and mental states. In parallel with the increase in the level of awareness, healthy food consumption habits also increase (13).

Although sedentary life is more common in developing countries, it is known that more than half of the adults in the world population do not participate in regular physical activity (14). It is seen that the causes of death due to lack of physical activity increase depending on the years. According to the data of the World Health Organization, the increase in alternatives in urbanization and transportation, depending on the economic development, causes the increase of physically inactive individuals (15,16). When obesity, which is one of the most common chronic diseases related to physical activity and nutrition in Turkey, is examined according to the gender factor, it has been observed that women are diagnosed as obese two times more than men (17). In addition, regular participation in physical activity is more limited in women than in men (15). In addition to all these, given that it is essential that physical activity practices that improve general health status and protect against chronic diseases are sustainable and continuous for middle-aged individuals (6) and that sports scientists, conditioners and coaches are constantly looking for new training methods that will improve the health-related parameters of sedentary people as well as athlete performance, this type of research, especially on female sedentary people, is important.

As in the rest of the world, life expectancy in our country has increased in recent years. This situation causes a parallel increase in age-related chronic diseases. Nutritional habits and physical activity, which are also related to sedentary life, are the leading prevention methods used in preventable chronic diseases, especially obesity and diabetes (18).

On the other hand, although there has been an increase in the number of studies focusing on women's health and physical activity in the literature in recent years (19,20,21,22), along with exercise practices for a certain period of time. No study was found in which nutrition education was given and the results were discussed. The aim of our study, which focuses primarily on women's health of sedentary life, is to examine the effects of physical activity and nutrition awareness training in sedentary women aged 50-60 on healthy life-related fitness levels, motor skills, nutritional preferences and nutritional awareness of individuals. Nutrition awareness education and physical activity practices are thought to have positive effects on health-related physical fitness parameters and nutritional awareness of sedentary women.

MATERIALS AND METHODS
Research Model: In this study, experimental model was used in accordance with the objectives. In the study, 8 women sedentary were not excluded from the training program for any reason, and the planned exercise program was performed 2 days a week (60 min/day) and nutrition awareness training were performed 1 day a week (30 min/day) for 6 weeks.

Study Group: The study included 15 volunteer women between the ages of 50-60 years who had not practiced sports before. The participants were divided into two groups as experimental (n=8) and control group (n=7) by random sampling method (Table 1). Inclusion criteria of permanents; It was determined as being in the 50-60 age range, being sedentary, not having any obstacles in doing sports, and being a woman.

Table 1. Demographic Information of Participants

Demographic Information	Experimental Group Mean ± ss	Control Group Mean ± ss
Age (years)	52.75 ± 5.898	58.14 ± 7.448
Height (cm)	171.25 ± 6.819	163.00 ± 7.528
Body Weight (kg)	82.38 ± 13.169	68.0 ± 6.733

Table 2. Exercise and Nutrition Program

Weeks	Days	Education	Number of Sets and Repetition	Education Content
Week 1	Tuesday	Education Nutrient		Nutrient elements basic education
		Exercise Program	2 sets / 25 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	2 sets / 20 sec – 8-10 repetitions	10 min warm-up + Resistance exercise + 5 min cool down
Week 2	Tuesday	Education Nutrient		Proteins, Fats
		Exercise Program	2 sets / 25 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	2 sets / 20 sec – 8-10 repetitions	10 min Warm-up + Resistance exercise + 5 min Cool down
Week 3	Tuesday	Education Nutrient		Carbohydrates
		Exercise Program	2 sets / 30 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	2 sets / 25 sec – 10-12 repetitions	10 min Warm-up + Resistance exercise + 5 min Cool down
Week 4	Tuesday	Education Nutrient		Vitamins and Minerals
		Exercise Program	2 sets / 25 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	2 sets / 25 sec – 10-12 repetitions	10 min Warm-up + Resistance exercise + 5 min Cool down
Week 5	Tuesday	Education Nutrient		Food Groups
		Exercise Program	3 sets / 30 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	3 sets / 25 sec – 10-12 repetitions	10 min Warm-up + Resistance exercise + 5 min Cool down
Week 6	Tuesday	Education Nutrient		Healthy snacking suggestions
		Exercise Program	3 sets / 35 sec	10 min warm-up + Step aerobics + 5 min cool down
	Thursday	Exercise Program	3 sets / 30 sec – 10-12 repetitions	10 min Warm-up + Resistance exercise + 5 min Cool down

Protocol: During the current study, the "Directive on Scientific Research and Publication Ethics of Higher Education Institutions" was followed. Before the study prepared in accordance with this proposal, all participants and the study team were informed about the research in detail and voluntary consent forms were signed by the participants. After obtaining the necessary permissions, the age, height, and body weight of the participants were determined before starting the exercise program. Then, performance tests of the participants were taken, and scales were applied. Anthropometric tests (height and body weight) and the scale (YETBID) were administered on day 1, while healthy living-related motor skills tests

(arm curl, back scratch, 2-min step, 8-food up and go, chair stand and chair sit and reach tests) were taken on day 2. Before the performance tests, a 15–20-minute warm-up protocol was applied to the participants. In order to eliminate the learning effect on the first day of the study, physical fitness tests were explained to the participants and they were asked to try them. After the pre-test measurements were taken, the exercise program was performed by experienced coaches in the gymnasium of the Faculty of Sports Sciences in accordance with health and safety rules. The exclusion criteria from the study were determined to be the presence of a chronic disease of the participants. Participants were free to leave the study voluntarily at any part of the study.

The collected data were not used in any way other than for scientific purposes and were prepared in a way that would not harm personal rights. After the 6-week training period, the same measurements were taken as a post-test in the same protocol. During the 6-week period, in addition to the exercise program, the participants were given training on nutritional awareness by a nutritionist 1 day a week (30 min/day). Participants in the control group were not subjected to any application and were asked not to perform physical activity during this period.

Exercise Program and Nutrition Education: Participants underwent an exercise program for 6 weeks, 2 days a week for 60 minutes each. An exercise program was planned as 10 minutes warm-up, 45 minutes exercise practice and 5 minutes cool down. Participants were subjected to the exercise program shown in Table 2 and received nutrition education. The intensity of aerobic exercises was determined according to the heart rate values obtained with the Karvonen formula (Target Heart Rate = [(max Heart Rate − resting Heart Rate) × %Intensity] + resting Heart Rate example). Aerobic exercises were performed at 60% of the heart rate of the individuals. Resistance exercises were performed with body weight and low weight dumbbells (2 kg, 3 kg) in accordance with the program designed. In the following periods of the program, the program process was continued by changing the duration, repetition, and number of sets in line with the development and the program was terminated after 6 weeks. Throughout the whole study, attention was paid to breathing and exhaling with the correct method, technique and breathing and exhaling at the correct point of the movement.

Warm-up Protocol Applied Before the Tests: Participants performed a 10-minute warm-up protocol

Figure 1. Health-Related Physical Fitness Tests (24).

Table 3. Pre-Test and Post-Test Results of Performance Parameters of the Control Group

Parameters	Pre-Test	Post-Test	t	p
	Mean ± ss	Mean ± ss		
Arm Curl Test (kg)	20.71 ± 4.348	21.00 ± 4.000	-.795	0.457
Back Scratch Test (cm)	-7.43 ± 12.095	-7.00 ± 12.396	-1.441	0.200
Two Minutes Step Test (count)	214.71± 33.270	223.71 ± 42.074	-.925	0.391
Eight Food Up and Go Test (sec)	6.45 ± .712	7.12 ± .808	-1.222	0.267
Chair Sit and Reach Test (sec)	9.43 ± 7.138	8.43 ± 4.237	.494	0.639
Chair Stand Test (count)	17.29 ± 2.138	14.00 ± 2.887	2.633	**0.039***

Statistical significance value p<0.05

Table 4. Pre-Test and Post-Test Results of Nutritional Parameters of the Control Group

Parameters	Pre-Test	Post-Test	Z	p
	Mean ± ss	Mean ± ss		
Basic Nutrition Knowledge (points)	49.86 ± 9.191	51.43 ± 8.753	-0.422	0.673
Nutrition and Health Relationship	8.14 ± .690	7.86 ± 1.345	-1.000	0.317

Statistical significance value p<0.05

Table 5. Pre-Test and Post-Test Results of Performance Parameters of the Experimental Group

Parameters	Pre-Test	Post-Test	t	p
	Mean ± ss	Mean ± ss		
Arm Curl Test (kg)	21.75 ± 8.172	25.75 ± 8.956	-2.733	**0.029***
Back Scratch Test (cm)	-1.88 ± 14.147	5.50 ± 10.650	-2.693	**0.031***
Two Minutes Step Test (count))	274.13 ± 74.455	316.63 ± 72.394	-2.471	**0.043***
Eight Food Up and Go Test (sec)	6.18 ± .780	4.47 ± .507	6.229	**0.000***
Chair Sit and Reach Test (sec)	16.13 ± 8.626	19.75 ± 7.906	-1.407	0.202
Chair Stand Test (count)	19.00 ± 3.024	21.25 ± 5.418	-1.741	0.125

Statistical significance value p<0.05

before all performance tests. Within the scope of the protocol, the participants ran for 5 minutes at 40-45% pace and performed dynamic warm-up movements for the upper and lower extremities. After the run, a 1-minute rest was given and dynamic warm-up movements for the lower extremities were performed first. After the warm-up, the participants were given a 2-minute rest period to make their final preparations before the test.

Data Collection Tools

Height and Body Weight: Participants' height and body weight were measured using a Seca 769 electronic measuring device (Seca Anonim Company, Hamburg, Germany) with an accuracy of 0.1 cm for height and 0.1 kg for body weight. (23).

Arm Curl Test: The participant is seated on the edge of a chair slightly to the side of the dominant arm. The dumbbell weight was 2.27 kg for women and 3.63 kg for men. The participants were asked to complete the test by performing full lifts of the weight for 30 s using the dominant hand with the arm in full extension below and full flexion above (24). At the end of 30 s, the total number of lifts was noted (25).

Back Scratch Test: While the participant was in a standing position, one arm was made to rotate outward, over the shoulder, with the palm facing the back and the fingers in extension, the participant was asked to reach the lowest point on the back. The other arm was rotated internally, and the participant was asked to reach the highest point on his/her back with his/her fingers in extension and the palm facing forward. The participant tried to bring the fingertips as close together as possible and the distance between the middle fingers of both hands was measured. During the measurement, the participant was not helped to bring the fingertips closer together. If the middle fingers were not touching, the distance was recorded as (-) in cm; if the middle fingers were touching end to end, the value was zero (0); and if the middle finger crossed over the other, the value was recorded as (+) in cm for the distance the middle finger crossed (24).

Two Minutes Step Test: In order to apply the test, while the participant was standing in an upright position, the distance from the front projection of the hip bone (iliac crest) to the midpoint of the kneecap (patella) was measured and the midpoint of the distance between these two bones was determined. The height of this point from the ground was measured and the step height of the subject was determined. In order to determine whether the step height reached the target height, a tape was drawn at the determined height, or the target height was marked on the wall, and it was checked whether the subject's step height (knee height) reached the target height. The participant was made to step in place for two minutes with both knees reaching the target height. The participant started the test with the right foot and was asked to lift both knees to the specified height. During the test, the participant was asked not to run but to perform the test as fast as he/she could, and at the end of two minutes, the total number of right steps performed correctly was recorded. If any of the participant's steps (right or left) failed to reach the desired height, these steps were considered invalid. The total number of right knees that reached the target height at the end of two minutes was recorded on the measurement sheet (24).

Eight Food Up and Go Test: The participant was seated in the center of the chair and his/her back was leaned back. The participant should have both hands on the knees and feet fully on the floor. In this position, with the start command, the participant was asked to turn around the funnel located 2.44 cm away and reach the chair again as soon as possible and sit down. The time started with the get up command was stopped when the participant sat on the chair again and the time was recorded in seconds (24).

Chair Sit and Reach Test: This test, which is a modified version of the sit-lie test, is used especially to determine the flexibility of the hamstring muscle group. The participant is seated on a chair with a height of 43.18 cm, which is placed against a wall or a solid floor, so that the junction of the thigh and hip bone is in front of the chair. At the participant's discretion (right left), one foot was extended forward in full extension with the heel of the foot on the floor and the ankle at approximately 90°. The other foot was placed towards the end of the chair with the knee flexed at approximately 90° and the sole of the foot on the floor. The participant's hands were placed on top of each other, and the middle fingers were aligned. The participant was instructed to reach towards the toe of the foot by extending the body forward with both hands without bending the knee, which was extended forward (extension), without

Table 6. Pre-Test and Post-Test Results of Nutrition Parameters of the Experimental Group

Parameters	Pre-Test	Post-Test	Z	p
	Mean ± ss	Mean ± ss		
Basic Nutrition Knowledge (points)	54.38 ± 6.479	57.88 ± 3.643	-1.524	0.128
Nutrition and Health Relationship	7.00 ± 3.024	8.38 ± 1.061	-1.604	0.109

Statistical significance value p<0.05

Table 7. Pre-test Comparison of Experimental and Control Group Performance Parameters

Parameters	Experimental Group	Control Group	t	p
	Mean ± ss	Mean ± ss		
Arm Curl Test (kg)	21.75 ± 8.172	20.71 ± 4.348	.299	0.769
Back Scratch Test (cm)	-1.88 ± 14.147	-7.43 ± 12.095	.811	0.432
Two Minutes Step Test (count)	274.13 ± 74.455	214.71± 33.270	1.941	0.074
Eight Food Up and Go Test (sec)	6.18 ± .780	6.45 ± .712	-.710	0.490
Chair Sit and Reach Test (sec)	16.13 ± 8.626	9.43 ± 7.138	1.623	0.129
Chair Stand Test (count)	19.00 ± 3.024	17.29 ± 2.138	1.249	0.234

Statistical significance value p<0.05

Table 8. Pre-test Comparison of Nutrition Parameters in Experimental and Control Groups

Parameters	Experimental Group	Control Group	Z	p
	Mean ± ss	Mean ± ss		
Basic Nutrition Knowledge (points)	54.38 ± 6.479	49.86 ± 9.191	-1.394	0.163
Nutrition and Health Relationship	7.00 ± 3.024	8.14 ± .690	-.909	0.364

Statistical significance value p<0.05

pushing the pain limit. If the fingertips of the participant's hand did not touch the toe, a value in centimeters (-) was taken as the distance between them; if the fingertips of the middle hand touched the toe, a value of zero (0) was taken; if the fingertip of the middle hand crossed the toe, a value in cm (+) was taken as the distance the middle fingertip crossed and recorded on the measurement sheet (24).

Chair Stand Test: The participant was made to sit in the center of a 43.18 cm highchair with his/her back straight, feet on the floor and arms crossed in front of the chest (right hand on the left shoulder, left hand on the right shoulder). In this position, the participant started the test with the start command and performed as many full take-offs as he/she could for 30 s. The number of full take-offs performed during 30 s was recorded as the participant's score (24)

Level of Nutrition Knowledge Scale for Adults - Basic Nutrition Section: It was developed by Batmaz (26) and a validity and reliability study were conducted. The scores obtained from the evaluation criteria of the nutrition knowledge level scale for adults are evaluated as poor, moderate, good, and very good. There are a total of 20 propositions in the "basic nutrition" section of the scale and the highest score that can be obtained from this section is 80. Those with a score less than 45 are considered to have poor knowledge, those with a score between 45 and 55 are considered to have fair knowledge, those with a score between 56 and 65 are considered to have good knowledge, and those with a score above 65 are considered to have very good knowledge. The reliability coefficient for the "Basic Nutrition" section of the YETBID was found to be 0.72**.**

Data Analysis: The data were analyzed in IBM SPSS 26.0 package program. After evaluating whether the obtained data showed normal distribution by looking at the kurtosis skewness values, Independent Samples T Test was applied at α=0.05 significance level to determine the difference between groups in performance tests, and Paired Samples T Test was applied in intra-group comparisons. In the parameters related to nutritional awareness, non-parametric tests were applied due to the small sample size; Man-Whitney U Test was used for inter-group comparisons and Wilcoxon Test was used for intragroup comparisons.

RESULTS

In Table 3, within-group analysis values of the performance parameters of the control group were compared. In the table, it was determined that there was a statistically significant difference between the participants' chair stand test (p=0.039) data due to pre-test measurements.
In Table 4, the intra-group analysis values of the nutritional parameters of the control group were compared. In the table, no statistical difference was found between the pre and post test values of the participants (p>0.05).
In Table 5, the intra-group analysis values of the performance parameters of the experimental group were compared. In the table, it was determined that there was a statistically significant difference between the participants' arm curl (p=0.029), back scratch (p=0.031), 2-minute step (p=0.043) and 8 food up and go test (p=0.0) data. Although there was no

statistically significant difference between the chair sit and reach and chair stand test data, it was revealed that the post-test measurements were numerically higher (p>0.05).
In Table 6, the intra-group analysis values of the nutritional parameters of the experimental group were compared. Although no statistical difference was found between the pre and post test values of the participants (p>0.05), it was determined that there was a numerically improvement in the post test measurements.
Table 7 compared the pre-test performance parameters of the control and experimental groups. The table does not reveal any statistical difference between the pre-test values of the groups (p>0.05).
In Table 8, the pre-test nutritional parameters of the control and experimental groups were compared. The table does not reveal any statistical difference between the pre-test values of the groups (p>0.05).
In Table 9, the post-test values of the performance parameters of the control and experimental groups were compared. In the table, it was determined that there was a statistically significant difference in favor of the experimental group between the groups' 2-minute step (p=0.011), 8 food up and go (p=0.005), chair sit and reach (p=0.005) and chair stand tests (p=0.008). Although there was no statistically significant difference between the arm curl and back scratch test data, it was revealed that the numerically post-test measurements were higher in favor of the experimental group (p>0.05).
In Table 10, the post-test values of the nutritional parameters of the control and experimental groups were compared. In the table, it was determined that there was a statistically significant difference between the basic nutrition knowledge scores (p=0.036) of the groups in favor of the experimental group .

DISCUSSION
The aim of our study is to investigate the effects of physical activity and nutrition awareness training on health-related physical fitness parameters and nutrition awareness in female individuals aged 50-60 years. In our study, it was observed that 6-week physical activity practices created a significant difference in the performance values of arm curl, back scratching, 2-min step and 8 food up and go tests on sedentary women in health-related motor skills tests (p<0.05). It was revealed that sedentary women in the experimental group performed better in the 2-min step, 8 food up and go, chair stand and chair sit and

reach tests compared to the women in the control group and this difference between them was statistically significant (p<0.05). It was also found that nutrition awareness training caused significant improvements in the basic nutrition knowledge level scores of sedentary women (p<0.05).

Although this study analyzed the effect of physical activity and nutrition education intervention on physical fitness and nutrition awareness of sedentary women in relation to health and life, it has some limitations. Under normal conditions, the number of experimental groups receiving exercise and nutrition education under exercise increases every four months: Exercise group, nutrition education training group, participation in nutrition support training and exercise application group, and only exercise and nutrition support training group, which is expected to be a control group, and a nutrition awareness and exercise application group. There are two groups. The presence of 2 groups in the study is considered

a limitation. The main reason for this limitation is that sufficient samples could not be reached in the specified age group. On the other hand, the necessity of practices encouraging participation is seen especially when the age group is taken into consideration. Based on this information, it can be suggested that researchers who want to study on this and similar subjects should study on the four different groups mentioned above in order to see the educational effects more healthy.

When the literature was examined, studies with similar results to the results of our study were found. In one study, a significant difference was found in the anthropometric measurements of menopausal women as their nutritional knowledge score and thus nutritional awareness increased. In other findings of the study, parameters such as lean body mass and body fat ratio of individuals who did and did not engage in physical activity were also evaluated and it was found that physical activity had a positive effect

Table 9. Post-test Comparison of Experimental and Control Group Performance Parameters

Parameters	Experimental Group	Control Group	t	p
	Mean ± ss	Mean ± ss		
Arm Curl Test (kg)	25.75 ± 8.956	21.00 ± 4.000	1.354	0.206
Back Scratch Test (cm)	5.50 ± 10.650	-7.00 ± 12.396	2.102	0.560
Two Minutes Step Test (count))	316.63 ± 72.394	223.71 ± 42.074	2.944	**0.011***
Eight Food Up and Go Test (sec)	4.47 ± .507	7.12 ± .808	-7.736	**0.000***
Chair Sit and Reach Test (sec)	19.75 ± 7.906	8.43 ± 4.237	3.378	**0.005***
Chair Stand Test (count)	21.25 ± 5.418	14.00 ± 2.887	3.160	**0.008***

Statistical significance value p<0.05

Table 10. Post-test Comparison of Nutrition Parameters in the Experimental and Control Groups

Parameters	Experimental Group	Control Group	Z	p
	Mean ± ss	Mean ± ss		
Basic Nutrition Knowledge (points)	57.88 ± 3.643	51.43 ± 8.753	-2.094	**0.036***
Nutrition and Health Relationship	8.38 ± 1.061	7.86 ± 1.345	-.610	0.542

Statistical significance value p<0.05

on the values (27). Kurt (28) applied step-aerobic exercise for eight weeks in their study on middle-aged sedentary women and examined the changes in physical fitness parameters of individuals. As a result of the study, a significant increase was observed in the strength, flexibility, endurance-related values of the individuals if continued regularly, while a decrease was observed in body fat percentages, resting and post-exercise pulse rates in relation to health. Vergili (29) examined the effects of Pilates and calisthenic exercise on the health-related quality of life of 153 women aged 25-55 years with sedentary behavior. The 15-D health-related quality of life questionnaire, whose sub-dimensions consisted of health-related parameters, was administered to the experimental group before and after the 12-week intervention. A significant increase in the health-related parameters of quality of life was found in the experimental group included in the exercise, while the values in the control group did not change.

In a study investigating the effects of aerobic exercise on body composition and blood values in young and middle-aged women, 30 minutes of running-walking exercise was practiced for 3 days for 12 weeks. Parameters related to physical fitness showed positive changes in both age groups. Especially in parallel with our study, an increase in HDL values and a parallel decrease in triglyceride values were observed in individuals evaluated in the middle age category, although not statistically significant (30). Akgül (31), it was seen that high-intensity interval training (HIIT) applied to sedentary women for 2 weeks, 3 days a week and 6 sessions in total, had a positive effect on the aerobic performance parameters of individuals.

It was observed that bosu exercises applied for 3 months in sedentary women had positive effects on the participants' hand grip strength, flexibility and circumference measurements (32).

A significant decrease in body mass index, body weight and fat mass amounts was observed in sedentary female individuals after exercise regularly applied for 3 days and 60 minutes for 12 weeks (33).

In a study investigating the effect of exercise applied 3 days a week for eight weeks on body composition in middle-aged sedentary women, significant changes were noted in the lean body weight and body mass index of individuals compared to pre-exercise (34).

In a study examining the relationship between the nutritional program determined in addition to 12-week resistance exercise and balance, three groups were formed as exercise and nutrition, nutrition and control, and a more significant improvement was observed in the balance parameter in the experimental group in which nutrition and exercise were combined than in the other groups (10). In the study findings, it was determined that the improvement in blood pressure and cardiovascular system in relation to health in individuals participating in resistance and aerobic exercise significantly changed in individuals diagnosed with hypertension (35).

Based on the increase in sedentary lifestyle with the pandemic, the effect of zumba exercise applied online for 8 weeks on total fat percentages, body image and eating attitudes of individuals was examined. The findings of the study showed a significant decrease in the waist-hip measurements, body mass index and body fat percentages of the individuals who participated in the exercise. Significant reductions were found not only in physical fitness and anthropometrics, but also in hunger sensitivity and emotional eating parameters of individuals in the experimental group (36). In another study on the dietary habits and physical activity levels of women in relation to the pandemic, it was observed that age had no effect on nutrition and physical activity levels. However, the variables of income, employment status and number of people in the household were found to be related to nutrition and participation in physical activity. In addition to the findings, it was observed that individuals consumed the food they enjoyed eating and had low physical activity levels during the pandemic period without calorie control (37).

In a study examining the nutritional knowledge and habits of obese women, low physical activity level was found to be among the factors in the formation of obesity together with factors such as dietary habits, meal frequency and number of births (38). In a study in which the effect of nutrition and physical activity level was investigated in a sample group over 65 years of age whose demographic structure was similar to our study, it was reported that the regular activity preference was generally walking and the increase in socio-economic level caused a decrease in the rate of physical activity (39). In a study conducted on women for 12 weeks, it was observed that the inclusion of physical activity in the diet program positively affected the weight loss and energy expenditure levels of individuals. In addition, in parallel with our study, a decrease in dietary habits, sugar and fat consumption and an increase in fruit,

milk and vegetable consumption occurred during the combination of nutrition and physical activity (40).

In the literature, it is seen that female individuals who participate in regular physical activity have higher scores than obese female individuals in nutrition awareness levels, cumulative physical activity scores, health responsibility, spiritual development, interpersonal communication and stress management, which are among the cognitive outcomes. This shows that healthy eating and participation in regular physical activity are associated with a healthy lifestyle in women (41,42).

CONCLUSION

In conclusion, physical activity and nutrition awareness training had a positive effect on nutrition awareness and motor skills related to physical fitness such as flexibility, endurance, and strength in sedentary female individuals aged 50 years and older. In the study, it was aimed to slow down the loss of flexibility and all motor skills in later ages. In addition to the findings, it is thought that the risk of falling, which is related to losses related to physical fitness, which is frequently seen in women aged 50 years and over, and which occurs with the decrease in bone density in the menopausal period, will also decrease. In addition to health-related physical fitness parameters, the positive effect of strength and endurance-based combination exercise models on bone and joint health should also be taken into consideration. In this context, considering both physiological, anatomical and motor outcomes, it is thought that the benefits of regular exercise will show its effect in many dimensions. It is thought that increasing the number of sample and control groups in future studies will positively affect the results of the study.

REFERENCES

1. Akyol A, Bilgiç P, Ersoy G. Fiziksel aktivite, beslenme ve sağlıklı yaşam. Klasmat Matbaacılık, Ankara.2008.
2. Lucas SR, Platts-Mills TA. Physical activity and exercise in asthma: Relevance to etiology and treatment. Journal of Allergy and Clinical Immunology 2005;115(5):928-9.
3. Çat G, Yıldırım İ. Ofis çalışanlarının yeme davranışları fiziksel aktivite düzeyleri ve yaşam kalitelerinin incelenmesi. Beden Eğitimi ve Spor Bilimleri Dergisi 2022;16(3):290-305.
4. Keogh JW, MacLeod RD. Body composition, physical fitness, functional performance, quality of life, and fatigue benefits of exercise for prostate cancer patients: A systematic review. Journal of Pain and Symptom Management 2012; 43(1):96-110.
5. Vural Ö, Eler S, Güzel AN. Masa başı çalışanlarda fiziksel aktivite düzeyi ve yaşam kalitesi ilişkisi. Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi 2010;8(2):69-75.
6. Bull FC, Al-Ansari SS, Biddle S. et. al, J.F. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. British journal of sports medicine 2020;54(24):1451-1462.
7. Ünal B, Ergor G, Horasan G. D, Kalaca S, Sozmen K. Turkey incidence of chronic diseases and risk factors study. Ankara: Ministry of Health. 2013;84.
8. Ameer Arsalan Hadi P. Nutritional status and sedentary lifestyle of individuals a review. International Journal of Modern Agriculture. 2021;10(2).
9. Charansonney OL, Després JP. Disease prevention—should we target obesity or sedentary lifestyle?. Nature Reviews Cardiology 2010;7(8):468-472.
10. Dilican T. Egzersiz ve beslenmeye bağlı kilo kaybının sağlıklı sedanter kadınların denge performansına etkisi. Master's Thesis. Uludağ University. Bursa, Turkey 2023.

11. Baysal A. Beslenme. Hatiboğlu Yayınları, 14. Baskı, Ankara. 2012.
12. Beyhan, Y. İşçi sağlığı, iş güvenliği ve beslenme. Sağlık Bakanlığı Yayın, Ankara.2012.
13. Bor H, Saka M. Besin Okuryazarlığı, Yeme Farkındalığı ve Beslenme. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi 2021;10(2): 307-313.
14. Lucas SR, Platts-Mills TA. Physical activity and exercise in asthma: Relevance to etiology and treatment. Journal of Allergy and Clinical Immunology 2005;115(5):928-9
15. World Health Organization. Global action plan on physical activity 2018-2030: more active people for a healthier world. World Health Organization, 2019.
16. Organisation for Economic Co-Operation and Development 2017, https://www.oecd.org/health/health-data.htm
17. Cengiz ŞŞ, Örcütaş H, Ulaş AG. Ateş B. Sedanter Bireylerin Yeme Bozukluğu, Beden Algısı ile Fiziksel Aktiviteye Karşı Tutum Ve Davranışlarının Belirlenmesi. Uluslararası Güncel Eğitim Araştırmaları Dergisi 2022;8(1), 198-214.
18. Durstine JL, Gordon B, Wang Z, Luo X. Chronic disease and the link to physical activity. Journal of sport and health science 2013;2(1), 3-11.
19. Grenier LN, Atkinson SA, Mottola et al. Be healthy in pregnancy: Exploring factors that impact pregnant women's nutrition and exercise behaviours. Maternal and Child Nutrition 2020; 17(1):e13068.
20. Kaya A, Aksu HS, Arslan F. Fiziksel aktivitelere düzenli ve düzensiz olarak katılım sağlayan kadınların fiziksel aktivite özdeğer algılarının incelenmesi. Sportive 2021;4(2):57-76.
21. Kong Z, Fan X, Sun S, Song L, Shi Q, Nie J. Comparison of high-intensity interval training and moderate-to-vigorous continuous training for cardiometabolic health and exercise enjoyment in obese young women: A randomized controlled trial. PLos One 2016;11(7):e0158589
22. McArthur D, Dumas A, Woodend, K., Beach, S., Stacey, D. Factors influencing adherence to regular exercise in middle-aged women: A qualitative study to inform clinical practice. BMC Women's Health 2014;14(1):1-8.
23. Bayrakdaroğlu S, Can İ, Albayrak AY, İmamoğlu R. Futbolcularda yo-yo aralıklı toparlanma testlerindeki (seviye 1-2) kalp atım hızı, laktat profili ve toparlanma sürelerinin incelenmesi. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi 2021;10(3):550-559.
24. Rikli RE, Jones JC. Senior fitness test manual champaign, IL: Humann Kinetics.2001.
25. Sampaio A, Marques EA, Mota J, Carvalho J. Effects of a multicomponent exercise program in institutionalized elders with Alzheimer's disease. Dementia 2019;18(2):417-431.
26. Batmaz H. Yetişkinler için beslenme bilgi düzeyi ölçeği geliştirilmesi ve geçerlik-güvenirlik çalışması. Master Thesis. Marmara University. İstanbul, Turkey 2018.
27. Fakılı FE. Menepoza girmiş kadınların beslenme durumları ile fiziksel aktivite ve beslenme bilgi düzeylerinin belirlenmesi. Master's Thesis. Başkent University. Ankara, Turkey 2013.
28. Kurt S, Hazar S, İbiş S, Albay B, Kurt Y. Orta yaş sedanter kadınlarda sekiz haftalık step-aerobik egzersizinin bazı fiziksel uygunluk parametrelerine etkilerinin değerlendirilmesi. Uluslararası İnsan Bilimleri Dergisi 2010; 7(1):665-674.
29. Vergili Ö. Sağlıklı sedanter kadınlarda kalistenik ve pilates egzersizlerinin sağlıkla ilişkili yaşam kalitesi üzerindeki etkileri. Kırıkkale Üniversitesi Tıp Fakültesi Dergisi 2012;14(3):14-20.
30. Karacan S, Çolakoğlu FF. Sedanter orta yaş bayanlar ile genç bayanlarda aerobik egzersizin vücut kompozisyonu ve kan lipidlerine etkisi. Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi 2003 1(2):83-88.
31. Akgül MŞ, Gürses, VV, Karabıyık H, Koz, M. İki haftalık yüksek şiddetli interval antrenmanın kadınların aerobik göstergeleri üzerine etkisi. International Journal of Sport Culture and Science 2016;4 (Special Issue 1):298-305.
32. Türk N. Sedanter bayanlarda bosu egzersizin fiziksel uygunluk ve psikososyal değişimlerine etkisi. Master Thesis. Hitit University. Çorum, Turkey 2016.
33. Aydemir İ, Dağ R. Düzenli pilates egzersizlerinin sedanter kadınlarda biyomotor ve fizyolojik parametreler üzerine etkisi. Spor Eğitim Dergisi. 2021;5(3):70-78.
34. Çolakoğlu F, Şenel Ö. Sekiz Haftalık Aerobik Egzersiz Programının Sedanter Orta Yaşlı Bayanların Vücut Kompozisyonu Ve Kan Lipidleri Üzerindeki Etkileri. Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi 2003;1(1):57-61.

35. Sharman JE, La Gerche A, Coombes JS. Exercise and cardiovascular risk in patients with hypertension. American Journal of Hypertension 2015;28(2):147-158.

36. Akyılmaz G. Kadınlarda online zumba egzersizlerinin vücut yağ oranları, yeme tutumları ve beden imajı üzerine etkisi. Master's Thesis. Hitit University. Çorum, Turkey 2021.

37. Tarhan M, Dursun Y. Covid-19 döneminde kadınların beslenme alışkanlıkları ve fiziksel aktiviteleri üzerindeki etkisi. Ankara Hacı Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi 2022;24(1):428-459.

38. Pekcan G, Baltaoğlu S. Şişman kadınların beslenme bilgi düzeyi ve alışkanlıklarının saptanması. Beslenme ve Diyet Dergisi 1988;17(2):221-234.

39. Ersoy G, Akbulut GÇ. Farklı sosyo ekonomik düzeylerde yaşayan 65 yaş üstü bireylerin beslenme ve fiziksel aktivite durumlarının değerlendirilmesi. Beslenme ve Diyet Dergisi. 2006;34(1):41-51.

40. Akbulut G, Rakıcıoğlu N. On iki hafta süresince düşük kalorili diyet ve/veya fiziksel aktivite uygulayan hafif şişman/şişman kadınların besin ve besin ögesi tüketim durumlarının ve bazı antropometrik ölçümlerinin değerlendirilmesi. Türkiye Klinikleri 2011;23(1):29-39.

41. Akarsu G. Kadınlarda fiziksel aktivitenin beslenme alışkanlıkları ve obezite üzerine etkisi. Master's Thesis. Gazi University. Ankara, Turkey 2018.

42. Dubbert PM, Carithers T, Sumner AE, et al. Obesity, physical inactivity and risk for cardiovascular disease. American Journal of The Medical Sciences 2022;324(3):116-126.