



ARAŞTIRMA / RESEARCH

Impact of exercise on quality of life, body awareness, kinesiophobia and the risk of falling among young older adults

Genç yaşlılarda egzersizin yaşam kalitesi, beden farkındalığı, kinezyofobi ve düşme riskine etkisi

Arzu Erden¹, Seçil Gülhan Güner²

¹Karadeniz Technical University, Faculty of Health Science; Department of Physiotherapy and Rehabilitation, ²Department of Nursing, Trabzon, Turkey.

Cukurova Medical Journal 2018;43(4):941-950

Abstract

Purpose: This study was planned to examine the effects of exercise on quality of life, body awareness, kinesiophobia and falling risk among young older adults.

Materials and Methods: The study was performed with 74 participants (aged between 65-74) in Trabzon. Age, gender, body mass index, educational status, family structure, living with people and chronic illness were all included in the sociodemographic data form. They were divided into two groups: one exercised group of 36 people (group I) and non-exercised of 38 subjects (group II). A 12-week exercise program was applied to the study group. The SF-36 Quality of Life Questionnaire was used to evaluate the quality of life, the Body Awareness Questionnaire (BAQ) for comparing awareness conditions, the Tampa Kinesiophobia Scale (TSK-11) for the perception of kinesiophobia, and the Denn Falling Risk Scale (DENN) to determine falling risk level.

Results: The mean age of the participants was 69.45 years. There were differences in terms of quality of life in all subscales between two groups. While there was a correlation between quality of life, body awareness and falling risk in exercise group, there was no correlation in non-exercise group. There was a positive correlation between falling risk and kinesiophobia in two groups. There was a negative correlation between falling risk and body awareness in exercise group.

Conclusion: The presence of positive effects on the quality of life and body awareness in the older adults will shed light on planning geriatric rehabilitation programs for health professions.

Key words: Older adult, exercise, quality of life

Öz

Amaç: Çalışma genç yaşlılarda egzersizin yaşam kalitesi beden farkındalığı, kinezyofobi ve düşme riskine etkisini belirlemek amacıyla planlandı.

Gereç ve Yöntem: Araştırma Trabzon'daki 76 katılımcı (65-74 yaş aralığında) ile gerçekleştirildi. Yaş, cinsiyet, beden kitle indeksi, eğitim durumu, aile yapısı, kimlerle yaşadığı, kronik hastalık bilgilerini içeren sosyodemografik veri formu kullanıldı. Katılımcılar egzersiz yapan 36 birey çalışma grubu (grup I) ve egzersiz yapmayan diğer 38 birey kontrol grubu (grup II) olarak ikiye ayrıldı. Çalışma grubuna 12 haftalık egzersiz programı uygulandı. Yaşam kalitesi SF-36 Yaşam kalitesi ölçeği ile, vücut farkındalığı BAQ (Beden farkındalık anketi) ile, kinezyofobi durumu Tampa Kinezyofobi Anketi Kısa formu (TKÖ-11) ile ve düşme riski düzeyi DENN düşme riski değerlendirme ölçeği ile değerlendirildi.

Bulgular: Katılımcıların yaş ortalaması 69.45 yılı. Egzersiz yapan ve yapmayan gruplar arasında yaşam kalitesi tüm alt boyutları ve bakımından anlamlı bir fark vardı. Egzersiz yapan grupta yaşam kalitesi ile beden farkındalığı ve düşme riski arasında ilişki varken; egzersiz yapmayan grupta ilişki yoktu. Her iki grupta da düşme riski ve kinezyofobi arasında pozitif ilişki vardı. Egzersiz yapan grupta düşme riski ile beden farkındalığı arasında negatif ilişki vardı.

Sonuç: Yaşlı bireylerde egzersizin yaşam kalitesi ve vücut farkındalığı üzerindeki olumlu etkilerinin varlığı sağlık profesyonellerine geriatrik rehabilitasyon programı planlamada ışık tutacaktır.

Anahtar kelimeler: genç yaşlı, egzersiz, yaşam kalitesi

Yazışma Adresi/Address for Correspondence: Dr. Arzu Erden, Karadeniz Technical University, Faculty of Health Science Department of Physiotherapy and Rehabilitation, Trabzon; Turkey. E-mail: arzu_erden@hotmail.com
Geliş tarihi/Received: 23.01.2018 Kabul tarihi/Accepted: 26.02.2018

INTRODUCTION

In developed countries, one-third of the older adults fall each year. Falling not only leads to physical problems, but also causes limitations in social roles. In Turkey, for healthy and community-dwelling older adult people over 65 years of age, the annual rate of falls per person of is 31.9 %. Stalenhoef et al¹ state that falls cause severe injury, fracture, fear of movement, inability in daily living activities, decreased confidence and less active life styles in the older adult. Regarding older adult people, there has been much work done on epidemiology, trauma stories about falls, and precautionary interventions against falls in the last decades of their lives²⁻⁴. Inadequate physical activity and reduced mobility resulting from the risk of falling and may lead to kinesiophobia (fear of movement).

Kinesiophobia is not only a condition of physical failure, but it also increases with emotional and physical traumatic experiences. Kinesiophobia, which may develop due to different causes, substantially affects the lives of the older adult. While the topic of the fear of falling and falling among the older adult is a heavily researched topic, there are very few studies on kinesiophobia⁵. Kinesiophobia causes a decrease in the physical activity levels of the older adult and also has negative effects on their overall quality of life. Compared to the past, there is now emphasis on the fact that there is a direct correlation between the quality of life and life span and health expectations are much more important than life expectancy. In this regard, the main objective among the geriatric population is to protect the quality of life of individuals. With respect to older adult people, in general "wellbeing" has 5 aspects: (1) physical wellness, (2) spiritual wellness, (3) mental wellbeing, (4) social wellbeing, and (5) emotional wellbeing. When developing policies regarding the older adult, it is important to make future oriented, comprehensive plans and to take into consideration the parameters that constitute wellbeing⁶.

The concept of body awareness is another important factor related to this topic. Body awareness is an indicator of a person's physical and emotional condition as a whole. It provides information about parts of the body and includes positional sense, the sense of movement (kinesthetic sense) conditions for mobility, and cognitive elements (processes of cognitive thought). It also

includes emotional aspects related to physical capacity and exercise. The concept of body brings together the life world and daily life experiences. According to Merleau-Ponty⁷, we establish a personal and subjective relationship with the world through our bodies. Therefore, it is impossible to recognize a person as a simple biological entity.

Based on this approach, our bodily experiences are shaped by the connection and interaction we have established with the World⁸. The effects of the body awareness on the quality of life, emotional condition and pain is an ever increasing area of interest⁹⁻¹¹. Another issue that very much needs to be researched is levels of body awareness and the factors that affect it in older adult people. With regards to trauma and learned positive activity experiences, the individual can protect him/herself through body awareness. Body awareness is a field that should be regarded as part of general health¹². In terms of healthy aging, which encompasses all these important concepts, exercise is crucial for the older adult to protect their physical and mental health. The purpose of exercise among geriatric individuals is functional capacity to the highest level possible and to maintain it, thus increasing the quality of life by allowing the individual to become more independent and social¹³. The role of exercise in the older adult is crucial in reducing the effects of changes in the musculoskeletal system resulting from increasing age. Exercise is a category under physical activity that is defined as planned and structured repetitive movement. The goal is to improve and protect 1 or more component of physical fitness¹⁴.

Regular exercise leads to many positive effects for the older adult such as restoring the musculoskeletal system, decreasing obesity, improving cardiovascular functions and decreasing the risk of disease, increasing physical performance, functional capacity and psychomotor skills, and mental activities, and decreasing anxiety and depression, thus improving the quality of life and extending life span¹⁵. Examining the effects of exercise, which protects and improves health, on falling and body awareness, has contributed a different perspective for other studies that have examined the quality of life and emotional state. The main areas of focus in this study were the concepts of the risk of falling, kinesiophobia and body awareness. Our work is the first research to evaluate all these components as a whole.

MATERIALS AND METHODS

This study was a single-centre, single-blinded clinical trial and approved by Clinical Research Ethics Committee of Health Sciences University Kanuni Education Research Hospital (Date:18.05.2017/No: 23618724-000- 6307). Each participant was informed about the study process and provided written, informed consent to satisfy the ethical requirements.

The study was performed between May-September 2017. Participants in the study signed an informed consent document, accepting the principle of conformity to the Helsinki Declaration Principles. Our study was conducted with young older adult individuals registered at the Kaşüstü Family Health Center who met the inclusion criteria. Participants were divided into 2 groups: a study group (group I) consisting of 36 people that exercised and a control group (group II) of 38 subjects who did not exercise.

Inclusion criteria of the study were; being between 65-74 years of age, able to communicate verbally, being literate, having a Standardized Mini Mental Test (SMMT) score above 24, having Katz Index of Independence in Activities of Daily Living (ADL) score between 13-18, and having a low and moderately low fall risk on the Berg Balance Scale (BBS): The exclusion criteria were; having a psychiatric diagnosis according to DSM-5, being confined to bed or wheelchair, having a condition that prevents exercise (amputation, neuropathy, chronic severe musculoskeletal pain, etc.), visual, hearing and speech impairments, having a cancer diagnosis, severe hypoglycemic episodes / dyspnoea / epileptic seizure / tachycardia / bradycardia chest pain etc. in the last month having undergone any surgery that would prevent exercise in the last month.

Hypothesis

H0: Exercise is not effective method on quality of life, body awareness, kinesiophobia and the risk of falling among young older adults

H1: Exercise is an effective method on quality of life, body awareness, kinesiophobia and the risk of falling among young older adults

H0: Quality of life, body awareness, kinesiophobia

and the risk of falling among are not interrelated in young older adults

H1: Quality of life, body awareness, kinesiophobia and the risk of falling among are interrelated in young older adults

After all participants (n=85) had completed SMMT, Katz Index of Independence in ADL and BBS participants (n=78) were included according to the inclusion criteria. They divided into 2 groups (intervention and control) by lottery method. The Consort Flow diagram is included (Figure 1).

The Exercise Program

The intervention protocol, as advised by the American College of Sports Medicine, focused on 3 specific objectives: mobility, balance, and resistance strength. The planned exercise program included: walking and regional strengthening and stretching and balancing exercises with free weights that can be used at home for muscles that have lost their elasticity. Exercise frequency was 3-5 days/week and 20-30 minutes/day.¹⁶ An exercise schedule was set up to track the exercise of the older adult person, and a calendar marking was requested when each exercise was completed. Implementation of the program lasted 12 weeks.

Exercises contain:

Aerobic Activity Content (Walking):

Frequency: 3-5 per week

Intensity: 50-80% of Heart rate max.

Duration: 20-30 min.

Muscle-Strengthening Activity Content

Number of Exercises: 8-10 exercises involving the major muscle groups (upper, lower extremity and trunk muscle groups)

Sets and Repetitions: 1 set of 8-15 reps (progress to >1 set)

Flexibility/Balance: 2-3 per week flexibility

Older adults were trained by a physiotherapist (researcher) at their home. For homogeneity of the application one physiotherapist applied and trained the program. Physiotherapist make a text that include the exercises to remember the details. Another blinded researcher(nurse) applied the scales before and after program in adults' home. First month participants were visited by physiotherapist to control the exercise.

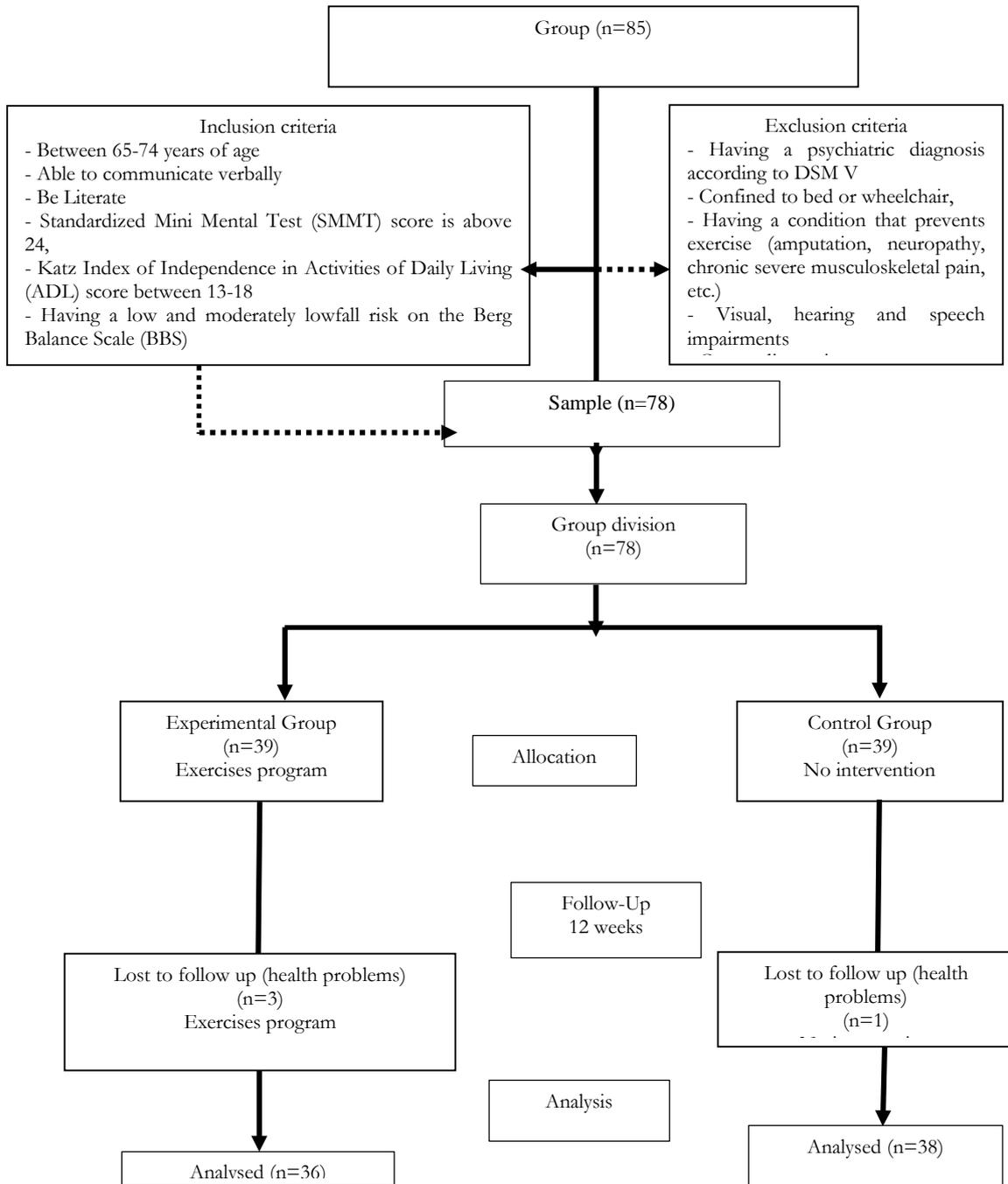


Figure 1. The consort flow diagram of group division.

After a month they were controlled by telephone interviews held every month, information was obtained regarding the current condition of the older adult person and exercise checks were carried out by researchers. In order to assess the feedback, the interview information was recorded in a follow-up form.

Assessment scales

Sociodemographic Data Form

The sociodemographic data form which was contained age, gender, body mass index, educational status, family structure, living with people and chronic illness.

The DENN Fall Risk Rating Scale

The scale consists of the Medicare Quality Improvement Organization's 9 main guidelines (level of consciousness/mental status, history of falls in past 3 months, ambulation/elimination status, vision status, gait and balance, orthostatic changes, and medications)¹⁷ Tekin et al¹⁸ adapted the form to Turkish. Assessment is based on the total score and the individual's risk score is determined. Those who score 0-5 points after the evaluation are considered as having a "low risk" in terms of falling; those who score 6-9 points are considered as having a "medium risk" and those who score 10 or higher are considered as having a "high risk".

Tampa Kinesiophobia Scale Short Form-11 (TSK-11)

The scale is a checklist of 11 questions. It is the abbreviated version of TSK 17. The scale uses a 4-point Likert scoring (1 = strongly disagree, 4 = strongly agree). Total score is between 11-44. A high score on the scale indicates that kinesiophobia levels are also high. It is recommended to use the total score in studies¹⁹. Larsson et al²⁰ tested the validity of the questionnaire. Turkish adaptation of the scale was performed by Bingöl U and Başaslan U in 2013²¹.

Body Awareness Questionnaire (BAQ)

Shields and Mehling developed this scale. It is a questionnaire composed of 4 subgroups (changes in the body process, sleep-wake cycle, estimation of the onset of the disease, estimation of the body reactions) and a total of 18 expressions to determine the normal or non-normal sensitivity level of the

body composition. Participants assess each item from 1 to 7. Scoring on the questionnaire is based on Bayar (2017) performed Turkish reliability and validity of the scale. Karaca and¹⁸ adapted the form to Turkish^{22,23}.

Short Form-36 Quality of Life Questionnaire

Ware and Sherbourne²⁴ developed the scale and Koçyiğit²⁵ performed the validity and reliability study of the Turkish version of the scale. The higher the score the better the quality of life. The scale consists of physical functioning (PF) (10 items), social functioning (SF) (2 items), role limitations due to physical problems (RLPP) (4 items), role limitations due to emotional problems (RLEP) (3 items), mental health (MH) (5 items), energy / vitality (V) (4 items), pain (P) (2 items) and general health perceptions (GHP).^{24,25}

The scales were applied two times: first was at the beginning of the study (before the exercises program) and second was at end of the 12 weeks.

Statistical analysis

In selecting the individuals to be sampled; power analysis was done in OpenEpi program. The number of samples was set at 95% confidence interval, with 80% for 72 with a target of reducing the risk of falling from 54% to 20% in the older adult. In spite of their inability to complete the program 85 participants were included in first sample. The flow process was explained on group division part.

Statistical analyses of the values obtained by the measurements were made with the 20.0 version of the SPSS program. The mean, standart deviation and percentage distributions for the descriptive data were calculated. In the analysis of the differences between the independent variables, the independent t test was used for parametric tests for normal distribution data and the nonparametric Man Whitney U test was used for non-normal distribution data. We used Person correlation for parametric datas and Spearman correlation for nonparametric datas. The significance level of all data was accepted as $p < 0.05$.

RESULTS

The sociodemographic information of the study group and the control group was displayed in Table

1. 55 of the participants (74.3%) were female and 19 (25.7%) were male and the mean (SD) age was 69.45 (0.43) years. 45.9% were obese, 31.1% were mildly overweight and 23% were normal. 45.9% were literate, 44.6% had completed primary school, 8.1%

had graduates from high school and 1.4% had graduated from university (Table 1). There was no differences between two groups in terms of mean age ($p=0.496$).

Table 1. Sociodemographic data

Variables	Group I (N=36) Mean(SD)	Group II (N=38) Mean(SD)
Age (year)	69.1 (3.3)	69.1 (4.0)
Body Mass Index	N (%)	N (%)
Normal	4 (11.1)	13 (34.2)
Overweight	7 (19.4)	16 (42.1)
Obese	25 (69.4)	9 (23.7)
Educational Status		
Literate	18 (50.0)	16 (42.1)
Primary school	14 (38.9)	19 (50)
High school	3 (8.3)	3 (7.9)
University	1 (2.8)	0(0)

Group I: Study, Group II: Control, (SD: Standard Deviation, N: Number, %: Percent)

There were differences between the study group and the control group in all quality of life subscales. The individuals who exercised showed significantly higher levels of physical and psychological roles, well-being and general health condition those who

did not exercise. Pain conditions were also significantly lower than the control group ($P < .05$). There was no statistically significant difference between the groups in terms of body awareness, kinesiophobia and falling risks ($P > .05$) (Table 2).

Table 2. Comparison groups for quality of life, body awareness, kinesiophobia levels and falling risk.

Variables	Group I(N=36) Mean(SD)	Group II(N=38) Mean(SD)	P
PF	71.11(27.67)	23.66 (12.03)	.000
RLPP	27.78(27.88)	64.03(27.63)	.000
RLEP	28.70(20.16)	52.24(22.72)	.000
V	60.56(14.38)	44.46(14.51)	.000
MH	66.44(12.10)	37.39(16.27)	.000
SF	60.56(18.90)	34.74(16.39)	.000
P	61.67(26.29)	9.81(18.87)	.000
GHP	59.72(18.63)	47.92(15.35)	.004
BA	91.11(18.86)	88.75(12.20)	.524
TSK-11	27.76(4.15)	27.06(3.63)	.379
DENN	5.92(3.42)	6.67(4.11)	.526

Notes: parametric data: MH, GHP,BA; nonparametric data: TSK, DENN

Abbreviations: The scale consists of physical functioning (PF) (10 items), social functioning (SF) (2 items), role limitations due to physical problems (RLPP) (4 items), role limitations due to emotional problems (RLEP) (3 items), mental health (MH) (5 items), energy / vitality (V) (4 items), pain (P) (2 items) and general health perceptions (GHP)

In Group I while there was a negative correlation between physical functioning (a quality of life subscale) and kinesiophobia ($P=.008$ $r=-0.431$) and physical functioning and falling risk ($P=.001$ $r=-0.546$), there was a positive correlation between physical functioning and body awareness ($P=.023$ $r=0.377$). There was a negative correlation between role limitations due to physical problems and the risk of falling ($P=.007$ $r=-0.440$). The correlation

between vitality and kinesiophobia ($P=.004$ $r=-0.468$) vitality and falling risk ($P=.008$ $r=-0.434$). There was a positive correlation between mental health and body awareness ($P=.041$ $r=0.342$). There was a negative correlation between pain and kinesiophobia ($P=.041$ $r=-0.342$). There was a negative correlation between general health and kinesiophobia ($P=.014$ $r=-0.405$) and general health and falling risk ($P=.038$ $r=-0.348$). There was a

positive correlation between kinesiophobia and the risk of falling in Group I. (P=.003 r=0.481). There was a negative correlation between body awareness and the risk of falling (P=.030 r=-0.362) (Table 3). In Group II, there was no significant correlation between the quality of life, and kinesiophobia, body

awareness and falling risk (P>.05) There was a positive correlation between kinesiophobia and falling risk (P=.032 r=0.348), while there was a negative correlation between body awareness and kinesiophobia (P=.002 r=-0.481) (Table 4).

Table 3. Correlation between quality of life and kinesiophobia levels, body awareness and falling risk in exercising individuals.

Group I n=36	TSK		BA		DENN	
	r	p	r	p	r	p
PF	-0.431**	0.008	0.377*	0.023	-0.546**	0.001
RLPP	-0.241	0.156	0.138	0.421	-0.440**	0.007
RLEP	-0.211	0.217	0.231	0.175	-0.266	0.117
V	-0.468**	0.004	0.326	0.053	-0.434**	0.008
MH	-0.234	0.169	0.342*	0.041	-0.309	0.067
SF	-0.195	0.255	0.254	0.134	-0.307	0.068
P	-0.342*	0.041	0.303	0.073	-0.285	0.092
GHP	-0.405*	0.014	0.319	0.058	-0.348	0.038
BA	-0.260**	0.126	-	-	-0.362**	0.030
TSK-11	-	-	-0.260**	0.126	.0481**	0.003
DENN	0.481**	0.003	-0.362**	0.030	-	-

The scale consists of physical functioning (PF) (10 items), social functioning (SF) (2 items), role limitations due to physical problems (RLPP) (4 items), role limitations due to emotional problems (RLEP) (3 items), mental health (MH) (5 items), energy / vitality (V) (4 items), pain (P) (2 items) and general health perceptions (GHP)

Table 4. Correlation between the quality of life of and non-exercising individuals and kinesiophobia levels, body awareness and falling risk

Group II n=38	TSK		BA		DENN	
	r	p	r	p	r	p
PF	-0.194	0.243	0.069	0.680	-0.318	0.051
RLPP	-0.176	0.292	0.076	0.650	-0.123	0.462
RLEP	-0.051	0.762	-0.012	0.941	-0.296	0.071
V	-0.073	0.665	-0.122	0.466	-0.120	0.475
MH	-0.192	0.247	-0.176	0.291	-0.114	0.495
SF	-0.015	0.930	-0.138	0.409	0.072	0.669
P	-0.090	0.591	-0.259	0.116	-0.123	0.460
GHP	-0.174	0.295	-0.086	0.607	0.013	0.937
BA	-0.481**	0.002	-	-	-0.316**	0.053
TSK-11	-	-	-0.481**	0.002	0.348**	0.032
DENN	0.348**	0.032	-0.316**	0.053	-	-

DISCUSSION

In this study, the quality of life of older adult individuals who exercised and did not exercise was compared to their body awareness, kinesiophobia levels and falling risk. While there was a difference between the groups in terms of quality of life, there was no difference in terms of body awareness, kinesiophobia levels and falling risk. Regularly and timely exercise protects the health condition of older adult individuals and reduces the risk depression,

thus preventing the older adult person's inability and increasing their quality of life¹⁵. According to Legters²⁶, functional decline and physical falls are closely associated with the fear of falling and a decline in the quality of life. The results of our study have revealed the positive effects of exercise on the quality of life. Positive results in the quality of life sub-scales mental health, pain and energy were significantly higher in those who exercised compared to those who did not exercise. There were significant negative correlations between the quality

of life, and kinesiophobia and falling risk. Contrary to our results, Batkın and Sumer²⁷ found no significant differences between the 2 groups in the study of 47 individuals living in nursing homes and 47 individuals living at home in terms of the quality of life. In this regard, Kırdı¹⁵ reported that older adult people who exercise are more physically active than non-exercising older adult people, and that they experienced an increase in strength and functioning capacities.

Kinesiophobia has been described by Kori, Miller and Todd²⁸ as the fear of excessive, repetitive injury that can occur after painful injury, reducing physical activity. Problems related to kinesiophobia in the older adult are rarely mentioned; they are usually associated with chronic pain. Larsson et al²⁹ found that the scores of individuals older than 65 did not change TSK-11 score in who were tracked for 12 months did not change over a year. Silva et al³⁰ have found that older people with musculoskeletal disorders who experience kinesiophobia particularly face a loss in activity due to the fear of movement. According to Pereira et al³¹ found pain and kinesiophobia are as factors that impair physical performance and lead to increase in the risk of falling resulting from pain or pain related disabilities in the older adult. Based on their study Vincent et al³² found a positive correlation between pain during walking and kinesiophobia in older adult people with chronic low back pain. Knapik et al³³ found a high negative correlation between the biological and psychological aspects of kinesiophobia and they found lower levels of kinesiophobia in physically active older adult women. Saulicz et al³⁴ found that the older adult individuals with lower levels of kinesiophobia showed significantly higher levels of physical activity during their adolescence. In this study, unlike in other studies, exercise and kinesiophobia were examined and the correlation between the quality of life, body awareness and the risk of falls was analyzed. There was no significant difference in the levels of kinesiophobia between the groups that did and did not exercise according to our results. On the other hand, in the group that exercised, only the correlation with the risk of falling was significant.

Body awareness is a general concept for body management, body experience, and the use of the body³⁵. There was no difference between exercising and non-exercising group; however, it was correlated with the quality of life, the fear of

movement and the risk of falling. In the exercising group, we found a negative correlation between body awareness levels and physical functioning, role limitations due to physical problems and vitality and general health. There was also a negative correlation between falling risk and body awareness in this group. In the non-exercising group, there was a negative correlation between body awareness levels and kinesiophobia. In the literature, there are studies on the effects of certain exercise programs that aim to improve body awareness, such as body awareness therapy, tai chi and yoga. Studies have shown that tai chi has a positive effect on postural control in the older adult and reduces their risk of falling³⁶. Exercise programs that improve physical capacity and balance are practiced among the older adult³⁷. Jacobs et al³⁸ demonstrated the effects of in-water exercises on improving body awareness. Hee³⁹ investigated the effects of the Body Mechanic Training program on reducing the fear of falling in individuals over 65 years of age. They found no statistical differences, but argued that the training older adult about body mechanics may be useful in increasing their levels of body awareness.

Many studies have shown that exercise reduces the risk of falls. A study that attributed to Gardner et al, who examines the efficacy of the exercise program in reducing the risk of falls and incidences of falls, recorded a significant decrease in the risk in individuals over 60 years of age⁴⁰. Pereira et al³¹ demonstrated that exercise reduced 16% of falls. In another study researchers argue that before they are encouraged to increase their physical activity outside of the home in order to reduce falls, the older adult must develop their physical abilities in a secure environment. This is important in demonstrating the positive effects of physical activity and physical capacity and in reducing the incidence of falls³⁶.

Liubicich et al⁴¹ assessed mobility functions including balance and gait with a group consisting of 33 exercising older adult and a control group 11 older adult living in nursing homes. There was no difference between the exercising group and control group before the study. After the physical activity program, the mobility levels including balance and gait in the exercise group were significantly higher than the control group. In our study, there was no difference in the risk of falling between older adult individuals who were given a 12-week exercise program and those who did not exercise. We didn't ask the physical activity habits of the individuals in

their pre-older adult period. Furthermore, the inclusion of older adult individuals with a low and moderate risk of falling suggests that they require longer follow-up.

Our results indicated that, of the quality of life subscales, there was a positive correlation between kinesiophobia and physical functioning, vitality and general health in the exercising group. Developing more specific exercises programs for risk of falling, kinesiophobia and body awareness is an important need.

Strengths of the study was to provide evaluating many parameters together. Because there are a lot of factors affecting exercise in elderly than other age groups. Balance, fear and anxiety are the most common problems. In our study, the relationship between body awareness, kinesiophobia, quality of life, and falling risk parameters were examined in exercise group and non exercise group. Thus, the effect of the exercise of the parameters could be revealed more clearly. Another strength of the study was to evaluate body awareness in effect of exercises. Our results showed that body awareness was associated with kinesiophobia and risk of falling. This is the first study to reveal the relationship.

Limitation of the study is not to compare the results with other older adults groups. The lack of literature on working with different older adult groups has may led to this limitation. In future studies, the study population could be distributed across 2 groups (young older adults, old older adults). We performed the study with low and moderate risky participants, we could not assess the effect of exercise on other variables according to the risk of falling. The study limited to 12 weeks and did not compared with before and long term results. Since participants' exercise habits during adulthood were not asked, it was not possible to correlate the results. Thus, this should be improved for future research. Previous kinesiophobia, quality of life and body awareness levels hadn't been calculated. So before and after results could not compared.

In conclusion, the concepts of quality of life, emotional state, kinesiophobia, body awareness, and the risk of falls should be assessed as a whole and the planning of exercise as a preventive and health-promoting approach for young older adult people is important for the success of geriatric rehabilitation programs.

Acknowledgement

We would like to thank the participants and the faculty of health science students Sultan Demirezen and Fatma Aksoy who contacted with older adult care centers.

REFERENCES

1. Stalenhoef P, Diederiks J, Knottnerus J, Kester A, Crebolder H. A risk model for the prediction of recurrent falls in community-dwelling elderly: a prospective cohort study. *J Clin Epidemiol.* 2002;55:1088-94.
2. Gillespie LD, Robertson MC, Gillespie WJ, Sherrington C, Gates S, Clemson LM et al. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev.* 2012;(9):CD007146..
3. Skelton D, Todd C. Interventions to prevent accidental falls among older people. *Prevention of Falls Network Europe.* 2004.
4. Albertsson DM, Mellström D, Petersson C, Eggertsen R. Validation of a 4-item score predicting hip fracture and mortality risk among elderly women. *Ann Fam Med.* 2007;5:48-56.
5. Güneş GY. Yaşlılarda egzersizin fiziksel aktivite, hareket korkusu, yorgunluk ve uyku kalitesine etkisi (Yüksek lisans tezi). Ankara, Hacettepe Üniversitesi, 2015.
6. Akyol Y, Durmuş D, Doğan C, Bek Y, Cantürk F. Quality of life and level of depressive symptoms in the geriatric population. *Arch Rheumatol.* 2010;25:165-73.
7. Merlau Ponty M. *Phenomenology of Perception.* London, Routledge & Kegan Paul, 1958.
8. Dahlberg K, Dahlberg H, Nyström M. *Reflective Lifeworld Research.* Lund, Sweden, Studentlitteratur, 2008.
9. Dennenberg N, Reeves G. Changes in health locus of control and activities of daily living in a physical therapy clinic using the Feldenkrais method of sensory motor education (Master's thesis). Rochester, Michigan, Oakland University, 1995.
10. Phipps A, Lopez R. A functional outcome study on the use of movement re-education in chronic pain management (Master thesis). Forest Grove, Pacific University, 1997.
11. Apel U. The Feldenkrais method: awareness through movement. *WHO Reg Publ Eur Ser.* 1992;44:324-7.
12. Hansell S, Mechanic D. Body awareness and self-assessed health among older adults. *J Aging Health.* 1991;3:473-92.
13. Oğuz H. *Tıbbi Rehabilitasyon, 3. Baskı.* İstanbul, Nobel Tıp Kitapevleri, 2015.

14. Ertüzün E, Karaküçük S, Bodur S. Health beliefs of females related with sportive recreational activities. *Int J Sport Stud*. 2015;5:535-44.
15. Kırdı N. Importance of exercise in older adult. 3th Academic Geriatri Congress; May 26-30 2010, 2010; Cyprus.
16. Nelson ME, Rejeski WJ, Blair SN, Duncan PW, Judge JO, King AC et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. *Circulation*. 2007;116:1094-105.
17. NICE. Fall Risk Assessment Form Nebraska's Medicare Quality Improvement Organization 2006. UK, NICE, 2006.
18. Tekin DE, Kara N, Tan NU, Arkuran F. The Delmarva Vakfı tarafından geliştirilen Düşme Riski Değerlendirme Ölçeğinin Türkçe uyarlaması: geçerlilik ve güvenilirlik çalışması. *Hemşirelikte Eğitim ve Araştırma Dergisi*. 2013;10:45-51.
19. Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the TSK-11: a shortened version of the Tampa Scale for Kinesiophobia. *Pain*. 2005;117:137-44.
20. Larsson C, Hansson EE, Sundquist K, Jakobsson U. Psychometric properties of the Tampa Scale of Kinesiophobia (TSK-11) among older people with chronic pain. *Physiotherapy theory and practice*. 2014;30:421-8.
21. Özcan Bingül U, Baş Aslan U. Korku-Kaçınma İnanışlar Anketi'nin Türkçe'ye uyarlanması, güvenilirliği ve geçerliği. *Fizyoterapi ve Rehabilitasyon*. 2013;24:135-43.
22. Karaca S. Vücut farkındalığı anketinin Türkçe uyarlaması: geçerlik ve güvenilirlik çalışması (Yüksek lisans tezi). Muğla, Muğla Sıtkı Koçman Üniversitesi, 2017.
23. Erden A, Altuğ F, Cavlak U. Sağlıklı kişilerde vücut farkındalık durumu ile ağrı, emosyonel durum ve yaşam kalitesi arasındaki ilişkinin incelenmesi. *Journal of Kartal Training Research Hospital*. 2013;24:145-50.
24. Ware Jr JE. SF-36 health survey update. *Spine*. 2000;25:3130-9.
25. Kocuyigit H. Reliability and validity of the Turkish version of short form-36 (SF-36): a study in a group of patients with rheumatic diseases. *Turk J Drugs Ther*. 1999;12:102-6.
26. Legters K. Fear of falling. *Phys Ther*. 2002;82:264-72.
27. Batkın D, Sümer H. Evde ve huzurevinde yaşayan yaşlılarda yaşam kalitesinin değerlendirilmesi. *Sağlık ve Toplum*. 2010;20:31-9.
28. Kori SH, Miller RP, Todd DD. Kinisophobia: a new view of chronic pain behaviour. *Pain Manage*. 1990;3:35-43.
29. Larsson C, Hansson EE, Sundquist K, Jakobsson U. Kinesiophobia and its relation to pain characteristics and cognitive affective variables in older adults with chronic pain. *BMC Geriatrics*. 2016;16:128.
30. Silva NS, Abreu SSE, Suassuna PD. Kinesiophobia and associated factors in elderly females with chronic musculoskeletal pain: pilot study. *Revista Dor*. 2016;17:188-91.
31. Pereira LSM, Sherrington C, Ferreira ML, Tiedemann A, Ferreira PH, Blyth FMet al. Self-reported chronic pain is associated with physical performance in older people leaving aged care rehabilitation. *Clin Interv Aging*. 2014;9:259-65.
32. Vincent HK, Seay AN, Montero C, Conrad BP, Hurley RW, Vincent KR. Kinesiophobia and fear avoidance beliefs in overweight older adults with chronic low back pain, relationship to walking endurance: part II. *Am J Phys Med Rehabil*. 2013;92:439-45.
33. Knapik A, Saulicz E, Rottermund J, Saulicz M, Myśliwiec A. Successful aging-the role of physical activity and its barriers in women of advanced age. *Family Health Disease*. 2013:13-23.
34. Saulicz E, Knapik A, Saulicz M, Myśliwiec A. Physical activity in youth and level of kinesiophobia in older adults. *Baltic Journal of Health and Physical Activity* 2016;8:64-77.
35. Roxendal G. Body awareness therapy and the body awareness scale: treatment and evaluation in psychiatric physiotherapy (Doctoral thesis). Gothenburg, University of Gothenburg, 1985.
36. Shih J. Basic Beijing twenty-four forms of Tai Chi exercise and average velocity of sway. *Percept Mot Skills*. 1997;84:287-90.
37. Wolf SL, Barnhart HX, Ellison GL, Coogler CE, Group AF. The effect of Tai Chi Quan and computerized balance training on postural stability in older subjects. *Phys Ther*. 1997;77:371-81.
38. Methajarunon P, Eitivipart C, Diver CJ, Foongchomcheay A. Systematic review of published studies on aquatic exercise for balance in patients with multiple sclerosis, Parkinson's disease, and hemiplegia. *Hong Kong Physiotherapy Journal*. 2016;35:12-20.
39. Hee J. The effects of body mechanics training on fear of falling in community-dwelling older adults (Master's thesis). Tacoma, WA, University of Puget Sound, 2011.
40. Suzuki T, Kim H, Yoshida H, Ishizaki T. Randomized controlled trial of exercise intervention for the prevention of falls in community-dwelling elderly Japanese women. *J Bone Miner Metab*. 2004;22:602-11.
41. Liubicich ME, Magistro D, Candela F, Rabaglietti E, Ciairano S. Physical activity and mobility function in elderly people living in residential care facilities. "Act on aging": a pilot study. *Advances in Physical Education*. 2012;2:54-60.