

Investigating the Effect of Home-based Physical Activity Schedule on the Quality of Life, Sleep Quality, and Mood of the Elderly at Risk of Depression as Compared to the Control Group

Abstract

Background: This study aimed at investigating the effect of home-based physical activity schedule on the quality of life (QOL), sleep quality, and mood of the elderly at risk of depression as compared to the control group. **Materials and Methods:** The open-label randomized controlled trial was performed on 61 elderly people at risk of depression who were divided into two groups. In addition to routine care provided by the health-care center (relaxation techniques), the elderly in the intervention group were given a home-based physical activity booklet. The control group only received the routine care of the health-care center. Moreover, before and after the intervention, the results of the QOL questionnaire, petersburg sleep quality questionnaire index (PSQI), and depression questionnaire were assessed and recorded. **Results:** The depression scores in the 1st and 3rd months during the intervention and 1 month after the intervention were significantly lower in the intervention group with the means of 3.60 ± 3.91 , 2.03 ± 2.43 , and 2.66 ± 3.37 as compared with the control group with the means of 5.39 ± 2.88 , 4.96 ± 2.77 , and 5.13 ± 3.14 , respectively ($P < 0.05$). Furthermore, the QOL and total PSQI scores in the physical and mental dimensions in the 3rd months during and 1 month after the intervention were higher in the intervention group as compared with the control group ($P < 0.05$). **Conclusion:** According to the findings of the study, the addition of home-based physical activity schedule to the routine care of the elderly can play a significant role in reducing the severity of their depression and improving their physical–psychological quality and sleep quality.

Keywords: Depression, Aged, physical activity, quality of life, Sleep Hygiene

Introduction

In most societies today, aging is an important issue. According to statistics, the elderly population is increasing, so that against the world population growth rate of 1.7%, it is 2.5% for the age of 65 years and older and it is predicted that about 10% of the population of the world be older than 65 years old in 2025.^[1] Therefore, along with increasing the quantity of the elderly, it is very important to pay attention to their quality of life (QOL) and identify the factors affecting it to promote health, prevent the occurrence of chronic diseases, and reduce the prevalence of aging-associated diseases.^[2]

One of the major mental illnesses of old age is depression. The prevalence of depression in the elders is about 22.4% in Iran, and according to the World Health

Organization, this rate is higher in nursing homes than in other settings and reaches 35%.^[3,4] Being female, older age, low education, poor lifestyle (smoking and alcohol consumption and inactivity), social factors (living alone, divorce, and lack of social support), physical condition (chronic diseases, impaired physical function, and cognitive decline), psychological stress, and poor QOL are factors affecting the onset and severity of depressive symptoms in the elderly.^[5]

Exercise and physical activity are considered as one of the antidepressant treatments with easy and cheap implementation.^[6] The results of previous studies show that exercise, especially resistance activity, can be physiologically beneficial in the elderly and reduce the prevalence of various neurological diseases, including depression, Alzheimer's, and dementia.^[7] In addition, physical activity can reduce the symptoms

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Motamedi N, Mostajabodaavati SR. Investigating the effect of home-based physical activity schedule on the quality of life, sleep quality, and mood of the elderly at risk of depression as compared to the control group. *Adv Biomed Res* 2021;10:17.

Narges Motamedi,
Seyede Roxana
Mostajabodaavati

Department of Community
and Family Medicine, Isfahan
University of Medical Sciences,
Isfahan, Iran

Address for correspondence:

Dr. Seyede Roxana
Mostajabodaavati,
Department of Community
and Family Medicine,
Isfahan University of Medical
Sciences, Isfahan, Iran.
E-mail: mostajabroxana@gmail.
com

Received: 24 July 2020

Revised: 24 August 2020

Accepted: 14 October 2020

Published: 29 July 2021

Access this article online

Website: www.advbiores.net

DOI: 10.4103/abr.abr_180_20

Quick Response Code:



of depression not only in healthy adults but also in people with major depression.^[5] The results of a study by De Mello *et al.* showed that the prevalence of depression and anxiety in people who did not have physical activity was 1.2 and 2.5 times more than those who had regular physical activity, respectively.^[8] Numerous studies have also suggested an association between daily activities and exercise and depression reduction and increasing the QOL in the elderly people.^[9-11]

The sleep quality of the elderly is another important indicator of health in old age. Epidemiological studies have shown that >57% of the elderly have sleep disorders and only 12% of them do not complain of sleep problems.^[12] Sleep disorders in the elderly can lead to depression, memory impairment, fatigue, mood swings, and anxiety.^[13] Regular physical activity increases the core body temperature, causing more relaxation and a way to start and maintain a high-quality sleep.^[14] The results of previous studies indicate that there was a significant positive relationship between the quality of sleep of the elderly and the amount of walking and daily physical activity.^[12,15,16]

Given that the elderly with depressive symptoms and low mood are less likely to participate in physical activity programs, it is important to consider an acceptable and sustainable physical activity program in the short and long term for the participants.

In summary, given the importance of the above-mentioned matters and the need for a regular and acceptable physical activity program for the elderly to promote mental health as well as the limited numbers of qualified clinical trials and considering shortcomings such as nonrandom allocation, lack of specificity for the elderly, small sample size, short follow-up period, lack of consideration of physical activity beyond daily activities, and lack of attention to facilitating physical home based activities, the present study was conducted aiming at evaluating the effect of these activities schedule on the QOL, sleep quality, and mood of the elderly at risk of depression compared to the control group.

Materials and Methods

Study design and participants

This open-label randomized controlled trial was conducted on the elderly at risk of depression in Isfahan. Sample size was estimated to be 32 individuals in each group based on the sample size formula at 95% confidence level, power of 80%, and considering differences in the score of the depression scale with standard deviation (SD) = 5 and at least 3.5 ($\mu_1 - \mu_2$) using previous studies.^[17]

Using simple random sampling method, 64 eligible elderly people at risk of depression who were referred to the two clinics of the No. 1 comprehensive health center (Rezaeeian and Ebn-sina) were selected. Then, they were

randomly assigned to the intervention or control groups using SPSS software (version 23; SPSS Inc., Chicago, Ill., USA).

The inclusion criteria included the age of higher than 65 years, having a profile in the comprehensive health centers, and being classified as at risk of depression by a physician in the assessment of elderly depression. These individuals were diagnosed as at risk of depression based on the criteria recommended in the New Health Services Package for elderly physicians announced by the Ministry of Health. It included getting 6 or more points from the depression scale (in the nonphysician service package) and having <3 symptoms of complementary questions or at least a key symptom. In addition, people with dementia or a disease that prevented them from engaging in physical activity (such as physical disability) did not included into the study. If the participants did not want to participate in the study and in case of complications such as problems and diseases leading to physical problems or failure to follow their condition during the study, they were excluded from the study.

In this study, one person in the control group and two people in the intervention group were excluded from the study due to lack of regular exercise (according to report of their family members) and lack of cooperation until the end of the study [Figure 1].

Randomization and intervention

After obtaining the code of ethics from Isfahan University of Medical Sciences (IR.MUI.MED.REC.1397.095) and obtaining the clinical trial code (IRCT20180513039630N1) and written consent from the elderly, eligible participants were divided into two groups using a random number table and their demographic information such as age, gender, level of education, employment, and marital status were recorded. Furthermore, before the intervention, they were completed three questionnaires of QOL, sleep quality, and depression.

The intervention group was invited to a public meeting by phone. In this meeting, the objectives of the study, sports protocol, and physical activities were explained to them and they were then given booklet on home-based physical activity that included training in aerobic-balance-endurance activities designed based on the facilities available at home.

The physical activity booklet was based on the part of Khoshbin's book entitled A guide to improving a healthy lifestyle in old age and considering the comments of some experts and turned into a home-based booklet.^[10]

Furthermore, in the control and intervention groups, routine measurements were performed according to the instructions of the new health services package for the physician of the elderly at risk of depression, which included ways to control stress and relaxation exercises. It was provided

to participants as the booklets. In both groups, a calendar was given to record daily physical activities that could be installed on the refrigerator (or similar location). The participants were asked to register the minutes of their daily activities and then the weekly mean of each activity duration were calculated.

Both groups were weekly followed by telephone to evaluate their regular physical activities and related problems for 3 months. In addition, the questionnaires were recompleted to assess the QOL, sleep quality, and depression of the elderly and the amount of weekly physical activity at the end of the 1st and 3rd months during the intervention. These questionnaires were completed on the phone or face-to-face in the related centers by the researcher.

Then, after 1 month from the end of the intervention (home-based physical activity), the QOL, sleep quality, depression, and the amount of weekly physical activity (in minutes per day) were evaluated and recorded again in the elderly.

Instruments

The Short-Form Health Survey (SF-36), Pittsburgh Sleep Quality Index (PSQI), and Geriatric Depression Scale (GDS-15) were completed before initiation of intervention. The SF-36 was used for evaluating QOL. The questionnaire evaluates the QOL in three dimensions: Physical health, mental health, and social functioning. Physical health includes subbranches of physical function, physical problems (limitations), physical pain, and general health. Mental health includes subbranches of mental health problems, mental health, psychological problems, and vitality. The score obtained from each dimension is

converted into 100 scales, so that zero denotes the worst and 100 show the best situation of the person in each dimension.^[18] The validity and reliability of this scale have been evaluated and confirmed outside and inside Iran.^[18,19]

The petersburg sleep quality index (PSQI) was used to evaluate sleep quality. The questionnaire contains 19 items that evaluates sleep quality in seven parts of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the past month. Each item gets a score between 0 and 3, in which 3 indicates a poor quality of sleep and 0 indicates a good quality of sleep.^[20] This questionnaire has been validated and confirmed inside and outside Iran.^[20,21]

The existence and severity of depression in individuals were also assessed using a 15-item GDS-15. This scale does not have a dimension and generally measures the depression of the elderly. It is responded with 0 and 1 score, and the total score is in the range of 0–15. A score of <5 is considered as nondepressive, a score of 5–9 is considered mild depression, and a score of more than 9 is considered severe depression.^[22] This scale was validated and confirmed outside and inside Iran.^[22,23]

Data analysis

Finally, the collected information was entered into SPSS software (version 23; SPSS Inc., Chicago, Ill., USA). The data were shown in mean ± SD or frequency (percentage). Furthermore, independent *t*-test was used for comparing the mean quantitative variables (including QOL and depression) between the two groups, Mann–Whitney was used for comparing the average quality of sleep between the

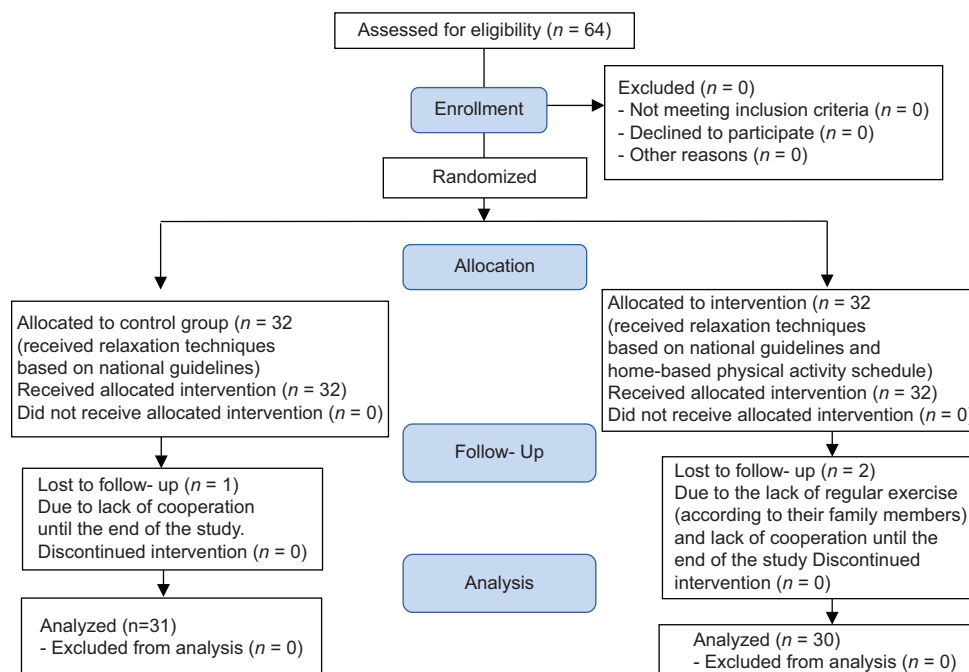


Figure 1: Consort flowchart

two groups, Chi-square test was used for comparing the frequency distribution of qualitative variables, and repeated measures ANOVA was used for comparing changes in quantitative variables during follow-up study (before the intervention to 1 month after the intervention) in each group. In all analyzes, a significance level of <0.05 was considered.

Results

The demographic information in the two study groups are listed in Table 1. Statistically, the two groups did not have significant differences in terms of age, gender, level of education, employment status, and marital status and home conditions ($P > 0.05$).

In addition, their daily physical activity before the intervention between the two groups did not differ significantly ($P < 0.05$). However, in the 1st and 3rd months during the intervention and 1 month after the intervention, daily physical activity in the intervention group was significantly higher than the control group ($P < 0.05$) [Figure 2]. Changes in daily physical activity before, during, and after the intervention in the control group were not significantly different. However, there was a significant increase in the intervention group during the 1st and 3rd months of the study and 1 month after intervention compared to before study, while there was not a significant difference between the 1st and 3rd months of during and 1 month after the intervention [Figure 2].

In addition, the QOL of the elderly in the three dimensions of physical, mental health, and social functioning before and during the 1st month of the intervention between the two groups did not differ significantly ($P < 0.05$). However, the physical and mental health of the elderly in the intervention group was higher with the mean of 61.44 ± 17.62 and 64.29 ± 21.23 in the 3rd months during the intervention than the control group with the mean of 43.70 ± 11.84 and 46.37 ± 14.99 , respectively ($P < 0.05$). In 1 month after the intervention, the physical and mental health of the elderly in the intervention group with the mean of 61.36 ± 20.14 and 59.68 ± 22.83 was higher than the control group with the mean of 44.96 ± 12.95 and 46.08 ± 9.02 , respectively ($P < 0.05$). Moreover, in the intervention group, there was a significant increase in physical and mental health from before the intervention to 1 month after the intervention ($P < 0.05$). However, no significant difference was found in the control group during this follow-up ($P < 0.05$). On the other hand, although the social functioning of the elderly in the intervention group was slightly higher than the control group, based on physical activity, this intervention could not have a significant effect on this factor and therefore there was no significant difference between the two groups over time ($P > 0.05$) [Table 2]. In more detail, it was found that the physical health dimension includes the subbranches of physical function, physical pain, physical problems,

and general health. The mental health dimension includes psychological problems, mental health, and vitality. In the control group, there were no significant changes, while in the intervention group, before the intervention, up to 1 month after the intervention, there was a significant increase in the improvement of these subbranches of physical and mental health, so that during the 3rd months of intervention, the mental and physical health of the elderly in the subbranches mentioned was higher in the intervention group compared to the control group ($P < 0.05$) [Figure 3].

On the other hand, the results of the evaluation of the sleep quality in the elderly indicated that before the intervention,

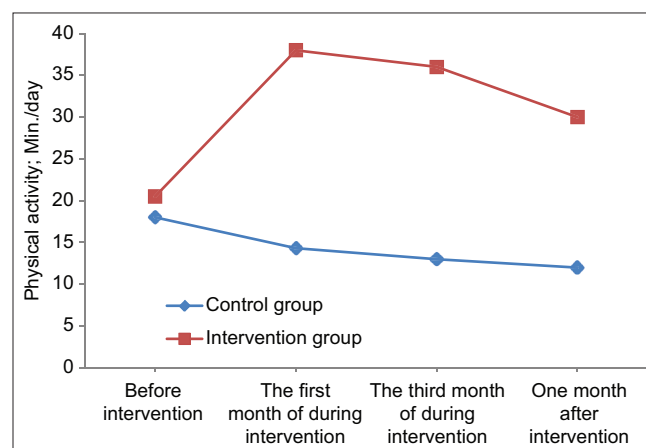


Figure 2: Comparison of physical activity of the elderly between the two study groups

Table 1: Comparison of baseline characteristics of the elderly between the two groups

Characteristics	Control group (%)	Intervention group (%)	P
Age (year)	65.10±4.23	64.00±4.35	0.336
Gender			
Male	8 (25.8)	6 (20)	0.762
Female	23 (74.2)	24 (80)	
Education level			
Guidance school degree	8 (25.8)	4 (14.3)	0.467
Under diploma to diploma	22 (71)	21 (75)	
University education	1 (3.2)	3 (10.7)	
Occupational status			
Self-employment	4 (12.9)	2 (7.1)	0.703
Housewife	20 (64.5)	21 (75)	
Retired	7 (22.6)	5 (17.9)	
Marital status			
Single	1 (3.3)	0 (0)	0.490
Married	24 (80)	22 (78.6)	
Other (divorced, widow)	5 (16.7)	6 (21.4)	
Roommate status			
Alone	2 (6.7)	2 (6.9)	0.805
With son	5 (16.7)	5 (17.2)	
With spouse	22 (73.3)	22 (75.9)	
Other	1 (3.2)	0 (0)	

the two groups did not significantly differ from each other in terms of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction ($P < 0.05$). However, in the 1st month during the intervention, the subjective sleep quality, sleep efficiency, sleep disorders, and daytime dysfunction of the elderly in the intervention group improved significantly compared to the control group ($P < 0.05$). In addition, in the 3rd months during

the intervention and 1 month after the intervention, the subjective sleep quality, sleep latency, and daytime dysfunction of the elderly in the intervention group were significantly better than the control group ($P < 0.05$). In general, during the follow-up in the intervention group, significant improvements were seen in all dimensions of sleep quality. Moreover, in the control group, significant improvement was found in the two dimensions of sleep latency and sleep disorders ($P < 0.05$). Overall, the

Table 2: Determining and comparing the mean value of dimensions of quality of life in the elderly between the two groups

QOL*	Before intervention	During intervention		After intervention One month	P ^a
		First month	Third month		
Physical health					
Intervention group	43.53±16.70	50.06±14.43	61.44±17.62	61.36±20.14	<0.001
Control group	44.12±15.60	44.50±11.75	43.70±11.84	44.96±12.95	0.958
P ^b	0.886	0.103	<0.001	<0.001	
Mental health					
Intervention group	46.42±18.94	51.04±18.04	64.29±21.23	59.68±22.83	0.008
Control group	47.85±17.81	47.62±15.83	46.37±14.99	46.08±9.02	0.915
P ^b	0.762	0.434	<0.001	0.003	
Social functioning					
Intervention group	54.01±23.43	58.16±19.13	58.66±24.11	58.59±21.82	0.755
Control group	55.50±23.27	55.27±24.97	55.33±25.23	51.15±14.50	0.786
P ^b	0.805	0.615	0.600	0.121	

*The range of scores is from zero to 100 and a higher score indicates better QOL, ^aSignificance level obtained from repeated measures ANOVA for comparing changes in QOL over time in each group, ^bSignificance level obtained from independent *t*-test for comparing the mean of QOL over time in each group. QOL: Quality of life

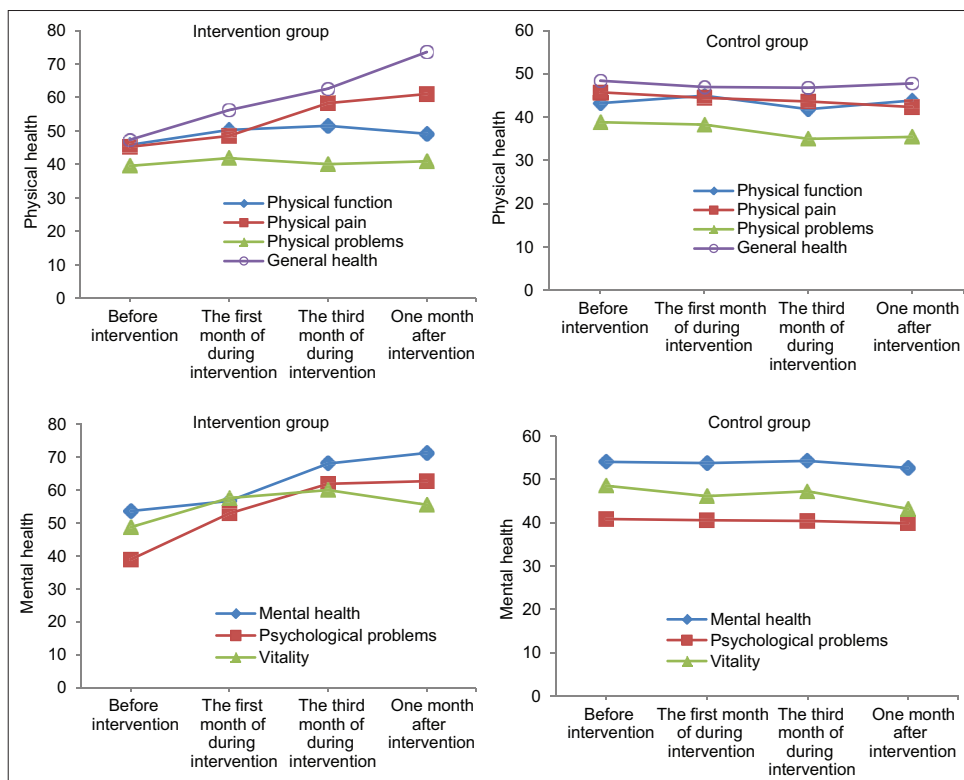


Figure 3: Mean of subbranches of physical and mental health of the elderly between the two groups

improvement of the sleep quality in the elderly from the 1st month of the intervention was significantly higher in the intervention group than the control group ($P < 0.05$). Moreover, the overall score of PSQI in both control and intervention groups decreased significantly over time (before the intervention to 1 month after the intervention); in other words, the quality of their sleep increased generally in both groups [Table 3]. Besides, the sleep quality with the total score of the PSQI showed that the PSQI score in the 1st and 3rd months during the intervention and 1 month after the intervention in the intervention group with the mean of 4.90 ± 3.23 , 4.43 ± 2.24 , and 3.33 ± 2.20 was significantly lower than the control group with the mean of 7.65 ± 4.83 , 6.90 ± 2.95 , and 5.74 ± 2.86 ($P < 0.05$) [Figure 4].

Finally, the evaluation of the mood based on the GDS depression scale in the elderly showed that before the

intervention, there was no significant difference in depression score between the two groups ($P < 0.05$). However, in the 1st and 3rd months during the intervention and 1 month after the intervention in the intervention group, the depression score with the mean of 3.60 ± 3.91 , 2.03 ± 2.43 , and 2.66 ± 3.37 was significantly lower than the control group with the mean of 5.39 ± 2.88 , 4.96 ± 2.77 , and 5.13 ± 3.14 ($P < 0.05$). In addition, before the intervention to 1 month after the intervention, the level of depression in the elderly in the intervention group significantly decreased with time ($P < 0.05$) [Figure 5].

Discussion

The aim of this study was to evaluate the effect of home-based physical activity schedule on QOL, sleep quality, and mood of the elderly at risk of depression

Table 3: Determining and comparing the mean of sleep quality dimensions between the two groups

Sleep quality	Before intervention	During intervention		After intervention One month	<i>P</i> ^a
		First month	Third month		
Subjective sleep quality					
Intervention group	1 (0-3)	1 (0-2)	0.5 (0-1)	0 (0-2)	<0.001
Control group	1 (0-3)	1 (0-3)	1.5 (0-3)	1 (0-3)	0.169
<i>P</i> ^b	0.118	<0.001	0.001	0.004	
Sleep latency					
Intervention group	1 (0-3)	0.5 (0-3)	0 (0-2)	0 (0-1)	0.002
Control group	1 (0-3)	1 (0-3)	2 (0-3)	1 (0-2)	0.027
<i>P</i> ^b	0.973	0.914	0.017	0.008	
Sleep duration					
Intervention group	1 (0-3)	1 (0-3)	1 (0-3)	0 (0-2)	0.005
Control group	1 (0-3)	1 (0-3)	1 (0-3)	1 (0-3)	0.162
<i>P</i> ^b	0.302	0.739	0.128	0.143	
Sleep efficiency					
Intervention group	1 (0-3)	0 (0-2)	1 (0-3)	0.5 (0-2)	0.025
Control group	1 (0-3)	2 (0-3)	1 (0-3)	1 (0-3)	0.191
<i>P</i> ^b	0.205	0.003	0.172	0.625	
Sleep disorders					
Intervention group	1 (0-3)	0.5 (0-2)	0 (0-2)	0.5 (0-3)	<0.001
Control group	1 (0-3)	1 (0-3)	0.5 (1-3)	0.5 (0-2)	0.021
<i>P</i> ^b	0.443	0.009	0.042	0.406	
Use of sleeping medication					
Intervention group	0 (0-2)	0 (0-3)	0 (0-2)	0 (0-1)	0.020
Control group	0 (0-2)	1 (0-3)	1 (0-3)	1 (0-3)	0.162
<i>P</i> ^b	0.787	0.789	0.243	0.284	
Daytime dysfunction					
Intervention group	1 (0-3)	0 (0-2)	0.5 (0-2)	0 (0-2)	0.027
Control group	1 (0-3)	1 (0-3)	1 (0-3)	1 (0-3)	0.292
<i>P</i> ^b	0.275	0.030	0.031	0.043	
Total PSQI score					
Intervention group	5 (2-13)	4.5 (1-12)	4 (0-9)	3 (0-7)	0.001
Control group	7 (4-14)	8 (0-14)	8 (3-14)	5 (1-12)	0.040
<i>P</i> ^b	0.222	0.002	0.001	0.036	

Data are expressed as mean (minimum-maximum). Scores between 0 and 3 indicates lack of sleep problem to very serious sleep problem.

^aSignificance level obtained from repeated measures ANOVA for comparing changes in sleep quality over time in each group, ^bSignificance level obtained from Mann-Whitney test for comparing the mean of sleep quality over time in each group. PSQI: Pittsburgh Sleep Quality Index

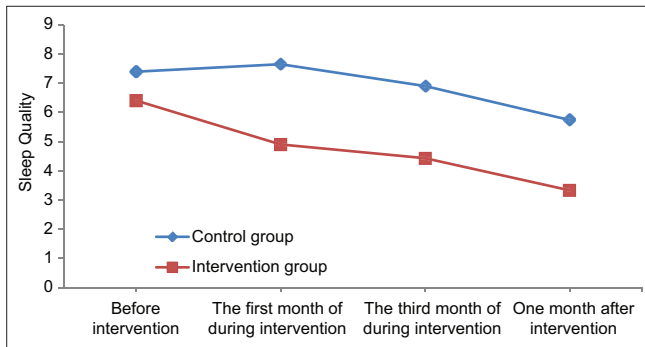


Figure 4: Total mean of PSQI score in the two groups

compared to the control group. Investigating the effect of home-based physical activity on QOL in the elderly at risk of depression showed that in three dimensions of physical and mental health and social functioning before and during the 1st month of intervention, it was not significantly different between the two groups. However, in the 3rd month of the intervention, the physical and mental health of the elderly in the intervention group was significantly higher than the control group. Moreover, in examining the dimensions of physical and mental health such as physical function, physical pain, physical problems, and general health and dimensions of mental health, consisting of subbranches of mental health problems and vitality, it was found that in the intervention group, from before the intervention to 1 month after the intervention, there was a significant increase in the improvement of these subbranches of physical and mental health. Since the 3rd month of the intervention, the physical and mental health of the elderly in the subbranches mentioned in the intervention group has been more than the control group. Finally, the results of social functioning as one of the dimensions of QOL suggested that the social functioning of the elderly in the intervention group was slightly higher than the control group, although it was not statistically significant.

Explaining this finding, it can be said that physical dysfunction and lack of physical and mental health in the elderly have a negative effect on the ability to maintain independence. All of these factors ultimately lead to a decrease of their QOL. Therefore, what modern sciences pay attention to not only is the prolongation of life, but also they pay attention to the fact that the elderly years of human life should be spent completely in calm with physical and mental health. Therefore, improving the QOL of the elderly is an important aspect of treatment and efforts to improve the QOL have always been considered by researchers. In this regard, consistent with the present study, Reid *et al.* reported that in addition to genetic variables that can affect mental perceptions and QOL, physical activity and exercise have also a significant effect on the QOL of the elderly.^[24] In addition, the results of other studies indicate that increasing motor abilities increase the QOL and health in this group

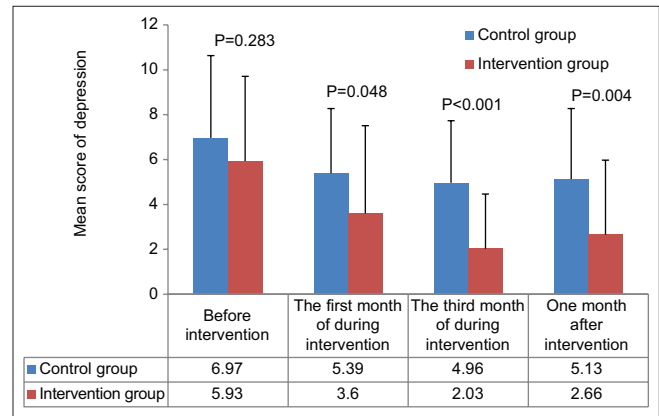


Figure 5: Determining and comparing the mean score of depression in the elderly between the two groups

of individuals.^[1,25] In general, exercise and daily activities can affect each of the physical,^[26] psychological,^[27] and social factors,^[28] thus improving the QOL.

On the other hand, evaluation of the sleep quality in the elderly showed that before the intervention, the two groups did not significantly differ in terms of sleep quality, subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disorders, use of sleeping medication, and daytime dysfunction. However, the sleep quality of the elderly in the 1st and 3rd months of intervention and 1 month after the intervention was significantly higher in the intervention group than in the control group. So that, in the 1st month during the intervention, the subjective sleep quality, sleep efficiency, sleep disorders, and daytime dysfunction of the elderly significantly improved in the intervention group compared to the control group. Moreover, in the 3rd months during the intervention and 1 month after the intervention, the subjective sleep quality, sleep latency, and daytime dysfunction of the elderly in the intervention group were significantly better than the control group. Similar to this study, according to the results of various studies on the sleep quality of the elderly, there is a direct relationship between sleep disorders in the elderly and the amount of physical activity.^[12,29]

In explaining this finding, it can be said that sleep quality is an important indicator of health in old age because insomnia in the elderly can affect individual health and increase the incidence of disease. In addition, concerning the mechanism of action of daily activities on sleep quality, it can be stated that regular physical activity reduces body fat percentage, especially fats in the arteries, around the lungs, intestines, stomach, and heart, which helps increase physiological efficiency and it plays an important role in deepening the sleep. In addition, regular physical activity leads to the release of hormones responsible for relaxation such as endorphins and the secretion of lactic acid in the body, which increases the body's innate need for rest and relaxation.

Finally, the results of the evaluation of the mood in the elderly based on the GDS depression scale showed that before the intervention, the elderly depression score between the two groups did not differ significantly. However, in the 1st and 3rd months during the intervention and 1 month after the intervention in the intervention group, the depression score was significantly lower than in the control group. Moreover, over time, up to 1 month after the intervention, the level of depression in the elderly in the intervention group has decreased significantly. In addition to the physical problems of the old age, depression is the most common mood disorder among the elderly. Older people feel that they have lost control of their lives as a result of problems such as limited social contact, financial constraints, and physical changes, such as decreased vision and hearing. Such problems can cause anxiety, disappointment, and social isolation in the elderly by creating negative emotions. These factors will eventually lead to depression, as the biggest psychological problem, and consequences to the serious and dangerous outcome of such emotions. Studies have shown that the elderly depression is directly related to decreased QOL^[30,31] and exercise and physical activity, as the most effective nonpharmacological therapies with increased vitality and peace of mind, concentration, and management lead to distracting negative thoughts and treating depression in the elderly.^[9-11]

Finally, it is recommended that health managers and policymakers, as well as health-care providers, pay special attention to the mental health of the elderly, including depression, sleep disorders, and QOL by guiding the elderly to perform easy home-based physical activity. It is recommended that this schedule be added to the routine care of the elderly at risk of depression so that we have healthy seniors.

Conclusion

According to the results of the present study, adding home-based physical activity to routine care for the elderly at risk of depression can play a significant role in improving the QOL in physical and mental dimensions and the sleep quality of the elderly. On the other hand, it significantly reduces their depression.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Laleh P, Yaser KB, Bahram P, Mohammad AJ, Mohammad-Bagher KA. The survey of the relationship between quality of life of elderly with depression and physical activity in Tabriz, Iran. *J Rehab Med* 2013;2:39-46.
- Kang HW, Park M, Wallace Hernandez JP. The impact of perceived social support, loneliness, and physical activity on quality of life in South Korean older adults. *J Sport Health Sci* 2018;7:237-44.
- Mirzaei M, Sahaf R, Mirzaei S, Sepahvand E, Pakdel A, Shemshadi H. Depression and its associated factors in elderly nursing home residents: A screening study in Khorramabad. *Iran J Ageing* 2015;10:54-61.
- Majdi M, Ghayour-Mobarhan M, Salek M, Taghi M, Mokhber N. Prevalence of depression in an elderly population: A population-based study in Iran. *Iran J Psychiatry Behav Sci* 2011;5:17-21.
- Chi SH, Wang JY, Tsai AC. Combined association of leisure-time physical activity and fruit and vegetable consumption with depressive symptoms in older Taiwanese: Results of a national cohort study. *Geriatrics Gerontol Int* 2016;16:244-51.
- Dinas P, Koutedakis Y, Flouris A. Effects of exercise and physical activity on depression. *Irish J Med Sci* 2011;180:319-25.
- Shabani M, Hovanloo F, Ebrahim K, Hedayati M. The effect of acute resistance exercise on BDNF, IGF-1 and IGFBP-3 in the elderly. *Iran J Ageing* 2014;9:218-26.
- De Mello MT, Lemos Vde A, Antunes HK, Bittencourt L, Santos-Silva R, Tufik S. Relationship between physical activity and depression and anxiety symptoms: A population study. *J Affect Disord* 2013;149:241-6.
- Schuch F, Dunn A, Kanitz A, Delevatti R, Fleck M. Moderators of response in exercise treatment for depression: A systematic review. *J Affect Dis* 2016;195:40-9.
- Khoshbin S, Farahani A, Motlagh MS, Ghosi A, Alavian SM. A Guide to Improving a Healthy Lifestyle in Old Age: An Active Life. Publication: Tandis; 2010. p. 1-74.
- Arman M. The comparison of depression, anxiety and stress between active and inactive old women in Isfahan. *Rehabil Med* 2014;3:10-5.
- Wu C, Su T, Fang C, Yeh CM. Sleep quality among community-dwelling elderly people and its demographic, mental, and physical correlates. *J Clin Med Assoc* 2012;75:75-80.
- Ahmadi SH, Khanekeh HR, Mohammadi F, Fllahi Khoshkenab M, Rezasoltani P. Effectiveness of treatment with limitation on sleep quality of older adults. *Salmand* 2010;5:7-15.
- Gomeñuka NA, Oliveira HB, Silva ES, Costa RR, Kanitz AC, Liedtke GV, *et al.* Effects of Nordic walking training on quality of life, balance and functional mobility in elderly: A randomized clinical trial. *PLoS One* 2019;14:e0211472.
- Vanderlinden J, Boen F, van Uffelen JG. Effects of physical activity programs on sleep outcomes in older adults: A systematic review. *Int J Behav Nutr Phys Act* 2020;17:11.
- Wang F, Boros S. The effect of physical activity on sleep quality: A systematic review. *Europ J Physiother* 2019;1:1-8.
- Mokhtari M, Nezakatalhossaini M, Esfarjani F. The effect of 12-week pilates exercises on depression and balance associated with falling in the elderly. *Procedia Soc Behav Sci* 2013;70:1714-23.
- Wagner AK, Wyss K, Gandek B, Kilima PM, Lorenz S, Whiting D. A Kiswahili version of the SF-36 health survey for use in Tanzania: Translation and test of scaling assumptions. *Quality Life Res* 1999;8:101-10.
- Montazeri A, Vahdaninia M, Mousavi SJ, Omidvari S. The Iranian version of 12-item short form health survey (SF-12): Factor structure, internal consistency and construct validity. *BMC Public Health* 2009;9:341.
- Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR,

- Kupfer DJ. The pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res* 1989;28:193-213.
21. Farrahi Moghaddam J, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). *Sleep Breath* 2012;16:79-82.
 22. De Craen AJ, Heeren TJ, Gussekloo J. Accuracy of the 15-item geriatric depression scale (GDS-15) in a community sample of the oldest old. *Int J Geriatric Psychiatry* 2003;18:63-6.
 23. Sohrabi M, Zolfaghari P, Mahdizade F, Aghayan S, Ghasemian-Aghmashhadi M, Shariati Z, *et al.* Evaluation and comparison of cognitive state and depression in elderly admitted in sanitarium with elderly sited in personal home. *Knowledge Health* 2008;3:27-31.
 24. Reid KJ, Baron KG, Lu B, Naylor E, Wolfe L, Zee PC. Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. *Sleep Med* 2010;11:934-40.
 25. Vukotic M. The importance of physical activity and fitness programs in older people: A systemic review. *J Anthropol Sport Phys Educ* 2018;2:37-41.
 26. Falck RS, Davis JC, Best JR, Crockett RA, Liu-Ambrose T. Impact of exercise training on physical and cognitive function among older adults: A systematic review and meta-analysis. *Neurobiol Aging* 2019;79:119-30.
 27. Sadeghi H, Alireza F. The effect of a water exercise program on static and Dynamics balance in elder women. *Iran J Aging* 2008;2:402-9.
 28. Liu Y, Lachman ME. A group-based walking study to enhance physical activity among older adults: The role of social engagement. *Res Aging* 2020; 2 (1):164027520963613.
 29. Brandão GS, Gomes GS, Brandão GS, Callou Sampaio AA, Donner CF, Oliveira LV, *et al.* Home exercise improves the quality of sleep and daytime sleepiness of elderlies: A randomized controlled trial. *Multidiscip Respir Med* 2018;13:2.
 30. Saeidimehr S, Geravandi S, Izadmehr A, Mohammadi MJ. Relationship between the quality of life and symptoms of depression among older adults. *Salmand: Iran J Ageing* 2016;11:90-9.
 31. Cao W, Guo C, Ping W, Tan Z, Guo Y, Zheng J. A community-based study of quality of life and depression among older adults. *Int J Environ Res Public Health* 2016;13:693.