

The Effect of Stationary Walking on the Quality of Life of the Elderly Women: A Randomized Controlled Trial

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ARTICLE INFO	ABSTRACT
<p>Article Type: Original Article</p>	<p>Introduction: Aging has a profound effect on all the body organs and quality of life. One of the appropriate interventions is exercises such as walking. Nevertheless, the risk of falling and its complications are lower in stationary walking than walking on ground. Due to the higher life expectancy in women than men, the increasing number of elderly, and the low quality of life of women compared to men, this study aimed to assess the impact of stationary walking on the quality of life of the elderly women.</p> <p>Methods: In this clinical trial, 66 household elderly women covered by health centers of Maragheh were randomly selected and divided into experimental and control groups. Six weeks exercise intervention was conducted. The participants completed the quality of life questionnaire of the elderly, before and after the intervention. SPSS software was used to analyze the data.</p> <p>Results: Mean scores of quality of life, in various aspects of the experimental group, before and after intervention, showed significant difference; there was no statistically significant difference in the control group. In addition, there was a significant difference in the mean and standard deviation of different aspects of quality of life in pre- and post-test of experiment and control groups.</p> <p>Conclusion: Using regular and constant exercise program such as stationary walking can increase the quality of life of the elderly women. It can improve healthy aging and having a healthy life at this age, too. Therefore, it is recommended to have stationary walking program in daily lives of the elderly.</p>
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Introduction

With the increasing number and proportion of older people in developed and developing countries, aging has become a major demographic and society issue.^{1,2} The United Nations in 2009 had announced the total number of elderly people around the world as 750 million people. According to this report, about 5 million people in Iran, meaning 7% of the total population, is comprised of people over 60-years old. It is estimated that this number in 2050 will reach about 27 million people, meaning 28% of the

total population.² The increasing proportion of elderly in Iran will show itself in 2040. According to the estimations of Iranian bureau of population and family health, the population of over 60-years old will reach 8.5 million in the year 2021.³

According to the WHO report, in 2012 the life expectancy in Iran was 70 years in men and 75 years in women.⁴ Although women have more life expectancy than men, but due to life style differences between men and women, and problems of gender inequality, unpaid work, low exercise and mobility, and more anxiety and distress in women, this

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group specially in older ages are more prone to health problems⁵ and are in need of special attention. Global statistics show that the proportion of elderly women in most developed and developing countries is considerably more than the elderly men. However, according to the statistical center of Iran during 1976- 2006, it showed that in every decade due to advances in health services, social and economic, the number of elderly women have increased in Iran. Nevertheless, the proportion of elderly women to men has reduced. Social indicators of health between men and women are different in Iran. Heart disease, high blood pressure, osteoporosis, illiteracy and emotional and psychological problems are more in elderly women than men and the quality of life in elderly women is lower.⁶ Despite the proven favorable effects of exercise, the majority of elderly women follow sedentary lifestyle and their exercise levels are less than their peers.⁷

Aging has a profound impact on people's health and quality of life and elderly people are in need of basic interventions to improve it.⁸ One of the strategies to improve the quality of life is regular and proper exercise. Stretching exercise causes muscles to relax, release and disposal of toxins, and increase blood flow to tissues. In addition, exercise reduces stress hormones and may lead to relaxation and helps the body to effectively cope with stress.⁹ Besides, an exercise that actively situates the body towards proper position, balance and coordinated movements, causes physical, mental and spiritual abundance.¹⁰ Exercise promotes health and agility in elderly person and makes faster responses to stimulus, person's ability increases, and makes him/her feel more powerful; thus it can help in one's self-care.⁸

Physical activity can effectively improve the quality of life during old ages and reduce disability due to aging. Using drugs to improve situations, which have side effects with high costs are much less important than the long-term effects of different strategies for

sport. 20 to 30 minutes of daily exercises can improve physical function in elderly men and women.¹¹

One of the suitable exercises is stationary walking on treadmill.¹² It could be said that walking on treadmill is mechanically similar to walking on ground.¹³ The advantage of stationary walking compared to other exercise programs is that it can be used at home or other desirable places, and it is more efficient to use this exercise rather than other complex cardiovascular exercises. Therefore, people can easily enjoy the benefits of exercise and improve their quality of life.¹²

One of the fundamental problems of the elderly, especially during exercise and walking is the inability to maintain their balance resulting in falling.¹⁴ Falling is one of the most common and most serious problems of aging. By aging, their abilities decrease and their physiological changes increasingly expose them to various diseases. Approximately, one third of people over 65 years, fall down at least one time in a year and half of these cases frequently fall. Causes of falling in older people are divided into two categories: internal and external factors. The internal factors include musculoskeletal disorders, emotional and mental problems, underlying diseases, nervous system diseases and disabilities associated with aging. The external factors include environmental problems that could be related to the area of residence, the structure of the residence, and environmental hazards (slipping and falling down). Consequences of falling in elderly people not only affect their own lives but also lead to further complications such as fear of falling, activity restriction, social isolation, and increased dependence on others.¹⁵ Studies conducted in Iran also suggest that falling on the ground is one of the most common causes of trauma in the elderly and older women are more involved than older men.¹⁶

During exercise, by walking or standing on a treadmill, the likelihood of falling in older people reduces.¹⁴ Also, using treadmill is based on the principle that walking on

treadmill is combined by reliable and valid measurements. While with casually walking on the ground, measurement is not possible.¹³

The only group of people and the elderly that cannot use treadmill are those who have foot bone and joint problems. Even the elderly who have cardiac problems are able to use the treadmill.¹² Walking on a treadmill initially increases heart rate, but after 6 minutes the rate is decreased.¹³ Elderly should consult their doctor about the maximum intensity allowed for them to run and their maximum heart rate before using treadmill. Treadmill can also be used for rehabilitation of people with stroke and muscle weakness.¹²

While the nurses have always considered long life, in recent years, more attention has been focused on the quality of life during aging. According to Eason, nurses can carry out effective interventions on the physical performance and self-care of the elderly, reduce their depression and anxiety, improve their mental performance and ultimately increase their life satisfaction and quality of life.¹⁷ Based on Ferrari study, long-term life depends on the strategies for survival of cells against various pathological factors. Physical activity can effectively enhance the quality of life in old age and decrease the disability of elderly.⁹ Kennar argues in his study that elderly, who exercise regularly compared to others, feel comfortable and are more satisfied with their lives.¹⁸ Stoppard suggested that sedentary lifestyle is significantly involved in the development of risk factors for age-related diseases and can lead to reduced quality of life.⁸ So, according to these advantages, people can benefit from comfortable and appropriate exercise and this can be a step towards improving their quality of life.

Nowadays, due to the limitations of exercise in outdoor spaces and problems caused by it, many families are unable to benefit from its advantages. Solutions should be found for families, specially the elderly, to enjoy the benefits of exercise. Due to the large

number of elderly, health problems affect their quality of life, and the importance of exercise in their lives, this study demonstrated the impact of stationary walking on the quality of life of elderly; with the assumption that the elderly women who perform stationary walking have better quality of life than the control group.

Materials and methods

This article is based on the research project "Evaluating the effect of stationary walking on the quality of life of the elderly women of Maragheh", approved by the faculty of nursing and midwifery, Tabriz University of Medical Sciences; according to the letter No. 5/4/3324, deputy of research and technology of Tabriz University of Medical Sciences, dated 05/1/2009 has been completed. (Ethic committee code: 92166)

This study was a controlled clinical trial. The study population comprised of the elderly women of Maragheh (Iran). The total number of elderly women referred to health centers in Maragheh (9 centers) was 9297. The sample size with the significant level (α) of 0.05 and test power of 0.8 for two-tailed tests, using the results of Kargarfard et al.,¹⁹ study was estimated 25 people in each group. Due to the possibility of sample loss in clinical studies, the number of 33 people per group, a total of 66 people, was taken into account. Sampling was randomly performed from a list of 65-75-year-old people, who were from the families covered by health centers of Maragheh. Then, for the random allocation of groups, each subject was given an identifier and based on the table of random numbers the subjects were divided into control and experiment groups.

Inclusion criteria included having 65 to 75 years of age, female gender, ability to answer LEIPAD (Leiden-Padua) questionnaire, signing informed consent to participate in the study, and having no mental disability, joint problems, or musculoskeletal problems confirmed by a specialist.

A physician assessed all participants at baseline. Women who had regular sports activity in 2 to 3 sessions per week in the past 2 months, or would not tolerate exercises, or did not wish to continue participating in the study were excluded from the study.

To gather data, LEIPAD questionnaire was used. It measures the quality of life of the elderly in association with physical and self-care dimensions. It is vision-based; zero represents the worst case with the lowest score, and the terminal numbers indicate the best and highest rate. This questionnaire was designed in 1998 by three Leiden University centers in Netherlands, Padua, Italy and Helsinki in Finland. Cultural aspects of the questionnaire were eliminated for use in all countries. After using this tool in three countries and its translation into three languages by experts, and ensuring its validity by the Office of Rotterdam Inventory control, it was approved. In Iran, the content validity of the questionnaire was conducted in Isfahan University of Medical Sciences and its reliability was proven ($\alpha=0.81$).²⁰

Researchers examined the inclusion criteria, and contacted the study subjects, explained the project and its objectives and invited them to participate in the study. After obtaining informed consent and being examined by a physician, all the subjects in health centers completed the quality of life questionnaire. Then, according to the schedule, the experiment group was invited to participate in an exercise program. Again, before beginning the exercise program, all the elderly were examined by the physician. The exercise training was performed in rehabilitation centers of Red Crescent in Maragheh with the guidance of a physiotherapist.

Treadmill is an exercise tool used for stationary walking, jogging, and running. The treadmill used in this study was Orchid and its calibration was done before the exercise by the seller company. To achieve the significant effects of exercise training, there is a need for physical intervention for 6

to 7 weeks. Furthermore, 3 to 5 times of weekly exercise for 20 to 30 minutes is enough for men and women.²¹

In this study, the experimental group had exercise intervention during the 6 weeks, in 3 sessions per week and each session was 30 minutes. Based on the literature review, researchers of this study made a structured exercise protocol and supervised designs; this protocol consisted of three parts: warm-up, aerobic exercise, and cool-down. The exercise sessions in the experiment group were in the form of group exercises, with 4 people in each group. In the first 7 minutes, stretching and ballistic movements were performed for warm-up. This section contained a series of dynamic exercises for enabling the major muscle groups. In the next phase for aerobic exercise, people walked for 15 minutes on the treadmill (with intensity of 2.5 m and speed of 5 km per hour), which was equipped to display for heart rate and calorie consumption. In order to control the intensity of physical activity, it was necessary to determine the maximum heart rate. In this case, the first 2 weeks of exercise intervention was done with 55% intensity, the second 2 weeks with 65% of intensity, and the third 2 weeks with 75% of maximum heart rate. In the third phase, for cooling down, the subjects performed stretching same as the first phase for 7 minutes.

It is worth noting if at the beginning of the exercise sessions the following issues occur, the subject would be excluded from that days exercise: systolic blood pressure less than 45 or more than 95 mmHg, resting heart rate greater than 100, oral temperature greater than 38°C, and respiratory rate greater than 20 at rest. During the exercise program, if any abnormal symptoms were observed in patient, the exercise program was stopped.²⁰ After completion of the 6 weeks of exercise intervention, the subjects were rescheduled to go back to the health centers to complete the quality of life questionnaire (24 hours after the intervention). Participants in the control group did not receive any advice for taking

part in sport intervention; they were only asked to complete the mentioned questionnaire twice in the same times as the experiment group. The data were analyzed using SPSS software version 13 (SPSS Inc., Chicago, IL) and chi-square, independent- and dependent-t tests.

Results

From 66 individuals participated in the study, 62 subjects eventually underwent evaluation and analysis. During 6 months, 2 subjects in the experiment group due to unwillingness to continue the study, 1 subject due to exercise intolerance, and 1 subject in the control group due to unwillingness to continue the study were excluded from the study in the post-test (Figure 1).

The results in tables 1 and 2 shows no statistically significant differences between experiment and control groups in terms of age, number of children, education level and marital status.

Before the intervention in all aspects of quality of life, no significant difference was observed between control and experiment group. Nevertheless, after intervention, dependent-t test showed a statistically significant difference between pre- and post-test of the experiment group in different dimensions of quality of life ($P < 0.001$). However, significant differences were not found between pre- and post-test of the control group. Changes of quality of life between the two groups were statistically significant (Table 3).

Discussion

The results of this study indicated that there was a significant relationship between the stationary walking and quality of life of elderly women. In this regard, Acree et al., showed a significant relationship between physical activity and physical function in the elderly, general health, vitality, social function, emotional, and mental satisfaction.²² Also, McAuley et al., study, with the

objective to assess physical activity and quality of life in older women, showed that changes in physical activity lead to changes in quality of life of women. With increase in physical activity, quality of life scores increased in the dimensions of physical health, physical pain, and general health.²³

Wolin et al. showed that women who had constant physical activity from 1986 to 1996 compared with women who reported no increase in their level of physical activity, earned higher quality of life in 1996. Also, increased physical activity resulted in increase in the scores of quality of life from 1996 to 2000.²⁴

Kibansky and Drory suggested that exercise can improve mobility, cognitive function, and psychological adjustment.²⁵ White et al., showed that with increased physical activity, physical and mental aspects of quality of life as well as the confidence and satisfaction, and overall quality of life increased.²⁶

In Bazrafshan et al., study on 400 women aged 60-79 years, the experiment group participated in an 8-weeks exercise program (three sessions a week, each session lasting 30 minutes). The results showed that the quality of life scores in the experiment group had significantly increased after exercise.²⁷

Also, a study by Elavsky et al., in the United States was conducted on 174 elderly and showed that physical activity leads to an increased quality of life in short duration.²⁸ In another study by Koltyn in the United States, the results showed that physical activity levels are significantly associated with quality of life and physical health of the elderly.²⁹

Lim et al., in Korea showed that there is a significant association between health and quality of life of the elderly and physical activity.³⁰ In a study by Hassanpour-Dehkourdi et al., with the aim to evaluate the effect of exercise on quality of life of the elderly, people's quality of life significantly increased compared to pre-intervention.³¹

Wood et al., showed that the elderly, who are independent in their daily activities, had better quality of life.³² In Herman et al., study, 9 patients who were able to move

independently and had mean age of 70 (6.8) years, walked on a treadmill for 30 minutes in 6 weeks for 4 sessions per week. The quality of life of the subjects increased after the intervention.³³

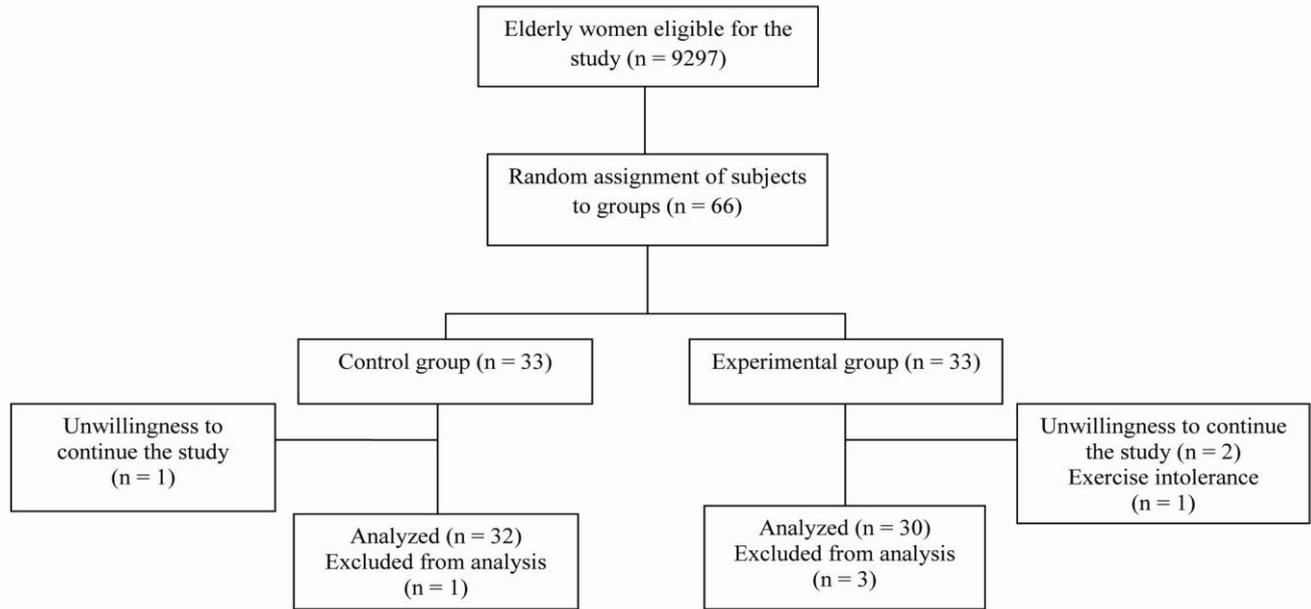


Figure 1. Clinical trial flowchart

Table 1. Mean and standard deviation of age, and number of children in the family of the subjects in experimental (n = 30) and control (n = 32) groups

Variable	Experimental Mean (SD)	Control Mean (SD)	Statistical indicators
Age (Year)	69.4 (2.94)	68.93 (3.5)	t = 0.56, df = 60, P = 0.5
Number of children	5.46 (2.19)	4.81 (1.73)	t = 1.3, df = 60, P = 0.1

Table 2. Frequency distribution of subjects according to educational level and marital status in the experimental (n = 30) and control (n = 32) groups

Specifications Status	Experimental group N (%)	Control group N (%)	Statistical indicators
Education level			$X^2 = 0.2, df = 2, P = 0.9$
Illiterate	11 (36.7)	13 (40.6)	
Primary	10 (33.3)	11 (34.4)	
Secondary	5 (16.7)	6 (18.8)	
High school	3 (10)	1 (3.1)	
University	1 (3.3)	1 (3.1)	
Marital status			$X^2 = 0.06, df = 1, P = 0.7$
Married	26 (86.7)	27 (84.4)	
Single	0	0	
Divorced	0	0	
Widow	4 (13.3)	5 (15.6)	

Table 3. Frequency distribution and comparison of quality of life dimensions of the subjects in experimental and control groups

Quality of life dimensions scores		Experimental group (n = 30) Mean (SD)	Control group (n = 32) Mean (SD)	Mean changes (95% CI)	Statistical indicators
Physical activity	Pre	60.80 (7.70)	63.15 (7.87)	-2.35 (-6.32, 1.60)	P = 0.240
	Post	68 (5.02)	62.87 (7.81)	5.09 (1.73, 8.44)	P = 0.004
	Dependent t-test result	t = -10.25, df = 29, P < 0.001	t = 0.78, df = 31, P = 0.43		
	Pre -post dif*	-7.2 (3.84)	0.28 (2.01)	7.48 (5.93, 9.03)	t = 9.67, df = 60, P < 0.001
Self-care	Pre	85.56 (6.07)	81.15 (14.21)	4.41 (-1.21, 10.03)	P = 0.120
	Post	87.60 (3.58)	80.43 (13.68)	7.16 (2.01, 12.31)	P = 0.007
	Dependent t-test result	t = -3.75, df = 29, P < 0.001	t = 1.53, df = 31, P = 0.13		
	Pre -post dif*	-2.03 (2.96)	0.71 (2.65)	2.75 (1.32, 4.18)	t = 2.03, df = 60, P < 0.001
Cognitive	Pre	60.2 (11.06)	58.9 (15.24)	0.33 (-6.12, 6.77)	P = 0.920
	Post	68.76 (8.24)	58.78 (14.29)	8.28 (2.79, 13.77)	P = 0.004
	Dependent t-test result	t = -4.67, df = 29, P < 0.001	t = 0.29, df = 31, P = 0.7		P < 0.001
	Pre -post dif*	-8.56 (10.02)	0.12 (2.43)	7.39 (4.48, 10.29)	t = 5.08, df = 60, P < 0.001
Life satisfaction	Pre	84.63 (11.98)	77.87 (22)	7.19 (-1.87, 16.27)	P = 0.120
	Post	95.2 (9.08)	77.46 (20.8)	18.83 (10.77, 26.88)	P < 0.001
	Dependent t-test result	t = -5.07, df = 29, P < 0.001	t = 0.94, df = 31, P = 0.3		
	Pre -post dif*	-10.54 (11.41)	0.4 (2.43)	12.07 (8.64, 15.50)	t = 7.04, df = 60, P < 0.001

* Pre- and post-test difference

Conclusion

This study showed that stationary walking leads to improvement in the quality of life of the elderly. Therefore, stationary walking can be one of the most important steps to enhance the quality of life of the elderly. The limitations of this study were the emotional stress of the participants, which affected the different dimensions of quality of life of the elderly and were beyond the control of the researchers.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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