



Research Article

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# The Effect of a Period of Regular Moderate-Intensity Physical Activity on Sleep Quality in Non-Active Elderly Men



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## Abstract

**Goals:** the aging period is a sensitive and damaging period due to physiological and psychological changes. The entrance to the aging period adds to the sensitivity of this period due to emotional deprivations, the increasing of sense of dependency and no role in life. The purpose of this study was to examine the effect of a period of regular moderate-intensity physical activity on sleep quality in non - active elderly men.

**Method:** The method of this study was semi empirical and design of it included pre-test, post-test with control group. The subjects of this study were 18 non - active elderly men. An appropriate training protocol and a valid questionnaire were used for this study. Shapiro Wilk Test was used to determine the normal distribution of data. The collected data were classified by descriptive statistical methods and were analyzed by dependent T-test and independent T-test ( $\alpha < 0.05$ ).

**Result:** The results of this study showed that there was no significant difference between control and experimental groups in the score of sleep quality before the training intervention and two groups were homogeneous. But, it was observed an improvement in sleep quality in the experimental group than the control group after the training intervention.

**Conclusion:** exercises can be useful to improve sleep quality in non-active elderly men and it is an effective step in the improvement of health of an aging society.

**Keywords:** Regular physical activity; Sleep quality; Elderly men; Non-active

## Introduction

The aging period age is a natural, biological, and general process [1]. It is a very sensitive period of a human's life and the attention to the issues and needs of this period is a social necessity. In other words, the aging is irreversible progressive and analytical changes that the physical and psychological forces diminish significantly in this period [2].

The aging period is a sensitive and damaging period due to physiological and psychological changes. . The entrance to the aging period adds to the sensitivity of this period due to emotional deprivations, the increasing of sense of dependency and no role in life. All kinds of physical and mental illnesses and diseases develop with the onset of aging [3]. The aging is the right of all human beings. It must be accepted that today, the aging period is not considered as a disease, and it is a passage from one stage to another stage of life. The aging is an inevitable reality. The aging will have a beautiful meaning with the acceptance of this view that aging is a human's perfection

time not the time of surrender to it. Today, the number of elderly people is increasing every year in the world with the improvement of medical science and technology [4,5]. The life expectancy in the world was 48 years old in the early 20<sup>th</sup> century, and only 4% of people were over 60 years old. The index rose to 65 years old at the end of this century. According to the World Health Organization (WHO), it is predicted that life expectancy will be 77 years in 2020 and 20% of the world's total population are people over 65 years old [6]. Changes occur in sleep quality and quantity and circadian rhythm with the age increasing. These changes can lead to sleep disturbances and repeated complaints from it [7].

In addition, the most important reason of sleep problems in the elderly people is not biological changes in the circadian rhythm, but the reason is due to diseases, the effect of drugs, depression, anxiety, and motor limitation [8]. Most of the elderly people suffer from the poverty of movement, so that studies

have shown that the poor sleep quality after headaches and gastrointestinal disorders is in the third grade of the problems in elderly people and is a common complaint and is one of the reasons for elderly individuals' referral to doctors [9]. In addition, the disturbance in the sleep quality and quantity in elderly people can lead to negative consequences such as the increasing of fatigue, too much sleep during the daytime, daily dysfunction, emotional and mental disorders, and the loss of quality of life [10-13]. On the other hand, studies show that variables of sleep quality and quality of life affect each other [14]. Park et al. [15] studied sleep quality in Korean older adults. They concluded that 60% of the subjects reported having poor sleep quality [15]. A research study showed that more than 51% of the elderly people suffer from sleep disturbance that this disturbance is considered as a factor for the reduction of sleep quality. The studied disorders in the mentioned study are the restless leg syndrome, the rapid movement of eye, the rhythm disturbance, insomnia, and the difficulty in falling sleep [16].

Bakhshalipour et al. [6] examined the effect of regular moderate-intensity physical activity on sleep quality in non-active elderly women. The results of their study showed that there was a significant effect on sleep quality in non-active elderly women after the intervention in the experimental group. Therefore, physical activity should be considered as an important principle in non-active elderly women's life and related organizations and institutions should also pay attention to it [17]. The results of another study also showed that 43% of the elderly people had poor sleep quality. In addition, mental characteristics and physical activities in elderly people of Taiwan city were surveyed in this study. The obtained data of this study showed that depression symptoms had a significant effect on poor sleep quality and physical activity had an improver effect on sleep quality [18]. A sedentary lifestyle is another factor that is often associated with the aging period [19]. A sedentary lifestyle can have a negative effect on elderly individuals' health. In this regard, the role of physical activity on physical and mental health is very important as an effective factor on a human's promotion and development, especially for elderly people [20]. The athlete elderly people have a higher general health and happiness than non-athlete elderly people [21,22]. The maintaining of high body function is one of the key and effective factors on a successful aging period, so that the maintaining of physical and mental activity can delay the development of some chronic diseases and disabilities and can improve physical and mental health in elderly people [23,24].

On the other hand, regular exercise can be an option for non-pharmacological treatment of metabolic disorders and sleep disturbances, especially in the elderly people [25-28]. These effects that are exacerbated by exercise depend on the intensity, volume, and duration of exercise [29]. Since the composition of the current population of this country is a young generation and they are also entering the aging period in the not

too distant future, so it is necessary now that we think about the improvement of the different effective dimensions in their life. According to the mentioned contents and the importance of the aging period in industrialized and developing societies, characteristics of this period and its effect on elderly individuals' life, and the necessity and importance of planning for the change of this group of society, the purpose of this study was to examine the effect of a period of regular moderate-intensity physical activity on sleep quality in non-active elderly men.

### Materials and Methods

#### Method

The method of research was semi empirical and design of it included pre-test, post-test with control group.

#### Participants

The subjects of this study were 18 non-active elderly men who voluntarily participated in this study.

#### Instruments and Tasks

The instrument of this study was an appropriate training protocol and a valid questionnaire.

#### Procedure

The necessary information and awareness about this study and its stages were explained to the subjects before the presentation of the consent form for the participation in test. Then, subjects' medical records including cardio-vascular disease, pulmonary disease, allergy, hypertension, and diabetes were identified by a questionnaire and subjects who had a special disease were excluded from this study. Subjects' history of physical activity was also examined and those who had a history of regular activity or were a member in clubs were excluded from the study. Subjects were asked to avoid from any intensity physical activity in stages of test.

#### Training Protocol

The training protocol was performed with an intensity of 60 percent of maximum heart rate for 12 weeks and 3 sessions in a week (36 sessions). This training was performed in the basis of specific recommendations of the American College of Sports Medicine (ACSM) for elderly people. Subjects trained in the first week for about 20 minutes each session. The duration and intensity of trainings was added in the coming weeks that the time training was about 40 minutes in the last week. Trainings consisted three parts: warm-up (8 minutes), aerobic exercise movements, and recovery (five minutes). The warm-up and cooling down program was considered a part of training time. Subjects' age subtracted from 220 to determine maximum heart rate and its certain percentage for each session due to the determination of the training intensity. Training intensity was monitored by Polar heart rate monitor during training. Practice conditions were the same for all subjects. All

subjects participated in the pre-test and the post-test. Only the experimental group trained during the training protocol and the control group did not exercise. Finally, subjects participated in the post-test.

**Data Analysis**

The collected data were classified by descriptive statistical methods and were analyzed by dependent T-test and independent T-test ( $\alpha \leq 0.05$ ).

**Result**

Subjects' individual characteristics were shown in Table 1. The mean and standard deviation of subjects' sleep quality index at the beginning of this study and after the execution of training protocol were shown in Table 2.

Table 1: Subjects' individual characteristics.

Group	Experimental	Control
*The lack of sports history (month)	49.86±17.74	56.4±23.51
*Age (years)	63.87±5.58	64.0±5.73

\*Mean±SD

Table 2: The results of variables survey in the pre-test and the post-test.

Group Variable		Experimental Group	Control Group
Sleep quality	Pre-test	10.1±3.24	12.3±3.39
	Post-test	8 ±2.45	12.7±3.45

**Discussion and Conclusion**

The purpose of this study was to examine the effect of a period of regular moderate-intensity physical activity on sleep quality in non - active elderly men. The results of the statistical tests showed that the sleep quality score in the experimental and control groups were not significantly different before the intervention and the two groups were homogeneous. The sleep quality improved in the experimental group in comparison of the control group after the training intervention. Although the results of sport studies are different about applied effects of exercise on body dimensions, several studies have shown a positive effect on sleep in elderly people and the aging period on the basis of an intervention and training protocols that included 30 minutes of exercise with maximum heart rate and the exercise intensity 67% - 70%, 30% -40% for 3 times per week and daily 30-minute daily walk, stretching or rhythmic movements, and

60 minutes of Tai Chi exercises twice a week. The positive effect of exercise on sleep was also observed in older studies that were softer than sleep problems [30-32].

The results of a study that was consistent with the results of this study showed that resistance trainings developed sleep quality in elderly people and led to an improvement in their sleep quality [33]. Also, another study that its results was consistent with the results of this study its results showed that elderly individuals' sleep quality improved significantly after four months of exercise trainings [34]. Another study was conducted with this same variable that its results were consistent with the results of this study. Its results showed that eight weeks of walking was significantly associated with sleep quality and some related metabolic indexes [35]. Bakhshalipour et al. [6] examined the effect of a moderate-intensity aerobic training program on the sleep quality, BMI, and weight in non-active people with type 2 diabetes. The results of this study showed functions of a moderate-intensity aerobic training program can be an effective treatment for sleep disturbances and obesity in non-active people with type 2 diabetes [28].

Thus, although it may be thought that sleep and physical activity are separate behaviors and are controlled by separate physiological mechanisms, but there is the evolving evidence about the existence of a clinical connection between sleep and physical activity. In general, exercise trainings have been considered as a non-pharmacological method with a positive effect and have been tested in a variety of studies in several studies, but the biological effect of exercise on sleep quality has been remained unclear that it cannot easily be analyzed. It seems that according to the theory of temperature regulation, changes in body temperature due to physical activities stimulate the hypothalamus and improve sleep quality. Research findings indicate that the melatonin hormone that creates changes in the body's core temperature has hypnotic effects human sleep and affects human's sleep, and on the other hand, the pineal gland secretes this substance and physical activity affects this gland. Also, in the theory of renewal of energy reserves, it is said that anabolic activity is better during sleep, and more catabolic activity occurs during night time. Also, theory of rebuilding of energy reserves expresses that anabolic the activity improves during sleep and more catabolic activity occurs during night time.

Therefore, a lot of energy that is spent on physical activity should be provided at rest in order to the proper balance of the energy and the maintaining of a balanced condition of body and the body tends to sleep more for this reason. According to the positive effect of the used training protocol on the sleep quality in non-active elderly men in this study, exercise can be useful in the improvement of sleep quality in elderly people and be considered as an effective step in the promotion process of health in an aging society.

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