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## The effect of regular moderate-intensity physical activity on sleep quality in non - active elderly women

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### Abstract

Sleep disorders are one of the problems that affect the quality of life in the elderly. The purpose of this study was to examine the effect of regular moderate-intensity physical activity on sleep quality in non - active elderly women. The method of research was semi empirical and design of it included pre-test, post-test with control group. 18 non - active elderly women were the subjects of this study. An appropriate training protocol and a valid questionnaire were used for this study. The collected data were classified by descriptive statistical methods and were analyzed by dependent T-test and independent T-test. The SPSS software (version 19) was used for data analysis ( $\alpha \leq 0.05$ ). The results of this 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.

**Keywords:** Regular physical activity, sleep quality, non - active elderly women

### 1. Introduction

Elderly is a process that all human of any gender, race, and culture will go through it. A period that if it has an appropriate quality, human's life will be desirable and enjoyable [1]. Elderly probably is the most important demographic phenomenon in the late twentieth century and early twenty-first century. Elderly people have the fastest growing among age groups and about two-thirds of the world's elderly population live in developing countries such as Iran [2]. Elderly is an inevitable process for human that refers to in analysis of progressive gradual in different parts of the body. It causes loss of fitness, physical inactivity, and consequently inactivity in life and social. Elderly is a sensitive period of human. Elderly's quality of life and physical activity is very important due to special needs of this period that should not be neglected. Physiological Disturbances [3], depression [4], cognitive disturbances [5], metabolic disorders [6], obesity [7], the reduction of power [8], the reduction of heart and lung fitness [9], and sleep disorders [10]. Are created with the increasing age that can be is more significant in the sixth decade of life. Sleep disorders are one of effective problems on the quality of life in elderly people [7]. Sleep disorders should be considered in the elderly due to its prevalence [10]. The good sleep quality maintains mental and physical health in addition to it reduces stress and anxiety, reinforces the ability of the adaptation with the environment, and increases the focus on daily activities [4, 11]. The research evidences show that insomnia is associated with anxiety and mood disorders [12], falling down [13, 14], and cognitive impairment [15] in elderly people. Considerable problems have been found in research studies in relation to a poor sleep quality and insomnia as well as potential side effects of sedative drugs that are normally prescribed [16]. This creates a necessity of the introduction of non-pharmacological therapeutic methods for the management of insomnia in elderly people. A sedentary lifestyle may be one of effective factors on a poor sleep quality in elderly people that it plays a role in the reduction of mental and physical health with the increasing age [17-19]. On the other hand, the maintaining of high physical function is considered a major factor for successful aging [17-19]. Physical activity is an effective method on a good sleep quality [23]. Physical activity causes biological and biochemical changes and improves mental health and sleep quality. Recently, researchers have shown that physical activity can reduce anxiety before sleep and it improves the sleep

quality in elderly people [20]. On the other hand, physical activity is a non-pharmacological mechanism that can have beneficial effects on sleep quality. This has been confirmed by epidemiological studies and there is a relationship between physical activity and sleep quality [21]. Health is an important issue in elderly people and have a great value in all societies. Therefore, it is necessary that the best and most appropriate method is selected for the improvement of sleep quality in elderly women. Therefore, the purpose of this study was to examine the effect of regular moderate-intensity physical activity on sleep quality in non - active elderly women.

## 2. Methodology

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

### 2.1 Participants

The subjects of this study was 18 non - active elderly women who voluntarily participated in this study. The necessary information and knowledge about 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, pulmonary, allergy, hypertension, and diabetes were identified by a questionnaire and subjects who had a special disease, were excluded from the study. Subjects' history of physical activity was also examined and those who had a history of regular activity or were a club member, were excluded from the study. Subjects were asked to avoid from any intensity physical activity in stages of test.

### 2.2 Instruments and Tasks

The instruments of this study were an appropriate training protocol and a valid questionnaire were used for this study.

### 2.3 Procedure

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 practice was performed in the basis of specific recommendations of the American College of Sports Medicine (ACSM) for elderly people. Subjects practiced in the first week for about 20 minutes each session. The duration and intensity of trainings was added in the coming weeks that time training was about 40 minutes in the last week. Training 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 time training. Subjects' age subtracted from 220 to determine maximum heart rate and its certain percentage for each session for the determination of the intensity of training. 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 post-test. Only the experimental group continued the practice during the training protocol and the control group did not exercise. Finally, subjects participated in the post-test.

## 3. Data Analysis

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

## 4. Results

Subjects' individual characteristics are shown in table [1]. Mean and standard deviation of subjects' sleep quality index at the beginning of the study and after the training protocol are shown in table [2].

**Table 1:** Subjects' individual characteristics

Group	Experimental	Control
*The lack of sports history (month)	53.72±17.74	53.4±23.51
*Age (years)	60.22±5.58	61.0±5.73

\* Mean±Sd

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

Group Variable	Experimental	Control
Sleep quality	Pre-test	Post-test
	<b>11.1 ± 8.24</b>	<b>13.3 ± 8.39</b>
	<b>10.1 ± 8.48</b>	<b>13.7 ± 3.48</b>

## 5. Discussion

The purpose of this study was to examine the effect of regular moderate-intensity physical activity on sleep quality in non - active elderly women. The results of this study showed that there was a significant effect on sleep quality in non - active elderly women after the intervention in the experimental group. This finding is consistent with the results of Erlacher *et al.*'s (2014) study. Erlacher *et al.*, (2014) studied the effects of exercise on sleep in adults with chronic sleep complaints [21]. The present study reports supplementary analysis of an already described and published study. Data were provided by a nonclinical sample of 98 normal-active adults with chronic initiating and the maintaining of sleep complaints. The results indicate that the number of steps ( $p = 0.02$ ) and the duration of physical activity ( $p = 0.01$ ) is significantly related to the improvement in subjective sleep measures and therefore reveal an independent effect within this combined sleep program. Sleep diary data (recuperation of sleep, number of awakenings after sleep onset, and wake time after sleep onset time) improved significant (all  $p < 0.01$ ) over the intervention program [22]. Geber, *et al.*, (2014) examined the effect of vigorous intensity exercise on stress, mental health, and good objective and subjective sleep in young adults. 42 male and female undergraduate students participated in this study. Geber, *et al.*'s (2014) study is consistent with this study since the positive role of physical activities has been proven on mental disorders. The results of Geber, *et al.*'s (2014) study showed that subjects who accomplished the American College of Sports Medicine's (ACSM) vigorous-intensity exercise recommendations differed from peers below these standards with regard to their level of perceived stress, depressive symptoms, perceived pain, and subjective and objective sleep. VPA was associated with less stress, pain, subjective sleep complaints and depressive symptoms. This suggests that the effectiveness of physical activity on individuals' sleep quality [23]. Lang, *et al.*, (2013) stated that both scientists and the general public assume that physical activity (PA) is an effective, non-pharmacological approach to improvement in sleep quality. However, objective and reliable data on this relationship are scarce, particularly for adolescents. Therefore, the aims of their study were to test the relationship by assessing both physical activity and sleep subjectively and objectively. A total of 56 adolescent vocational school students (Mean age=17.98, SD=1.36; 28 males, 28 females) participated in the study. Sleep and PA were subjectively assessed via questionnaires. Accelerometers objectively assessed PA, while sleep-EEG devices objectively assessed sleep. The data supported our prediction that adolescents with high PA levels would have longer TST, fewer wakening at night (WASO), fewer symptoms of insomnia, and higher sleep quality. However, gender influenced this pattern of results in that significant findings were only found between high self-reported PA levels and

shorter perceived sleep onset latency (SOL). Though self-reported PA levels were a better predictor of good sleep than objectively assessed PA levels, gender was associated with sleep complaints; females reported more sleep complaints. Results indicate that among a non-clinical sample of adolescents increased PA is favorably associated with restoring sleep. Therefore, PA seems beneficial not only for physical and mental health, but also for sleep restoration [24]. Fábio, *et al.*, (2011) assessed the effects of moderate exercise training on sleep quality and on the metabolic profile of elderly people with a sedentary lifestyle. Fourteen male sedentary, healthy, elderly volunteers performed moderate training for 60 minutes/day, 3 days/week for 24 weeks at a work rate equivalent to the ventilatory aerobic threshold. The results of this study showed that the moderate exercise training protocol improves the sleep quality, insulin resistance, and metabolic problems in older people [25]. Tartibian, *et al.*, (2013) compared the respiratory parameters and sleep quality in active and non-active young men. They stated that physical activity has good effects on enhancement of performance levels of lung volumes and improvement of sleep quality [26]. The results of mentioned studies that show the effectiveness of physical activity on sleep quality in non-active elderly people are consistent with this study. So, many research studies are conducting about the relationship between sleep and physical activity although it may be thought that sleep and physical activity behaviors are separate and control by separate physiological mechanism. This consistent with the results of mentioned studies can be due to that sleep is a complex and active experience and the quality and quantity of sleep are affected by several factors. For example, a proper physical activity program can increase the sleep quality in non-active elderly people. Therefore, the research samples show various research studies have pointed to the fact that physical activity improves a specific type of sleep in non-active elderly people. It seems that these effects can be created due to the major role of melatonin that plays an important role in sleep. It should be noted that physical activity effects on the amount and level of secretion of this hormone. It can effect on pineal gland in the short time and increases the level of tux sulfa melatonin (the production of melatonin metabolism). Also, physical activity increase fatigue provides some degree of relaxation for the person that is conducive to sleep. This can improve sleep quality in non-active elderly women.

## 6. Conclusion

The related organizations and institutions should also pay attention to physical activity as an important principle in non-active elderly women's life. Also, Physical activity should be addressed as a low-cost and healthy method for the prevention of problems in elderly people in addition to treatment and care programs.

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