

The Effects of Aerobic Exercise Program on Non-Athlete Male Students' Subjective Sleep Quality

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ABSTRACT

The purpose of this study was to survey the effects of aerobic exercise program on non-athlete male students' subjective sleep quality. The concept of subjective sleep quality has a wide concept it includes the continuity of sleep, subjective feeling of comfort, and consciousness during the day. The poor quality of subjective sleep can affect on the quality of life so that it can increase the risk of depression and anxiety and decrease the ability of coping with the daily stresses. Human regulates his/her function according to the 24-hour cycle. The sleep-wake cycle is affected by internal and environmental factors. 40 non-athlete male students ($M_{age}=21$) were tested for this purpose by Pittsburgh Sleep Quality Index (PSQI). The training program was weekly and it was lasted 45 to 65 minutes in 3 sessions. The trainings were a combination of hiking, jogging, Cooper running, Fartlek training, interval running and roping and they were performed with 70 to 85% maximum heart rate intensity. The data were analyzed by dependent T-test. The results of this study showed that the subjective sleep quality were significantly increased through aerobic exercise program in non-athlete students ($P<0.05$). Therefore, these physical activities were recommended for the improvement of students' health level.

KEYWORDS: subjectivesleep quality, Aerobic exercise program, non-athlete

INTRODUCTION

The concept of subjective sleep quality has a wide concept it includes the continuity of sleep, subjective feeling of comfort, and consciousness during the day (Harvey et al., 2008). A human's sleep quality and quantity is related to his/her health so that a poor subjective sleep quality can affect on the quality of life thus it can increase the risk of depression and anxiety and decrease the ability of coping with the daily (Blanc et al., 2007). Therefore, the individual will be easily aroused and upset in such conditions. Individuals' cognitive function and their concentration level in daily activities can affect by the amount and quality of subjective sleep (Silva, 2006). Today, many students suffer from sleep disorders. We should accept that the sleep is one of basic human needs and the sleep disorder is an earliest symptom of mental disorders in most cases (Kaplan and Sodok, 2002). On the other hand, a poor sleep quality has destructive effects on health (Yongstedt, 2014). Sleep is a part of the rhythm of life for all people (Buysse et al., 1989). So sleep is influenced by biological rhythms (Almasi and Mottalei, 2006). Human regulates his/her function according to the 24-hour cycle and the sleep-wake cycle is affected by internal and environmental factors (Lima et al., 2002). Also mental and physical health is affected by the circadian cycle (Farhadi Nasab and Azimi, 2008). Norepinephrine, serotonin, and growth hormones are released during the sleep and the chemical and the increasing of cell nutrition are performed until the body is ready for the implement of next day activities. Also, the restoration, reorganization, reinforcement of memory, and learning occur in the nervous system. In addition, the good subjective sleep quality reduces the nervous stresses and anxiety and it helps individual for better concentration of senses, adaptability and enjoyment of daily activities (Zakerimoghadam et al., 2006). The prevalence of sleep disorders have been reported between 15 to 45 in the general population. Since one third of a human's life is spent in sleep so we can say that the sleep disorders are one of the most important humans' mental disorders. The sport activities are one of good habits of health or promoting behaviors of health that can have good effects on humans' health and their quality of life (Hoyt et al., 2012). On the other hand, there is a strong relationship between the sleep quality and quality of life. Also the using of sport is usually a non-drug approach the can has beneficial effects on sleep Wang and Youngstedth, 2014). The studies have showed the using of physical activity is one of effective daily behaviors in relationship with sleep quality (Erlacher et al., 2014; Brand et al., 2010; Lang et al. 2013). Researchers believe that students have a set of problems such as academic, finance, marriage, personality, social, and behavioral problems (Nariman et al., 2010). Students are exposed to high pressures due to the requirements of the university moreover the sleep-wake cycle is determined with insufficient sleep, sleep latency, and naps during the day (Jean-Louis et al., 2002). Some studies show that the prevalence and incidence of

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physical and mental disorders in students are more than the general population. Those claim that mental disorders such as anxiety, depression, and physical disorders have a high prevalence among students. They experience states such as insomnia, poor sleep, fatigue, sensitivity of oblivion and negligence, lack of concentration and attention, physical complaints, and disorders related to personality (Iwata *et al.*, 2011). There is a great relationship between sleep duration and mode of professional function and individuals' subjective awareness (Lima *et al.*, 2002). Also sleep deprivation can affect on students' educational status (Lima *et al.*, 2002). Therefore, this study examines the effects of 4-week of aerobic exercise training on non-athlete male students' subjective sleep quality since students are intellectuals and scholars of a country.

METHODOLOGY

Method

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

Participants

The statistical population of this study was all non-athlete students of Islamic Azad University Langroud Branch. 40 non-athlete students who had the conditions of this study were randomly selected. The lack of regular sports activities on campus, out of campus, and clubs was one of selected sample conditions in this study.

Instruments and Tasks

The instrument of this study was Pittsburgh Sleep Quality Index (PSQI). It assessed the subjective sleep quality over the last month.

Procedure

The subjects were divided control and experimental groups. The experimental group participated in a training program that it was weekly and it was lasted 45 to 65 minutes in 3 sessions. The trainings were a combination of hiking, jogging, Cooper running, Fartlek training, interval running and roping according to American college of sports medicine strategies (1986).

Data Analysis

The collected data were classified by descriptive statistical methods and were analyzed by dependent T-test. The SPSS software (version 19) was used for data analysis ($\alpha \leq 0.05$).

RESULTS

The results of table (1) show that the mean and standard deviation of the subjects' age and time of lack of sports history. The subjects' frequency and percent were presented based on marital status, employment status, and field of study in the table (2). The descriptive information of some subjective sleep quality characteristics was presented on the pre-test and post-test in the table (3).

Table1. The subjects' characteristics

Variable		Mean	SD	Minimum	Maximum
Age	Experimental Group	19.7	1.0311	18	22
	Control Group	20	1.45	18	23
Time of lack of sports history (month)	Experimental Group	24.6	9.91	12	36
	Control Group	20.4	10.13	6	36

Table2. The frequency and percent of marital status, employment status, and field of study

Status Group	Single		Married		Student		Employee		Self-employed		Civil		Electric		Food industry		Business management	
	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N
Experimental Group	80%	16	20%	4	80%	16	20%	4	0%	0	35%	7	25%	5	40%	8	0%	0
Control Group	80%	16	20%	4	75%	15	20%	4	5%	1	20%	4	40%	8	10%	2	30%	6

Table3. The descriptive information of subjective sleep quality on the pre-test and post-test

Group	Variable	Experimental Group	Control Group
Subjective sleep quality	Pre-test	2.05±0.94	1.3±0.57
	Post-test	1.3±0.73	1.35±0.67

Table (3) shows all changes of pre-test and post -test of subjective sleep quality in the experimental and control groups. According to table (3), the mean of subjective sleep quality has decreased from 2.05 to 1.3 after the performing of aerobic exercise training in the experimental group (36% improvement) and there was no changing in the control group.

DISCUSSION AND CONCLUSION

The purpose of this study was to examine the effects aerobic exercise program on non-athlete male students' subjective sleep quality. According to the results of this study, we can conclude that 4-week exercise training had been effective on non-athlete male students' subjective sleep quality and it can lead to the increasing of subjective sleep quality in non-athlete male students. Caldwell et al., (2009) examined the effects of exercise trainings on individuals' sleep quality in young people (18-32 years old). They stated that exercise trainings had a significant effect on these individuals' sleep quality. The effects of these exercise trainings may be due to its main focus on the reducing of muscle tone and the increasing of flexibility that it shows its desired effects with the creation of feeling of relief (Caldwell et al., 2009). The exercise activities can increase the individuals' self-efficiency and self-confidence with the increasing of their physical ability so exercise can be effective on subjective sleep quality due to this reason so that it will lead to improve interpersonal relationships and social functions (Stroth et al., 2010). In addition, exercise programs leads to the biological and biochemical changes and improve individuals' mental and physical health that it would improve the sleep quality as well (Dua et al., 2010). This finding is consistent with the results of Wang and Youngstedt (2014) and Erlacher et al., (2014) study. Wang and Youngstedt (2014) examined the sleep quality improved following a single session of moderate-intensity aerobic exercise in older women. Fifteen healthy, non-obese (body mass index = 24.4 ± 2.1 kg/m², mean \pm SD), sedentary (<20 min of exercise on no more than 3 times/week) older women (66.1 ± 3.9 years) volunteered for the study. Subjects wore a wrist ActiGraph monitor (GT3X+; ActiGraph, Pensacola, FL, USA) 24 h each day for 7 days at baseline, and 48 h after each exercise session (Wang and Youngstedt, 2014). This study showed that a single session of moderate-intensity exercise improved sleep quality in older women (Wang and Youngstedt, 2014). Erlacher et al., (2014) studied the effects of exercise on sleep in adults with chronic sleep complaints. 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 (Erlacher et al, 2014). The regular physical exercise is effective on cognitive and emotional functions of brain with the effectiveness on the secretion of endorphins, norepinephrine, catecholamine, serotonin and other neurotransmitters of brain (Schuch and Vasconcelos, 2011). Today, exercise trainings are considered as a non-drug method with positive effects and they were studied by several studies in different exercises. However, the biological mechanism of effects of exercise on the sleep quality and pattern is still unknown. The increasing of physical fitness through the execution of exercise is associated with the increasing of delta waves during the third and fourth stages of sleep and effectiveness on neuroendocrine system especially on the metabolic changes of brain can be associated with a favorable condition of sleep and the improving of sleep quality as well (Tang et al., 2010). According to the results of this study, we can conclude the subjective sleep quality of experimental group was better than the subjective sleep quality of the control group in non-athlete male students. We hope that the students pay attention to the aerobic exercise programs to improve their subjective sleep quality because the application of healthy behavior patterns and physical activity can improve their health level and subjective sleep quality.

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