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Research Article

The Survey of the Relationship Between Moderate-Intensity Sport Activities and the Level of Sleep Subjective Quality in Non-Athlete Male Students Using Pittsburgh Sleep Quality Index

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Abstract

The sleep quality and quantity are directly and indirectly related to human health and sleep disorders can lead to a lot of harm to students. Therefore, the purpose of this study was to survey the relationship between moderate-intensity sport activities and the level of sleep subjective quality in non-athlete male students using Pittsburgh Sleep Quality Index (PSQI). This study was a semi empirical study and 20 non-athlete male students were randomly selected using PSQI. The PSQI questionnaire was used to measure subjects' sleep subjective quality and a standard training protocol. The collected data was analyzed by Shapiro-Wilk test, dependent t-test, and Wilcoxon test. The SPSS software (version 23) was used for data analysis. The results showed that the score of students' subjective sleep quality was 9.2 in the experimental group and was 7.3 in the control group and it was 7.4 in the post-test. It shows that students' sleep quality improved significantly with the implementation of protocol ($P<0.05$). It is suggested that sports activities can be effective on the improvement of students' sleep quality and it is an applied mechanism to improve health indicators.

Keywords: Daytime Dysfunction; Low Activity; Sleep Quality; Training Protocol

Introduction

One of the most appropriate health habits or health promotion behaviors is motor activity and regular exercise which has positive effects on human health; in a way that reduces the field of psychological and physical disorder and increases mental health in students [1]. Exercise and physical activity lead to biological and biochemical changes, and improve mental health and, consequently, promote sleep quality [2]. Regular Physical Training and exercise, with the effectiveness on the secretion of endorphins, norepinephrine, catecholamine, serotonin, and other neurotransmitter of the brain, are effective on cognitive and emotional functions of the brain such as memory and learning of students [3]. In addition, research results suggest that exercise can increase blood flow, oxygen and glucose in the brain and as a result optimum brain function will be followed [4]. Exercise, in addition to reducing body fat and making muscle, strengthens the resistance to the disease [5]. In fact, frequent training courses enhance the immune response, reduce the risk of physical illness and, if illness develops, it helps to improve it faster. Sports activities also reduce the incidence of cardiovascular disease [3], cancer, diabetes and hypertension [6]. On the other hand, human health is related to the quantity and quality of his sleep, so that sleepless nights can affect the quality of life and increase the incidence of depression and anxiety in students and reduce the ability to cope with daily stress [7].

In the same vein, studies have shown that treating sleep disorders, such as frequent waking, increase physical activity and improve quality of life. Usually, exercise is a non-drug strategy that can have beneficial effects on sleep quality and student sleep

disorders; this is supported by epidemiological studies and reports better communication between exercise and sleep [6].

Studies show, during sleep sympathetic activity decreases and parasympathetic activity increases [8]. These changes reduce heart rate and overnight blood pressure [9]. Therefore, long-term sleep deprivation may have a direct negative effect on the cardiovascular system and increase the risk of cardiovascular disease [10]. So, the changes that are made in the student's sleeping habits disrupt the circadian rhythm whose complications are characterized by inability to wake up at the scheduled time and delayed night sleep [11]. Most students who fail to study do not know that the cause of this weakness may be related to their poor sleep habits. Students with poor quality sleep have significantly lower educational performance than students with good sleep quality [12]. Problems and shortness of sleep duration have irreparable effects on physical and physical health, so that studies show that the limits of sleep lead to severe negative effects on health and performance indicators [13].

Park, et al., (2013) studied sleep quality in Korean older adults. They concluded that 60% of the subjects reported having poor sleep quality [14]. 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 [15]. 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 [16].

Therefore, considering the importance of the topic of sleep and ill-treatment disorders and the students, this question was posed to researchers that do a course of activity of training can impact on the quality and quantity of sleep students?

Materials and Methods

Considering the goals and main questions of the research; the present research is applicable in terms of purpose that its purpose is development of applied knowledge in a field and this research was a kind of semi-experimental research. By applying an independent variable, researchers investigated the probability of influencing the dependent variable.

Participants

The subjects of this study were 20 non-active female students who participated voluntarily in this study and randomly divided into two groups of control (20 persons) and experimental (20 persons).

Research Instrument

Pittsburgh Sleep Quality Index: To measure sleep disorders, a PSQI questionnaire with 7 sub-scales was selected and the sum of the seven-point scale marks the total score which is from zero to 21. A total score of six or more means poor sleep quality. The coefficient of validity of this questionnaire has been approved by numerous researchers in many countries.

Research Methodology

Before presentation compliance form of the company in the test to the subjects, the information and knowledge about how to conduct the research and the steps were provided to them. Then by questionnaire Patients' history of the disease, including cardiovascular, pulmonary, allergic, hypertension, diabetes and other specific illnesses were identified and subjects, who had specific disease, were excluded from the study. Subjects' physical activity records were also examined and people with a history of regular activity or a member of the club were excluded from the research. Subjects were asked to avoid severe physical activity during the test. All 40 subjects from experimental and control groups pre-test was taken. During the implementation of the practice protocol, only the experimental group continued to practice, and the control group did not have any physical activity, and finally, all 40 subjects were subjected to post-test.

Practice Protocol

The exercise protocol was performed at 60% maximum heart rate for 12 weeks and 3 sessions a week (36 sessions in total). This exercise was conducted based on the recommendations of the American College of Sports Medicine (ACSM). The duration of Subjects' exercise in the first week was about 20 minutes per session which was gradually increased over the following weeks over the duration and intensity of the exercises, until it reached 40 minutes in the last week. The exercises included three heating sessions (8 minutes), aerobic gymnastics and five minutes back. The heating and cooling program was also considered as a part of the training time. The intensity of exercise was controlled by the Pollard Hourly bird watch during exercise. Practical conditions were the same for all subjects. At each stage of the exercise, the researchers controlled the intensity of the exercise by heart rate for each subject, and if exercise intensity needed to increase or decrease, necessary feedback to the subjects was provided.

Statistical Procedures

To analyze the collected data Descriptive and inferential statistics were used. The Shapiro-Wilk test was used to examine the assumption that the data were natural and T-dependent parametric test and Wilcoxon's nonparametric test were used. Also, for statistical calculations, the SPSS version 21 software has been used.

Results

The demographic characteristics and characteristics of the subjects and each of the experimental and control groups are visible in the following tables (1-4).

Variable		mean	standard deviation	minimum	maximum
Age	Experimental group	21.7	1.119	18	23
	control group	23.9	1.42	17	21
Lack of exercise history (month)	Experimental group	24.6	7.15	13	23
	control group	22.18	8.7	12	20

Table 1: Age attribute and duration of non-sporting subjects.

Field of Study group	Accounting		Psychology		Electronics		Mechanics	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Experimental group	35%	7	25%	5	40%	8	0%	0
control group	20%	4	40%	8	10%	2	30%	6

Table 2: Frequency and percentage of subjects according to the field of study.

Group Variable		Experimental group	Control group
Sleep quality	pre-test	9/2 ±3/24	7/3±3/39
	post-test	7/3±2/45	7/4±3/45
Mental sleep quality	pre-test	2/9±0/94	1/9±0/57
	post-test	2/2±0/73	1/17±0/67
Delay in time to fall asleep	pre-test	1/57±0/89	2/9±0/52
	post-test	1/01±0/73	2/11±0/75
Duration to fall asleep	pre-test	1/7±0/72	1/4±0/89
	post-test	1/2±0/67	1/4±0/71
Sleep efficiency	pre-test	1/21±0/69	0/9±0/81
	post-test	1/1±0/65	0/9±0.74
Sleep disorders	pre-test	2/12±0/76	1/9±0/83
	post-test	1/19±0/69	1/10±0/79
Daily dysfunction	pre-test	1/40±0/64	1/19±0/51
	post-test	1/7±0/55	1/20±0/59

Table 3: Results of variables examining in pre-test and post-test.

Variables	Group	Degrees of freedom	Statistics	Significance level
Sleep quality	pre-test	0/92	20	0/149
	post-test	0/928	20	0/221
Mental Sleep quality	pre-test	0/811	20	0/001
	post-test	0/790	20	0/00
Delay to fall asleep	pre-test	0/840	20	0/019
	post-test	0/810	20	0/001
Duration of sleep	pre-test	0/790	20	0/001
	post-test	0/799	20	0/001
Useful sleep	pre-test	0/9	20	0/001
	post-test	0/77	20	0/00
Sleep disorders	pre-test	0/814	20	0/002
	post-test	0/810	20	0/001
Daily dysfunction	Before	0/76	20	0/00
	After	0/68	20	0/00

Table 4: Results of Shapiro-Wilk test for experimental group.

Discussion

The results of the statistical tests showed that the sleep quality score in the experimental and control groups was 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 were also observed in older studies that were softer than sleep problems [17-19].

Bakhshalipour, et al., (2016) 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 [20]. The results of this study were consistent with the results of Erlacher, et al. (2014) [21] study that they examined the effect of exercise on sleep among adults with chronic sleep complaints. The results of their study showed that the number of steps and the duration of physical activity is significantly related to the improvement in subjective sleep measures and therefore revealed 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 over the intervention program [22]. The results of this study were consistent with the results of Geber, et ale's (2014) study that they assessed the effect of vigorous intensity exercise on stress, mental health, and good objective and subjective sleep in undergraduate students. Since the positive role of physical activity on mental disorders has been proven, so the results showed that subjects who accomplish the American College of Sports Medicine's (ACSM) vigorous-intensity exercise recommendations differ from peers below these standards about their level of perceived stress, depressive symptoms, perceived pain, and subjective and objective sleep. The vigorous physical activity was associated with less stress, pain, subjective sleep complaints, and depressive symptoms. Moreover, vigorous exercisers had more favorable objective sleep pattern. This proves the effectiveness of physical activity on individuals' sleep quality [23]. The improvement of subjects' sleep quality through aerobic physical activities is probably due to a reduction of REM period and an increasing of NREM period. Because the changes in body temperature due to these exercises stimulate peroptic nucleus and the anterior hypothalamus that this process improves the sleep quality [23]. Also, the increase of the activity of the sympathetic system during exercise and the reduction of its activity than the parasympathetic system during recovery may result in the deeper sleep and an increase of in sleep duration [24].

There is evidence that shows there is a clinical connection between sleep and physical activity [20, 25-27]. In general, 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 [28].

Conclusion

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 analyze [29]. 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 [30,31]. 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.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Fuentes JP, Diaz C (2010) Analysis of heart rate during a tennis training session and its relationship with heart-healthy index. Journal of Sport and Health Research 2: 26-34.
2. Dua JS, Cooper AR, Fox KR, Graham Stuart A (2010) Exercise training in adults with congenital heart disease: feasibility and benefits. International journal of cardiology 138: 196-205.
3. Schuch FB, Moreno MPV, Fleck MP (2011) The impact of exercise on Quality of Life within exercise and depression trials: A systematic review. Mental health and physical activity 4: 43-48.
4. From S, Liira H, Remes-Lyly T, Frost A, Leppävuori J, et al. (2010) Exercise intervention and health promotion by a nurse in 35–45-year-old men at elevated cardiovascular risk. Journal of Men's Health 7: 302-302.
5. Sasai T, Inoue Y, Komada Y, Nomura T, Matsuura M, et al. (2010) Effects of insomnia and sleep medication on health-related quality of life. Sleep medicine 11: 452-457.
6. Youngstedt SD (2014) Effects of exercise on sleep. Clinics in Sports Medicine 24: 355-365.

7. Youngstedt SD, Perlis ML, OBrien PM, Palmer CR, Smith MT, et al. (2003) No association of sleep with total daily physical activity in normal sleepers. Physiology & behavior 78: 395-401.

8. Buboltz Jr WC, Brown F, Soper B (2001) Sleep habits and patterns of college students: a preliminary study. Journal of American college health 50: 131-135.

9. Alhola P, Polo-Kantola P (2007) Sleep deprivation: Impact on cognitive performance. Neuropsychiatric disease and treatment 3: 553-567.

10. Waterhouse J, Drust B, Weinert D, Edwards B, Gregson W, et al. (2005) The circadian rhythm of core temperature: origin and some implications for exercise performance. Chronobiology international 22: 207-225.

11. Brown FC, Buboltz Jr WC, Soper B (2006) Development and evaluation of the Sleep Treatment and Education Program for Students (STEPS). Journal of American College Health 54: 231-237.

12. Norman JF, Von Essen SG, Fuchs RH, McElligott M (2000) Exercise training effect on obstructive sleep apnea syndrome. Sleep Res Online 3: 121-129.

13. Reid KJ, Baron KG, Lu B, Naylor E, Wolfe L, et al. (2010). Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. Sleep Med 11: 934-940.

14. Park JH, Yoo MS, Bae SH (2013) Prevalence and predictors of poor sleep quality in Korean older adults. Int J Nurs Pract 19: 116-123.

15. Lang C, Brand S, Feldmeth A K, Holsboer-Trachsler E, Pühse U, et al. (2013) Increased self-reported and objectively assessed physical activity predict sleep quality among adolescents. Physiology & behavior 120: 46-53.

16. Chia YW, Tung PS, Chin LF, Chang MY (2011) Sleep quality among community-dwelling elderly people and its demographic, mental, and physical correlates. Journal of the Chinese Medical Association 75: 75-80.

17. Nguyen MH, Kruse A (2012) A randomized controlled trial of Tai chi for balance, sleep quality and cognitive performance in elderly Vietnamese. Clin Interv Aging 7: 185-190.

18. Irwin MR, Olmstead R, Motivala SJ (2008). Improving sleep quality in older adults with moderate sleep complaints: a randomized controlled trial of Tai Chi Chih. Sleep 31: 1001-1008.

19. Benloucif S, Orbeta L, Ortiz R, Janssen I, Finkel SI, et al. (2004) Morning or evening activity improves neuropsychological performance and subjective sleep quality in older adults. Sleep; 27:1542-1551.

20. Bakhshalipour V, Khodaparast Sareshkeh S, Keramati Moghadam M, Falah Kazemi M (2014) The effect of a moderate-intensity aerobic training program on the sleep quality, BMI, and weight in non-active people with type 2 diabetes. Sport Scientific And Practical Aspects. Sport SPA 13: 13-18.

21. Erlacher C, Erlacher D, Schredl M (2014) The effect of exercise on self-rated sleep among adults with chronic sleep complaints. Journal of Sport and Health Science 4: 289-298.

22. Gerber M, Brand S, Herrmann C, Colledge F, Holsboer-Trachsler E, et al. (2014) Increased objectively assessed vigorous intensity exercise is associated with reduced stress, increased mental health and good objective and subjective sleep in young adults. Journal of Psychology & Behavior 135: 17-24.

23. Schaffer L (2005) Exercise may improve sleep. J Sleep Res 13: 186-190.

24. Mello MTD, Aurélia RA, Esteves AM, Tufik S (2005) Physical exercise and the psychobiological aspects. Rev Bras Med Esporte 11: 203-207.

25. Micklesfield L, Rosenberg L, Cooper D, Hoffman M, Kalla A, et al. (2003) Bone mineral density and lifetime physical activity in South African women. Calcified tissue international 73: 463-469.

26. Van der Heijden MMP, van Dooren FE, Pop VJM, Pouwer F (2013) Effects of exercise training on quality of life, symptoms of depression, symptoms of anxiety and emotional well-being in type 2 diabetes mellitus: a systematic review. Diabetologia 56: 1210-1225.

27. Lira FS, Pimentel GD, Santos RV, Oyama LM, Damaso AR, et al. (2011) Exercise training improves sleep pattern and metabolic profile in elderly people in a time-dependent manner. Lipids in health and disease 10: 1-6.

28. BakhshaliPour V, Khodaparast Sareshkeh S, Azizi B (2017) The effectiveness of a period of academic training extra-curricular activity on the levels of sleep disturbances and the quality of life in non-active female students. RAHIS14:100-111.

29. Passos GS, Poyares D, Santana MG, Garbuio SA, Tufik S, et al. (2010) Effect of acute physical exercise on patients with chronic primary insomnia. Journal of clinical sleep medicine: JCSM 6: 270-275.

30. Bakhshalipour V, Azizi B, Khodaparast Sareshkeh S (2018) The effect of a period of 8-weeks of aerobic exercise training program on some components of sleep subjective quality, weight and BMI in non - active elderly women with type 2 diabetes. Biology of exercise 14: 49-60.

31. Bakhshalipour V, Sanatkaran A, Rezaei Soufi M (2018) The effects of 4-week of aerobic exercise training on non-athlete male students sleep and life quality. IJBPAS 4: 103-118.