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Investigating the effectiveness of Physical Activity on Sleep Quality in consumers of tobacco

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Abstract

Background and objective: Tobacco consumption is one of the hazardous factors that affect people's quality of life and quality of sleep. This study aimed to compare components quality of sleep in physically active and inactive people tobacco consumers.

Methods: Tobacco consumers in Shiraz were the statistical population of this comparative study. That 470 people of them Participated in the study. Pittsburgh sleep quality questionnaire (PSQI) was used for data collection.

Results: physically active tobacco consumers compared with inactive tobacco consumers obtained significantly better scores in total PSQI score (p = 0.006) and subscales such as daytime dysfunction (p = 0.007), sleep duration (p = 0.002), sleep latency (p = 0.01), subjective sleep quality (p = 0.03).

Conclusion: Exercise and physical activity can have a positive effect on the quality of sleep in tobacco consumers. Findings can inform interventions designed to improve sleep quality via increasing opportunities for exercise among smokers.

Keywords: Tobacco, sleep quality, Exercise

Introduction

Tobacco smoking has been one of the most important causes of health problems and it is associated with an increased risk of many health (1, 2) and is linked to 6 million deaths annually(1). Poor sleep quality is a crucial public health issue in the 21st century (3). There is evidence that smoking can impair breathing and snoring during sleep (4). The results of the study showed that Cigarette smokers are at increased risk for poor sleep quality(5). Sleep disturbances were more prevalent among cigarette smokers than nonsmokers(6). A study reported the presence of symptoms of sleep apnea and sleep apnea syndrome in smokers. Also, sleep problems

during quitting were associated with the severity of nicotine dependence and the duration of quitting (7). One of the causes of sleep disorders is that nicotine stimulates nicotinic acetylcholine receptors and leads to the release of several neurotransmitters, most importantly dopamine, which are associated with sleep regulation mechanisms (8).

Compared to the general population, cigarette smokers report poorer sleep quality. Poor sleep quality in cigarette smokers is associated with greater nicotine dependence. While exercise is known to improve sleep quality in the general population, less is known about how exercise affects sleep in those who smoke(5). Research has shown that poor sleep quality can lead to both physical and mental health issues(9). Healthy lifestyle behaviors are beneficial in improving sleep quality(10). Various kinds of sports, including eight-section brocade(11), yoga(12), and aerobic exercises(13), can improve sleep quality. According to our knowledge, no research has Investigating the effectiveness of Physical Activity on Sleep Quality in consumers of tobacco in Iran. Therefore, the ultimate goal of the present study was to Investigating the effectiveness of Physical Activity on Sleep Quality in consumers of tobacco.

Materials and Methods

Study Population

The statistical population of the present study was tobacco consumers (smokers and hookahs) in Shiraz which 470 people (physically active 240 and inactive people 230) selected randomly (mean of Age(yrs.) (PA:24.57±5.13 vs PI: 25.55±3.11), Height(cm) (PA: 173.47±6.72 vs PI: 175.65±6.27), Weight(kg) (PA: 69.14±6.09 vs PI: 71.76±7.64). The inclusion criteria were male gender and at least one year of smoking (cigarette and hookah). We selected the subject why refer to coffeehouse and public places, the aims of the research were explained and it was assured that the subjects' information would be kept confidential. Subjects who exercised (recreational activity such as football, handball, volleyball, bodybuilding) for at least three one-hour sessions per week were selected as physically active subject and those who did not exercise were selected as inactive subjects (14). After completing their written informed consent and demographic information, the subjects began to complete the questionnaires.

Ethical Considerations

The authors of this article, while observing the rules and provisions of ethical regulations, including the Helsinki Declaration and obtaining informed consent from the participants and full assurance of the confidentiality of the collected information and complete freedom to participate in the study as well as leaving the study, conducted the present study. The study approved by the Research Ethics Committee of the Jahrom University of Medical Science (ethics code: IR.JUMS.REC.1399.045).

Data Collection

Pittsburgh Sleep Quality Index (PSQI) and Qualitywere used in this study.

Pittsburgh Sleep Quality Index (Psqi)

The PSQI questionnaire was used to measure sleep quality using 19-item self-report questionnaire yields 7 component scores: subjective sleep quality, sleep latency (i.e., how long it takes to fall asleep), sleep duration, habitual sleep efficiency (i.e., the percentage of time in bed that one is asleep), sleep disturbances, use of sleeping medication, and daytime dysfunction

(Scoring: Subjective sleep quality—question 9; Sleep latency—questions 2 and 5a; Sleep duration—question 4; Sleep efficiency—questions 1, 3, and 4; Sleep disturbance—questions 5b-5j; Use of sleep medication—question 6; Daytime dysfunction—questions 7 and 8; Add the seven component scores together- Global PSQI).

All components received a score based on a Likert scale of 0–3, where a score of 0 reflected the positive extreme ("not during the past month") and a score of 3 refected a negative extreme.

A global PSQI score was generated for each participant after summing the seven components (all weighted equally on a 0–3 scale), with a final range of 0–21 where higher scores indicated worse sleep quality (15). A global PSQI score >5 was indicative of poor sleep quality(16). Validity and reliability of this questionnaire have been investigated in Iran (α = 0.83 and correlation coefficient = 0.88)(17).

Statistical Analysis

In this study, mean and standard deviations were used as descriptive statistics (mean ± SD). And also Mann-Whitney U test was used for inferential statistics. The significance level was considered to be $P<0.05$. All data analysis was done using SPSS software version 18.(14, 18)

Results

The results showed that there was a significant difference between physically active and inactive subjects in mean of sleep quality (P = 0.006) and subscales such as sleep disturbances (P = 0.007), sleep duration (P = 0.002), sleep latency (P = 0.013) and subjective sleep quality (P = 0.031). but there is not significant difference in daytime dysfunction (P = 0.632), sleeping medication (P = 0.89) and habitual sleep efficiency (P = 0.245) between two groups (Table1).

Table 1. Results of Mann–Whitney U test about sleeps quality

Parameter	physically active	physically inactive	P
subjective sleep quality	0.9±0.53	1.23±0.63	0.031*
daytime dysfunction	1.09±0.7	1±0.85	0.632
use of sleeping medication	0.42±0.5	0.40±0.92	0.890
sleep disturbances	0.95±0.21	1.21±0.54	0.007*
habitual sleep efficiency	0.14±0.35	.04±0.2	0.245
sleep duration	0.52±0.89	1.12±0.89	0.002*
sleep latency	0.9±0.53	1.38±1.01	0.013*
sleep quality	5.04±1.28	6.27±1.28	0.006*

Discussion

This study aimed to investigate the effect of physical activity on sleep quality in physically active and inactive tobacco consumers. This study found that the overall sleep quality, morning sleep disorder, duration of sleep, delayed sleep, and mental quality of sleep in active tobacco consumers were significantly lower than inactive tobacco consumers. We didn't find a study that examined the effect of exercise on sleep quality of tobacco consumers. However, the impact of exercise on other communities (11, 13, 18) and sleep quality in smokers (5, 6, 19) has been well documented.

Active smoking status has been associated with shorter sleep duration and increased difficulty falling asleep, along with other sleep disturbances(20). And also reported that participants with high and moderate smoke exposure reported more sleep complaints than those with low exposure(6). It is suggesting that better sleep quality may be associated with lower levels of smoking urges. Further, exercise may be associated with better sleep quality in cigarette smokers(5). Sleep disturbances were more prevalent among cigarette smokers than nonsmokers(6). Purani et al.,(2019) showed that Cigarette smokers are at increased risk for poor sleep quality. (5). There is a significant and negative relationship between students' sleep quality and tobacco use(19). Young adult smokers have lower sleep continuity without necessarily subjectively experiencing their sleep as poor. Nevertheless, their lower sleep continuity is related to their level of nicotine dependence(18). Compared to the general population, cigarette smokers report poorer sleep quality. Poor sleep quality in cigarette smokers is associated with greater nicotine dependence. While exercise is known to improve sleep quality in the general population, less is known about how exercise effects sleep in those who smoke(5).

Healthy lifestyle behaviors are beneficial in improving sleep quality(10). The result of a study by Seol et a.,(2020) shows that replacing 30 min of sedentary activity per day with an equal period of light-intensity physical activity significantly influenced sleep quality parameters. However, there was no significant difference in sleep quality when light-intensity activity was replaced with vigorous-intensity activity(21). One study suggested that regular exercise resulted in improved sleep quality across all subscale except drug use (22). EKline et al. concluded that exercise leads to improved average sleep quality by reducing overall sleep quality. They reported reduced sleep latency, and scores below the sleep quality scale, which is consistent with the present study (23).

It has been suggested that exercise can improve the sleep quality via the change in the body temperature, increase energy loss, lose weight, increase fitness, increase cardiovascular function, change in cytokine concentration, increase fatigue, change in mental symptoms, change in heart rate, increase hormones secretion, BDNF secretion, and changes in body composition (22, 24, 25). The present study has limitations such as not examining the effect of specific exercise (type, duration, intensity) and also levels of smoking urges or level of nicotine dependence that can affect the research results.

Conclusion

Exercise and physical activity can have a positive effect on the quality of sleep in tobacco consumers. Since the present study had limitations, Therefore, it is suggested that studies be done with an emphasis on the

specific exercise (type, duration, intensity) and the levels of smoking urges to determine the extent of further changes.

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