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Effect of Sleep Hygiene Training on Treatment Seeking Smokers with Poor Sleep Quality: A Randomized Controlled Study

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ABSTRACT

Objectives: This study aimed to investigate the effect of sleep hygiene training on sleep quality among smokers.

Methods: A randomized controlled study was planned between May and November 2017 at a tertiary hospital's family medicine clinics. First, treatment-seeking smokers with poor sleep quality were included in the study. Subsequently, patients randomized to the order of the study sample patient list were divided into sleep hygiene training intervention (n=50) and control (n=50) groups. A comparison between the first Pittsburgh Sleep Quality Index (PSQI) score (before education) and final score (after education) of the two groups was evaluated.

Results: This study included 59 (59.0%) men, with a mean age of 35.8±10.6 years. The first and final PSQI scores were 7.1±2.6 and 7.1±2.5, respectively. No significant change was found in the PSQI score of control and intervention groups (p=0.317 and p=0.083, respectively). Also, no relationship was found between daily smoking with first and last PSQI scores (p=0.051 and p=0.052, respectively).

Conclusion: Although no significant change was found in the sleep quality in the quitting process of smokers with hygiene education, this result showed that not only sleep hygiene training is needed, but also holistic behavioral therapy methods.

Keywords: Nicotine dependence, sleep hygiene, smoking

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INTRODUCTION

Sleep plays an important role in achieving a good and healthy life. Sleep hygiene is indicated for patients who engage in habits, consume substances, and/or set up sleep environments that are not conducive to initiating or maintaining sleep.[1] Good sleep hygiene can improve sleep. If insomnia continues despite sleep hygiene and persists for ≥4–6 weeks, a physician and institution (sleep center) specializing in this subject should be consulted.[2]

Smoking has been associated with a group of symptoms that suggest difficulty in falling asleep and sleep division in both gender. The prevalence of sleep disorders in smokers may be due to withdrawals of nicotine or nighttime stimulating effect.[3] Sleep disturbance is emerging as a potential neurobiological factor in smoking relapse.[4] Studies suggest that smokers may spend less time in deeper, more restful sleep states than nonsmokers and, a higher baseline sleep efficiency in smokers also predicts a higher quitting success at the end of cessa-

tion treatment.[5,6] The extent to which unhealthy sleep in smokers may be a viable intervention target for promoting smoking cessation treatment response is considered. Ultimately, conceptual support for sleep therapy as an adjunctive treatment for smoking cessation might be useful.[7]

Sleep hygiene trainingis a method of adjunctive sleep therapies, including lifestyle measures, such as diet, exercise, substance use, and advice and measures designed to provide better sleep on environmental factors, such as heat, light, and sound. Applying behavioral therapy in patients undergoing smoking cessation treatment has been shown to improve sleep efficiency and quality, prolong sleep time, and reduce insomnia symptoms.[1]

This study aimed to investigate the effect of sleep hygiene training on sleep quality among smokers.

METHOD

Treatment-seeking smokers over the age of 18 years in Gaziosmanpaşa Training and Research Hopital Family Medicine clinics between May and November 2017 were included in this randomized controlled study.

The sample size was calculated as 42 participants in each group and 84 participants in total with an 0.80 effect size, 0.05 type I error, and 95% power estimation. The study sample was composed of 100 individuals with poor sleep quality according to the beginning Pitsburg Sleep Quality Index (PSQI). The patients with poor sleep quality were listed from number 1 to number 100 according to the order in which they admitted to the polyclinic. Single numbers were assigned to the control group (n=50) and double numbers to the intervention group (n=50). Participants were classified based on demographic data, nicotine dependence characteristics based on Fagerstrom Test for Nicotine Dependence (FTND), and sleep quality based on PSQI.

Pitsburg Sleep Quality Index: Ağargün et al. performed the Turkish validity and reliability of the PSQI scale consisting of 24 questions, including 19 questions for the participants and five questions for their partners. Those scoring 5–21 points on the scale have poor sleep quality.[8]

Fagerstrom Test for Nicotine Dependence: FTND is a six-item questionnaire ranging between 0 and 10 points. Reliability for Turkish version of FTND was performed by Uysal et al. in 2004.[9]

The intervention group was provided for sleep hygiene training by psychotherapy-certified healthcare professional. The participants had counseling sessions for 12 weeks. Based on the final PSQI scores of the two groups, sleep quality was re-evaluated, whether sleep quality improved and whether sleep hygiene education was effective. Sleep hygiene training aimed to inform the environmental and acquired factors that disrupt the sleep structure of the patient, to be aware of their habits, and the conditions for healthy sleep, e.g. avoiding stimulants before bedtime, avoiding excessive physical activity and sports before bedtime, using the bedroom only for sleep and sexual activity, and avoiding reading books or watching TV in the bedroom, maintaining sound, light, and heat at optimum levelsin the bedroom, no drinking alcohol before bedtime and keeping a regular sleep diary.[2,10]

Participants who had a prior diagnosis of sleep disorders, history of restless leg syndrome, obstructive sleep apnea syndrome, pregnancy, medical contraindications or any additional chronic disease (uncontrolled hypertension, asthma, diabetes mellitus), current major depression, current use of antipsychotics, stimulants, alcohol, or medications (MAO inhibitors, tricyclic antidepressants) and history of shift work or distant travel necessity that disrupt sleep patterns were excluded from this study.

NCSS 10 software (2015, Kaysville, Utah, USA) was used for the analyses. Frequency, percentage, mean, standard deviation, median, minimum and maximum values were used as descriptive statistics. Student t-test and Mann Whitney U test for two-group comparisons, Kruskal Wallis test for groups with 3 and over categories, Wilcoxon test for comparison of dependent group values, and Chi-square test for categorical variables were used. A p value of <0.05 was considered as statistically significant.

RESULTS

A total of 100 patients, including 50 (50.0%) control and 50 (50.0%) intervention groups, were included in the study. The mean age of the patients was 35.8±10.6 years, 59 (59.0%) patients were men. The mean FTND score and daily time cigarette consumption were 5.9±2.3 points and 22.7±10.4 cigarettes/day, respectively. Sociodemographic and nicotine addiction features between control and intervention groups are summarized in Table 1.

The first and final global PSQI scores of the intervention group were 7.4±2.4 and 7.3±2.3, respectively (p=0.083). Similarly, first and final global PSQI scores of the control group were 6.8±2.8 and 6.8±2.7 (p=0.317). The first PSQI values of men and women in intervention group were 6.7±1.8 and 8.1±2.7, respectively, but the mean of last PSQI values were 6.7±1.7 for men and 8.0±2.5 for women (p=0.057 and p=0.049, respectively).

Daily smoking of under one packet (1-19 cigarettes) and over one packet (>20 cigarettes) per day did not cause a significant change between the first and final PSQI score in

Table 1. Sociodemographic and nicotine addiction features between control and intervention groups

	Control group (n=50)	Intervention group (n=50)	p
Age (years)	34.5±9.2	37.1±11.8	0.221*
Gender, n (%)			
Male	33 (66.0)	26 (52.0)	0.222†
Female	17 (34.0)	24 (48.0)	
Education level, n (%)			
Primary school	13 (26.0)	24 (48.0)	0.120‡
Secondary school	6 (12.0)	6 (12.0)	
High school	12 (24.0)	9 (18.0)	
University	19 (38.0)	11 (22.0)	
Marital status, n (%)			
Single	9 (18.0)	10 (20.0)	1.000†
Married	41 (82.0)	40 (80.0)	
FTND score	7.0 (0-10.0)	5.0 (0-10.0)	0.054§
Daily cigarette consumption (per cigarette)	20.0 (10.0-34.0)	20.0 (10.0-28.0)	0.018§
Duration of nicotine addiction (years)	18.0 (4.0-45.0)	18.0 (3.0-49.0)	0.600§

FTND: Fagerstrom Test for Nicotine Dependence.
Data are presented as n (%), mean±standard deviation and median (min-max).
*Student t-Test, †Continuity (Yates), ‡Ki Square Test, §Mann Whitney U Test.

the intervention group (p=0.317 and p=0.157, respectively). The change in PSQI scores according to daily cigarette consumption for control and intervention groups is shown in Figure 1.

It was demonstrated that the levels of education was not different between the groups with and without sleep hygiene training. PSQI levels before and after of hygiene education situations according to education level are summarized in Table 2.

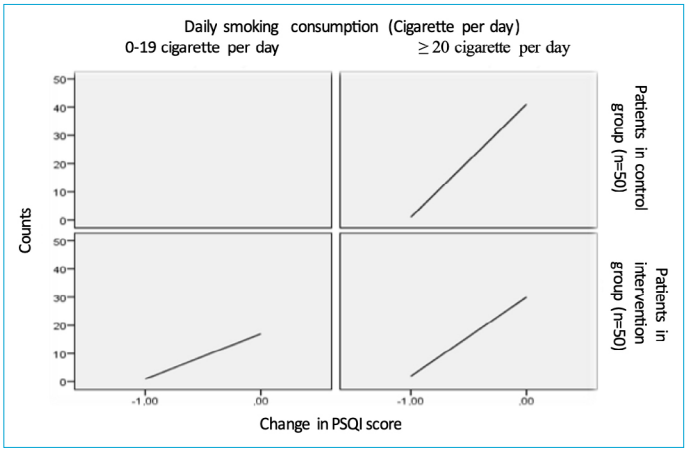

Figure 1. The change in Pitsburg Sleep Quality Index scores according to daily cigarette consumption for control and intervention groups.

No relationship was found between change in the PSQI scores and age, first FTND score, beginning smoking age and daily cigarette consumption (p=0.958, p=0.647, p=0.574 and p=0.786, respectively). There was no correlation between daily smoking with first and final PSTI score (p=0.051 and r=-0.612; p=0.052 and r=-0.621, respectively).

DISCUSSION

In studies conducted in patients with sleep disorders, sleep disturbance effects on smoking cessation are complicated by the sleep disturbance caused byboth smoking and nicotine withdrawal.[11] The evaluation of our study based on the change in PSQI scores from the first to the final visit showed that a significant change in sleep quality among smokers was not possible, whether with sleep hygiene training or without. This may be related to a difference in daily cigarette consumption between the control and intervention groups because age, gender distribution, mean FTND score, duration of addiction, education level, and beginning PSQI scores were statistically similar between the groups.

An association between nicotine dependence severity in young adult smokers and poor sleep quality was indicated in a recent study. Advice from practitioners to cut back on the number of cigarettes smoked dailyand treatment

Table 2. Pitsburg Sleep Quality Index levels before and after of hygiene education situations according to education level

	Sleep Hygiene Training							
	Absent (n=50)				Present (n=50)			
	First	p	Final	p	First	p	Final	p
Primary school	5.0 (5.0-17.0)	0.739	5.0 (5.0-16.0)	0.739	6.0 (5.0-10.0)	0.474	6.0 (5.0-12.0)	0.509
Secondary school	5.0 (5.0-9.0)		5.0 (5.0-9.0)		6.0 (5.0-10.0)		6.0 (5.0-10.0)	
High school	6.0 (5.0-13.0)		6.0 (5.0-13.0)		8.0 (5.0-10.0)		8.0 (5.0-10.0)	
University	5.0 (5.0-14.0)		5.0 (5.0-14.0)		9.0 (5.0-14.0)		9.0 (5.0-13.0)	

Data are presented as median (min-max).
Kruskal Wallis Test.

of nicotine dependence symptoms may improve sleep quality in young adult smokers.[12] In our study, lower daily smoking seemed to be effective in improving sleep quality.

A study comparing the effect of one given sleep hygiene training plus cessation counseling versus only cessation counseling did not demonstrate any difference in terms of sleep quality.[4] A Brazilian school-based sleep hygiene study suggested that sleep hygiene training program was effective in reducing sleep irregularity and latency and advancing nap awaking although no difference was found in sleep quality and daytime sleepiness.[13] According to a study conducted in Iran, sleep quality improved in elderly women with sleep disorders in the intervention group based on sleep hygiene training effect.[14] Sleep hygiene education combined with reflexology for patients undergoing chemotherapy increased sleep quality and decreased fatigue after sleep hygiene training and reflexology.[15] In a Japanese large-scale study, the intention-to-treat analysis revealed that the intervention group presented significantly greater prevention of insomnia symptoms and short sleep duration. However, no significant differences were found in the odds ratios for poor sleep quality between the two groups.[16]

In a previously published meta-analysis on insomnia and gender differences, the women/men ratio for insomnia was 1.41:1, and the occurrence of insomnia tends to increase in elderly women.[17] A recently published meta-analysis reported that women had longer sleep onset latency and more general fatigue after nine sessions of cognitive behavioral therapy for insomnia compared with men. In contrast, men reported higher sleep disturbances (PSQI subscale) compared with women.[18-20] In our study, sleep quality was not related to age, and no gender difference was detected that might dependon cessation treatment-seeking characteristics of participants based on sociocultural differences in our country. Meanwhile, in the intervention group of our study, the final PSQI values of men were statistically significantly lower than those of women as an effect of sleep hygiene training. This result was compatible with the higher prevalence of sleep disorders in women than that of men.

In some studies from different countries, a significant difference in sleep quality was found between education categories, but results showed that all university-graduated elderly and the majority of those with primary education were poor sleepers, revealing that sleep disturbance was not related to lower education level as the Japanese study or higher education level as in the studies from Egypt and other countries.[21-24] In our study, different education levels had no difference in PSQI scores or change in sleep quality after sleep hygiene training.

A study has shown that behavioral therapy for insomnia and sleep restriction therapy effectively treat menopause-related insomnia disorder and were superior to sleep hygiene education.[25] Thus, a combination of behavioral therapy might be included for future studies.

There are some limitations to be explained in our study. During the 12-week follow-up, daily nicotine level was a confounding factor in hygiene training effectiveness because the smoking or non-smoking status of participants could not be stabilized and was not equal. Second, another confounding factor was smoking cessation treatment's side effects that would cause sleep disorders during treatment.

CONCLUSION

Currently, poor sleep quality caused by nicotine or post-cessation withdrawal have led to a search for adjunctive cessation strategies. Although no significant change was found in the quality of sleep in the quitting process of smokers with hygiene education in our study, these results showed that not only sleep hygiene training is needed, but also holistic behavioral therapy methods.

Disclosures

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Ethics Committee Approval: The approval for the research was obtained from Taksim Training and Research Hospital Clinical Research Local Ethics Committee (Approval date: Apr 5, 2017 and Approval number: 35).

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