

Effect of a Sleep Hygiene Education Program on Sleep Problems in Female Nurses on Shift Work

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Abstract

Background and Objective: Sleep condition of nurses is important because it may affect providing healthcare services by them. The aim of this study was to determine the effect of a sleep hygiene course in nurses suffering from sleep disorders.

Materials and Methods: This study was conducted among nurses with clinical insomnia. The nurses were randomly divided into intervention (50 nurses) and control (50 nurses) groups. For nurses in the intervention group, a 2-hour training session was held about sleep hygiene practices. 1 month after the intervention, the Persian versions of Insomnia Severity Index (ISI), Epworth sleepiness scale (ESS), and Pittsburg sleep quality index (PSQI) questionnaire were completed by all participants. Data were analyzed using t test.

Results: All nurses were female, and their mean age was 29.8 ± 3.2 years. After the intervention, sleep latency was 15.5 ± 8.8 and 35.7 ± 19.7 minute in the intervention and control groups, respectively ($P < 0.001$). Total sleep duration per day was 462.6 ± 21.4 and 436.8 ± 18.8 minute in the intervention and control groups, respectively ($P < 0.001$). Total PSQI score (5.4 ± 0.9 vs. 7.0 ± 1.2 , $P = 0.003$), ISI (9.3 ± 1.2 vs. 15.3 ± 2.7 , $P < 0.001$), and ESS (7.6 ± 1.3 vs. 10.6 ± 1.6 , $P < 0.001$) in the intervention group were significantly lower than control group.

Conclusion: Sleep hygiene education consisted of a 2-hour session, and an educational brochure improved sleep problems in shift work nurses.

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Keywords: Sleep; Nurses; Insomnia; Sleep hygiene; Shift work schedule

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Introduction

Modern society is changing rapidly in terms of economic and social situation and personal behaviors. In 24 hour societies today, hours of daylight are not considered as a limiting factor for human activities; and most activities are conducted all over the day. Therefore, some people should work outside of usual hours as shift workers (1, 2).

Shift work is an important risk factor for health. Disruption of sleep-wake cycle in shift

workers causes symptoms as characterized by fatigue, drowsiness, insomnia, digestive problems, irritability, decreased mental activity, and degradation of individual performance. In general, work productivity and safety in night shift is at its lowest (3, 4).

Furthermore, shift work increases the risk of some diseases in long-term. Measuring the long-term effects of shift work is harder, but some of them increase the risk of cardiovascular disease, diabetes, mood disorders, and cancers (5). One of the most common problems in shift workers is shift work sleep disorders (SWSD) (6).

SWSDs are caused by disruption of circadian rhythm of sleep and wake and are characterized

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by excessive daytime sleepiness and insomnia. The prevalence of SWSDs is more than 30% in shift workers and its prevalence increase with aging (7, 8). Due to the high prevalence of SWSDs, many researchers have tried to find ways to solve this problem. One of the proposed solutions to this issue is training shift workers in sleep hygiene (9).

Many people do not have enough information about proper sleep hygiene practices. On the other hand, shift workers often adopt strategies to overcome shift work difficulties that will worsen the problems (1, 10). Proper sleep hygiene habits can improve sleep quality. Even recent studies have shown that proper sleep hygiene practices are invaluable as a first line treatment in many sleep disorders (11, 12).

Nurses play an important role in providing healthcare services in hospitals. Mental and physical condition and sleep quality of nurses have a significant impact on their quality of patient care, and therefore these are vital for the health system (13, 14).

Due to the nature of nurses' job, they face with many kinds of occupational stress including irregular shift work, interpersonal relationships, and demands of patients (13). Shift work and high level of stress in work environment increase the vulnerability of nurses to sleep disorders. Irregularity of sleep-wake pattern in nurses decreases the total amount of sleep and disturbs the quality of sleep. Finally, all these events are causing disruption in the job performance of the nurses. Therefore, paying enough attention to sleep problems and their consequences in nurses is important (13-16).

Poor sleep quality is prevalent among Iranian nurses. Previously, it has been found that the prevalence of poor sleep quality in nurses was 84.5% in Kerman (17), 83% in Zahedan (18), and 74.7% in Rafsanjan (19). The prevalence of sleepiness was also 45.6% in Kerman (17) and 32.6% in Zahedan (18).

In a study conducted in Japan, the effects of a short-term training session about sleep hygiene were assessed in 391 shift workers of an information technology company. The effects of sleep hygiene training were measured by assessment of sleep quality and excessive daytime sleepiness in participants. Results showed that a short-term course of sleep hygiene improves sleep quality in shift workers (17).

In another study conducted in Japan, a

combination of sleep hygiene training and behavioral therapy showed that sleep quality significantly improved in the intervention group compared to a control group (18). However, there is a limited number of studies among Iranian nurses (20, 21).

According to the information provided above, the aim of this study was to determine the effects of a sleep hygiene session on insomnia, excessive sleepiness, and sleep quality in nurses suffering from sleep problems in Qazvin, Iran.

Materials and Methods

This clinical trial was conducted among nurses with clinical insomnia employed at Booali-Sina Hospital in Qazvin during 2013. The study protocol was approved by the Ethics' Committee of Qazvin University of Medical Sciences. All subjects gave their written informed consent and were free to withdraw from the study.

Inclusion criteria were experience of recent working as a nurse for more than 6 months and clinical insomnia. Exclusion criteria were diseases that affect sleep quality, pregnancy, recent acute problems, addiction, and grief due to the loss of relatives in the past 6 months.

Demographic characteristics including age, sex, work experience, education level, and body mass index (BMI) were collected for all nurses. At the beginning, the Persian version of Insomnia Severity Index (ISI) questionnaire (22, 23) was completed by all nurses who were eligible for the study. The ISI is a 7-item questionnaire that measures the severity of problems in the beginning of sleep, staying asleep, waking up too early, and satisfaction with sleep, interference with daytime functioning, noticeability of impairment, and concern caused by the sleep problems. Each question is scored on a 0-4 scale giving a total score ranging from 0 to 28. The higher the ISI score, the more severe insomnia. ISI score more than 14 was considered as clinical insomnia as suggested by some researchers (24).

The ISI questionnaire was completed by 168 nurses, and 100 nurses met the criterion for clinical insomnia. The nurses with clinical insomnia were randomly divided into two groups as an intervention (50 nurses) and control (50 nurses) groups. For nurses in the intervention group, a 2-hour training session was held about sleep hygiene practices including the following topics in detail: trying not to work a number of night shifts

Table 1. Characteristics of the study participants at baseline

Variable	Intervention group	Control group	P-value*
Age (year)	30.2 ± 5.9	29.4 ± 5.9	0.470
BMI (kg/m ²)	23.9 ± 3.4	24.3 ± 3.2	0.600
Work experience (year)	12.6 ± 6.3	13.8 ± 7.5	0.210
Hours of shift work per month	233.3 ± 35.4	241.2 ± 43.7	0.300
Bed time at night	23.8 ± 0.9	24.2 ± 0.8	0.600
Sleep latency (minute)	36.2 ± 21.9	39.8 ± 19.1	0.370
Wake time at morning	7.7 ± 1.4	7.9 ± 1.2	0.380
Total sleep duration per day (minute)	440.5 ± 20.8	439.8 ± 19.8	0.863
Frequency of unwanted napping during the day	6.6 ± 4.2	6.5 ± 4.5	0.908

Data are presented as mean ± SD; BMI: Body mass index; SD: Standard deviation; *P value by t test

in a row; avoiding frequently rotating shifts; avoiding long commutes that take time away from sleeping; keeping workplace brightly lighted to promote alertness; limiting caffeine use; avoiding bright light on the way home from work; providing regular sleep-wake schedule; limiting phone calls and visitors during sleep hours; and blocking sunlight in daytime sleep. Moreover, a brochure about sleep hygiene practices was provided including the same topics as mentioned above and it was given to the participants in both intervention and control groups. The control group had no training session about sleep hygiene practices.

One month after the intervention, the Persian version of ISI, Epworth sleepiness scale (ESS), and Pittsburg sleep quality index (PSQI) questionnaires were completed by all participants. The PSQI is a 19-item questionnaire that measures Sleep Quality over a 1-month period using a total score and seven components including sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each component scores on a 0-3 scale. The higher the PSQI score, the poorer the sleep quality (25, 26). The ESS is an 8-item questionnaire that measures daytime sleepiness in particular situations in adults. Each question is scored on a 0-3 scale giving a total score ranging from 0 to 24. ESS score more than 10 indicates high daytime sleepiness (27).

Data were recorded as the mean ± standard deviation. Student's t test was used for analysis of continuous Variables. $P < 0.050$ was considered as statistically significant. All statistical analyses were performed using SPSS software (version 16, SPSS, Inc., Chicago, IL, USA).

Results

One hundred nurses with clinical insomnia were randomly divided into two groups as an intervention (50 nurses) and control (50 nurses) groups. All nurses participated in this study were female, and their education level was Bachelor of Science in nursing. Mean age was 29.8 ± 3.2 years. Characteristics of the study participants at baseline are reported in table 1. There were no significant differences between two groups in terms of age, BMI, hours of shift work per month, and sleep-wake parameters.

Comparison of sleep patterns between two groups after the intervention is reported in table 2. Bedtime at night; sleep latency, total sleep duration per day, and frequency of unwanted napping during the day were significantly different between the two groups.

Comparison of sleep quality, insomnia and daytime sleepiness between two groups after the intervention is reported in table 3. Total PSQI score, ISI, and ESS score were significantly different between the two groups.

Table 2. Comparison of sleep patterns between two groups after intervention

Variable	Intervention group	Control group	P-value*
Bedtime at night	23.4 ± 0.6	23.8 ± 0.8	0.025
Sleep latency (minute)	15.5 ± 8.8	35.7 ± 19.7	< 0.001
Wake time at morning	7.4 ± 1.3	7.8 ± 1.3	0.150
Total sleep duration per day (minute)	462.6 ± 21.4	436.8 ± 18.8	< 0.001
Frequency of unwanted napping during the day	1.6 ± 1.5	6.2 ± 4.7	< 0.001

Data are presented as mean ± SD; *P value by t test; SD: Standard deviation

Table 3. Comparison of sleep quality, insomnia and daytime sleepiness between two groups after intervention

Variable	Intervention group	Control group	P-value*
PSQI components' score			
Subjective sleep quality	1.18 ± 0.30	1.51 ± 0.40	0.020
Sleep latency	0.80 ± 0.10	0.90 ± 0.70	0.090
Sleep duration	1.16 ± 0.70	1.67 ± 0.40	0.009
Habitual sleep efficiency	0.31 ± 0.07	0.45 ± 0.40	0.005
Sleep disturbance	0.83 ± 0.20	1.31 ± 0.50	0.001
Use of sleep medications	0.18 ± 0.07	0.14 ± 0.09	0.070
Daytime dysfunction	0.91 ± 0.20	1.34 ± 0.60	0.210
Total PSQI	5.41 ± 0.90	6.97 ± 1.20	0.003
Insomnia Severity Index (sum)	9.35 ± 1.20	15.30 ± 2.70	< 0.001
Epworth sleepiness scale (sum)	7.60 ± 1.30	10.60 ± 1.60	< 0.001

Data are presented as mean ± SD; *P value by t test; PSQI: Pittsburg sleep quality index; SD: Standard deviation

Discussion

As the results show, sleep education to nurses may improve their sleep quality and relieve insomnia and daytime sleepiness. Moreover, sleep hygiene education program could improve their sleep-wake schedule including hours of going to bed, sleep latency, and unwanted napping during the day. After the educational session, nurses went to bed earlier, had a little delay to falling to sleep, and nap fewer during the day.

The results of this study are consistent with previous studies that have been done on the same issue (11, 20, 21). However, Nishinoue et al. showed that adding cognitive behavioral therapy to sleep hygiene course can have a greater positive impact on sleep quality compared to holding only an educational session about sleep hygiene (11). It should be noted that their study was done among people without any complaint of sleep problems. However, nurses participating in this study had suffered from insomnia.

Other studies conducted by Morin et al. (28), Edinger and Sampson (29) have shown that adding sleep hygiene education program to sleep restriction therapy, cognitive-behavioral treatment, and relaxation therapy could have more beneficial effects on quality of sleep in participants. However, in another study conducted by Suzuki et al., internet-based education about sleep hygiene practices could not have a significant improvement on sleep quality in participants. This difference in results may be due to face-to-face education and providing additional information by brochure in the current study (30).

In some previous studies that have been conducted among people with sleep problems, program intervention included several educational meetings and training sessions. It should be noted that holding these meetings is time-consuming

and costly. However, in this study, we spend little time for training the nurses. Despite the short time it took for training, significant improvements were seen in sleep parameters and sleep quality in participants. Therefore, using this method (combination of a session of education and a brochure) can be used for other organizations and hospitals.

In the present study, sleep hygiene education showed significant positive effects on insomnia and daytime sleepiness in nurses. After the intervention, significant improvements in insomnia and daytime sleepiness were seen. Present results are consistent with results from other studies (11, 20, 21, 28, 29).

This study has some limitations. Our study was performed in a teaching hospital with a small sample size. Therefore, the results may not be applied to the other communities. In addition, this study was conducted in nurses with clinical insomnia (moderate severity). It is possible that such intervention on people with minor sleep problems may not show significant results. Actigraphy as the gold standard method for evaluation of SWSD was not performed in the present study. Using placebo was not possible for the present study.

Conclusion

Considering the above information, it can be concluded that sleep hygiene education along with providing a brochure can improve sleep problems in shift work nurses. This study was conducted on a group of nurses that they had some information about shift work-related sleep problem and its harmful effects. Furthermore, it is possible that they seek a solution for their sleep problems. Therefore, a similar education program on other people may be less effective. For future studies, using objective tests such as polysomnography is

recommended for detection of the effects of sleep hygiene education programs.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

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