Sleep Hygiene Training Program for Patients on Hemodialysis

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Introduction. The high prevalence of sleep disorders highlights the importance of its treatment in hemodialysis patients. Due to complications of hypnotic medications, considering effective nonpharmacological methods to improve sleep quality is important. This study has conducted to determine the effect of a sleep hygiene training program on sleep quality of hemodialysis patients.
Materials and Methods. In a randomized controlled clinical trial, 82 hemodialysis patients were randomly selected and allocated to the intervention (n = 41) and control (n = 41) groups. A 1-month sleep hygiene program was provided to the intervention group within 6 sessions, and the sleep quality was assessed by the Pittsburgh Sleep Quality Index before and after the intervention. The global and components scores were compared between the two groups.
Results. The mean global scores and component scores of sleep quality were not significantly different between the two groups before the intervention. The mean global score of sleep quality of the intervention group significantly reduced after sleep hygiene education, as compared to the baseline values. The mean global score of the intervention group was significantly lower than that of the control group after the intervention (intervention, 9.92 ± 3.80 versus control, 13.05 ± 4.28). Also, the mean scores subjective sleep quality, sleep latency, sleep disturbances, and daytime dysfunction were significantly lower in the intervention group.
Conclusions. The findings of this study suggest that nursing and physicians team should consider reducing sleep problems of hemodialysis patients by training sleep hygiene.

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INTRODUCTION

Sleep disorders are common among patients with late stages of kidney disease. Some studies have reported its incidence to be over 80%.[1] The disorders often involve delay in falling asleep, frequent waking up, daytime sleepiness, sleep apnea, restless leg syndrome, and periodic limb movement.[2,3] Recent studies have stated that there is a correlation between sleep deprivations, lack of sleep and sleep disorders in general with a reduction in quality of life and an increase in death rates of hemodialysis patients.[4]

Different methods are used to treat insomnia, including the use of sleep medications, which are effective in short-term treatment of insomnia.[5] Some studies also found that the use of cognitive-behavioral therapy (CBT) to improve the quality and quantity of sleep in primary insomnia are effective.[6] The main methods of CBT including relaxation practice, stimulus control, sleep restriction and sleep hygiene.[7] Many of the studies done about the effect of CBT have focused on the primary insomnia; however, it is still not clear whether these methods can successfully be applied to

cure secondary insomnia caused by medical and psychological disorders.[8]

Sleep hygiene training program is widely used in combination with psychological intervention for insomnia and has been proved effective for chronic insomnia in the elderly, patients with cancer, and patients with chronic pain.[9,10] However, the effectiveness of sleep hygiene is investigated alone in some studies and its effectiveness has not been studied in patients undergoing maintenance hemodialysis.

Sleep hygiene training programs include instruction about health practices and environmental factors that can be beneficial for maintaining sufficient sleep and also details regarding homeostatic drive for sleep, circadian factors, and the effects of drugs and habits prior to sleep.[11] Sleep hygiene involves behavioral practices based on our understanding of sleep physiology and pharmacology, which have been identified to promote good sleep.[12] Several studies have demonstrated that sleep hygiene education can significantly reduce wake after the onset of sleep in normal populations.[13] The present study seeks to investigate the effect of an sleep hygiene training program on the sleep quality of hemodialysis patients in terms of reducing their problems, improving their quality of life, and meeting their satisfaction.

MATERIALS AND METHODS

Participants

This randomized controlled trial was conducted on patients undergoing maintenance hemodialysis in hemodialysis centers of Arak Valiasr Hospital. Eighty-two patients with sleep problem were randomly selected. Inclusion criteria were being at least 18 and up to 65 years old, having a history of hemodialysis for at least 6 months, having undergone hemodialysis 2 or 3 times per week, and having acceptable ability to learn sleep hygiene program. Patients were excluded from study if they were unwilling to continue to participate in the study, suffering from known mental diseases including deep anxiety and depression (according to patient answer and his/her medical history), having cognitive impairment, and experiencing an unpredictable crisis or disease during the study period. Physical and psychological crisis can influence sleep quality. For this reason, participants who experienced severe physical crisis (acute illness, hospitalization, and extensive surgery) or psychological crisis (bereavement, divorce, etc) in the past 6 months and also during the study were excluded. Study participation was voluntary, and informed consent was obtained from all participants.

Procedure

The study protocol was approved by the Ethics Committee of Arak University of Medical Sciences. Participants were randomly selected from among the hemodialysis patients in the dialysis unit and randomly assigned into the intervention (n = 41) and control (n = 41) groups. Patients in the intervention group participated in 6 weekly sessions of half-hour sleep hygiene training program. The content of training sessions was developed according to standard scientific methods. Sleep hygiene training program was conducted by the researchers and feedback of the participants was obtained. Direct teaching methods, a combination of face-to-face methods, lectures, and group discussions were used. Training in each session was as follows:

Session 1: Introduction, statement of research goals, and explaining sleep physiology;

Session 2: Explaining effective factors on sleep and types of sleep disorders;

Session 3: Overview of the sleep hygiene education instructions;

Sessions 4 and 5: Training behavioral interventions such as relaxation and imagery practice;

Session 6: Review sessions, getting feedback from the samples, and providing an educational pamphlet.

After 1 month of sleep hygiene training program, sleep quality scores of the participants in the intervention and control groups were compared.

Sleep Quality

Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI), which is a standard self-report questionnaire for determining the quality of sleep during the past month.[14-16] The PSQI includes 19 questions in 7 components (subjective sleep quality, sleep latency, sleep efficiency, sleep duration, sleep disturbances, use of sleep medications, and daytime dysfunction). The global score in this questionnaire is between 0 and 21, and higher scores indicate poorer quality of sleep. A score of 5 or higher shows that the

person has a sleep problem.[17,18] This questionnaire has been used in many studies to measure sleep quality and determine sleep disorders. It contains high validity and reliability. Previous studies have shown a reasonable match between the results of this questionnaire and laboratory examinations on sleep using polysomnography. Psychometric properties of this questionnaire have been validated for the Iranian population.[19] In order to be used in this study, content validity of this index was assessed through asking 11 experts. Similarly, its reliability was assessed by testing the internal consistency and test-retest. In the test-retest method, the questionnaire was given to 15 hemodialysis patients two times at a 2-week interval and then the Pearson correlation coefficient was calculated to assess reliability. The reliability of this questionnaire using the test-retest method was 78% and the Cronbach alpha for internal consistency was 85%.

Statistical Analysis

The SPSS software (Statistical Package for the Social Sciences, version 16.0, SPSS Inc, Chicago, Ill, USA) was used for data analyses. To report demographic properties of the data, descriptive statistics were utilized. Continuous data were presented as mean ± standard deviation, whereas categorical data were reported as percentages. To investigate normal distribution of the studied variables (global score of sleep quality and score of each sleep quality component), the Kolmogorov-Smirnov test was used. Using this test, the global score of sleep quality had a normal distribution and the score of sleep quality components had a skewed distribution. In order to compare the global PSQI scores of the intervention and control groups, the independent *t* test was used. In order to compare the scores of each component of the PSQI in the intervention and control groups, the Mann-Whitney test was used. The scores before and after the intervention in each group were compared using the paired *t* test and the Wilcoxon test. A *P* value less than .05 was considered significant.

RESULTS

Six of 82 patients (3 in the intervention group and 3 in the control group) were excluded from the study and data of 76 patients were analyzed. The majority of the participants was women (53.9%) and married (68.5%). The mean age of the participants was 45.12 ± 15.86 years, and they were on hemodialysis treatment for 5.1 ± 5.19 years. All of the participants were receiving hemodialysis on alternate days, 3 times in a week. Seventy-five percent of the patients had an average daily activity and 71.4% were not receiving sleep medications. Comorbidities other than kidney disease were seen in 40.8% patients (including diabetes mellitus, hypertension, heart disease, and lupus erythematosus). The two groups did not have any significant differences in terms of age, sex distribution, educational level, marital status, daily activity, duration and frequency of hemodialysis, and use of sleep medications, identified through self-report (Table 1).

As summarized in the Table 2, before intervention, the mean global scores of sleep quality were not significantly different between the two groups (intervention, 14.18 ± 3.81 versus control, 13.47 ± 4.39; *P* = .21). The mean scores of sleep quality components were not significantly different between the two groups either (Table 2). After the intervention, the mean global score of the intervention group was significantly lower than that of the control group (intervention, 9.92 ± 3.80 versus control, 13.05 ± 4.28). Also, the mean scores of sleep quality components,

Table 1. Characteristics of Participants*

Characteristic	Intervention Group (n = 38)	Control Group (n = 38)	*P*
Mean age, y	52.27 ± 17.32	57.87 ± 13.95	.23
Mean dialysis duration, y	4.9 ± 5.7	5.2 ± 4.5	.34
Sex			
Male	15 (39.5)	20 (52.6)	
Female	23 (60.5)	18 (47.4)	.17
Education level			
Illiterate	13 (34.2)	24 (63.2)	
Primary school	6 (15.8)	3 (7.9)	
Secondary school	11 (28.9)	5 (13.2)	
High school	6 (15.8)	5 (13.2)	
University	2 (5.3)	1 (2.6)	.13
Marital status			
Single	7 (18.4)	1 (2.6)	
Married	22 (57.9)	30 (78.9)	
Divorced	2 (5.3)	1 (2.6)	
Widowed	7 (18.4)	6 (15.8)	.10
Physical activity			
Low	11 (28.9)	6 (15.8)	
Moderate	27 (71.1)	30 (78.9)	
High	0 (0.0)	2 (5.3)	.16
Use of sleep medication	16 (42.1)	13 (34.2)	.16

*Values in parentheses are percentages.

Table 2. Comparison of the Pittsburgh Sleep Quality Index (PSQI) Scores Between Intervention and Control Groups of Hemodialysis Patients

Sleep Quality	Before Intervention			After Intervention			Before-After *P*	
	Intervention	Control	*P*	Intervention	Control	*P*	Intervention	Control
Global PSQI	14.18 ± 3.81	13.47 ± 4.39	.21	9.92 ± 3.80	13.05 ± 4.28	.001	.001	.21
Subjective sleep quality	2.47 ± 0.64	2.45 ± 0.72	.83	1.71 ± 1.01	2.45 ± 0.92	.001	.001	.13
Sleep latency	2.24 ± 0.96	2.11 ± 0.92	.18	1.53 ± 0.68	2.08 ± 0.78	.003	.001	.21
Sleep duration	2.82 ± 0.60	2.58 ± 0.82	.08	2.05 ± 1.01	2.37 ± 0.78	.18	.001	.20
Sleep efficiency	2.32 ± 0.87	2.42 ± 0.94	.39	1.84 ± 1.07	2.24 ± 0.88	.10	.03	.07
Sleep disturbance	1.24 ± 0.49	1.42 ± 0.50	.11	1.03 ± 0.28	1.42 ± 0.50	.002	.02	.10
Use of sleep medications	1.21 ± 0.87	1.03 ± 0.90	.09	1.01 ± 0.60	1.13 ± 0.92	.10	.001	.11
Daytime dysfunction	1.7 6 ± 0.91	1.66 ± 0.74	.48	1.76 ± 0.70	1.66 ± 0.76	.01	.01	.08

such as subjective sleep quality, sleep latency, sleep disturbances, and daytime dysfunction, were significantly lower in the intervention group than in the control group (Table 2).

The mean global score of sleep quality of the intervention group significantly reduced after sleep hygiene education, as compared to the baseline values ($P < .001$; Table 2). Moreover, the mean scores of each of the components of sleep quality were significantly lower than those before sleep hygiene education (Table 2). In the control group, the scores did not have any significant changes after the study period (Table 2).

DISCUSSION

In this study, the effect of sleep hygiene training program on the sleep quality of hemodialysis patients was investigated. To reach the purpose of this study, the effect of sleep hygiene training program on the global scores of sleep quality and each of its components were assessed. The sleep hygiene training program improved the global score of sleep quality and its components in hemodialysis patients. This finding is similar to the results of other studies done on the effect of CBTs including sleep hygiene training program on sleep disturbances in other chronic conditions.[20-24] In one study, Chen and colleagues assessed a 4-week trial of CBT for peritoneal dialysis patients with severe insomnia. The intervention group (n = 13) received CBT (including the cognitive, sleep restriction, stimulus control, and relaxation exercises) from a psychiatrist for 4 weeks and sleep hygiene education, whereas the control group (n = 11) received only sleep hygiene education. This study showed that CBT and sleep hygiene education are both effective in improving sleep quality of peritoneal dialysis patients.[21] What distinguishes our study from other studies is that in our study, the effect of sleep training program was assessed separately, while other studies examined the effect of sleep hygiene training along with other CBT methods.

In the present study, sleep hygiene training program created a significant improvement in all components of sleep quality; improvement in daytime dysfunction shows that sleep hygiene also greatly helps relieve daytime fatigue and sleepiness, a side effect of hypnotics. However, the mean sleep quality global score in the intervention group after sleep hygiene training program suggested low sleep quality (sleep quality global score > 5). This showed that although sleep hygiene training program improved patients' sleep quality, it could not bring the average sleep quality to a normal level. This is justified due to severely impaired quality of sleep in these patients.

An important limitation of this study was that the participants' sleep was assessed by a questionnaire, which is less accurate in comparison with polysomnography. The other limitation was that physical and psychological crisis can influence sleep quality, and we did not include these patients.

CONCLUSIONS

According to the results of this study, sleep hygiene training program has a favorable effect on the sleep quality of hemodialysis patients. Sleep hygiene improves various components of sleep quality. This method could be taught as a useful method to improve the sleep quality of patients in the hemodialysis wards. For further research, it is suggested that the effect of sleep hygiene training program be compared with hypnotics on the sleep quality of these patients.

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CONFLICT OF INTEREST

None declared.

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