Original Research Article

The Effect of Family-Centered and Peer-Centered Education on the Sleep Quality of Hemodialysis Patients: A Randomized Clinical Trial

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Maryam Mardanpour, MSc[1], Jahangir Rezaei, MSc[1], Ali Akbar Vaisi Raygani, PhD[1], Alireza Abdi, PhD[1], Nader Salari, PhD[2], Behnam Khaledi-Paveh, PhD[3], and Mohammad Mehdi Mohammadi, PhD[1]

Abstract

Introduction: Sleep disorders in hemodialysis patients are of high prevalence affecting the lives of these patients.
Objective: The present study was conducted to investigate the effect of family-centered and peer-centered education on the sleep quality of hemodialysis patients.
Methods: In this controlled clinical trial, 90 patients were randomly assigned to three groups (control, family-centered, and peer-centered). All three groups completed Pittsburgh Sleep Quality Index before the intervention. The intervention included five training sessions conducted by the researcher according to the patients' needs to improve their sleep quality. Routine ward interventions were performed for the control group. At the end of the study, the Pittsburgh Sleep Quality Index was completed by all three groups once again. Data were collected and analyzed using SPSS version 24 software and statistical tests.
Results: No significant difference was found between the two intervention and control groups regarding demographic variables and variables related to sleep quality before the intervention ($p < .05$). However, based on the results of the Wilcoxon test, there was a statistically significant difference between the mean rank of sleep quality in the intervention and control groups after the intervention (p-value = .008), indicating that sleep hygiene education was effective in the two intervention groups.
Conclusion: According to the findings, the mean rank of sleep quality in the two intervention groups was significant after the training, indicating the effectiveness of family-centered and peer-centered education. Accordingly, medical healthcare managers, policymakers, and planners, including nurses, are recommended to employ these convenient, safe, and cost-free training methods and provide better sleep quality and more comfort to patients by spending a short period of time for training.

Keywords

family-centered education, peer-centered education, sleep quality, hemodialysis patients

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Introduction

Today, as life expectancy increases, chronic diseases are considered critical health problems (Parvan et al., 2013). Chronic kidney disease (CKD) is one of the significant health problems in today's world, and the number of patients suffering from this disease is increasing every day (Amini et al., 2016; Singh et al., 2018). This disease is one of the leading causes of mortality and disability, due to which about 1 million patients died in 2013 (Hasan et al., 2018).

[1]School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Department of Biostatistics, School of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran
[3]Sleep Disorders Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding Author:
Ali Akbar Vaisi Raygani, School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: vaisi20.a@gmail.com

Significant progress has been made in treating CKD (Ruiz-Ortega et al., 2020). However, this disease is spreading with a 6–7% growth rate, higher than the world population growth rate. In order to preserve the patient's life, it is necessary to use alternative therapy following conservative therapies, among which are different types of dialysis. At present, hemodialysis is the most prevalent alternative treatment for these patients. Of these patients, one million nine hundred and twenty-nine thousand undergo hemodialysis (Oshvandi et al., 2018; vatandoost et al., 2018). However, hemodialysis patients face numerous complications, such as cognitive impairment, depression, sleep disorders, and impaired quality of life following treatment (Afsar & Elsurer, 2015).

One of the most common last-stage complications in patients with kidney disease is sleep complaints (Pretto et al., 2020; Zhang et al., 2014). The results of several studies show a high prevalence of sleep disorders in these patients, varying from 14% to 85% (Obayashi et al., 2018; Tu et al., 2019; Zhang et al., 2017). The prevalence of sleep disorders in hemodialysis patients in Iran is reported to be 70%–80% (Soleimani et al., 2017). The results of several studies have shown that sleep deprivation reduces health status and predicts sleep deprivation as one of the critical factors of the disease (Rahe et al., 2015; Saunders et al., 2015; Stewart et al., 2014). It has also been shown that sleep quality predicts the quality of life and the risk of mortality in hemodialysis patients (Wang et al., 2016). Given the increasing prevalence of sleep disorders, optimal treatment methods are needed. Primary healthcare providers and other healthcare team members are required to cooperate in providing the highest level of care, yet achieving this goal is challenging and costly (Singh et al., 2015).

Considering the fact that the main factors influencing the clinical outcomes of patients with kidney failure are outside the healthcare system and in the home environment, family members who spend time with the patient at home play a significant role in patient care and support (Bahramnezhad et al., 2015). Participation and involvement of family members through increasing the care knowledge and obtaining a better understanding of the disease conditions can help them take effective steps to solve the patient's problem and improve the condition (Jivad et al., 2018). In Iranian culture, family plays a significant role in providing care and support to those who are ailing or recovering (Shamsikhani et al., 2021). To improve the quality of sleep in Iran, interventions must align with cultural conventions, principles, and beliefs. Unfortunately, many contemporary interventions do not consider these factors, leading to difficulties for patients in understanding and adopting new sleep hygiene behaviors (Connolly et al., 2021; Mortazavi et al., 2021). This can result in opposition or noncompliance, reducing the effectiveness of interventions in managing sleep disorders. Therefore, interventions to manage sleep disturbances should acknowledge the importance of family and culture in Iranian society (Mortazavi et al., 2021).

Family-centered education is a care model whose primary goal is to strengthen the family (the patient and other family members) to improve their health (Ghasemi et al., 2018). This approach is one of the main nursing concepts, and its goal is to increase the awareness and ability of the family to provide unique care for each patient. Family-centered education entails collaborating intently with the patient and their family to establish customized care strategies that cater to their distinct requirements and inclinations (Ghavidel et al., 2015).

Another type of patient training method is peer-centered education, which is considered a novel and flexible educational model. Peer groups are able to communicate better with their peers and encourage them to opt for healthy behaviors (Dehghani et al., 2013). In the peer education approach, information and behavior are provided to individuals or groups by those with characteristics, such as age, sex, experience, and culture, identical to the target group and possess the required conditions or positions to exert influence (Hatami Rad et al., 2017). The study results show that employing this method in health education, especially in AIDS patients, has beneficial effects such as increasing sexual health knowledge and reducing high-risk behaviors (Zarifnejad et al., 2015).

The family-centered and peer-centered education interventions appear to possess distinct strengths that complement each other, offering a promising approach to addressing the weaknesses of one another and enhancing the quality of sleep in hemodialysis patients (Rajai et al., 2019). Family-centered education imparts knowledge to families regarding factors affecting sleep quality and ways to create a conducive sleep environment at home. Meanwhile, peer-centered education provides emotional support and motivation to hemodialysis patients in maintaining a healthy sleep routine (Zarifnejad et al., 2015).

Patients spend most of their lifetime in the family, and the family can continuously influence the transfer of education; therefore, the patient's living environment might positively or negatively affect the education the patient receives. Since in patients with chronic diseases (for a long time or even the end of life), the disease will be a part of their lives, education by an individual with a similar experience can be different.

Review of the Literature

Sanaie et al. (2013) conducted a semi-experimental study to examine the impact of family-centered education on adherence to a sports program among coronary artery bypass graft surgery patients. The study included 112 patients who were hospitalized at Chaharmahal Hospital both before and after surgery. After selecting the patients, the researchers completed the first questionnaire (before the intervention), and then randomly divided the samples into two groups: experimental and control. The family-centered education

method was used for patients and their families during three 20–30 min educational sessions. The groups consisted of four to six patients after surgery. The family-centered education stages were as follows: first, a training session was used to improve the patients' and their families' knowledge level, 24 h before surgery. The second and third sessions were conducted 48 h after surgery. The results showed that family-centered education had a significant effect on adherence to the sports program after surgery. However, the study also highlighted one of the biggest obstacles to achieving stable adherence to treatment programs in patients with chronic disorders, which is the absence of family and patients' lack of self-efficacy in disease management based on the health beliefs model (Sanaie et al., 2013). It is important to note that this study focused on heart surgery patients, who have more severe conditions compared to hemodialysis patients, and their disease period is much shorter. Therefore, the effects of these educational interventions may differ from those of hemodialysis patients.

In 2016, a controlled randomized clinical trial was conducted to explore the effects of sleep hygiene education on 60 patients receiving hemodialysis treatment at a dialysis center affiliated with Urmia University of Medical Sciences. The participants were randomly divided into an intervention group (30 patients) and a control group (30 patients). The sleep hygiene education protocol was developed by the researchers and supervisor based on a reliable reference and consisted of two parts taught face to face within an hour. The first part focused on the sleep process, its importance and impact on daily activities, and the significance of the sleep environment. The second part focused on behaviors related to mental health. Participants were allowed to ask questions for 10 min after the second session. The educational process for sleep hygiene behaviors was provided in the form of a group session. The study measured the participants' sleep quality using the Pittsburgh Sleep Quality Index (PSQI) before and after the intervention. The results showed that sleep hygiene education improved the quality of sleep in hemodialysis patients in all components of the PSQI questionnaire except for the sleep medication use component. The study concluded that sleep hygiene is a low-cost, accessible, and practical method that can effectively improve the quality of sleep in hemodialysis patients in a short period of time (Soleimani et al., 2016). However, it is important to note that patients may forget sleep hygiene tips when completing the questionnaire or not implement them, which could affect the research results. The researchers met with the dialysis patients twice a week at the center to ensure proper implementation of the given education. The study used this data to determine the content of the education provided to hemodialysis patients and to determine the sample size.

Michielsen et al. (2012) conducted a non-randomized controlled trial to investigate the impact of peer education on HIV prevention in high schools in Rwanda. Fourteen schools were selected from two neighboring districts, with 1,950 students assigned to eight intervention groups and six control groups. The study assessed students' knowledge, attitudes, and behaviors regarding HIV three times over a 12-month period (at baseline, 3 months, and 12 months), and sample size calculations were performed using the *t*-test after data collection. Ultimately, there was no significant difference observed in the effectiveness of peer education in HIV prevention between the intervention and control groups. Several reasons for the limited effectiveness of peer education were identified through analysis (Michielsen et al., 2012). Although this study had a long training period and a high likelihood of sample attrition, a shorter training session was considered. One of the strengths of this study is its large sample size, which indicates the results are reliable. However, it should be noted that random allocation was not performed in this study, which is a significant limitation.

Based on the reviewed literature, it can be concluded that previous studies investigating the impact of peer-centered and family-centered education on the sleep quality of hemodialysis patients had several limitations, including differences in the study population, lack of randomization in the clinical trial, and inadequate monitoring of participants' engagement throughout the study. Therefore, the present study was designed to address these limitations and investigate the effects of family-centered and peer education on the quality of sleep in hemodialysis patients using a randomized clinical trial approach.

The hypothesis of the study: The quality of sleep of hemodialysis patients in peer-centered education group, family-centered education group, and control group is not the same after the intervention.

Methods

Design

This study was a parallel group randomized controlled trial conducted on three groups: two intervention groups (sleep hygiene education through peer-centered and family-centered methods) and a control group (routine ward care). The allocation ratio in this study was 1:1. This controlled clinical trial was registered in the Iranian Registry of Clinical Trials (IRCT) with code Irct20130812014333n85.

Research Question

What is the effect of peer-centered and family-centered education on the quality of sleep in hemodialysis patients compared to a control group?

Sample

This study population included all patients referred to the dialysis ward of Imam Reza Teaching Hospital in Kermanshah, Iran, the largest teaching hospital in the west of Iran.

The samples included 90 patients undergoing hemodialysis in Imam Reza hospital. To enroll the samples, first, 90 individuals were included in the study through the convenience sampling method and based on the inclusion criteria. After obtaining the informed consent, individuals were randomly divided into three groups of 30, namely the peer-centered education group, the family-centered group, and the control group. The sample size was calculated based on the formula of comparing a quantitative trait in the two groups and its parameters, namely 95% confidence coefficient ($1-\alpha$), 90% test power ($1-\beta$), and other parameters according to the results of the pilot study (Appendix 1).

Inclusion and Exclusion Criteria

The inclusion criteria were as follows:

1. No change in companion until the end of the study (in the family-centered group)
2. High school or higher educational attainment
3. Ability to speak and understand the Persian language
4. Age between 22 and 65 years
5. No history of a doctor's or psychiatrist's visit due to sleep disorders
6. No drug addiction
7. No participation in an educational program or other research related to sleep hygiene
8. Appropriate social relations and the ability to conduct meetings (for peer-centered group educators)
9. Equal consumption of sleeping pills in all groups in the past month

The exclusion criteria were as follows:

1. Failure to participate in training classes for more than one session
2. Failure to complete the follow-up period
3. Death of the patient
4. Withdrawal from the study due to unwillingness to continue cooperating in the intervention

In this study, no patient met the exclusion criteria or was excluded from the study.

Implementation Process

In this study, after obtaining the approval code from the ethics committee of the university with the code IR.KUMS.REC.1396.392 and permission to conduct the study from the administrators of Imam Reza hospital and complying with the ethical standards of clinical trial studies, sampling began. In this study, 90 patients were equally and randomly divided into three groups (family-centered, peer-centered, and control groups). Hemodialysis patients who met the inclusion criteria were enrolled. After explaining the purpose of the study and the characteristics of the samples to the shift supervisor, eligible patients were selected from the list of hospitalized patients. Before the intervention, the eligible patients were provided with a full explanation of the study objectives and implementation. After obtaining written informed consent, in order to select the sample and receive the patient's information and clinical history using their medical profile, the researcher referred to the dialysis ward of Imam Reza teaching hospital in Kermanshah daily in the morning shift from 8 a.m. to 12 p.m. and in the afternoon shift from 3:30 a.m. to 6 p.m. for two months. The educational intervention was implemented in five 20-min sessions over three weeks for hemodialysis patients and their companions in the family-centered group (the patients' companions were requested to stay with the patient until the end of the educational sessions) (Appendix 2). In the peer-centered group, four individuals were selected as the leader to prepare for training. These individuals were trained in five sessions to improve the sleep quality of patients. In these sessions, in addition to the training, these four individuals shared their experiences related to the strategies used to adapt and improve sleep quality, and the researcher modified and completed the cases based on scientific books. Each of these four individuals in the peer-centered group was randomly assigned to a 6- or 7-member group. Afterward, educational sessions, including sharing those individuals' experiences and the sleep hygiene training program, were conducted in five sessions for the peer-centered group with the cooperation of those leaders in the presence of the researcher. The content and implementation of the educational program were identical for all groups. During the sessions, first, the peer expressed his/her experiences of reducing insomnia and adapting to it. Afterward, the patients shared their information with other patients in the group after gaining these experiences and sharing their experiences during the disease. The researcher participated in all the sessions as an observer and answered patients' questions if needed. One month after the intervention, the patients completed the Pittsburgh Index for the second time.

Randomization

In this study, a simple randomization method was used to generate the random allocation sequence. To this end, 90 consecutive numbers (from 1 to 90) were written on paper separately and placed inside a container. Afterward, the participants in the trial were requested to randomly choose one of those 90 numbers from the container containing numbers. Individuals who chose the numbers 1 to 30, 31 to 60, and 61 to 90 were assigned to group A (control group), group B (peer-centered education group), and group C (the family-centered education group), respectively (participants were unaware of the numbers for the allocated intervention type).

Outcome Measurement

The primary outcome of this study was sleep quality measured by the PSQI. In addition, a form for collecting individual characteristics of the patient and the trainer was used in this study. Patients' information forms included questions about gender, age, marital status, occupation, place of residence, and the history of sedative use. The personal information form for the trainer included questions about gender, age, family relationship (parents, spouse, children, and siblings), level of education, and occupation. The Pittsburgh Index examined the quality of sleep from the person's point of view. This questionnaire contains 14 questions, including subjective sleep quality (from the person's point of view), delay in falling asleep, sleep adequacy from the person's point of view, sleep duration, sleep disorders, the use of sleeping pills to fall asleep, and daily dysfunction due to sleep inadequacy. The score of each question ranges between 0 and 3, and the total score of this questionnaire is between 0 and 42. The scores are then converted to 0–100. Based on the nature of the questions, a score of 0 to 33 is considered favorable sleep quality, 33 to 66 unfavorable, and 66 to 100 extremely unfavorable. The Pittsburgh Index was completed by the control and intervention groups once more one month after the intervention. The consistency between the questionnaire components has been confirmed with Cronbach's alpha of 0.83. Farrahi Moghaddam et al. (2012) examined the psychometric properties of this questionnaire (across the country), and its Cronbach's alpha was determined to be 0.77 (27).

Statistical Analysis

The data were entered into SPSS software version 16. Descriptive statistics (frequency distribution, percentage, mean, and standard deviation) and analytical statistics (chi-square test and Wilcoxon and Kruskal–Wallis test) were used to analyze the data. The normality of the data was investigated using the Kolmogorov–Smirnov test. Moreover, the Chi-square test was used to check the homogeneity of demographic characteristics. Wilcoxon and Kruskal–Wallis tests were used to compare the mean rank of sleep quality in the intervention and control groups before and after the intervention. A significant level was considered $p < .05$ for all tests.

Results

Sample Characteristics

In the enrollment stage, 132 individuals undergoing hemodialysis were examined in order to investigate the study inclusion criteria, and 90 patients met the inclusion criteria. Afterward, in the allocation stage, the samples were allocated to one of the peer-centered (30 individuals), family-centered (30 individuals), or control (30 individuals) groups using the random allocation method. During the intervention and follow-up, no participant was excluded. Finally, data analysis was performed on 30 individuals in each group (Figure 1).

Of 90 patients undergoing hemodialysis, 51.1% were male, and more than 72% were married. The majority of the samples had school diplomas (45.6%), and 45.6% were unemployed. The mean age of the patients was 39.56, with a standard deviation of 9.12 years. Their age ranged between 22 and 64 years. Moreover, in this study, investigating the homogeneity of demographic characteristics, including gender, marital status, level of education, and occupation, showed that the mentioned variables were homogeneous in the intervention and control groups (Table 1) ($p < .05$). Besides, regarding the age variable, the intervention and

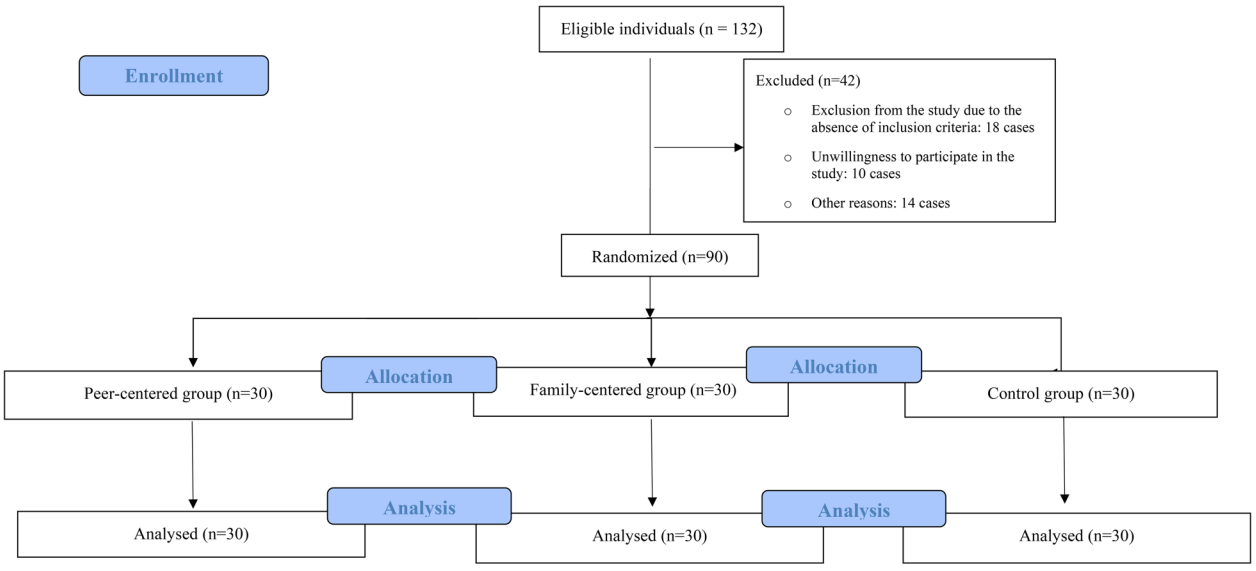

Figure 1. CONSORT flow diagram of study.

control groups did not have a statistically significant difference in terms of mean age and were homogeneous ($p < .05$).

Research Question Results

Based on the findings in Table 2, the mean rank of sleep quality in the control group was 46.65, which increased to 50.77 after the intervention, and no significant difference was observed after implementing the Wilcoxon test (p-value = .655). Moreover, the test results showed that in the family-centered group, the mean rank of sleep quality before the intervention was 49.03, which was reduced to 43.97 after the intervention, and this difference was statistically significant at the 95% confidence level (p-value = .008).

Furthermore, in the peer-centered education group, the mean rank of sleep quality before the educational intervention was 40.82, which decreased to 41.77 after the intervention, and this difference was statistically significant (p-value = .035).

In addition, the data analysis related to the mean rank of sleep quality before the intervention in the peer-centered, family-centered, and control groups was 40.82, 49.03, and 46.65, respectively. The results of the Kruskal–Wallis test showed no significant difference between the intervention and control groups before the intervention regarding the mean rank of sleep quality (p-value = .411). Moreover, the findings of this test showed that the mean rank of sleep quality after the intervention was 41.77 in the peer-centered, 43.97 in the family-centered, and 50.77 in the control groups, with no significant difference at the 95% confidence level (p-value = −.314) (Table 2).

Table 3 showed that according to the Wilcoxon test, there was no significant difference in the mean rank of subjective sleep quality in the control group before and after the intervention; however, there was a statistically significant difference in the family-centered group. Moreover, in the peer-centered education group, the mean rank of subjective sleep quality before the educational intervention was 39.53, which was reduced to 39.30 after the intervention. This difference was not statistically significant (p-value = .160). Moreover, there was no significant difference in the data analysis related to the mean rank of subjective sleep quality according to the results of the Kruskal–Wallis test before and after the intervention in the peer-centered, family-centered, and control groups ($p < .05$). The results showed no statistically significant difference in the mean rank of sleep latency according to the Wilcoxon test before and after the intervention in the peer-centered, family-centered, and control groups ($p < .05$). Moreover, the data analysis related to the mean rank of sleep latency before and after the intervention according to the results of the Kruskal–Wallis test showed no significant difference between the intervention and control groups ($p < .05$).

In addition, no significant difference was observed in the mean rank of sleep duration in control (p-value = .083), the

Table 1. Examining the Homogeneity of Demographic Variables in the Intervention and Control Groups.

		Peer-centered	Family-centered	Control		
Variables		Frequency (percentage)	Frequency (percentage)	Frequency (percentage)	Chi-square	p-value
Gender	Female	15 (34.1)	17 (38.6)	12 (27.3)	1.690	.430
	Man	15 (23.6)	18 (39.1)	13 (28.3)		
Marital status	Single	6 (24)	11 (44)	8 (32)	2.105	.349
	Married	24 (36.9)	19 (29.2)	22 (33.8)		
Level of education	High school	6 (25)	9 (37.5)	9 (37.5)	2.456	.651
	School diploma	13 (31.7)	15 (36.6)	13 (31.7)		
	Higher	11 (44)	8 (32)	6 (24)		
Job	Unemployed	10 (24.4)	18 (43.9)	13 (31.7)	4.390	.111
	Employed	20 (40.8)	12 (24.5)	17 (34.7)		

Table 2. Comparison of the Mean Rank of Sleep Quality in the Intervention and Control Groups Before and After the Intervention.

	Peer-centered	Family-centered	Control	
Variable/Group	Mean rank	Mean rank	Mean rank	Statistical index
Before intervention	40.82	49.03	46.65	Kruskal–Wallis test = 1.77 p-value = .411
After the intervention	41.77	4.97	50.77	Kruskal–Wallis test = 2.319 p-value = .314
Statistical index	Wilcoxon test = −2.11 p-value = .035	Wilcoxon test = −2.653 p-value = .008	Wilcoxon test = −0.477 p-value = .655	

Table 3. Comparison of the Mean Rank of Subjective Sleep Quality, Sleep Duration, and Sleep Adequacy in the Intervention and Control Groups Before and After the Intervention.

	Peer-centered	Family-centered	Control	
Variable/Group	Mean rank	Mean rank	Mean rank	Statistical index
Subjective sleep quality before the intervention	39.53	45.72	51.25	Kruskal–Wallis test = 3.77 *p*-value = .151
Subjective sleep quality after the intervention	39.30	46.90	50.30	Kruskal–Wallis test = 3.73 *p*-value = .155
Statistical index	Wilcoxon test = 1.40 *p*-value = .160	Wilcoxon test = 2.53 *p*-value = .011	Wilcoxon test = 0.557 *p*-value = .564	
Sleep latency before intervention	39.23	47.83	49.43	Kruskal–Wallis test = 2.97 *p*-value = .225
Sleep latency after intervention	43.67	47.83	49.43	Kruskal–Wallis test = 0.367 *p*-value = .832
Statistical index	Wilcoxon test = 0.775 *p*-value = .439	Wilcoxon test = 1.15 *p*-value = .248	Wilcoxon test = 1.15 *p*-value = .248	
Sleep duration before intervention	45.80	47	43.70	Kruskal–Wallis test = 0.271 *p*-value = .873
Sleep duration after intervention	41.67	47.08	47.83	Kruskal–Wallis test = 1.124 *p*-value = .570
Statistical index	Wilcoxon test = 3.357 *p*-value = .001	Wilcoxon test = −2.27 *p*-value = .273	Wilcoxon test = −1.73 *p*-value = .083	
Sleep adequacy before intervention	39.55	49.97	46.98	Kruskal–Wallis test = 3.23 *p*-value = .199
Sufficient sleep after the intervention	35.93	52.13	48.43	Kruskal–Wallis test = 8.97 *p*-value = .012
Statistical index	Wilcoxon test = 1.89 *p*-value = .058	Wilcoxon test = −1 *p*-value = .317	Wilcoxon test = −0.276 *p*-value = .783	

peer-centered (p-value = .001), and the family-centered groups (p-value = .273) before and after the intervention ($p < .05$).

Table 3 shows that based on Wilcoxon test results, no statistically significant difference was found between the sleep adequacy score before and after the intervention in the peer-centered, family-centered, and control groups ($p < .05$). However, the results of the Kruskal–Wallis test showed a significant difference in the studied groups after the intervention, although the sleep adequacy score before the intervention was not significantly different in the family-centered, peer-centered, and control groups.

According to the results of the Wilcoxon test, it can be stated that there was no statistically significant difference was observed between the scores of sleep disorders before and after the intervention in the peer-centered, family-centered, and control groups ($p < .05$) (Table 4). The results of the Kruskal–Wallis test showed a significant difference between the intervention and control groups before the intervention regarding the mean sleep disorders rank (p-value = .022). After the intervention, no statistically significant difference was observed in the peer-centered, family-centered, and control groups ($p < .05$).

Based on the Wilcoxon test and Table 4, no significant difference was observed in sleeping pills consumption by hemodialysis patients in the control group (p-value = .951); however, there was a difference in the peer-centered and family-centered groups before and after the intervention, which was statistically significant.

However, there was no significant difference between peer-centered, family-centered, and control groups according to the Kruskal–Wallis test results and the analysis of the mean rank of sleeping pills consumption before and after the intervention ($p < .05$).

The last finding of the study indicated no statistically significant difference in the daily dysfunction of hemodialysis patients between the peer-centered, the family-centered, and the control groups before and after the intervention according to the results of the Kruskal–Wallis and Wilcoxon tests ($p < .05$). In the family-centered group, the mean rank of sleeping pills consumption before the intervention was 47.82; however, it was reduced to 43.40 after the intervention, which was statistically significant at the 95% confidence level according to the Wilcoxon test (p-value = .007) (Table 4).

Discussion

The present study was conducted to compare the effect of peer-centered and family-centered education on sleep quality in patients undergoing hemodialysis. Sleep disorder was a critical complication in hemodialysis patients.

Table 4. Comparison of the Mean Rank of Sleep Disorders, Sleeping Pills Consumption, and Daily Dysfunction of Hemodialysis Patients in the Intervention and Control Groups Before and After the Intervention.

	Peer-centered	Family-centered	Control	
Variable/Group	Mean rank	Mean rank	Mean rank	Statistical index
Sleep disorders before intervention	41.97	41.40	51.13	Kruskal–Wallis test = 7.66 *p*-value = 0.022
Sleep disorders after intervention	42.43	42.43	51.63	Kruskal–Wallis test = 4.76 *p*-value = .092
Statistical index	Wilcoxon test = 0.0001 *p*-value = .999	Wilcoxon test = 0.447 *p*-value = .655	Wilcoxon test = 0.447 *p*-value = .655	
Sleeping pills consumption before the intervention	48.22	47.82	40.47	Kruskal–Wallis test = 2.77 *p*-value = .249
Sleeping pills consumption after the intervention	47.80	43.40	45.30	Kruskal Wallis test = 1.51 *p*-value = .562
Statistical index	Wilcoxon test = 2.14 *p*-value = .032	Wilcoxon test = −2.71 *p*-value = .007	Wilcoxon test = −0.061 *p*-value = .951	
Daily dysfunction before the intervention	42.27	43057	43,057	Kruskal–Wallis test = 2.188 *p*-value = .335
Daily dysfunction after intervention	41.05	42.20	41.05	Kruskal–Wallis test = 4.926 *p*-value = .085
Statistical index	Wilcoxon test = −0.390 *p*-value = .696	Wilcoxon test = −0.00001 *p*-value = .999	Wilcoxon test = 0.369 *p*-value = .712	

The results of the present study showed that the quality of sleep in family-centered and peer-centered groups was statistically significant. Regarding this finding, the results of this study are in line with Sanai's study (2013) conducted to investigate the effect of family-centered education on the rate of adherence to the exercise program in patients undergoing coronary artery bypass surgery and Dehghani et al.'s study (2013) conducted to determine the effect of peer-centered education on depression in 110 multiple sclerosis patients in Iran's MS Center (Dehghani et al., 2013; Sanaie et al., 2013). The results of this study indicate that empowerment, which includes the ability to solve problems, self-reliance, and building self-confidence, is one of the main elements in improving society's health. Empowerment helps the family to achieve changing abilities (Minooei et al., 2016). In peer-centered education, which is proposed as a novel and flexible educational model, peer groups are able to better communicate with their peers and encourage them to opt for healthy behaviors (Simoni et al., 2011). The results of this study were inconsistent with the study by Michielsen et al. (2012) conducted to investigate the effect of peer-centered education on HIV prevention in secondary schools in Rwanda; The results of this study indicated that education based on information sharing alone will never significantly change behavior and that peer education should be embedded in a larger strategy (Michielsen et al., 2012). Countless factors influence dialysis patients' low quality of sleep (Parvan et al., 2013).

This study also showed that family-centered education was influential on patients' subjective sleep quality and improved it in this group. One of the main elements in improving the health of society is empowerment. Empowerment helps the family to be able to change (Luthfa & Ardian, 2019). Family-centered education is one of the main nursing concepts since it is believed that the occurrence of a disease in a person leads the family members into the disease cycle (Sanaie et al., 2013). However, in the peer-centered education group, there was no statistically significant difference in the mean rank of subjective sleep quality before initiating the educational intervention and after that, which was consistent with the study by Razmaraei et al. (2016) conducted to investigate the effect of family-centered education on self-care in patients with type 2 diabetes. Their results showed that after the family-centered education, there was a statistically significant difference in the mean scores of self-care and its dimensions between the two control and intervention groups, indicating the positive effect of education on a diet in the intervention group (Razmaraei et al., 2016). Along with healthcare staff, patients and their family members need to actively participate in improving their own and the patient's quantity and quality of life, which cannot be achieved unless the patients and their families obtain sufficient knowledge and information about the disease, treatment, and care (Chong et al., 2015). However, these results are inconsistent with Dehghani et al.'s study (2013) conducted at the Iran University of Medical Sciences to investigate the effect of peer-centered education on depression levels in multiple sclerosis patients (Dehghani et al., 2013). The reason might be the different variables, which were "depression" in Dehghani et al.'s study and "sleep quality" in our study.

Other results of this study showed no statistically significant difference in the sleep latency of hemodialysis patients in the peer-centered, family-centered, and control groups after the intervention. The results of this study were in line with the study by Michielsen et al. (2012) that investigated the effect of peer-centered education on AIDS prevention in secondary schools in Rwanda (Michielsen et al., 2012). Although the method of peer-centered education in these two studies and the present study was quite similar, the type of patients enrolled probably influenced the results. However, the results related to sleep latency were inconsistent with the study by Soleimani et al. conducted to investigate the effect of sleep hygiene education on 60 hemodialysis patients referred to the dialysis center of Shahid Ayatollah Madani Khoi Hospital (Soleimani et al., 2016). Although the instrument in both studies was the Pittsburgh Index, the difference in the program, the education style, or the type of patients enrolled in these two studies might impact the results.

Other study results indicated that hemodialysis patients' sleep adequacy in the peer-centered and family-centered education groups did not change significantly after the intervention. The results of this study were consistent with the study by Tafazzoli et al. (2012), conducted to compare the effect of peer-centered education and education by healthcare workers on time to initiation of breastfeeding in 105 primiparous women in Mashhad (Tafazzoli et al., 2012). Education based on information sharing alone will never significantly change behavior, and peer education must be embedded in a larger strategy (Alipor et al., 2017). Numerous factors have a role in dialysis patients' low sleep quality; however, the results were inconsistent with the study by Asadnia et al. (2013) conducted in Tabriz to investigate the effect of sleep hygiene education on improving sleep quality and reducing migraine symptoms, which showed that sleep hygiene education improved participants' sleep quality and reduced migraine symptoms. These results might indicate the subjective nature of sleep quality and that several factors are influential in the low sleep quality in dialysis patients. In patients with chronic kidney failure undergoing hemodialysis, various factors, including blood urea and creatinine levels, parathyroid hormones, systolic and diastolic blood pressure levels, comorbidities, and lifestyle, can cause sleep disturbance (Asadnia et al., 2013).

Another study result was the lack of statistically significant difference in hemodialysis patients' sleep disorders in the peer-centered education, the family-centered education, and the control groups after the intervention. The results of this study were consistent with Michielsen et al.'s study (2012) conducted to investigate the effect of peer-centered education on HIV prevention in secondary schools in Rwanda (Michielsen et al., 2012). However, it was contrary to Philis-Tsimikas et al.'s (2011) study conducted in the United States to identify the importance of diabetic peer education compared to routine diabetes care education. These results indicate that countless factors are influential in dialysis patients' low sleep quality, including blood urea and creatinine levels, parathyroid hormones, systolic and diastolic blood pressure levels, concomitant diseases, and lifestyle (Philis-Tsimikas et al., 2011).

Other results of the present study showed that sleeping pills consumption in hemodialysis patients in the peer-centered and family-centered education groups was reduced after the intervention. In the control group, the mean rank of sleeping pills consumption was not statistically significant. The results of the present study are in line with the study by Razmaraei et al. (2016) and Dehghani et al.'s study (2013) conducted to investigate the effect of peer-centered education on the level of depression in patients with multiple sclerosis at the Iran University of Medical Sciences. Their results showed that after the family-centered education, the mean self-care scores between the control and intervention groups had a statistically significant difference, indicating the positive effect of training on a diet in the intervention group (Dehghani et al., 2013; Razmaraei et al., 2016). Many researchers have emphasized the role of education in solving dialysis patients' problems. Educational interventions for caregivers and family members of such patients profoundly increase the quality of home care for patients (Ghane et al., 2016; Novak et al., 2013). Today, one of the effective non-pharmacological treatment methods is to provide education and sufficient information related to the disease, control, and follow-up care by individuals who are informed and involved with the disease, titled as peer group (Dehghani et al., 2013). In this educational approach, a simple and safe learning environment is created by considering members' similar characteristics, and the patients share their experiences of the disease they have in common (Najafi et al., 2018).

Strengths and Limitations

The strength of the current study lies in its aim to deliver more precise and dependable outcomes by tackling previous limitations and utilizing a comprehensive strategy for patient education. One of the limitations of this study was relying on patients' self-reports about sleeping pills consumption during the training period, which was beyond the researcher's control.

Implications for Practice

Considering the fact that nurses are more involved in patient care than other healthcare providers, they have a central role in supporting patients and their families. Paying attention to these two cost-effective and straightforward educational approaches improves the quality of care for hemodialysis patients. The utilization of family-centered and peer-centered education in the care program for hemodialysis patients is reasonable because it significantly improves their sleep quality, making it cost-effective.

Conclusion

This study showed that family-centered and peer-centered approaches could improve some components of sleep quality. Family-centered education improved subjective sleep quality and reduced the consumption of sleeping pills in hemodialysis patients using the family empowerment mechanism. Based on this educational approach, a strong relationship is created between the family members and their health status, and one spends more time with their family. On the other hand, the peer-centered group leads to a decreased consumption of sleeping pills. Based on this approach, individuals encourage their peers to opt for appropriate health behaviors since they are able to share their weaknesses, strengths, and common experiences. According to the findings of this study, it is recommended that the two educational approaches be included in the care protocols for hemodialysis patients.

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Availability of Data and Materials

The data analyzed and materials used in this study are available from the corresponding author on reasonable request.

Author Contributions

AAVR, MM, AA, JR, NS, BKP, and MMM conceptualized, analyzed, and interpreted the data, and drafted the manuscript. AAVR, MM, JR designed the study and participated in the analysis and interpretation of data. All authors coordinated the study, revised the manuscript, edited and approved the final version to be submitted for publication, and helped in the analysis and interpretation of data.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethics Approval and Consent to Participate

This study was ethically approved by the ethics committee of Kermanshah University of Medical Sciences (IR.KUMS.REC. 1396.392). The researcher obtained the written informed consent of each participant. Participants were assured that they had the right to withdraw from the study at any stage.

Consent for Publication

All participants were informed about the study process and its objectives, and the written informed consent was obtained from them.

Trial Registration

Iranian Registry of Clinical Trials, IRCT20130812014333N85. Registered 2018-02-11, https://en.irct.ir/trial/28904.

ORCID iD

Ali Akbar Vaisi Raygani https://orcid.org/0000-0002-2427-4538

Supplemental Material

Supplemental material for this article is available online.

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