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Collaborative Care Model effect on the patients' sleep quality with maintenance hemodialysis

Farhad lashkari[1],Abdolali Shariati[1*],Shahram Baraz[1], Mahmud Latifi[2,3]

1.Department of Nursing, Ahvaz Jundishapur University of Medical Science, Ahvaz. Iran.
2.Department of Statistics, School of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
3. Diabetes Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Abstract

Introduction: Poor sleep quality affects many hemodialysis patients and can leave a significant negative impact on their quality of life and health status. The purpose of the present study was to evaluate the effect of a collaborative care model on sleep quality of hemodialysis patients.

Materials & Methods: A total of 52 patients with maintenance hemodialysis in this clinical trial study, were selected and randomly divided into two equal groups; intervention and control (26 patients per each group). Demographic Data Questionnaire and Pittsburgh Sleep Quality Index (PSQI) questionnaire were applied as instruments. Collecting data in the pre-test stage, a collaborative care model was developed for patients undergoing maintenance hemodialysis according to their four steps (motivation, readiness, involvement and evaluation) for the intervention group over three months. the average score of sleep quality for one month after the intervention were compared against previous intervention. Data were analyzed using SPSS v. 19 and chi-square tests, t-independent, repeated values, Man-Whitney and Wilcox on.

Results: Repeated measures showed a significant difference between the means of Pediatrics PSQI dimensions in all aspects, except sleep disorders and hypnotic drug use ($p \leq 0.009$). Moreover, the paired t-test showed a significant difference in the Pediatrics Pittsburgh Sleep Quality Index dimensions of the intervention group before and after the intervention ($p<0.001$).

Conclusion: Overall, the findings revealed that the collaborative care model was effective on the increasing sleep quality in patients with undergoing maintenance hemodialysis.

Keywords: Collaborative Care Model, Hemodialysis, Sleep Quality

Introduction

Chronic renal diseases are risky both for physical and other aspects of health. these patients if cannot succeed to receive a kidney, while are trapped in a range of physical, mental, emotional, social and economic problems, it would generally affect the quality of their life, getting rid of premature death using modern medical methods, including hemodialysis (1).

The incidence of chronic kidney disease during the past five years in Iran has been increasing at a rate of 8% (2). The end stage renal disease incidence have been reported in the whole population of the United States and Iran 330 and 253 cases per one million people per year respectively. The latest statistics regarding the end stage of kidney disease in Iran is 32686 with 15000 hemodialysises with 17% is being added to this group of patients annually (3).

**Corresponding author:*
Department of Nursing, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Tel:+989163134412 Email :Shariati @ajums. ac.ir
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Although hemodialysis can increase the patient's lifespan, but cannot alter the natural course of the underlying disease of the kidney, and cannot be a quite alternative for kidney function; however, the patient is exposed to the numerous effects and problems (4).

Among common clinical symptoms and findings in hemodialysis patients, seven common symptoms can be pointed out: insomnia (70-80% of patients experience these symptoms), fatigue (70%), cramp (57%), dyspnea (40%), itching (49%), headache (42%), and joint pain (44%) (5). The sleep-related problems are the most common complications. The sleep disturbance in hemodialysis patients has a high prevalence and it has been reported among the 80% of hemodialysis patients (6) that is associated with difficulty with sleeping, difficulty with staying asleep, sleeping too much during the day and the restless legs syndrome (5).

The disorder in the sleep quality is associated with the physical, behavioral and psychological problems; and it causes the mental and social dysfunction, as well as dysfunction of interpersonal interactions, Lack of sleep or the sleep disorders may also cause the impaired brain function reducing learning ability(7). In this regard, Sabbatini et al. in Italy, found that 63% of hemodialysis patients under the study, reported sleep problems in the form of the reduced sleep time, the fragmented sleep and the increased time awake in bed(8). Stepanski et al. in Chicago also found that 77% of hemodialysis patients reported daily nap, and 51% of them experienced falling asleep involuntarily (5). Therefore, paying more attention to health, prevention and the use of care model appropriate to the condition of these patients seems absolutely necessary. In this regard, the present study evaluated a new model, called the Collaborative Care Model, which has been designed according to the local agents. This model is one of the models that has been designed, implemented and evaluated for the first time in the field of nursing, at Tarbiat Modarres University, and includes four steps: 1) Motivation, 2) Readiness, 3) Involvement and 4) Evaluation.

The results of Alijany et al. studies in Ahvaz showed that the collaborative care model has been effective to improve the quality of life in school-age children with thalassemia (9). In another study, Khoshnevis et al. in Tehran demonstrated that applying this model enhances the quality of life for the chemically- injured people with bronchitis (10). Since hemodialysis is one of the most discussed health care issues raised in all over the world, including Iran, therefore, to provide the appropriate programs and patterns for medical care, disease management, to reduce complications and to improve quality of life is one of the key interventions in dialysis patients. according to the positive results of researches mentioned in the implementation of the collaborative care model, this study was conducted to determine the effect of the collaborative care model on quality of sleep in hemodialysis patients.

Materials and Methods

A clinical trial study was conducted on patients undergoing hemodialysis in the hemodialysis centers of Golestan, and Imam Hospitals , Ahvaz, 2012. The inclusion criteria for this study were patients who were under dialysis three times a week, able to communicate and have been under hemodialysis for at least three months. At the end, 52 out of 239 of hemodialysis patients with end-stage kidney disease (ESRD) using a sample size formula (11) and purposefully were selected and randomly divided into experimental and control groups of 26 people each equally.

The data collection tool was a questionnaire consisted of two parts. The first part included demographic information about the patient's illness. The second part of the questionnaire was the Pittsburg Sleep Quality Index (PSQI) investigating the sleep quality. The questionnaire had seven domains (the subjective sleep quality, latency, the sleep efficiency, the sleep duration, use of sleep medications, the sleep disorders and

daily abnormal function) that were separately scrutinized. The score of each component was from zero (no problem) to three (severe problem), respectively. The scores were aggregated to obtain a total score ranging 0-21. The higher score the least sleep quality was attained; scores greater than five were considered as poor sleep quality (7).

Phillips et al. conducted a study in Colombia; the reliability and validity of questionnaires were calculated equal to 85% and 83%, respectively. The reliability in a study conducted by Abdi in 2009 in Iran were determined that reliability was calculated as 83% (12). Following introductions (with the aim of encouraging collaboration until end-stage) and explaining the objectives of the study, patients announced own readiness by a written consent to participate in the study. In this regard, firstly, Pitts burg questionnaires were completed by the patients in both groups, and their sleep qualities were assessed. Then, steps based on the Collaborative Care Model (motivation, readiness, implementation, involvement and evaluation) was designed and implemented in the test group.

In the first stage, i.e. the motivation, according to the principles and objectives of the model, some actions were predicted for stimulating the patient, and after initial evaluation, the results and findings were analyzed by researchers. The obtained results were discussed in the presence of the patients. This stage was carried out by researchers in a two-hour session during the first week for all groups. At the next stage, i.e. readiness, the plan was carried out according to the care problems for collaborative learning visits and collaborative follow-up visits.

At this stage, the patients in the experimental group were divided into groups of 8-10. Subsequently, the duration of each session of the visit was coordinated with patients and physicians. This stage also was performed by researchers at a one-hour session during the first week for all people in the experimental group. At the next steps during the involvement stage, the collaborative learning and collaborative follow-up visits were performed as follows;

A)- The collaborative learning visits, during three sessions, including 1) the nature of the disease, treatment and its complications (at the second week), 2) diet and activity (at the fourth week), 3) issues related to the sleep quality (at the sixth week), and each was run for 60-70 minutes. At these meetings, information, skills and techniques required regarding the sleep quality and following items were fully described to the contributors by the researchers:

B)- A learning sessions were applied how to develop good habits before sleep, how to improve useful sleep hours and sleep-related factors (diet, exercise, drugs, smoking, etc.), the sleep sanitation (sleep and awake, stimulants, sleeping environment, etc.), the sleep disorders (insomnia, hypersomnia, and other sleep disorders). At the end of each visit, researchers discussed the material and topics provided by patient, doctor and nurse.

c) The collaborative follow-up visits: during these visits, which was performed during the seventh and eighth weeks, positive and negative results of educational actions and previous measures were examined by researchers; and the treatment team was participated for about half an hour, and necessary guidance's were introduced to correct defects.

In all steps, training materials were carried out as a simple step by step method and as lectured by researchers and in the presence of the doctor and the nurse and all educational content in the educational books and pamphlets were given to each of the members.

Evaluation was carried out in the form of a stage at the beginning and end of each meeting; and one month later, the sleep quality questionnaire was completed again by patients in both groups for the final evaluation of the implementation of the model for the sleep quality effect.

In this research, intervention was not applied on the control group; but in order to respect the

ethical considerations, after collecting data, all educational pamphlets were given to all patients in the control group.

Finally, the obtained data were statistically analyzed using Chi-square and T-test equation. The sleep quality dimensions were analyzed by Mann Whitney and overall score of sleep quality were analyzed by the repeated measures test and with the help of SPSS version-19. Total number of samples were 52 patients in the two groups of 26 people (experimental and control groups) The study was completed without reducing the sample size.

Ethical considerations

This study was conducted after obtaining the confirmation of the Ahvaz Jundishapur Ethics Committee and the informed consent from all subjects participating in the study.

Results

The contributors average age in the intervention and the control groups were 44.3 ± 9.6 years and 45.7 ± 10.2, respectively and the T test equation showed no significant difference between the two groups (p=0. 68). Females with 42.3% and males of 57.7%, applying the chi-square test equation showed no significant statistical differences in terms of sex between the two groups (p=0.39).

In terms of education level for the test groups, 34.6% and 65.4% in the control group were illiterate and literate, respectively; also, in the control group, 46.2, and 53.8% were illiterate and literate, respectively. The average duration of hemodialysis (per month) in the experimental and the control groups was 48.5±29.4 and 43.3 ±27.8, correspondingly, and t-test did not show any significant statistical differences between the two groups.

Table 1 shows the mean and SD of sleep quality scores in different dimensions and overall scores of sleep quality, before and after the intervention in the test and control groups.

The Mann Whitney test showed that the average scores of the dimensions of the sleep quality between the test and control groups before intervention did have no significant difference in any sleep quality dimensions ($p \geq 0.02$). However, after the intervention, the average scores in some of the aspects were significant between the two groups ($p \leq 0.009$), that shows an improvement in the sleep quality in this dimension. But in the two dimensions of the sleep disorders ($p = 0.11$) and the use of hypnotic drugs ($p = 0.15$) no significant difference was observed, which suggests that recovery in sleep quality dimension was not achieved.

Furthermore, the duplicate statistical test values comparison the average overall scores of the sleep quality in both groups indicated a significant difference after the intervention ($p \leq 0.001$) reflecting the overall improved sleep quality.

Table 1: Sleep quality scores and overall dimensions of the unit

Variable / Group	Before intervention		P-Value	After intervention		P-Value
	Case Mean±SD	Control Mean±SD		Case Mean±SD	Control Mean±SD	
Subjective quality of sleep	1.76± 0.71	1.8±0.74	0.73	1.07±0.62	1.92±0.84	**0.001**
Delay in sleep	0.57±0.75	1.76±0.81	0.27	0.73±0.6	2±0.66	**0.001**
Sleep duration	1.84±0.92	1.69±0.83	0.51	0.73±0.77	1.8±0.93	**0.001**
Sleep adequacy	1.84±0.78	1.93±0.79	0.7	0.92±0.68	1.88±0.9	**0.001**
Sleep disorders	1±1.16	1.19±0.84	0.24	0.96±0.95	1.34±0.89	**0.11**
Use of sleep medications	1.26±1.07	1.07±0.97	0.52	0.8±0.63	1.26±1.04	**0.15**
Daily dysfunction	/1.53±0.81	1.61±0.8	0.68	0.96±0.91	1.34±0.89	**0.009**
PSQI score	12.5±3.5	13.6±3.6	–	5.5±2.3	14.9±3.3	**0.001**

Discussion

The study showed that the overall Sleep quality in two groups after the intervention in order to increase the quality of sleep indicated a significant difference in the experimental group.

The experimental group also possessed a better quality of sleep after the intervention than before the intervention. Alijany et al. in Ahvaz showed that the collaborative care model improved the life quality of the school-age children affected with Beta-thalassemia major (9). Van der voort et al. in the Netherlands showed that collaborative model had a positive impact on mental performance and the quality of life of bipolar patients (13). Rahimi in Tehran, investigated follow-up care model effect on the quality of life of hemodialysis patients; he reported that in the evaluation of sleep as a part of the questionnaire SF-36, patients were suffering of sleep disorder in the form of insomnia or low sleep and the performance of this model increased sleep quality (14).

Edward et al. in Canada showed that low sleep was common in hemodialysis patients, and it was associated with to be low quality of their life (15). Based on the results of this study, 100% of the studied patients had low sleep quality, which it is consistent with Sadeghi et al.'s study, in Kerman, in which the sleep disorder in hemodialysis patients was reported as 83.7% (7).

According to the results of a study of Scott et al., in Washington, 55.2% of patients with end-stage kidney disease (ESRD) have a sleep disorder (16). Mystakidou et al. in the United States (17) and Baraz et al. in Shahrood County, Iran (18) reported that 74% of patients had an unfavorable sleep quality. As a result, most hemodialysis patients used the pharmaceutical and non-pharmaceutical interventions to control these side effects. Some of non-pharmaceutical interventions affecting the reduction of complications of hemodialysis can be: training, leisure, acupuncture, acupressure, relaxation, exercise, counseling, rehabilitation and maintaining energy. Tsay et al. in Taipei, Taiwan showed that acupressure improves the quality of sleep in hemodialysis patients (19).

Saeedi et al. in Tehran showed that the progressive muscle relaxation improves quality of sleep hemodialysis patients (20). Consequently, with regard to the impact of non-pharmaceutical interventions on sleep quality of patients, it should bear in mind that the role of the nurse and the patient is increasingly important.

A number of elements would be very effective causing to remove or reduce complications such as; diagnosis and teaching methods of care, consistency with the existing conditions, the patient participation in the treatment regimen. Ghavidel et al. in Tehran in Iran investigated the effect of applying the collaborative care model on the quality of life of hemodialysis patients referred to the best hospital affiliated with the Air Force in Tehran; they indicated that implementation of the collaborative model in the evaluation of sleep as a part of the SF-36 questionnaire patients improved the quality of sleep patients (21).

In fact, the importance of the role of the nurse in health education and help individuals to achieve desirable health is very important and specific. This research indicated that the collaborative care model has significantly improved the five sleep quality dimensions (subjective sleep quality, sleep duration, the latency duration, the sleep adequacy and the daily abnormal function); however, it has not been significantly affecting on two dimensions of the sleep disorders and the use of hypnotic drugs.

In the study of Shariati et al., a significant difference existed between the average sleep quality dimensions in the experimental and control groups after acupressure that the quality of sleep in these dimensions in the experimental group got better (11); as well as the there had not been significant differences between the average scores of the sleep adequacy in the two groups after the intervention.

But in this study as well as the study of Abdi et al. a significant difference was observed, which it

could be due to differences in the kind of research and method of intervention(12).

In the study of Shariati et al., and Saeedi et al., significant difference did not exist between the average scores in the dimension of use of hypnotic medications in two groups of case and control, which was consistent with the present study. In the study of Abdi et al. this difference was also not significant.

In the current study, the overall quality of sleep was also significantly improved that it was consistent with the studies of Tsay and Loon (19), Nasiri et al. (22), Shariati et al. (11), and Afshar et al. (23). It is worth noting that some factors such as the difference in the rate of learning, the emotional status of subjects when completing a questionnaire and the amount of exact implementation of cases trained by subjects would have an effect on the results of the research that it was out of the researcher control.

It can be hoped that with implementation of this model, valuable results would be obtained to improve and increase the sleep quality in hemodialysis patients, and this model should be used in the field of nursing education, the clinical management and increasing clinical services quality(24).

Based on this study results, the nursing managers now can use this model as an educational method in their own wards in planning to use various training methods. Thus, the culture and the structure of the organization will be changed in line with the development and influence of power of nurses' word (21).

Conclusion

The collaborative care model implementation in hemodialysis patients had a favorable effect on improvement and quality of sleep.

The nursing patterns are helpful system in nursing care; the use of nursing models, particularly models that have compatibility with the society culture, can be effective in performing nursing care and in other hand, continuity in caring and also, controlling the possible conflicts in health care.

The creation and application of patient-centered models can also cause the nurses understand the people and the needs associated with their health. The current study indicated that uncontrollable variables such as; knowledge, previous experiences, affective, psychological characteristics, and cultural roots of patients had an impact on interests and motivations as well as the level of their learning performance.

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