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Quality of Sleep and its Relationship to Quality of Life in Hemodialysis Patients

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ABSTRACT

Introduction: Despite many advances in the treatment of chronic renal failure, the quality of sleep in patients who suffer from this disease is at the risk. The high prevalence of sleep disorders in hemodialysis patients, which is concomitant with physical, behavioral, and psychological problems, has always affected these patients' quality of life (QOL). This study aimed to determine the relationship between quality of sleep and quality of life in hemodialysis patients.

Methods: By using a descriptive and correlational design, this study was conducted on 245 hemodialysis patients in 2012. Patients were selected by convenience sampling from the hemodialysis ward of four training hospitals of Tabriz and Maragheh. Quality of sleep was measured by the Pittsburgh Sleep Quality Index (PSQI), and the quality of life for patients was measured by the Kidney Disease Quality Of Life questionnaire (KDQOL-SF).

Results: 83.3% of hemodialysis patients had poor quality of sleep. Poor quality of life was significantly associated with poor quality of sleep. There was a significant negative correlation between global PSQI and important aspects of quality of life including physical health, symptoms and problems, the impact of kidney disease on daily life, burden of kidney disease, mental health, social support, and sexual function.

Conclusion: The low quality of sleep in hemodialysis patients has an effect on the deterioration of their quality of life. Therefore, training, counseling, and advocacy programs should be developed to improve the patients' quality of sleep and quality of life, especially those with lower education level and income, and older people.

Introduction

Today, with increased life expectancy, chronic diseases have been propounded as a major health problem. The people suffering from these diseases have to change their role as a normal person into a permanent patient and always be under the surveillance of the treatment groups.[1] Renal insufficiency is considered as one of the main problems of general health.[2] Available statistics indicate CRF (chronic renal failure) growth in our country during recent years. Despite great efforts to prevent CRF and to reduce mortality and morbidity, the number of these patients is rising. There are 32 thousand patients with renal failure in Iran, 49% of which use renal transplant treatment, 48% of them use hemodialysis, and 3% use peritoneal dialysis.[3] The end stage of renal disease is an incurable condition that is associated with irreversible deficiency of kidney function, when more than 95% of the kidney tissue is destroyed because of different reasons. Accumulation of toxins in the body come to an extent that the patient depends on renal replacement, hemodialysis, or kidney transplantation permanently in order to avoid uremia and life-threatening complications. In the final stage of renal insufficiency, treatment cannot be selected as a goal. However, at this stage, getting the maximum function and

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patient's well being becomes important, so that he or she can do their daily activities.[4] Sleep disorders and sleeplessness in hemodialysis patients is due to the illness, treatment, and medicines which influence their ability to perform daily activities.[5]

The incidence of sleep disorders and its causes in patients undergoing hemodialysis have attracted the attention of many researchers in the past 10 years.[6] Sleep disorders are common in dialysis patients and this problem has been reported in over 80% of them.[7] Renal replacement therapy exposes the patients to the risk of a wide range of physical, psychological, economic, and social problems, and influences their quality of life in general.[8] Quality of life can be affected by social-demographic variables, disease, and the clinical status of the patient, and that is affected by the person's experience and perception of life.[9] Quality of life is an important criterion that shows the effectiveness of health care, health and sense of well-being, and provides the possibility of forecasting mortality incidence and hospitalization rate.[10] Reduced quality of life in hemodialysis patients may affect different aspects of their life. It can especially change the functional status of the patients physically, so that the rate of daily activity and their ability to do daily activities are reduced.[11] Edell-Gustafsson et al., showed that sleep quality and sleep quantity impact the persons' QOL.[12]

It was shown in a study conducted by Novak et al., (2006) on hemodialysis patients that sleeplessness is the most prevalent sleep disorder in these patients. This disorder causes difficulty in initiating or maintaining sleep, or poor sleep quality, daytime sleepiness and fatigue during waking hours, morning headaches, impaired concentration, and impaired daily functioning. Furthermore, insomnia is more prevalent in women, in patients who suffer from chronic pain, and those who are from lower social classes and generally have lower quality of life.[13] Quality of life is affected in hemodialysis patients by a number of factors such as culture, diagnosis and prognosis, age, different kinds of medical treatment and predisposing factors, and periodic leg movements during sleep, on which nurses cannot have control and impact. However, QOL is affected by some factors that nurses can control, such as environmental factors, social and individual status, sleep quality, and symptoms of the disease. These actions are possible via providing necessary information for the patients and their family members, controlling the symptoms, and nursing care.[14] It can be said that patients with chronic renal failure requiring hemodialysis, on the one hand, are confronted with the physical problems caused by dialysis, and on the other hand, have sleep disorders such as insomnia, restless leg syndrome, dizziness, and daily drowsiness. Furthermore, due to the high prevalence of sleep disorders and complications such as anxiety, depression, dizziness, and daytime sleepiness, living conditions become difficult for them and their family and their quality of life decreases.

Based on the increasing number of hemodialysis patients, it seems that these problems are increasing and the studies and researches in this field are insufficient. On the other hand, it should be noted that culture and cultural customs are also effective factors on patients' sleep quality. That is, religious ceremonies, sleep time, sleeping place, and sleep schedule may change according to every patient's culture. Therefore, awareness of sleep quality and QOL of these patients is an important factor in making clinical decisions and controlling the problems. Therefore, this study aims to determine the quality of sleep and quality of life of hemodialysis patients and the relationship between these two factors.

Materials and methods

This was a descriptive and correlational study, approved by the Research Ethics Committee of Tabriz University of Medical Sciences, and permitted by the teaching hospitals of Maragheh and Tabriz. The sample size was calculated by a pilot study of

20 hemodialysis patients. According to α= 0.05, Mean (SD) = 7.75 (3.53) for quality of sleep and 56.6 (10.48) for quality of life, r = -0.37 and power= 0.8, the sample size was estimated to be 228 persons. With regard to the possibility of loss of subjects it was increased to 258 persons. All subjects signed a consent form. The number of hemodialysis patients in Maragheh was not enough for the present study. Therefore, patients were selected by convenience sampling from three educational hospitals of Tabriz and one educational hospital of Maragheh in 2012. Being at least 18, a history of hemodialysis of 6 months and more, undergoing dialysis 2 to 3 times per week, being able to communicate verbally, and not having severe mental problems (such as anxiety and depression) were the inclusion criteria of the study.

The exclusion criteria were participating in similar studies and unwillingness to participate. Finally, based on the inclusion and exclusion criteria, from the 258 patients, 245 patients were enrolled in the research. Sleep quality was measured with PSQI (Pittsburgh Sleep Quality Index). PSQI is a standard self-controlling, valid, and reliable questionnaire that reviews the quality of sleep during the previous month. It includes 19 questions in seven sections (subjective sleep quality, sleep latency, sleep sufficiency, sleep duration, sleep disturbances, use of sleep medications, and daytime dysfunction). Each section has a rating of zero to three and patients rate themselves based on this questionnaire. The total score of the Pittsburgh Sleep Quality Index is between zero and 21; higher scores indicate poor sleep quality. The scores over 5 show that the person's sleep is insufficient and he or she has many problems in at least two or three dimensions of this criterion, and generally has a poor sleep quality.[15] The validity of this questionnaire for the Iranian population is confirmed by the study of Farhadi Nasab and Azimi.[16] Farrahi et al., conducted a study on 85 patients with posttraumatic stress disorder resulting from earthquake and 133 healthy persons to evaluate the psychometric properties of the questionnaire. As a result, they obtained 100% sensitivity, 93% specificity, and Cronbach's alpha was 0.89 for the Persian version of the questionnaire.[17]

Kidney Disease Quality Of Life-Short Form (KDQOL-SF) is a standard and self-administered questionnaire that included both general and specific dimensions in relation to quality of life. The general dimension of quality of life includes two dimensions (physical and mental health) and eight domains. Physical health dimension includes four domains; general health (6 items), physical functioning (10 items), physical role (including 4 items), and bodily pain (3 items). The mental health dimension includes emotional role (3 items), social functioning (2 items), and mental health and vitality (8 items). The specific dimension of quality of life includes 9 domains containing a list of symptoms and problems (12 items), the impact of kidney disease (8 items), burden of kidney disease (4 items), cognitive functioning (3 items), quality of social interactions (3 items), social support (2 items), sleep status (4 items), job status (2 items), sexual issues (2 items), and satisfaction of care (3 items). This is a valid and reliable multi-dimensional tool which covers all the dimensions of SF-36 questionnaire and the variables related to kidney disease. It also has parallelism and internal consistency. The score of every dimension ranges from 0 to 100 and the scores over 50 indicate better quality of life.[18] The reliability of the questionnaire is calculated with Cronbach's alpha in Iran which was 0.85.[19] The validity of the questionnaire was reviewed and approved by 10 faculty members of the department of medical-surgical, school of nursing and midwifery of Tabriz university of medical sciences. Data collection lasted about two months and after completing the questionnaires, descriptive statistics were used to describe the characteristics of the units under study. Pearson correlation

coefficient was calculated to determine the relationship between quantitative variables of quality of sleep and quality of life. Student's t-test was used for two-domain variables and ANOVA for multi-domain variables. These were calculated by using SPSS for Windows (version 13; SPSS Inc., Chicago, IL. USA).

Results

In this study, 245 patients were enrolled with an average age of 58.03 (range 20-87). 64.5% of them were male and 35.5% of them were female. Most of the patients (112 persons) were illiterate. 78.8% of them were married. 84.1% were living in urban areas and the rest in rural areas. 34.4% of patients were housewives, 32.7% unemployed, and a few others had other occupations. Among patients, 76.7% earn less than they spend in terms of economic issues. 72.7% of patients were not hospitalized at all during the last 6 months. 61.1% of patients were dialyzed three times a week. 60.4% of samples had been undergoing hemodialysis for 3 years or more.

Among subjects, 10.6% of patients had a history of renal transplant, and the most common cause of kidney disease was diabetes, with 31.4%. The mean score of quality of sleep (global PSQI) was 10.45 (4.54) and its range was 2-20. 16.7% of the patients (41 persons) had good sleep quality, and 83.3% of patients had poor sleep quality. Among the components of the PSQI, the lowest mean score was of the use of sleep medication and the highest mean score was of sleep latency (Table 1).

In this study the mean score of the global quality of life in patients was 48.37 (11.91). Generally, the mean score of quality of life was undesirable in dimensions of physical health, mental health, and burden of kidney disease. However, it was desirable in dimensions of symptoms and problems, the impact of kidney disease on daily life, social support, and sexual functioning (Table 2).

Table 1. The Mean and standard deviation of quality of sleep and its dimensions

Quality of sleep and its dimensions	Mean (SD)
Global PSQI	10.45 (4.54)
Sleep quality dimensions	
Sleep duration	1.83 (0.97)
Sleep disorders	1.72 (0.64)
Sleep latency	1.98 (1.20)*
Daytime dysfunction	1.63 (0.76)
Subjective sleep quality	1.26 (0.82)
Use of sleep medications	0.4 (1.24)
Sleep sufficiency	1.26 (1.28)

* highest mean = the most problems

Table 2. The mean and standard deviation of important dimensions of quality of life

Dimensions of quality of life	Mean (SD)
Physical health	37.28 (15.58)
Mental health	43.03 (11.29)
Symptoms and problems	66.13 (17.72)
The impacts of kidney disease on daily life	56.28 (18.17)
Burden of kidney disease	27.34 (23.91)
Social support	88.16 (20.97)
Sexual functioning	52.80 (40.71)
Total score of quality of life	48.37 (11.91)

There was a significant inverse relationship between the global PSQI and global KDQOL-SF ($p < 0.05$). There was a significant inverse relationship between the global PSQI and physical and mental health dimensions, burden of kidney disease, symptoms and problems, effects of kidney disease on daily life, social support, and sexual functioning (Table 3).

There was a significant direct relationship between the global score of sleep quality and age ($p < 0.01$). Mean and standard deviation for age was 58.03 (14.03). There was a significant relationship between sex and sleep quality. There was no significant relationship between sleep quality and educational status, occupation, economic status, and dialysis years. There was a significant inverse relationship between QOL and age ($p < 0.01$). There was a significant relationship between QOL and economic, occupational, and educational status. QOL did not have a significant relationship with sex and dialysis years (Table 4). Statistical tests are shown in tables 3 and 4.

Table 3. The relationship between quality of sleep with quality of life and its related dimensions

Quality of Life and its dimensions*	Quality of Sleep	p
Global quality of life	r = -0.58	p < 0.001
Physical health	r = -0.44	p < 0.001
Mental health	r = -0.13	p = 0.040
Burden of kidney disease	r = -0.37	p < 0.001
Symptoms and problems	r = -0.47	p < 0.001
The impact of kidney disease on daily life	r = -0.42	p < 0.001
Social support	r = -0.13	p = 0.042
Sexual functioning	r = -0.15	p = 0.014

*Higher score indicates better quality of life, r = Pearson correlation coefficient

Table 4. The relationship between demographic characteristics and quality of life and quality of sleep

Demographic characteristic	Quality of life (KDQOL-SF) Mean (SD)	Statistical Indicators	Quality of sleep (PSQI) Mean (SD)	Statistical Indicators
Age	48.37 (11.91)	P < 0.001* r = -0.25	10.45 (4.54)	P < 0.004* r = 0.18
Sex				
Male	50.31 (12.05)	P = 0.32 t = 3.51	9.96 (4.23)	P = 0.014* t = -2.26
Female	44.84 (10.86)		11.33 (4.96)	
Educational status				
Illiterate	44.95 (11.41)	P < 0.001* F = 7.84	11.24 (4.40)	P = 0.100 F = 1.96
Reading and writing literacy	47.89 (11.03)		10.41 (4.90)	
Under diploma	51.00 (8.97)		9.60 (4.21)	
Diploma	53.34 (13.36)		9.25 (4.85)	
University	59.96 (12.40)		9.33 (3.72)	
Occupation				
Unemployed	47.42 (10.21)	P < 0.001* F = 6.11	10.37 (3.98)	P = 0.60 F = 2.25
Self-employed	58.19 (13.85)		8.18 (4.44)	
Staff	61.83 (13.49)		7.80 (1.78)	
Farmer	49.82 (7.44)		11.50 (3.72)	
Retired	50.69 (12.19)		10.14 (4.63)	
Housekeeper	44.47 (10.82)		11.45 (5.00)	
Other jobs	57.33 (14.81)		7.57 (3.30)	
Economic status				
Equal receipts and expenses	49.97 (11.37)	P = 0.02* F = 3.77	10.68 (4.31)	P = 0.63 F = 0.45
Receipts more than expenses	57.73 (15.10)		9.11 (5.06)	
Receipts less than expenses	47.52 (11.71)		10.45 (4.59)	
Years of dialysis				
Less than 1 year	49.11 (11.09)	P = 0.64 F = 0.44	9.21 (4.09)	P = 0.078 F = 2.57
1 to 2 years	49.34 (13.06)		10.00 (4.70)	
3 years and more	47.80 (11.66)		10.94 (4.53)	

*The relationship is significant for P < 0.05, r: Pearson correlation coefficient, t: Independent Samples t-test, F: ANOVA (Scheffe)

Discussion

Understanding and evaluating the quality of life for patients with end-stage renal disease is important and patients undergoing hemodialysis have a significant level of impairment in the quality of their lives.[20,21] Although sleep disorders are prevalent in hemodialysis patients, there is limited information about the effect of these problems on the patients' quality of life.[22] In the present study, the prevalence of sleep disorders and poor sleep quality was 83.3%. In the study of Eryavuz et al., the percentage of sleep disorders and poor sleep quality in hemodialysis patients was 88% versus 78% in peritoneal dialysis patients.[23] In the study by Sabbatini et al., 86% of patients reported sleep disturbances.[24] In the study by Sadeghi et al., 83.7% of hemodialysis patients had lower sleep quality.[25] the results of this study are consistent with the results of the aforementioned studies. Among the dimensions of the PSQI, the patients had the most difficulty in sleep latency; 48.6% of the patients had some degree of insomnia in the form of disturbance at the beginning of sleep. The patients expressed severe problems in this dimension during the past month, about 3 times a week, and they expressed minimum problems in the use of sleep medications. In recent studies sleep latency has been reported to be 40 to 60%.[26]

In a study by Walker et al. on hemodialysis patients, 46% of patients had sleep latency and their minimum problem was in the use of sleep medications.[26] This result is consistent with the result of the present study. In the present study, patients' physical and mental health, and their global quality of life were undesirable. In the studies of Vasilieva and Iliescu et al. the mean mental and physical health was also low.[27,28] In the present study, the significant inverse relationship between total sleep quality score and QOL shows that by increase in the sleep quality scores and deterioration in patients' sleep quality, their global QOL has become lower. This result confirms results of the studies by Iliescu et al. and Tel.[28,29] Furthermore, in the present study there was a significant relationship between poor sleep quality and poor physical and mental health dimensions. In a study it was reported that there is a significant relationship between patients' sleep quality and their mental and physical health. That is, patients who had lower sleep quality had poor physical and mental health. Moreover, the patients with poor sleep quality and insomnia had many problems in doing daily activities.[22,29] Therefore, studying sleep quality and treatment of insomnia as an effective criterion in patients' QOL should be a priority. Its treatment can cause increase in QOL and clinical outcomes, and being left untreated can cause the patients' to refer to the treatment centers repeatedly and increase the costs. It can also be a criterion and alarming symptom for mental disorders. These matters show the importance of considering sleep quality.[28]

In the present study, the patients' mean QOL was desirable in symptoms and problems dimension and the impact of kidney disease on daily life. Therefore, it can be said that by increasing the score of quality of life in these dimensions, the global PSQI is decreased and sleep quality improves. It was reported in a study that sleeping, as a special dimension of QOL, improves as the problems due to kidney disease and it improves hemodyalisis patients' daily life.[30] This result is in line with the results of the present study. Lack of care for hemodialysis patients' fluid intake brings about fluid retention in their body and they encounter problems such as general body swelling, gaining weight, cardiovascular disorders, shortness of breath, decreased activity, and subsequent sleep problems, which will endanger their health. Therefore, the impact of kidney disease on the daily lives of patients should be considered.[31] In the present study, low quality of life in the burden of kidney disease dimension had a significant relationship with poor sleep quality. The study of effective

factors on Rumanian hemodialysis patients' quality of life by Seica et al. showed that the quality of life score was lower in the burden of kidney disease dimension, but its relationship with sleep quality was not shown.[32]

In the study by Mucsi et al. on hemodyalisis patients, it was shown that the mean QOL score in the burden of kidney disease dimension, as one of the especial dimensions of QOL, decreases, the patients will have higher levels of insomnia and their sleep quality will decrease generally.[33] In the present study the patients who gained desirable social support, had desirable sleep quality. A study conducted in Saudi Arabia on the QOL of hemodialysis patients showed that these patients' mean social support was high and it had a desirable effect on patients' QOL.[34] In a study on hemodialysis patients, it was reported that patients with desirable sleep quality had enough social support, desirable social interaction, and good physical and mental functioning, and generally they had desirable QOL.[35] Therefore, it can be said that social support can be effective in sleep quality by decreasing stress on it, health behaviors, and healthy sleep habits.[36] In the present study, desirable sexual functioning had a significant relationship with desirable sleep quality. In QOL related studies, a few studies have concentrated especially on sexual functioning. Dunn et al. reported that with initiating dialysis, sexual activity is impaired and patients are unable to satisfy their wife's sexual needs, and this makes them feel guilty and depressed, and this issue affects different aspects of their QOL.[37]

The results of past studies on sexual functioning of hemodialysis patients were not in line with our study. The cause of this lack of agreement may be due to the patients abstaining answers to the related questions because of cultural and religious reasons. In past studies no relationship has been mentioned between sexual functioning and sleep quality.[37] Sexual functioning is one of the most important aspects of QOL. Therefore, health care team members, including nurses, should be trained to give patients the necessary trainings.[38] In the present study, the patients' QOL and sleep quality became lower with age. In the study by Tel, it was reported that as the patients' age increases, the QOL and sleep quality deteriorate and physical limitations increase.[29] Other studies have also reported that insomnia and the factors leading to sleep disturbance have a relationship with age.[35,39] Therefore, it seems that getting older has noticeable physical and mental impact on the patient. Since the risk of diseases and disabilities increase with age, considering supportive factors and enabling older people to improve their quality of life is important and preventive, and curative policies should be developed to protect the health of the elderly.[40] Since sleep quality is an effective factor on mental and physical health dimensions of the QOL of the elderly, evaluating patients and risk factors, and their sleep disorders should be done carefully.[30] In the present study, QOL had no significant relationship with patients' sex. While female patients' quality of life was lower than that of males, the statistical tests showed no significant relationship between them. In the study by Tel, female patients had lower quality of life.[29] However, in other studies there was no significant relationship between quality of life and sex.[22,28] This is in line with the results of the present study.

In this study, sleep quality of females was lower than males. In the studies of Chang and Yang, and Friedman it was reported that the rate of insomnia and poor quality of life are higher in females.[39,41] This was in line with the present study. The lower QOL of women may be because they were all housekeepers except 3 of them and they did not have enough income, and this has affected different aspects of their health, such as mental and physical aspects, and has deteriorated their sleep quality. There was no significant relationship between years of dialysis and patient´s QOL and sleep quality.

Although, some researchers have said that the experienced sleep disorder in hemodialysis patients and long period of dialysis causes decrease in patients' quality of life.[42] In the present study, most hemodialysis patients had been undergoing hemodialysis for 3 years or more and the mean QOL and sleep quality in this group of patients was lower than other patients. However, statistical tests have showed no significant relationship between them yet. In some other studies there was no significant relationship between hemodialysis years and QOL and sleep quality.[29,39] In the present study, low quality of life had a significant relationship with undesirable economic status, i.e. the patients who had undesirable economic status had lower quality of life. In the studies of Seica et al. and AL-Jumaih et al., the low economic status of hemodialysis patients had a significant relationship with low quality of life.[32,34]

In the present study, there was no significant relationship between sleep quality and economic status. In the study by Mucsi et al., the relationship between insomnia and the factors leading to sleep disorders, and income was not significant.[33] In the present study, the patients who were unemployed and homemaker had low quality of life and those who were employed especially self-employed patients had better QOL. In the study by Tel, the homemaker patients also had lower quality of life and physical health, and those who were employed had social support. Therefore, the appropriate occupational status is an important factor, which is effective in improving hemodialysis patients' QOL.[29] The fact that dialysis is costly and the probability of gradual to sudden job loss cause the patient socio-economical problems, and the lack of ability to provide therapeutic requirements and even life necessities has a direct impact on their QOL.[43] There was no significant relationship between quality of sleep and occupation. This was in line with the result of previous studies.[29,35]

In the present study, there was a significant relationship between quality of life and patient education. That is, illiterate patients or those who had reading and writing literacy had lower quality of life compared with those that had a diploma or academic education. The study by Tel showed that illiterate patients had lower quality of life and those who had higher levels of literacy could receive the information needed for treatment and the maintaining and accelerating factors better.[29] They generally could control the disease better, so they had better quality of life compared with those who did not have these privileges.[29] These results are in line with the results of the present study. There was no significant relationship between quality of sleep and education. This confirms the results of the studies by Mucsi et al. and Tel.[29,33]

Conclusion

The results of the present study showed that poor sleep quality and insomnia in the form of sleep latency is prevalent in hemodialysis patients. This will affect different aspects of QOL especially burden of kidney disease, physical health, and mental health dimensions. Therefore, study and treatment of insomnia as an effective criterion in QOL should be a priority as it makes the patients' lives longer. Thus, it is necessary to provide individual and group training programs for patients to organize and manage the problems resulting from kidney disease and health, and sleep problems.

Limitation of the study and suggestions for further research

It is probable that the subjects did not reveal their real feelings in answering the questions. However, this matter was controlled to some extent by explaining the fact that the content of the questionnaire would be kept confidential and there was no need for their names and family names. Data collection in most of the subjects (because of the high number of illiterate subjects), was done via face to face interviewing. Thus, it is probable

that some patients have not answered the questions carefully for different reasons. According to the fact that the answers were limited to those choices provided in the questionnaire and also by considering the fact that it is possible to get more comprehensive information by using tools for measuring sleep disorders, for studying sleep problems and its impacts on patients' daily life, we suggest using polysomnography which is a valid tool for measuring sleep disorders.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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