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Original Article

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The Effect of Quality of Sleep on Depression in Hemodialysis Patients

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Abstract

Objective: The aim of the present study was to determine the quality of sleep and depression scores of hemodialysis patients and to search their relationship.
Materials and Methods: This cross-sectional study was performed on 150 patients at the Erciyes University Health Application and Research Center and a private dialysis center between July 2017 and November 2017. A questionnaire form including the demographic sociocultural properties of the patients and Pittsburgh Sleep Quality Index (PSQI) and Beck Depression Inventory (BDI) was used as data collection tools.
Results: The patients' mean PSQI point was 11.82±2.81, and the BDI mean point was 15.1±9.65. The BDI mean point was significantly higher in patients with chronic disease other than chronic renal failure than in patients without other chronic diseases ($p<0.05$). The PSQI and BDI mean points were both significantly high in patients reporting change in life due to the disease ($p<0.05$). The BDI mean points were significantly high in patients feeling extremely tired after dialysis ($p<0.05$). There was a weak positive correlation between the PSQI and the BDI points ($p<0.01$).
Conclusion: The depression points of patients with chronic disease other than chronic renal insufficiency were higher. Quality of sleep was low in patients with high depression points.
Keywords: Hemodialysis, quality of sleep, depression

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INTRODUCTION

There are many problems that a patient with chronic renal failure (CRF) has to face due to the progression of renal disease. Many systems in the body are affected in the late stages. In addition to general signs and symptoms, such as fatigue and decreased mental activity, there are problems of the heart, lungs, stomach, and skin. In the endocrine system, decreased libido and impotence may be seen, and anemia occurs as a hematologic system problem. On the other hand, neuromuscular problems, such as muscular twitches, peripheral sensory and motor neuropathies, muscle cramps, restless legs, hyperreflexia, seizures, and sleep disorders, may be seen (1).

Sleep disorders may be related to many factors, such as the quality, timing, and amount of sleep. The most common sleep disorder is insomnia, whereas narcolepsy, obstructive sleep apnea, and restless leg syndrome are other types of sleep disorders. There is a relationship between sleep disorders and both physical and emotional problems (2). In primary care, 10%-20% of people complain of significant sleep problems, approximately one-third of adults report insomnia symptoms, and 6%-10% meet the criteria for insomnia disorder (3).

The Pittsburgh Sleep Quality Index (PSQI), which has been developed in the late 1980s, shows us the properties of sleep, such as subjective sleep quality, sleep

latency (sleeping late), duration of sleep, usual sleep activity, sleep disturbance, use of medicine for sleep, and daytime dysfunction (4, 5). The Beck Depression Inventory (BDI) was developed to objectively measure the depressive symptoms (6, 7).

The aim of the present study was to determine the quality of sleep and depression scores of hemodialysis patients by using the PSQI and the BDI and to search their relationship.

MATERIALS AND METHODS

This cross-sectional study was performed on 150 patients in Erciyes University Health Application and Research Center and a private dialysis center between July 2017 and November 2017. A questionnaire form including the demographic sociocultural properties of the patients and PSQI and BDI was used as data collection tools.

This study was approved by the ethics committee of Erciyes University. Informed consents were obtained from the participants.

Data Collection Tools

1. Pittsburgh Sleep Quality Index

The index was developed by Buysse et al. in 1989 (4). The Turkish validity and reliability study was performed by Ağargün et al. (5). The index is a 19-item self-report scale that evaluates the quality of sleep and sleep disturbances during 1 month. Every item in the index has 0–3 points. The index has seven subscales: subjective sleep quality, sleep latency (sleeping late), duration of sleep, usual sleep activity, sleep disturbance, use of medicine for sleep, and daytime dysfunction. The total sleep quality index point is the sum of seven subscales. The total point varies between 0 and 21, and a score of >5 clinically shows bad sleep quality. Sleep quality is evaluated as fine in those with an overall score of ≤5.

2. Beck Depression Inventory

The inventory was developed by Beck et al. (6). The Turkish validity and reliability study was performed by Hisli (7). In addition, the inventory is a 21-item self-evaluation scale that objectively measures the depressive symptoms. Every item has 0–3 points, and the maximum sum point is 63. The cut-off point is 17. The rise in total points shows the increase in the depressive symptom level. The scores are classified as normal (0–9), mild depression (10–18), moderate depression (19–29), and severe depression (30–63). The Cronbach's alpha internal consistency coefficient in BDI was found to be 0.849 in our study.

Statistical Analysis

Data were analyzed using R 3.2.0 (www.r-project.org) software. Student's t-test and variance analysis were used for statistical analysis. Tukey test (post hoc), one of the multiple comparison tests, was used in finding the group causing the difference. Pearson correlation coefficient was calculated to evaluate the relationship between the variables. A $p<0.05$ was accepted as statistically significant.

Table 1. The distribution of the patients' PSQI and BDI points according to demographic sociocultural properties

Variables	n (%)	PSQI Mean±SD	BDI Mean±SD
Age group (years)			
18-27	6 (4.0)	8.2±3.6	11.5±7.1
28-37	7 (4.7)	8.1±3.7	17.6±15.2
38-47	13 (8.7)	7.7±3.0	13.9±8.5
48-57	25(16.7)	10.0±3.4	15.2±10.0
≥58	99 (66.0)	9.1±3.0	15.3±9.5
p	0.210	0.824	
Gender			
Female	69 (46.0)	8.9±3.1	15.6±8.9
Male	81 (54.0)	9.1±3.2	14.8±10.3
p		0.632	0.627
Educational level			
Illiterate/literate	77 (51.3)	8.6±3.0	14.1±9.5
Primary school	49 (32.7)	9.6±3.0	15.6±9.7
High school and over	24 (16.0)	9.2±3.8	17.4±10.1
p		0.175	0.322
Marital status			
Married	126 (84.0)	9.1±3.1	14.9±9.3
Single	24 (16.0)	8.6±3.3	16.5±11.4
p		0.493	0.451
Profession			
Housewife	66 (44.0)	8.8±3.1	15.3±8.8
Retired	34 (22.7)	8.6±3.3	13.9±10.0
Self employment	22 (14.7)	8.9±2.4	13.0±9.6
Other*	28 (18.7)	10.2±3.6	17.6±11.0
p		0.157	0.303
Smoking			
Still smoking	28 (18.7)	8.8±2.7	14.9±11.7
Never smoked	84 (56.0)	8.7±2.9	14.6±8.9
Quit smoking	38 (25.3)	9.9±3.8	16.4±9.8
p		0.134	0.620
Alcohol			
Still drinking	17 (11.3)	7.9±2.7a	13.1±10.5
Never drank	119 (79.3)	9.0±3.1b	15.0±8.8
Stopped drinking	14 (9.3)	10.8±3.7ab	18.4±14.5
p		0.041	0.299
Disease other than CRF			
Yes	95 (63.3)	9.4±3.4	16.5±10.1
No	55 (36.7)	8.4±2.5	12.8±8.5
p		0.050	0.024

*Employee, government clerk, and without a job.
Alphabetical superscripts stand for statistical significance if groups are different (a and b are different, ab is not). Bold data shows statistical significance.

Table 2. The patients' PSQI and BDI points

Scales	X±SD
PSQI	
Subjective sleep quality	1.3±0.8
Sleep latency	3.0±0.3
Duration of sleep	1.9±1.1
Usual sleep activity	0.5±1.0
Sleep disturbance	1.1±0.6
Use of medicine for sleep	0.3±0.7
Daytime dysfunction	0.9±0.9
Total sleep quality	9.0±3.2
BDI	
BDI total	15.1±9.7

Table 3. The patients' PSQI and BDI scale point distribution according to different variables

Variables	n (%)	PSQI X±SD	BDI X±SD
Change in life due to the disease			
Yes	135 (90.0)	9.2±3.1	16.6±9.1
No	15 (10.0)	7.0±2.8	2.2±2.7
p		0.008	<0.01
Has sleep disorder			
Yes	86 (57.3)	10.2±3.0	17.2±8.7
No	64 (42.7)	7.5±2.8	12.4±10.3
p		<0.01	0.003
Decreased physical activity			
Yes	100 (66.7)	9.4±3.0	17.1±8.8
No	50 (33.3)	8.3±3.4	11.3±10.1
p		0.045	<0.01
Closure and anhedonia			
Yes	56 (37.3)	9.5±3.1	19.4±8.7
No	94 (62.7)	8.8±3.2	12.6±9.3
p		0.200	<0.01
How do you feel during and after dialysis?			
Very well	19 (12.7)	8.9±4.5	12.2±12.6[a]
Exhausted	73 (48.7)	9.0±3.1	14.6±8.5[ab]
Extremely tired	52 (34.7)	9.1±2.9	17.6±9.9[b]
Other*	6 (4.0)	8.5±2.6	8.8±5.2[b]
p		0.975	0.047

*Headache, vertigo, and distress.
Alphabetical superscripts stand for statistical significance if groups are different ([a] and [b] are different, ab is not). Bold data shows statistical significance.

RESULTS

Of the patients, 54.0% were men, 51.3% were illiterate/literate, 84.0% were married, 44.0% were housewives, 45.3% had income <1000 TL, 56.7% were living in detached houses, 18.7% were smoking, and 11.3% were drinking. Of the patients, 63.3% had chronic disease other than CRF, 25.3% had diabetes mellitus, 17.3% had hypertension, and 6.0% had heart failure (Table 1).

The patients' duration of CRF was 6.5±5.8 years, median (min-max) 4.0 years (1 month-27 years). The mean time from the start of dialysis was 5.4±4.8 years, median (min-max) 4.0 years (1 month-20 years). The patients were treated 2.8±0.7 days/week.

The sleep quality points of the patients still drinking were statistically significantly lower than those of the patients who never drank (p=0.041). The BDI mean points of the patients who had chronic disease other than CRF were statistically significantly higher than those of the patients who do not have other chronic diseases (p=0.024).

The patients' PSQI and BDI mean points are given in Table 2. The total sleep quality mean point of the patients was 9.0±3.2, and the total BDI mean point was 15.1±9.65.

Of the patients, 90.0% stated that their life changed due to the disease. The mean points of PSQI and BDI were statistically significantly high in patients who stated that their life changed due to the disease (p<0.05). Of the patients, 66.7% stated that their physical activity decreased. There was insomnia in 57.3% of the patients. Closure and anhedonia were reported by 37.3% of the patients. The PSQI and BDI points of the patients who had insomnia and decrease in physical activity and the BDI points of the patients reporting closure and insomnia were statistically significantly higher than others (p<0.05) (Table 3).

The BDI points of the patients feeling extremely tired after dialysis were statistically significantly higher than those of the patients feeling very well and others (headache, vertigo, and distress) (p=0.047) (Table 3). The mean duration of sleep of the patients was 6.6±2.0 h, and there was a weak negative correlation between the BDI points and duration of sleep (r=−0.205, p=0.012). There was a weak positive correlation between the PSQI and BDI total points in our study (r=0.354, p<0.01).

DISCUSSION

Statement of Principal Findings

The BDI mean points of the patients who had chronic disease other than CRF were statistically significantly higher than those of the patients who do not have other chronic diseases. The mean points of PSQI and BDI were statistically significantly high in patients who stated that their life changed due to the disease. Physical activity was decreased in 66.7% of the patients. Insomnia was present in 57.3% of the patients. The PSQI and BDI points of the patients who had insomnia and decrease in physical activity and the BDI points of the patients reporting

closure and insomnia were statistically significantly higher than others. There was a weak positive correlation between the PSQI and BDI total points in our study.

Strengths and Limitations

The strength of the present study is that a comparison of quality of sleep has been made with the evaluation of depressive symptoms. This made us able to compare the relationship between quality of sleep and depression. In addition, questions regarding the change in life due to disease, sleep, and depression were asked that were not present in the scales.

The limitation of the present study is that the BDI by itself may not define depression in patients without a detailed history and a physical examination.

Comparison with Existing Literature

Trbojević-Stanković et al. (8) have made a study on the quality of sleep in hemodialysis patients. Their study included 222 patients, and assessment was made by using the PSQI and the BDI. The results of their study showed that the average BDI was 16.1±11.3. Depressed patients have been significantly older, had significantly lower dialysis adequacy, and their quality of sleep was worse. There was no difference according to some factors, such as gender, employment, marital status, comorbidities, and dialysis type. The average PSQI has been reported as 7.8±4.5, and 64.2% of the patients were poor sleepers. Poor sleepers have been significantly older, they were more often females, and had a significantly higher BDI, whereas other investigated variables were not correlated with sleep quality. A statistically significant positive correlation was found between BDI and PSQI. The result of our study is similar to this study where we have also found a positive correlation between the BDI and PSQI.

In 2012, Turkmen et al. (9) have performed a similar study on the quality of sleep in hemodialysis patients. There were 63 hemodialysis patients in the study. As research tools, a modified Post-Sleep Inventory (PSI), the Medical Outcomes Study 36-item short form health survey, and the BDI were applied. As a result, it has been found that the prevalence of poor sleepers (those with a PSI total sleep score (PSI-4 score) of ≥4) was 71% (45/63), and the prevalence of depression was 25% (16/63). Of the 45 poor sleepers, 15 had depression, defined as a BDI score of ≥17. Poor sleepers were stated to have a significantly higher rate of diabetes mellitus and significantly higher total BDI scores and lower Physical Component Scale scores than good sleepers. It has been stated that the PSI-4 score correlated positively with the BDI score. In conclusion, they reported that poor sleep quality is a very common issue and is associated with both depression and lower health-related quality of life in elderly hemodialysis patients. In our study, insomnia was present in 57.3% of the patients, which is close to poor sleepers in Turkmen et al.'s study (9).

In 2013, Masoumi et al. (10) investigated the quality of sleep in dialysis patients. Their patients completed the PSQI and Hospital Anxiety and Depression Scale. Ninety patients were evaluated, and poor sleep quality was frequent in 86.6% of the cases in each group of hemodialysis and peritoneal dialysis patients. They have reported that patients on hemodialysis had poorer sleep quality in terms of total PSQI scores and two dimensions of sleep latency and sleep efficiency. Anxiety, depression, and being on hemodialysis have been reported as independent predictors of overall poor sleep quality. They have concluded that poor sleep quality was highly frequent in patients on maintenance dialysis, and mood disorders and being on hemodialysis are predictive factors. They have also stated that further studies are required for better understanding of risk factors associated with poor sleep quality and, thus, the possible treatments in these patients. In our study, we have demonstrated the correlation between the PSQI and the BDI, showing the relationship between the quality of sleep and depressive symptoms.

Implications

Our study demonstrated that many hemodialysis patients report sleep problems, and these are related to the depressive symptoms that the patients have. The care of hemodialysis patients should include the evaluation and treatment of both depression and sleep problems.

CONCLUSION

The depression points of the patients with chronic disease other than chronic renal insufficiency were higher. There was a weak positive correlation between the PSQI and BDI total points in our study. Quality of sleep was low in patients with high depression points. Health professionals should be more careful about the diagnosis and treatment of sleep problems and depression in hemodialysis patients.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Erciyes University.

Informed Consent: Written informed consents were obtained from patients who participated in this study.

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