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ORIGINAL ARTICLE

The Evaluation of Dream Anxiety and Sleep Quality in Hemodialysis Patients

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ABSTRACT

Sleep problems are prevalent in hemodialysis patients. Although several studies have investigated the sleep quality and its causes in hemodialysis patients, there is no report available on dream anxiety in hemodialysis patients. The aim of this study was to evaluate the sleep quality and dream anxiety in hemodialysis patients. We also investigated related factors which influence sleep quality and dream anxiety. Fifty-two hemodialysis patients and 38 healthy individuals were included in the present study. The sleep quality and dream anxiety were assessed with Pittsburgh Sleep Quality Index (PSQI) and Van Dream Anxiety Scale (VDAS); respectively. The majority of hemodialysis patients had poor sleep quality (%92.3) in our study. Hemodialysis patients had significantly longer sleep latency, higher sleep disturbances and daytime dysfunction than healthy individuals. Hemodialysis patients had higher global dream anxiety scores than healthy individuals. There was a negative relationship between hemoglobin levels and Global VDAS score. Global PSQI score was negative correlated with serum creatinine and phosphorus levels, while positive correlated with C-reactive protein levels. Our results suggest that hemodialysis patients had poor sleep quality, higher sleep disturbances and daytime dysfunction compared with healthy subjects. Moreover, we demonstrated that dream anxiety was significantly higher in hemodialysis patients.

Keywords: sleep quality, dream anxiety, hemodialysis

INTRODUCTION

Sleep disorders are common in dialysis patients. Sleep complaints such as insomnia, sleep apnea and excessive daytime sleepiness may be linked with worse outcomes in dialysis patient (Brekke et al. 2014). The etiology of sleep disorders in patients on dialysis is multifactorial. Dialysis, medications, metabolic abnormalities, malnutrition, fatigue, muscle cramps, peripheral neuropathy, and emotional problems appear to interplay in the development of sleep disturbances in these patients (Perl et al. 2006, Bilgic et al. 2007). Sleep quality and sleep disturbances of hemodialysis patients are affected by factors such as socio-demographic variables, comorbidities of psychiatric disorders and other physical conditions, including tobacco use and uraemia (Masoumi et al. 2013). Poor sleep quality can potentially predict morbidity and mortality in many hemodialysis patients (Elder et al. 2008). Previous studies have shown that the prevalence of poor sleep ranges from 50% to 80% among

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these patients (Iliescu et al. 2003), however, the majority of sleep problems in dialysis patients have not been noticed by nephrologists.

Another area of sleep related researches are the dreams and nightmares. There are many suggested effects of dreaming including mood-regulation, adjustment and the integration of new information into existing memory systems (Levin et al. 2002), Dream anxiety, which waking anxiety causes via frightening dreams, is associated with a variety of psychopathological conditions such as depression (Besıroglu 2005); schizophrenia (Mume 2009) and anxiety (Roberts & Lennings 2006). On the other hand, dream anxiety is a potent inducer of acute myocardial infarction (AMI) in patients with coronary artery disease (Selvi et al. 2011).

Several studies have investigated the quality of sleep and sleep disorders in dialysis patients (Sabbatini M et al. 2002; Sabet et al. 2012). To our knowledge, there is no report on dream anxiety and related factors in hemodialysis patients. The aim of this study was to evaluate the sleep quality and dream anxiety in hemodialysis patients. We also investigated related factors influencing sleep quality and dream anxiety.

MATERIALS AND METHODS

Patients and Study Design

The cross-sectional study was conducted in the Department of Nephrology at Yuzuncu Yil University, Dursun Odabas Medical Center,Van, Turkey. The study subjects were recruited during regular hemodialysis patients with end-stage renal disease receiving hemodialysis therapy three times per week.

A total of 52 haemodialysis patients (20 female, 32 male, mean age = 43.9 ± 13.7 years) and 38 age- and sex-matched healthy control subjects (20 female, 18 male, mean age = 38.9 ± 10.8 years) were included in this study.

The inclusion criteria were as follows: patients should have been receiving maintenance haemodialysis for greater than three months; age greater than 18 years, have no current symptoms or history of psychiatric disorder or treatment and provide informed consent. Patients who had an acute infection, presence of coronary artery disease, diabetes mellitus or cerebrovascular disease were excluded. The patients did not smoke or consume alcohol.

Enrolled patients completed our questionnaire during their dialysis sessions or while waiting for their treatment. Quality of sleep and dream anxiety were measured using the Pittsburgh Sleep Quality Index (PSQI) and the Van Dream Anxiety Scale (VDAS); respectively.

Blood samples were taken in all patients when they came to the hospitals for dialysis session before the dialysis. Complete blood counts; serum urea; creatinine; total cholesterol; C-reactive protein; albumin and electrolytes, including, sodium, potassium, calcium and phosphorus, were assessed.

The first year of hemodialysis treatment is very important for compliance with dialysis. We thought that new living conditions, regular treatment programmes or deterioration of functionality could adversely affect patients' quality of sleep and dream anxiety. We hypothesised that after the first year of hemodialysis, patients' adaptation would be completed and their quality of sleep and dream anxiety may improve. Therefore, we divided them into two groups: 0–12 months and 12+ months according to hemodialysis duration.

The study was approved by the Regional Ethics Committee for Medical Research at Yuzuncu Yil University and conducted according to the declaration of Helsinki. Written and informed consent was obtained from all patients after they received a complete description of the study protocol.

Measurement Instruments

Pittsburgh Sleep Quality Index

The PSQI is a self-rated questionnaire that assesses sleep quality and disturbances over a one-month interval (Buysse et al. 1989). It has a total of 24 items, even though the quality of sleep is calculated only on the basis of 19 items. Items include both open-ended questions, e.g. 'During the past month, when have you usually gone to bed at night?', and fixed choice questions, e.g. 'During the past month, how would you rate your sleep quality overall?': 'Very good', 'Fairly good', 'Fairly bad', or 'Very bad'). Nineteen individual items that are weighted equally on a 0–3 scale generate seven component scores: (1)

subjective quality of sleep, (2) sleep latency, (3) sleep duration, (4) sleep efficiency, (5) sleep disturbances, (6) medication used for sleep and (7) daytime dysfunction. A global PSQI score less than five is considered to be a sensitive and specific measure of poor sleep quality. The PSQI has been shown to be valid and reliable in Turkish population studies (Agargun et al. 1996).

The Van Dream Anxiety Scale

The VDAS assesses nightmare frequency and dream anxiety caused by frightening dreams during the preceding month (Agargun et al. 1999). The VDAS has a good level of internal consistency (Cronbach's α = 0.87). Pearson correlations have indicated that the question–total correlation coefficients ranged from 0.93 to 0.48 in the validation study. There are 17 self-rated questions in the scale. Four questions (numbers 7–10) are used for clinical information only and are not tabulated in the scoring of VDAS. Twelve questions are concerned with nightmare frequency, difficulty in falling asleep after a nightmare, fear of sleeping because of anticipated nightmare, trouble sleeping, dream recall frequency, sleepiness, daytime anxiety, occupational distress, familial distress, social distress, psychological disturbances and memory/concentration problems. These 12 questions are weighted equally on a scale of 0–4. Question five is related to autonomic hyperactivity and consists of 12 symptoms (shortness of breath, dizziness, exhaustion, palpitation, sweating, shivering, nausea, having a stomach ache, tightness in chest, dry mouth, fear of death and sore throat). Each of the 12 symptoms is weighted on a scale of 0–4. If the total score is between 0 and 10, the sum score of this question is 0, between 11 and 20 = 1, between 21 and 30 = 2, between 31 and 40 = 3 and between 40 and 48 = 4. Thus, 13 question scores are summed to yield a global VDAS score, which has a range of 0–42. It has been shown to be a valid and reliable instrument to measure nightmare frequency and dream anxiety presenting similar psychometric properties as the original version. VDAS was also used in many different studies related to dream anxiety (Simor et al. 2010). VDAS can be used to assess dream-anxious persons in psychiatric and general medical practice because of its good validity and reliability (Semiz et al. 2008).

Statistical Analysis

The collected data were analysed using Statistical Package for the Social Sciences (SPSS) version 16.0. The independent samples t-test was used for normally distributed continuous variables. A comparison of non-normally distributed continuous variables was performed using the Mann-Whitney U test. The Chi-square test was used for the analysis of categorical variables. Correlations were calculated using Pearson's correlations. P-values of less than 0.05 were considered statistically significant.

RESULTS

There were no statistically significant differences between the hemodialysis patients and the controls with respect to age and gender (p>0.05).

In the hemodialysis patients, the mean duration of renal disease and duration of hemodialysis was 42.91±38.7 months. The majority of hemodialysis patients had poor sleep quality (92.3%). Hemodialysis patients had significantly longer sleep latency, higher sleep disturbances and daytime dysfunction than

Table 1: Comparison of sleep quality in hemodialysis patients and control group

PSQI	Hemodialysis Patients (n=52)	Control group (n=38)	p
PSQI global severity score	12.05±4.85	10.78±3.95	0.190
Subjective sleep quality	2.90±1.13	2.70±1.18	0.391
Sleep latency	1.90±0.86	1.47±0.86	**0.009**
Sleep duration	1.09±1.30	0.76±1.19	0.218
Habitual sleep efficiency	0.90±1.10	0.60±1.02	0.209
Sleep disturbances	2.40±0.50	2.07±0.63	**0.002**
Use of sleeping medication	1.38±0.80	1.15±0.59	0.168
Daytime dysfunction	1.53±0.77	1.94±0.95	**0.028**

Note. **PSQI:** Pittsburgh Sleep Quality Index; Bold values indicated p<0.05

Table 2: Comparison of dream anxiety in hemodialysis and control groups

VDAS	Hemodialysis Patients (n=52)	Control Group (n=38)	p
Global VDAS score	20.36±8.41	16.55± 7.14	**0.026**
Nightmare frequency	2.11±1.30	1.39±0.68	**0.030**
Difficulty in falling asleep after a nightmare	2.23±1.42	1.44±0.89	**0.004**
Fear of sleeping because of anticipated nightmare	1.50±0.87	1.21±0.57	0.079
Trouble sleeping	1.59±0.91	1.18±0.51	**0.014**
Autonomic hyperactivity	13.9±4.20	15.8±7.10	0.141
Dream recall frequency	1.84±1.14	1.44±0.92	0.080
Daytime sleepiness	1.46±0.82	1.18±0.65	0.090
Daytime anxiety	1.59±0.97	1.42±0.91	0.391
Occupational distress	1.30±0.78	1.28±0.65	0.907
Familial distress	1.40±1.51	1.23±0.54	0.517
Social distress	1.34±0.71	1.28±0.65	0.700
Psychological problems	1.67±1.06	1.18±0.45	**0.009**
Memory/concentration problems	1.32±0.70	1.13±0.41	0.131

Note. **VDAS:** Van Dream Anxiety Scale; Bold values indicated p<0.05

Table 3: Pearson correlations between the patients' global sleep quality and dream anxiety scores and laboratory parameters in the study patients

Parameters	Hemodialysis Group (n=52)	Global VDAS score	Global PSQI score
Hemoglobin (g/dL)	12.09±2.5	-0.287*	-0.095
WBC (103/mmol)	6.10±2.43	-0.022	0.278
Urea (mg/dL)	84.81±53.7	-0.012	0.010
Potassium (mmol/L)	4.89±0.97	0.024	-0.175
Calcium (mg/dL)	10.68±10.67	-0.143	-0.146
Creatinine (mg/dL)	6.8±3.05	-0.187	-0.382**
Albumin (g/dL)	4.19±0.94	-0.050	0.110
Phosphorus (mg/dL)	4.93±1.63	-0.039	-0.320*
Total cholesterol (mg/dL)	159.9±35.9	-0.027	-0.006
C-reactive protein (mg/dL)	21.8±35.4	0.085	0.275*

WBC: White blood cell
VDAS: Van Dream Anxiety Scale
*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

healthy individuals (all, p < 0.05). No significant differences were found in terms of global PSQI scores, subjective sleep quality, habitual sleep efficiency, use of sleeping medication scores and sleep duration (p>0.05) (Table 1).

Hemodialysis patients had significantly higher nightmare frequency, difficulty falling asleep after a nightmare, fear of sleeping because of anticipated nightmare, trouble sleeping, psychological problems and global dream anxiety scores than healthy individiuals (all, p<0.05). There were no significant differences in the scores of other dream anxiety components including autonomic hyperactivity, dream recall frequency, daytime sleepiness daytime anxiety, occupational distress, familial distress, social distress and memory/concentration problems (p>0.05) (Table 2).

Hemodialysis patients were divided into two groups: 0–12 months and 12+ months of haemodialysis duration. There were no significant differences in both groups in terms of dream anxiety and sleep quality (p > 0.05).

There was a negative relationship between hemoglobin levels and global VDAS scores (r=-0.287, p<0.05). Global PSQI score was negatively correlated with serum creatinine (r=-0.187, p<0.01) and phosphorus levels (r=-0.320, p<0.05). They were positively correlated with C-reactive protein levels (r = -0.275, p < 0.05). Other laboratory tests results were not correlated with PSQI total score and global VDAS scores (p > 0.05) (Table 3).

DISCUSSION

In the present study, we evaluated sleep quality and dream anxiety in hemodialysis patients. We also investigated related factors influencing sleep quality and dream anxiety. Despite the fact that there are many reports investigating the prevalence of sleep disorders and sleep quality in hemodialysis patients, there is no study investigating dream anxiety and related factors in hemodialysis patients.

The prevalence of poor sleep according to PSQI scores in hemodialysis patients was 92.3% in our study. We observed that hemodialysis patients had significantly longer sleep latency and higher sleep disturbances when compared with the healthy subjects. Moreover, we found that hemodialysis patients had higher global dream anxiety scores than healthy individuals.

Poor sleep quality could lead to on-going emotional and physical problems in hemodialysis patients because sleep is one of the most vital physical and mental needs of humans. Better sleep is a sign of physical health and well-being; it reduces stress, anxiety and tension, enhances body's energy and mental focus, and it balances the body so that it enjoy daily activities (Abedi et al. 2005).

Reports about the sleep quality of haemodialysis patients are controversial (Eryavuz et al. (2008). Perl et al. (2006) found that 42% of dialysis patients had sleep problems and sleep disorders affected their daily activities. Kusleikaite et al. (2005) reported a poor sleep rate of 67% in a hemodialysis population. Similarly, Iliescu et al. (2003) examined the quality of sleep in ESRD patients on hemodialysis using the PSQI and found a prevalence of 'poor sleep' (global PSQI > 5) of 71%. Eryavuz et al. (2008) reported that the percentage of sleep disorders and poor sleep quality in hemodialysis patients was 88%.

We observed that the prevalence of poor sleep according to PSQI in hemodialysis patients was 92.3% in our study. Our results are clearly higher than the previous studies. Our results are clearly higher than the previous studies; this may be due to some factors such as the localisation of Van (in the eastern part of Turkey). The sunrise and sunset times are earlier than in other regions of Turkey. In addition the low socioeconomic status of Van city, being unemployed patients are among the factors influencing sleep quality and dream anxiety. Previous studies have shown that sleep quality could deteriorate in elderly patients due to an increased frequency of physical diseases, multiple drug use, primary sleep disturbances, or lifestyle modifications (Brandenberger et al. 2003, Kamel et al. 2006). The relationship between age and sleep quality is controversial in ESRD patients. Yildirim et al. (2004) reported a negative correlation between age and sleep quality in hemodialysis patients. Yoshioka et al. (1993) found that advanced age affects patients experiencing sleep problems. In our study, we found no association between age and sleep quality.

In some studies with hemodialysis patients, there has been no relationship between the dialysis duration and sleep quality. However, Veiga et al. (1997) reported higher PSQI scores in patients who have received hemodialysis therapy for a long period of time. Our findings are in agreement with the results of previous studies.

The effect of gender on sleep quality is controversial among dialysis patients. Unruh et al. (2003) reported that sleep quality is worse among male patients on dialysis therapy. However, this result has not been confirmed in many studies (Holley et al.1992; De, Vecchi et al 2000). Furthermore, Pai et al. (2007) reported that female gender was associated with poor sleep quality. In the present study, we did not find any significant association between gender and sleep quality.

According to laboratory test results, we found a negative correlation between global PSQI scores and creatinine levels. This means that higher creatinine levels are advantageous for good sleep quality. Higher creatinine levels indicate good nutritional status and hypocreatinemia is a risk factor of a poor outcome (Kalantar-Zadeh et al. 2004). Therefore, we hypothesised that higher serum creatinine is an advantage for a good quality of sleep.

Iliescu et al. (2003) demonstrated that global PSQI score is inversely associated with serum albumin and haemoglobin in dialysis patients. In the present study,

there was no association between the global PSQI score and these variables.

Anaemia is a risk factor for sleep disturbance in dialysis patients, and an association between haemoglobin levels and sleep disturbances has been indicated (Güney et al. 2010). It has been shown that, when anemia is improved, sleep quality increases, waking at night decrease, and sleeping time is less divided so that a more restful sleep is obtained (Ohayon 1996). Several previous studies conducted with hemodialysis patients have indicated a relationship between low hemoglobin levels and deteriorated sleep quality (Benz et al. 1999; Iliescu et al. 2003) In the present study, we did not find any significant association between the hemoglobin levels and sleep quality. Our findings are not in agreement with previous studies.

On the other hand, we observed that hemoglobin levels were negatively correlated with global VDAS scores; this suggests that anaemia is associated with higher levels of dream anxiety and nightmares. We could not find any similar in the literature related with dream anxiety and anemia. Our result will be the first report to be published in this area. According to our results, the evaluation of haemoglobin levels and appropriate therapy for anaemia may improve dream anxiety in hemodialysis patients.

Poor sleep quality was associated with higher serum phosphate levels (Unruh et al. 2003). Other studies found that a higher amount of calcium×phosphate product is associated with sleep quality (Li et al. 2012). This association may be justified by higher frequency of comorbidities in patients with elevated calcium×phosphate product (Li et al. 2012). In the present study, we found that higher serum phosphate levels are associated with poor sleep quality. Further studies are required to clarify the results.

Elevated C-reactive protein (CRP), an inflammatory marker, is a strong predictor of morbidity and mortality in many diseases, including hemodialysis patients. Previous studies have indicated that there is an association between sleep disorders and inflammation in hemodialysis. Emami Zeydi et al. (2014) investigated sleep quality and its correlation with serum CRP levels in hemodialysis patients and they found that a correlation between decreased sleep quality in hemodialysis patients and elevated CRP levels. Jenabi et al. (2007) also reported the correlation between sleep problems and serum CRP levels in hemodialysis patients. In accordance with these studies, we found a significant correlation between serum CRP levels and global PSQI score.

Dream anxiety may also cause the emergence of diseases manifestations. High dream anxiety at the end of night, and serious problems such as irregular heartbeat and acute myocardial infarction may occur. Therefore ignoring attention to dream anxiety in hemodialysis patients can damage their physical health and cardiovascular disease the most common cause of death in the hemodialysis population (Eslami et al. 2014). To our knowledge, this study is the first study investigating dream anxiety in hemodialysis patients.

Dream anxiety may be the result of early waking and inadequate sleep. Sabbatini et al. (2002) reported the relationship between night time waking and the inability to sleep. In the present study, we evaluated dream anxiety using the VDAS in hemodialysis patients. We found that hemodialysis patients have higher global dream anxiety scores than healthy individuals. Moreover, in the present study, with respect to dimensions of VDAS, nightmare frequency, difficulty falling asleep after a nightmare, fear of sleeping because of anticipated nightmare, trouble sleeping and psychological problems were very much affected areas.

Our study has several limitations. First, this study is a cross-sectional study. It is not possible to establish a cause and effect relationship in the examined associations. Second, the number of patients on hemodialysis that were enrolled in the study was relatively small, so these observations must be confirmed in a large sample. Third, polysomnographic evaluation could not be measured due to technical insufficiency, so it is not possible to ascertain the exact causes of sleep disturbance and dream anxiety.

As a result this study demonstrated that most of the hemodialysis patients had poor sleep quality and higher dream anxiety than the general population. We can say that sleep quality and dreams as a part of

quality of life affected in hemodialysis patients. Therefore, early detection and intervention to improve sleep quality and dream anxiety is necessary. Further studies are required for better understanding of risk factors associated with poor sleep quality and dream anxiety in hemodialysis patients. These studies could result in new methods and treatment techniques aimed at improving sleep quality.

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