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CLINICAL STUDY

Dream anxiety in renal transplant recipients

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Abstract

Objective: Although low quality of sleep has been reported in kidney transplant patients with functioning allografts, there are no previous studies investigating the dreams of these patients. We aimed to investigate the differences in dream anxiety level between renal transplant patients and healthy control subjects. We also planned to compare depression and anxiety symptoms, sleep quality and sleepiness level between these two groups. *Methods*: Twenty-two living-donor renal transplant recipients followed at an outpatient nephrology clinic and 22 healthy controls were enrolled in this observational cross-sectional study. Sociodemographic Data Collection Form, and the Van Dream Anxiety Scale (VDAS), the Pittsburg Sleep Quality Index (PSQI), the Insomnia Severity Index (ISI), Beck Depression and Anxiety Inventories were used for the assessment of the necessary features. Hemoglobin (Hb), blood urea nitrogen (BUN), creatinine (Cr) and glucose levels were measured. *Results*: There were no significant differences between the groups in terms of dream anxiety ($p = 0.45$), depression ($p = 0.76$), sleep quality ($p = 0.8$), insomnia severity ($p = 0.08$) and Hb ($p = 0.11$) and glucose levels ($p = 0.14$). Although, BUN ($p = 0.00$) and creatinine ($p = 0.00$) levels differed significantly between the two groups, both parameters were found to be within their normal range. *Conclusions*: In our study, chronic renal failure patients with a successful kidney transplant were found to be able to completely return to normal in terms of metabolic parameters, sleep quality and mood. Similar levels of dream anxiety are also consistent with these findings.

Keywords

Renal transplantation and affective disorders, renal transplantation and psychiatry, renal transplantation and sleep

History

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Introduction

Mental activity occurring in sleep characterized by vivid sensorimotor imagery that is experienced as waking reality despite such distinctive cognitive features as impossibility or improbability of time, place, person and actions; emotions, especially fear, elation and anger predominate over sadness, shame and guilt and sometimes reach sufficient strength to cause awakening; memory for even very vivid dreams is evanescent and tends to fade quickly upon awakening unless special steps are taken to retain it.[1] Because dreaming is closely related with sleep physiology, any disorder deteriorating the sleep physiology is expected to alter dream recall and content. To understand the possible link between sleep disorders and dreaming, three theoretical frameworks have been introduced: arousal retrieval model of dream recall, the continuity hypothesis of dreaming and the mind–body interaction during Rapid Eye Movement (REM) sleep. According to arousal retrieval model, it can be supposed that sleep disorders accompanied by frequent nocturnal awakenings are associated with elevated dream recall frequency. The basic notion of the continuity hypothesis is that dreams reflect waking concerns and emotional preoccupations. The body–mind interaction model deals with the relation between the physiological parameters, such as eye movements, heart rate and the subjective experience of sleepers.[2] The studies investigating the dream recall frequency and dream content of patients with some sleep disorders support that hypothesis. Dream recall frequency was found to be elevated due to heightened frequency of nocturnal awakenings and dream emotions were found to be more negative due to waking life stressors in a study investigating dreams of patients with insomnia.[3] Obstructive sleep apneas were found to decrease the frequency of nightmares by suppressing the REM sleep and cognitive experience of nightmare recall.[4]

Although kidney transplantation offers several advantages in terms of improved clinical outcomes and quality of life, low-quality of sleep, depressive symptoms and high rates of affective disorders have been reported in kidney transplant recipients treated for end-stage renal disease.[5–7] The low-quality of sleep observed in transplant patients with a functioning allograft obviously shows that the poor quality of sleep in renal patients has some extra-factors other than renal dysfunction.[8] Anxiety, some dimensions of health-related quality of life, medical comorbidities and sexual

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relationships were found to be correlated with sleep disorders in kidney recipients.[9] All of those factors and also the presence of sleep disorders may also alter dream content and recalling in transplant patients according to the hypothesis explained above. To our knowledge, there are no previous studies investigating the dreams of these patients.

We aimed to investigate the differences in dream anxiety level between renal transplant patients and healthy control subjects. We also planned to compare depression and anxiety symptoms, sleep quality and sleepiness level between these two groups.

Methods

The study was carried out between January and May 2013 in Hitit University, Çorum Training and Research Hospital, Department of Internal Medicine, Nephrology clinic and included 22 living-donor renal transplant recipients, of which 11 were receiving cyclosporine therapy and 11 were receiving tacrolimus therapy. Other drugs used in the treatment were mycophenolate mofetil and low-dose oral corticosteroids. Study participants were the kidney recipients whose transplantation procedure had been performed at least 1 year before the study. Control group included 22 age- and gender-matched individuals with no physical or mental illness and no history of drug use. All participants gave informed consent and the sociodemographic characteristics were recorded on Data Collection Form after obtaining the approval from the ethics committee. The Van Dream Anxiety Scale (VDAS) was used to assess the dream anxiety level, the Pittsburg Sleep Quality Index (PSQI) and the Insomnia Severity Index (ISI) were used to assess the sleep quality and insomnia level, and Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI) were used to assess the depression and anxiety levels. Items of the scales were answered by the participants themselves and the clinicians who were responsible from the study helped them when they had any problem about answering the questions.

Hemoglobin (Hb), blood urea nitrogen (BUN), creatinine (Cr) and glucose levels were evaluated in all participants. Blood samples from all participants were obtained in the morning after a 12-h fasting period. Laboratory parameters were measured by using the routine methods.

To be included in the study, patients should have the mental capability of understanding and responding the scale items and should give signed consent form with agreeing to participate in the study with his/her own free volition. The patients under the age of 18 and over the age of 65 years, those with a diagnosis that result in sleep disorder, such as narcolepsy, obstructive sleep apnea syndrome and restless leg syndrome, those using any psychiatric medication, such as antipsychotics, antidepressants or mood-stabilizing drugs in the last month and those with a mental inability that impair the ability to evaluate the truth and to decide in their own volition (mental retardation or dementia) or with a psychiatric illness (psychotic disorder) were excluded from the study.

Van Dream Anxiety Scale (VDAS)

The scale has been developed by Ağargün et al. The validity and reliability studies for the scale have been performed on patients with nightmare disorder[10] (Cronbachs $a = 0.87$). The scale assesses the dream anxiety levels in the last month and includes 17 items with a final dream anxiety score ranging between 0 and 52. Because the scale is the single and first scale for the assessment of dream anxiety, it was considered to be appropriate to be used in the present study.

Pittsburg Sleep Quality Index (PSQI)

The scale has been developed by Buysse and colleagues.[11] The reliability and validity of the Turkish version has been established by Ağargün et al.[12] (Cronbachs $a = 0.804$). It is a useful tool to differentiate the patients with sleep disorder from healthy individuals and to determine the sleep problems and sleep quality.

The scale includes 24 items in total; however, only 19 self-reported items are included in the calculation of the scale score, which ranges from 0 to 21. A score of 5 or greater indicates a poor sleep quality.

Insomnia Severity Index (ISI)

The scale has been developed by Bastien and colleagues.[13] The reliability and validity of the Turkish version has been established by Boysan et al.[14] The scale assesses the severity of insomnia symptoms with seven items that can give a total score ranging from 0 to 28. The developers of the scale has stated that a score of 10 points suggests clinical diagnosis of insomnia and a score over 15 points indicates a definite diagnosis of insomnia.

Beck Depression Inventory (BDI)

The original form of the scale has been developed by Beck and colleagues.[15] It was adapted into Turkish by Hisli[16,17] (Cronbachs $a = 0.80$). The inventory form consists of 21 symptom categories, all of which have four options to mark. Patients are asked to mark the sentences defining how they felt themselves in the last week including the test day. Each item is scored from 0 to 3, with a maximum possible score of 63. Higher total scores indicate higher severity of depression. The inventory can be used in individuals aged 15 years or over. The cut-off point for the inventory has been reported as 17 in validity and reliability studies of the Turkish version of the inventory.

Beck Anxiety Inventory (BAI)

The inventory has been developed by Beck and colleagues.[18] It was adapted into Turkish by Ulusoy.[19] The inventory assesses the anxiety level, and symptom distribution and severity. It consists of 21 items with a possible total score range of 0–63. The scores under 17 indicate a low level of anxiety. Items are answered by the patient and the inventory can be used in individuals aged 15 years or over.

Statistical analysis

All data analyses were performed by using PASW Statistics 18 and SigmaStat 3.5. The descriptive statistics were demonstrated with n (sample size), mean and standard deviation for continuous variables and, n (sample size), median and 25th and 75th percentiles for non-normally

Table 1. Sociodemographic characteristics.

		Study group				
		Control *n* (%)	Transplantation *n* (%)	Toplam *n* (%)	Chi-square	*p*
Gender	Male	9 (40.90)	13 (59.10)	22 (100.00)	0.818	0.366
	Female	13 (59.10)	9 (40.90)	22 (100.00)		
Marital status	Unmarried	5 (35.7)	9 (64.3)	14 (100.00)	3.297	0.424
	Married	14 (53.8)	12 (46.2)	26 (100.00)		
	Widowed	1 (50.00)	1 (50.00)	2 (100.00)		
	Divorced	2 (100.00)	0 (00.00)	2 (100.00)		
Educational level	Illiterate	0 (00.00)	1 (100.00)	1 (100.00)	1.650	0.800
	Primary school	7 (43.8)	9 (56.3)	16 (100.00)		
	High school	7 (58.3)	5 (41.7)	12 (100.00)		
	University	8 (53.3)	7 (46.7)	15 (100.00)		
Employment	Unemployed	1 (25.00)	3 (75.00)	4 (100.00)	5.115	0.192
	Government employee	17 (63.00)	10 (37.00)	27 (100.00)		
	Self-employment	3 (37.50)	5 (62.5)	8 (100.00)		
	Retired	1 (20.00)	4 (80.00)	5 (100.00)		

distributed variables. Kolmogorov–Smirnov normality test was used. According to the normality test, all variables were distributed non-normally. The comparisons between two groups were performed with Mann–Whitney *U* test. Chi-square analyses were used for categorical variables. Spearman correlations analysis was applied to determine correlations among non-normally distributed variables. p value less than 0.05 ($p < 0.05$) was accepted significant.

Results

Median age of the 22 renal transplant patients included in the study was 33 years (range, 21–61 years), of which 13 were male and nine were female. Control group included nine male and 13 female individuals with a median age of 40.5 years (range, 25–48 years). There was no significant difference between the groups in terms of age ($p = 0.23$) and gender ($p = 0.36$). Of the renal transplant patients, nine were unmarried, 12 were married and one was widowed, while, of the control subjects, five were unmarried, 14 were married, one was widowed and two were divorced with no significant difference between the two groups in terms of marital status ($p = 0.43$). Educational level and employment status were also did not differ significantly between patients and controls ($p = 0.80$ and 0.19, respectively) (Table 1).

Four of the renal transplant patients had hypertension which was under control with the calcium channel blocker agents. There were no other co-morbidities in the patients. The primary cause of the end-stage renal disease was hypertensive nephrosclerosis in five, nephrolithiasis in two, chronic glomerulonephritis in 10, reflux nephropathy in two and unknown etiology in three patients. The mean dose of the steroids (methyl prednisolone) used by the patients was 4.18 ± 0.85 mg. The median duration of dialysis prior to the transplantation was 45.5 months (range, 7–204 month) in the form of hemodialysis in 14 and peritoneal dialysis in eight patients.

Median dream anxiety scale score was 0 (range, 0–31) in the renal transplantation patients and 0 (range, 0–29) in the control subjects, with no significant difference between the groups ($p = 0.45$). The scores on anxiety scale were found to be under the cut-off value (<17) and did not differ between the renal transplantation patients and the control subjects [3.5 (0–32) and 7 (0–47), respectively] ($p = 0.28$). Depression scale median score was 9.5 (range, 0–36) and 7.5 (range, 0–23) in the transplanted patients and the control subjects, respectively. Median scores were under the cut-off value (<17) in both the groups with no significant difference between the groups ($p = 0.76$). Median score on PSQI was similar in the renal transplantation group and the control group [4 (2–12) and 4 (0–13), respectively] ($p = 0.80$). Median value for both groups were <5; thus, sleep quality was not poor. Median value for insomnia severity was found to be 2 (range, 0–21) in the renal transplantation patients and 3 (range, 1–19) in the control subjects with no significant difference between the groups ($p = 0.08$). Because both the groups had a median value of <10, the diagnosis of insomnia was excluded.

Median Hb and glucose levels were 13.35 (range, 10.6–17.5) and 97.35 (range, 79–221) in the transplantation group and 14 (range, 10.7–16.9) and 93 (range, 72–114) in the control group, with no significant difference between the groups ($p = 0.11$ and $p = 0.14$, respectively). Median BUN and creatinine levels were 15.91 (range, 7.48–38.32) and 1.15 (range, 0.7–2.1) in the transplantation group and 13.08 and 0.79 in the control group. Although there was a significant difference between the groups in BUN ($p = 0.00$) and creatinine ($p = 0.00$) levels, the measurement values were in normal range in both groups (Table 2).

There was no significant correlation between the dream anxiety and the duration of dialysis ($p = 0.77$; $r = 0.06$) and the dose of steroids ($p = 0.43$; $r = -0.17$). We also did not find any significant correlation between the sleep quality and the duration of dialysis ($p = 0.23$; $r = 0.26$).

Discussion

Sleep disorders have been found to be more common among the end-stage renal failure patients under treatment with hemodialysis or peritoneal dialysis.[20,21] There are also several studies reporting higher frequency of poor sleep quality in renal transplant patients compared with the healthy

Table 2. Clinical findings.

	Control		Transplantation		
	Mean ± Std	Median (Min–Max)	Mean ± Std	Median (Min–Max)	*p*
Age	39.18 ± 6.32	40.5 (25.00-48.00)	36.91 ± 11.21	33.00 (21.00–61.00)	0.231
VDAS	2.63 ± 6.38	0.00 (0.00–29.00)	4.63 ± 9.00	0.00 (0.00–31.00)	0.454
BAI	8.68 ± 9.57	7.00 (0.00–47.00)	7.13 ± 8.73	3.50 (0.00–32.00)	0.289
BDI	9.00 ± 5.99	7.50 (0.00–23.00)	12.04 ± 11.30	9.50 (0.00–36.00)	0.760
PSQI	4.72 ± 3.48	4.00 (0.00–13.00)	4.90 ± 2.84	4.00 (2.00–12.00)	0.802
ISI	5.09 ± 4.87	3.00 (1.00–19.00)	3.45 ± 5.13	2.00 (0.00–21.00)	0.085
Hb	14.33 ± 1.78	14.00 (10.70–16.90)	13.53 ± 1.98	13.35 (10.60–17.50)	0.118
Glucose	93.45 ± 9.98	93.00 (72.00–114.00)	104.30 ± 29.56	97.35 (79.00–221.00)	0.145
BUN	13.16 ± 3.00	13.08 (8.00–21.03)	19.04 ± 7.72	15.91 (7.48–38.32)	0.003
Creatinin	0.76 ± 0.14	0.79 (0.50–1.06)	1.23 ± 0.35	1.15 (0.70–2.10)	<0.001

Abbreviations: VDAS: Van Dream Anxiety Scale; BAI: Beck Anxiety Scale; BDI: Beck Depression Scale; PSQI: Pittsburg Sleep Quality Index.

population.[5,8,9] Present study found no significant difference between the transplantation patients and control subjects in terms of sleep quality and insomnia severity, which are in consistent with previous studies reporting increased sleep quality and decreased sleep disorders following the transplantation procedure.[22–24]

In renal transplant patients, anxiety level and presence of co-morbidities have been associated with sleep quality.[9] Lack of a significant difference between the groups in terms of sleep quality may be attributed to the facts that the patients included in the present study had similar anxiety and depression levels with the control subjects and had no co-morbidity.

According to the arousal retrieval model of dream recall, frequent nighttime awakenings and low sleep quality are associated with increase in dream recall.[2] According to the continuity model, compared to the healthy subjects, patients with insomnia have more negative contents in their dreams which are the reflection of stress of sleeplessness in the daytime to the dreams in the nighttime.[25] Results of the present study support both the above-mentioned hypotheses, because in addition to the sleep quality and insomnia severity, dream anxiety also did not differ between transplantation patients and control subjects. Moreover, according to the suggestion that daytime emotions affect the dreams, anxiety and depression levels were similar in both groups in the present study, also supporting the continuity model.

Anemia has been found to be associated with poor sleep quality in patients treated with hemodialysis.[26] However, similar Hb levels in the transplantation patients and control subjects may eliminate this possibility. Kachuee et al.[9] have reported a significant association between co-morbidity and poor sleep quality in transplantation patients. Because glucose levels were similar between the groups and no patient had additional co-morbidities, such as diabetes mellitus, the negative effects of these situations in the transplantation patients are eliminated in the present study. Moreover, BUN and creatinine levels in the transplantation group were significantly higher compared to the healthy population. However, all these levels were in the normal range according to our laboratory criteria, suggesting that these transplanted kidneys are functioning well.

Pourfarziani et al.[8] have found a significant association between the duration of end-stage renal failure and poor sleep quality in patients with renal transplantation. However, in the present study, sleep quality and dream anxiety were not associated with the duration of dialysis.

Major limitation of the present study is the limited number of patients. Another limitation is that Dream Anxiety Scale has been developed using patients with nightmare disorder. It may be questionable whether this scale accurately assesses the dream anxiety level in renal transplantation patients. Moreover, no patient had pre-transplantation evaluation that can be used for comparison.

More comprehensive further studies overcoming the above-mentioned limitations will guide the clinicians about the role of assessment of sleep and dreams in the treatment period of patients with chronic renal failure or renal transplantation.

Results of the present study suggest that chronic renal failure patients with a successful kidney transplant may completely return to normal in terms of metabolic parameters, sleep quality and mood. Similar levels of dream anxiety are also consistent with these findings.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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