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Examining the Relationship Between Sleep Quality and Quality of Life in Kidney Transplant Patients

Böbrek Nakli Hastalarında Uyku Kalitesi ve Yaşam Kalitesi Arasındaki İlişkinin İncelenmesi

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Abstract

Objective: This study aimed to examine the relationship between sleep quality and quality of life in patients who had a kidney transplant.

Materials and Methods: The research has a cross-sectional and descriptive design. The sample of the study consisted of 77 patients who had a kidney transplant at a university hospital organ transplantation centre between August 2020 and August 2021 and were followed up in the outpatient clinic. An individual identification form, the Quality-of-Life Short Form, and the Pittsburgh Sleep Quality Index were used to collect research data. Descriptive statistics (percentage and number), Pearson's correlation test, Student's t-test for independent variables, ANOVA, and linear regression analysis were used in the research analysis.

Results: In the study, the mean age of the patients was 47.19±11.29 (min: 24, max: 73), and the mean transplantation time was 94.92±75.23 months. The mean PSQI and SF-36 scores of kidney transplant patients were 4.91±3.09 and 65.49±18.18, respectively. There was a statistically significant correlation between sleep quality and quality of life in kidney transplant patients (r=-0.511, p=0.0001).

Conclusions: In the study, the quality of life increased as the sleep quality of the patients increased.

Keywords: Renal transplantation; Sleep quality; Quality of life.

Özet

Amaç: Bu çalışmada böbrek nakli olan hastalarda uyku kalitesi ile yaşam kalitesi arasındaki ilişkinin incelenmesi amaçlandı.

Gereç ve Yöntem: Araştırma, kesitsel ve tanımlayıcı bir tasarıma sahiptir. Araştırmanın örneklemini bir üniversite hastanesinin organ nakli merkezinde Ağustos 2020-Ağustos 2021 tarihleri arasında böbrek nakli olan ve poliklinikte izlenen 77 hasta oluşturdu. Araştırma verilerinin toplanmasında bireysel tanımlama formu, Yaşam Kalitesi Kısa Formu ve Pittsburgh Uyku Kalitesi İndeksi kullanıldı. Araştırma analizinde tanımlayıcı istatistikler (yüzde ve sayı), Pearson korelasyon testi, bağımsız değişkenler için Student t-testi, ANOVA ve lineer regresyon analizi kullanıldı.

Bulgular: Çalışmada hastaların ortalama yaşı 47.19±11.29 (min: 24, max: 73), ortalama nakil süresi 94.92±75.23 ay idi. Böbrek nakli hastalarının ortalama PSQI ve SF-36 puanları sırasıyla 4.91±3,09 ve 65.49±18.18 idi. Böbrek nakli hastalarında uyku kalitesi ile yaşam kalitesi arasında istatistiksel olarak anlamlı bir ilişki vardı (r=-0.511, p=0.0001).

Sonuç: Çalışmada hastaların uyku kalitesi arttıkça yaşam kalitesinin arttığı görüldü.

Anahtar Sözcükler: Böbrek nakli; Uyku kalitesi; Yaşam kalitesi.

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INTRODUCTION

Chronic renal failure (CRF) is defined as progressive and irreversible damage to kidney function related to vascular, tubular, and lower urinary tract disorders (1). Physiological problems such as an increase in the amount of urea in case of insufficiency, anaemia due to the decreased erythropoietin level, oedema in the upper respiratory tract, metabolic acidosis, uremic nephropathy, and muscle weakness cause sleep disorders in patients (2,3). The most common sleep disorders are restless legs syndrome, sleep apnea, and insomnia (1,2,4,5). Sleep disorders affect the quality of life negatively by bringing physiological and psychological problems along in patients (3,4,6–9).

Kidney transplantation is the treatment method used in patients with end-stage CRF. According to the data of the Health Research Services Administration, 23.401 people had kidney transplantation in the USA in 2019 (10). In Turkey, this number was 3375 in 2021 (11). However, factors such as pre-transplantation physiological and psychological factors, fear of organ rejection, use of immunosuppressive and steroid drugs, obesity, changes in emotions, and additional chronic diseases lead sleep disorders to remain after kidney transplantation (2,6,12). In the literature, there are studies in which patients had poor sleep quality (30-62%) after kidney transplantation and stating that there is a statistically significant correlation between sleep disorders and quality of life (2,4,7,12–14.) However, studies on sleep in the national and international literature had been mostly conducted with CRF patients (4,7,13) and studies on sleep and quality of life after kidney transplantation are limited (12–14). Quality of life is among the primary outcomes of kidney transplantation, which is currently accepted as the standard gold treatment for patients with end-stage CRF (15). On the other hand, an impairment in sleep quality that may occur in the post-transplant period may cause changes in physical, mental, and emotional functions. It may adversely affect the quality of life of the kidney transplant recipient. (7). Early detection of sleep quality deterioration after kidney transplantation and a better understanding of its relationship with quality of life may shed light on the creation of sleep quality interventions, which is a potentially modifiable factor.

MATERIAL AND METHODS

Aim and Objective

Therefore, this study aimed to examine the relationship between sleep quality and quality of life in patients who had a kidney transplant. Research questions in this study:

- What is the level of sleep quality in kidney transplant patients?
- What is the level of quality of life in kidney transplant patients?
- Is there a relationship between level of sleep quality and quality of life in kidney transplant patients?

Study Design

This study was cross-sectional type.

Validity and Reliability of Instrument

The research data were collected by the researchers with a data collection form consisting of three parts: an Individual Identification Form, the Pittsburgh Sleep Quality Index, and the Quality of Life Short Form (SF-36).

Individual Identification Form: The form was prepared in line with the literature to obtain information about the sociodemographic characteristics of individuals participating in the research. It consists of 26 questions, seven of which are open-ended. It includes questions about the patients' age, gender, educational status, caffeine and alcohol consumption and smoking, chronic disease history, medications used, time of transplantation, childhood sleep disorders, and pre- and post-transplantation sleep disorders.

Pittsburgh Sleep Quality Index: It was developed by Buysse et al. to define sleep and quantitatively measure sleep quality. The Turkish validity and reliability of the index was established by Agargun et al. in 1996. It consists of a total of 24 questions and seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of hypnotic medications, and daytime dysfunction. The sum of scores of these seven components gives the overall index score. Each item is scored between 0-3. The lowest score obtainable from the scale is zero and the highest score is 21. The Cronbach alpha value of the scale is 0.70. A score of five or over on the scale indicates poor sleep quality.

Quality of Life Short Form (SF-36): It was developed by Ware in 1987 to examine the health status and quality of life of individuals. The scale, which includes 36 items, is a multi-title scale evaluating two main headings (physical and mental dimensions) and eight concepts (physical function, role limitation-physical, pain, vitality/fatigue, social function, role limitation-emotional, mental health, general health perception). The scores of each subscale and two main dimensions in the scale range from 0 to 100. SF-36 has a positive ranking, indicating that the higher the score of each health area, the higher the health-related quality of life. The Turkish adaptation, validity, and reliability study of SF-36 was performed by Kocyigit et al. in 1999. The Cronbach alpha value for each subgroup of the scale is between 0.73-and 0.76.

Sampling

The population of the research consisted of 922 patients who over the age of 18, had previously undergone kidney transplantation at a university hospital organ transplantation centre and who came to the outpatient clinic of the same centre between 1 August 2020 and 31 August 2021 for control examination.

The sample is adults who had previously undergone kidney transplantation at a university hospital organ transplantation centre before and who came to the outpatient clinic of the same centre between 1 August 2020 and 31 August 2021 for follow up examination. These adults are over the age of 18, did not have communication problems, and were not diagnosed with any psychiatric disease that could affect sleep quality, had a kidney transplant for the first time, and had a transplant at least one month ago.

The sample size was calculated at a 95% confidence level using the G. Power-3.1.9.2 program. As a result of the analysis, the effect size was found to be 0.9053 at the α=0.05 level in accordance with the literature and the minimum sample size was calculated as 76. Although 76 patients were identified with G power, 92 patients were reached due to data loss. Fifteen patients who answered the data collection form incompletely, had a history of multiple organ transplantation and had rejection findings were excluded from the study. The study was completed with 77 patients.

Data Collection

The data were collected in outpatient clinic of a university hospital organ transplantation centre. The data were collected through face-to-face interviews with patients.

Data Analysis

Research data were analysed with the Statistical Package for the Social Sciences (SPSS) 22.0 program. Sociodemographic characteristics and other descriptive data of the patients were calculated as numbers, percentages, and means. Normal distribution with skewness and kurtosis values within the range of ±2 (16). Factors affecting sleep quality were compared with Student's t-test and the one-way ANOVA. The correlation between sleep quality and quality of life was evaluated with Pearson correlation analysis and simple linear regression analysis. In the statistical evaluation, $p<0.05$ was considered significant. Also, a reliability analysis was performed prior to the data analysis to evaluate the consistency of the answers given to the form.

Ethical Considerations

The purpose of the study was explained to the patients. Before the study, written permission was

taken from ethics committee of the institution (05.11.2020, 20-11T/63) where the study was conducted, and the patients participating in the study. Furthermore, written permission was received from Kocyigit et al. (17) and Agargun et al. (18) who established the Turkish validity and reliability of the scales used in the study. All procedures were performed in accordance with the Helsinki Declaration.

RESULTS

The mean age of the patients was 47.19 ±11.29 (min: 24, max: 73) and the majority were male (n=50, 64.9%). Of the patients, 31% were secondary and high school graduates and 53% did not work after transplantation. 74.0% of the patients stated that they were not smokers and 88.3% stated that they did not consume alcohol. 65% of the patients had an additional chronic disease. 89.2% of the patients had hypertension; 20% had diabetes; 20% had hyperlipidaemia; 12.3% had heart disease (Table 1).

According to the patients' kidney transplantation data, the mean time of transplantation was 94.92 ±75.23 months (min:1, max:384, median:82.00); 79.2% of the patients had undergone dialysis before transplantation; the mean age of donors was 48.21± 12.69 months. As post-transplantation immunosuppressive treatment, patients had used cyclosporine (19.5%), short-release tacrolimus (62.3%), extended-release tacrolimus (7%), corticosteroid (96.1%), mycophenolate mofetil (45.5%), mycophenolate sodium (28.6%), azathioprine (18.2%), sirolimus (1.3%), and everolimus (10.4%) (Table 1).

The mean PSQI score of patients who had undergone kidney transplantation was 4.91±3.09 (min: 0, max: 15). This result shows that the kidney transplant patients participating in our study had good sleep quality. When the subscales were examined, it was seen that 46% of the patients evaluated their subjective sleep quality as quite good and that 74% of them did not use hypnotic medications. There was no statistically significant correlation between the mean PSQI score and gender (p=0.439), employment status (p=0.322), smoking (p=0.413), alcohol use (p=0.263), history of chronic disease (p=0.295), and history of pre-transplantation dialysis (p=0.134) (p>0.05). The type of immunosuppressive drug used by the patients and the mean PSQI score were compared. There was no statistically significant correlation between the mean PSQI score of the patients participating in the study and corticosteroids (p=0.289), calcineurin inhibitors (p=0.664), mTOR inhibitors (p=0.833), and antiproliferative agents (p=0.481) (Table 1).

The mean score of the patients on SF-36 was 65.49± 18.18 (min:8, max:96). This result shows that the quality of life of kidney transplant patients participating in our study was moderate. The scale has two summary scores, namely physical and mental health. In our study, the mean physical health summary score of kidney transplant patients was 67.83±17.93 (min:31.43, max:99.05) and the mean mental health summary score was 63.14±20.75 (min:15.71, max:100.00). There was no statistically significant correlation between the mean quality of life score and gender (p=0.129), employment status (p=0.067), smoking (p=0.925), alcohol use (p=0.662), history of chronic disease (p=0.296) and pre-transplantation dialysis (p=0.227) (Table 1).

There was a significant correlation between the mean total PSQI score of kidney transplant patients and the mean total SF-36 score (r=-0.511, p=0.001) (p<0.05) (Table 2). Table 3 explains the effect of sleep quality on quality of life in linear regression analysis. The sleep quality of kidney transplant patients explains 26% of the quality of life ($R=0.511$, $R^2=0.261$, $F=26.450$, $p=0.001$, $DW=2.07$).

Table 1. The Relationship Between Patients' Sociodemographic Characteristics and Scales Total Scores

		PSQI		SF-36	
	n (%)	**t/F**	**p**	**t/F**	**p**
Gender					
Female	27 (35.1)	t=0.782	0.439	t=1.554	0.129
Male	50 (64.9)				
Education level					
Read and write without entering school	2 (2.6)				
Primary school	30 (39.0)	F=0.074	0.974	F=0.553	0.648
High school	31 (40.3)				
University	14 (18.2)				
Marital status					
Single	20 (26.0)	t=0.099	0.922	t=0.960	0.340
Married	57 (74.0)				
Perceived financial situation					
Income less than expenses	34 (44.2)	F=3.393	0.039	F=2.830	0.065
Income and expenses balanced	35 (45.5)				
Income greater than expenses	8(10.4)				
Occupation					
Officer	11 (14.3)	F=0.056	0.946	F=0.052	0.950
Private sector	13 (16.9)				
Other	53(68.8)				
Workplace					
Full-time indoor job	19(24.7)	F=0.102	0.754	F=1.978	0.067
Part-time indoor job	5 (6.5)				
Full-time outdoor job	53(68.8)				
Smoker					
Yes	20 (26.0)	t=0.824	0.413	t=0.095	0.925
No	57 (74.0)				
Alcohol*					
Yes	9 (11.7)	t=1.129	0.263	t=0.439	0.662
No	68 (88.3)				
Chronic disease					
Yes	68 (88.3)	t=1.054	0.295	t=1.052	0.296
No	9 (11.7)				
Dialysis history					
Yes	61 (79.2)	t=1.516	1.134	t=1.218	0.227
No	16 (20.8)				
Sleep disorder befor transplantation					
Yes	13 (16.9)	t=0.606	0.546	t=1.725	0.089
No	64 (83.1)				
Sleep disorder after transplantation					
Yes	14 (18.2)	t=1.570	0.121	t=1.522	0.132
No	63 (81.8)				
Immunosuppressive treatment					
Corticosteroids	74 (96.1)	t=1.090	0.289	t=3.131	0.009
Calcineurin inhibitor	69 (89.6)	t=0.878	0.664	t=0.753	0.454
mTOR inhibitor	9 (11.2)	t=0.123	0.833	t=0.285	0.777
Antiproliferative	71 (92.2)	t=0.708	0.481	t=1.423	0.159

*Alcohol use is social drinking

Table 2. Correlation Between PSQI and SF-36 Scale Scores

	PSQI	
Characteristic	**r**	**p**
SF-36 Total	-0.511	0.0001
Physical dimension	-0.408	0.0001
Mental dimension	-0.534	0.0001

p<0.01

Table 3. Investigation of Factors Affecting Patients' Level of Quality of Life

Characteristic	B	SE	95% Cl (Lower, upper)	β	p
PSQI	-3.004	0.584	(-4.168, -1.840)	-0.511	<.001

SE, Standard error; CI, confidence interval; β, Beta; DW, Durbin-Watson

p<0.05

R=0.511, R^2=0.261, F=26.450, p=0.001, DW=2.07

DISCUSSION

In this study, the sleep quality of patients was evaluated with PSQI and it was found that their sleep quality was good. Studies examining the sleep quality of kidney transplant patients are available in the literature. In these studies, it was seen that sleep quality had improved between six months and three and a half years after kidney transplantation with the improvement of kidney functions and the reduction of symptoms due to renal failure, but sleep disturbance had not improved completely (6,9,19). Although the results of this study are similar to those reported in the literature, it was determined that the sleep levels of the patients were better than expected. It can be thought that the symptoms related to renal failure decreased and sleep quality increased since the mean time of transplantation of the patients included in the study was seven years.

When the factors affecting sleep after transplantation were examined, results that are different from those in the literature were obtained in this study. In the literature, female gender, fear of organ rejection, use of immunosuppressive drugs, steroid drugs, and disease symptoms such as dyspnoea, sleep apnoea, nocturia were reported to cause sleep disorders in kidney transplant patients (4,12,13). In this study, contrary to the literature, it was observed that gender and immunosuppressive drugs did not affect sleep quality. This can be explained by the fact that sleep quality is not only associated with the pathology of the disease, the drugs used, and the symptoms of the disease, but also to the duration of falling asleep, hopelessness, and the patient's sleep history as suggested by Molnar et al. (14).

In this study, it was determined that the sleep quality of kidney transplant patients was at a good level and that their quality of life increased as sleep quality increased. In the literature, it was stated that sleep quality is effective on the quality of life in kidney transplant patients and that the quality of life increases as the sleep quality increases (7,14,19). This research result is consistent with the literature.

Quality of life is a subjective indicator of an individual's health status. In our study, it was seen that the quality of life of kidney transplant patients was moderate. Likewise, in the literature, it was stated that the quality of life of kidney transplant patients was moderate (13,20,21). Although the quality of life after kidney transplantation in patients with chronic renal failure increased compared to pre-transplantation, it was both internationally (22–24). and nationally below the norm values of society. This finding is explained by many factors such as a decrease in the post-transplant immune system, decrease in physical activity, anxiety, or depression due to graft rejection as well as sleep quality (7,9,21,25).

Considering the factors affecting the quality of life after kidney transplantation, it was reported that variables such as female gender, unemployment, low education level, living alone, high body mass index, presence of diabetes mellitus, or a long history of dialysis reduce the quality of life of kidney transplant patients (7,20,26,27). However, in this study, contrary to the literature, it was determined that gender, employment status, financial income level, education level, smoking/alcohol use, history of chronic disease, and pre-transplantation dialysis did not affect the quality of life of patients. This can be explained by the fact that the patients included in the study were young, that most of them had been living with their spouses, had social support, and did not have a history of smoking/alcohol use. Moreover, the high perception of physical health and mental health among patients participating in this study seems to support this situation.

This research has some limitations. First, the results of the study cannot be generalized to all kidney transplant patients as the sample included transplant patients at a single institution. In addition, sleep quality measurements were not performed by polysomnography and were based on subjective data. Therefore, future studies can be carried out in different sample groups by assessing sleep-related measurements with polysomnographic parameters. Finally, given the effects of kidney function parameters on sleep quality and quality of life, it may be useful to consider kidney function indicators such as blood urea nitrogen, creatinine clearance, serum creatinine level, and glomerular filtration rate in future studies.

Relevance to Clinical Practice

In this study, it was found that although the sleep problems of kidney transplant patients decreased compared to the pre-transplant period, it is still an ongoing problem. As poor sleep quality and presence of sleep problems after transplantation negatively affect the quality of life of the patients, it is necessary for transplant nurses to define sleep quality in transplant patients. Sociodemographic and clinical variables such as age, gender, comorbidity, history of dialysis and immunosuppression should be considered in the evaluation of sleep quality of transplant patients. Educating transplant patients about sleep hygiene may also be helpful. Sleep hygiene is the practice that ensures full wakefulness during the day and uninterrupted sleep at night. Sleep hygiene includes individual and environmental regulations such as waking up at the same time every day, identifying drugs that affect sleep, reducing the consumption of caffeinated beverages before sleep, and not keeping electronic items such as telephones in the bedroom. In this context, educating patients about sleep hygiene may help improve sleep quality after kidney transplantation.

CONCLUSIONS

In this study, it was found that the sleep quality of the patients after kidney transplantation was good and that their quality of life was moderate. It was observed that the quality of life of the patients increased as their sleep quality after transplantation increased. Furthermore, even though seven years had passed since the transplantation period, the quality of life of kidney transplant patients was found to be quite low compared to healthy individuals reported in the national and international literature.

Ethics Committee Approval
Ege Üniversitesi Klinik Araştırmalar Etik Kurulu (05.11.2020, 20-11T/63).

Informed Consent
From the study participants informed consent was obtained.

Conflict of Interest
None

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