



Ukrainian Journal of Nephrology and Dialysis

Scientific and Practical, Medical Journal

Founders:

- State Institution «Institute of Nephrology NAMS of Ukraine»
- National Kidney Foundation of Ukraine

ISSN 2304-0238;
eISSN 2616-7352

Journal homepage: <https://ukrjnd.com.ua>

Original Papers

Ergün Parmaksız¹, Elif Torun Parmaksız²

doi: 10.31450/ukrjnd.3(79).2023.06

Comparison of sleep quality in patients undergoing hemodialysis and renal transplant recipients

¹Health Sciences University, Kartal Dr Lutfi Kırdar City Hospital, Istanbul Turkey

²Health Sciences University, Sancaktepe İlhan Varank Training Hospital, Istanbul Turkey

Citation:

Parmaksız E, Parmaksız ET. Comparison of sleep quality in patients undergoing hemodialysis and renal transplant recipients. Ukr J Nephrol Dial. 2023;3(79): 39-44. doi: 10.31450/ukrjnd.3(79).2023.06.

Abstract. Low sleep quality is a prevalent health issue among patients undergoing kidney replacement therapy. Our objective was to assess and compare sleep quality between patients undergoing hemodialysis (HD) and kidney transplant recipients.

Methods. This observational, cross-sectional study recorded socio-demographic data and medical histories. The study comprised two groups: patients undergoing HD for at least one year and kidney transplant recipients with a successful renal transplant over six months. Each participant completed the Pittsburgh Sleep Quality Index (PSQI).

Results. The study encompassed 56 HD patients and 35 age and gender-matched renal transplant recipients. The mean age of the entire study population was 47.97 ± 12.92 years (ranging from 23 to 77), with 49 (53.8%) being males. PSQI scores were ≥ 5 in 57 patients, including 21 transplant recipients and 36 undergoing HD patients. PSQI results exhibited no significant difference between the transplant and HD groups. The mean sleep quality score was 5.69 ± 2.95 in the transplant group and 5.72 ± 3.29 in the HD group, with no statistically significant difference.

Conclusions. PSQI scores were similar in patients undergoing HD and transplant recipients with well-preserved renal functions. Identifying low sleep quality is essential for enhancing the overall quality of life.

Key words: hemodialysis, kidney transplant recipients, sleep quality.

Conflict of interest. The authors declare no conflict of interest.

© E. Parmaksız, E. T. Parmaksız, 2023.

Correspondence should be addressed to Elif Torun Parmaksız: dreliftorun@yahoo.com

Article history:

Received March 6, 2023

Received in revised form
March 27, 2023

Accepted March 31, 2023



© Пармаксиз Е., Пармаксиз Е. Т., 2023

УДК: 616.61-085.38-073.27:616.61-089.843]:616.8-009.836

Ергюн Пармаксиз¹, Еліф Торун Пармаксиз²

Порівняння якості сну у пацієнтів, які лікуються методом гемодіалізу та реципієнтів ниркового трансплантату

¹Університет медичних наук, Каргальська міська лікарня ім. Лютфі Кирдара, Стамбул, Туреччина

²Університет медичних наук, навчальна лікарня Санчактепе Ілхан Варанк, Стамбул, Туреччина

Резюме. Низька якість сну є поширеною проблемою серед пацієнтів, які лікуються нирковою замісною терапією. Метою нашого дослідження було оцінити та порівняти якість сну серед пацієнтів, які лікуються методом гемодіалізу (ГД) та реципієнтів ниркового трансплантату.

Методи. Це обсерваційне одномоментне дослідження оцінювало соціодемографічні та медичні дані двох груп пацієнтів: пацієнтів, які лікувались ГД протягом щонайменше одного року, та реципієнтів ниркового трансплантату, які успішно перенесли трансплантацію нирки понад шість місяців тому. Кожен учасник заповнював опитувальник якості сну (Pittsburgh Sleep Quality Index, PSQI).

Результати. Дослідження включало 56 ГД пацієнтів та 35 пацієнтів з трансплантованою ниркою, співставлених за віком та статтю. Середній вік всієї когорти становив $47,97 \pm 12,92$ років, з яких було 49 (53,8%) чоловіків. $PSQI \geq 5$ балів було визначено у 57 пацієнтів, включаючи 21 реципієнта ниркового трансплантату та 36 ГД пацієнтів. Результати $PSQI$ не продемонстрували статистично значущої різниці між досліджуваними групами. Середня оцінка якості сну становила $5,69 \pm 2,95$ балів у групі пацієнтів з трансплантованою ниркою і $5,72 \pm 3,29$ балів у групі ГД пацієнтів.

Висновки. Якість сну хворих, які лікуються методом ГД та пацієнтів з трансплантованою ниркою та збереженою функцією нирок була схожою. Виявлення низької якості сну є необхідним для поліпшення загальної якості життя.

Ключові слова: гемодіаліз, одержувачі трансплантованих нирок, якість сну.

Introduction. End-stage kidney disease is a major worldwide health problem and has profound effects on the routine lives of patients. It is characterized by the irreversible loss of endogenous renal functions and has to be treated with any form of kidney replacement therapy (KRT) [1].

Sleep is a basic physical and psychological need. Sleep quality is among the most frequent predictors of mental and physical well-being. Sleep-related complaints are common conditions deteriorating the quality of life in KRT patients, and a substantial part of the daytime symptoms may be attributed to concomitant sleep problems [1]. Sleep disorders are reported to be highly prevalent problems in KRT patients (20–83%) [2, 3] and poor sleep quality may have negative effects on physical well-being.

The most widely used KRT is hemodialysis (HD). Previous studies have stated that sleep quality is disturbed in many undergoing HD patients [4, 5].

Renal transplantation is accepted as the best treatment of choice in KRT [6]. Patients treated with either modality have to experience significant lifestyle changes that seriously affect their physical or psychological well-being. Health-related quality of life has been reported to be highly affected [7]. Socio-demographic characteristics, presence of comorbidities, duration of the KRT, dialysis, or underlying psychological problems may be associated with quality of life [8, 9]. The quality of life has been reported to improve in patients after kidney transplantation compared to those on dialysis [10]. The kidney functions are replaced in both of the therapies, however, the substantial psychological burden of the disease persists [7].

The present study aimed to evaluate the symptoms of sleep disturbances in patients treated with HD and renal transplant recipients and to compare sleep quality in these two groups matched for age, gender, and comorbidities.

Methods. Study design and population. This observational, cross-sectional study included patients undergoing HD and renal transplant recipients. The data were collected from adult patients (>18 years of age) followed up in the Nephrology department in our hospital. The patients with previous diagnoses of mental and psychological diseases, neurological impairment, and cognitive dysfunction, patients taking sleep

Elif Torun Parmaksız
dreliftorun@yahoo.com

medication, and those who were unable to finish the questionnaire were not included in the study. The HD group consisted of subjects who had been on the HD treatment for at least one year period. The transplan-

tation group included kidney recipients who received a successful renal transplant over six months. The patients with rejection were excluded from the study group (Fig. 1).

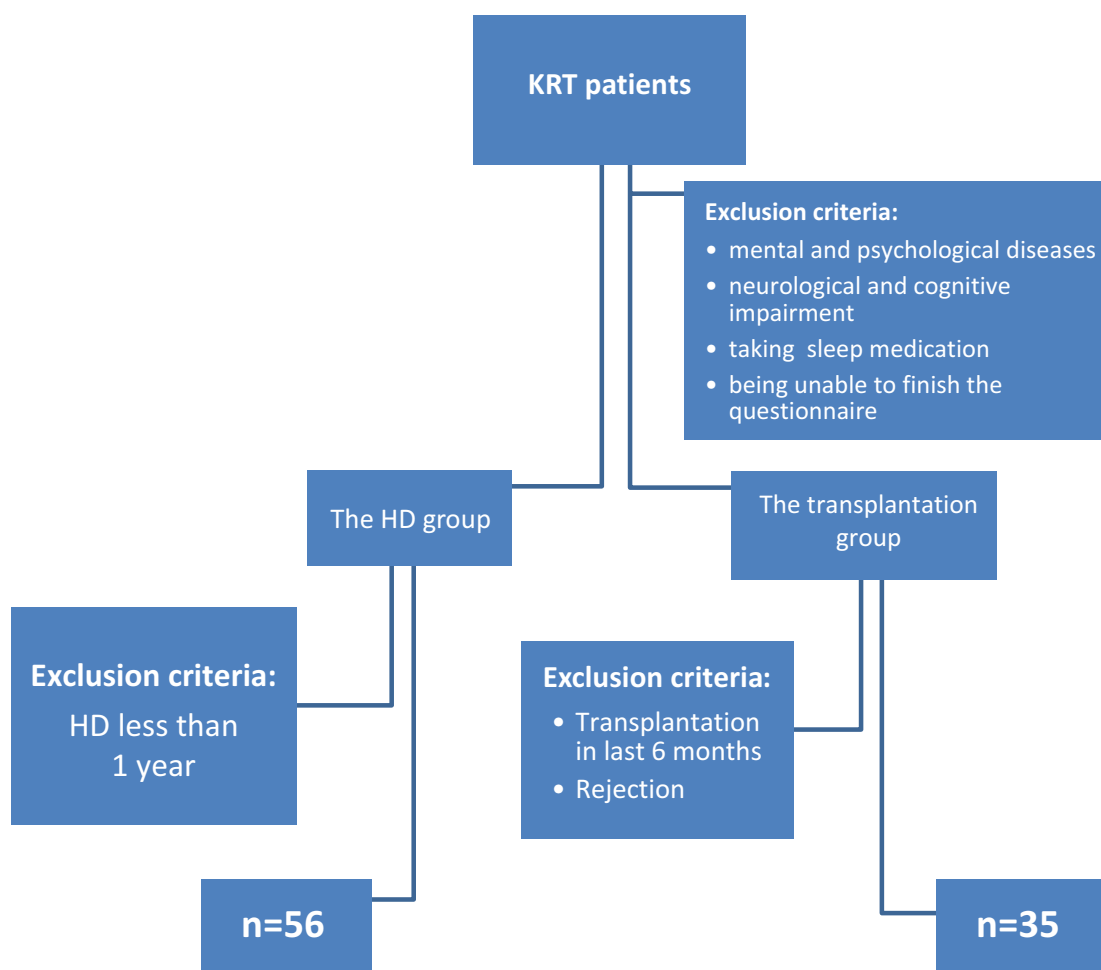


Fig. 1. The flow diagram of the study population.

All participants provided informed consent, and the study received approval from the local ethics committee under reference number 2021/514/208/2, dated May 25, 2021.

Study instruments. The inquiries have been individually explained to the patients. All participants were interviewed by the same clinician on socio-demographic characteristics, education, employment, and family status, and the data were recorded. The etiology of the KRT and medications were obtained from the medical history.

Each participant was delivered the Pittsburgh Sleep Quality Index (PSQI) [11]. Turkish version of PSQI was used to assess sleep quality [12]. PSQI is a self-reported questionnaire designed to measure sleep disturbances and sleep habits over one month. It consists of 19 items rated on a 5-point Likert scale. A total score equal to or more than 5 indicates poor sleep quality.

Statistical Analysis. The socio-demographic characteristics were evaluated by descriptive statistics. Continuous data were expressed as mean and standard deviation ($M \pm SD$). Sleep disturbances were expressed regarding mean scores of PSQI. The statistical analyses were conducted using Statistical Package for the Social Sciences (SPSS) (version 19), and p -values less than 0.05 were considered statistically significant.

Results. A total of 91 patients participated in the study, comprising 56 patients undergoing HD and 35 kidney transplant recipients. The mean age of the entire study population was 47.97 ± 12.92 years, ranging from 23 to 77, with 49 (53.8%) being male. In the transplant group, the mean age was 44.80 ± 12.21 , while in the HD group, it was 49.95 ± 13.06 ($p=0.06$). There were 20 male cases (57%) in the transplant group and 29 cases (52%) in the HD group.

Table 1 displays the PSQI results for the total study population and the two patient groups.

Table 1

Pittsburgh Sleep Quality Index in the study population

	All participants	Transplantation Group	HD Group	P-value
Pittsburgh Sleep Quality Index	5.78±3.14	5.69±2.95	5.72±3.29	0.81
1 Subjective sleep quality	1.11±0.84	1.20±0.93	1.05±0.80	0.44
2 Sleep latency	1.45±0.98	1.51±1.01	1.41±0.96	0.63
3 Sleep duration	0.63±0.93	0.46±0.81	0.73±0.99	0.15
4 Habitual sleep efficiency	0.31±0.69	0.23±0.54	0.36±0.78	0.35
5 Sleep disturbances	1.45±0.62	1.43±0.60	1.46±0.63	0.78
6 Use of sleep medication	0.14±0.56	0.17±0.70	0.13±0.47	0.73
7 Daytime dysfunction	0.66±0.80	0.69±0.79	0.64±0.81	0.80

The results indicate no significant differences in sleep quality among transplant and HD patients in terms of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. PSQI scores were ≥ 5 in 57 patients; 21 were transplant recipients, and 36 were undergoing HD patients, meaning that 60% of transplant recipients and 64% of HD patients had poor sleep quality.

In the HD group, 13 participants (23.3%) reported fairly or very bad subjective sleep quality, compared to 25.7% (n=9) in the transplant group. Sleep latency was normal in 19.6% (n=11) of HD patients and 14.3% (n=5) of transplant recipients. Sleep duration was equal to or less than 7 hours/night in 42.9% (n=24) of HD patients and 28.6% (n=10) of transplant recipients. Thirteen (23.2%) of HD patients and 6 (17%) of transplant recipients had sleep efficiency less than 85%. One participant in each group reported undisturbed sleep. The majority of participants did not use sleep medications (91% of HD patients and 94.3% of transplant recipients). Thirty-one HD patients (55.4%) and 18 transplant recipients (51.4%) reported no daytime dysfunction.

Discussion. In this study, we compared sleep quality between patients undergoing HD and kidney transplant recipients. The mean sleep quality score was 5.69±2.95 in the transplant group and 5.72±3.29 in the HD group. The difference was not statistically significant. Sleep quality was found to be compromised in KRT patients regardless of the treatment modality. PSQI was found to be similar in undergoing HD patients and transplant recipients with well-preserved renal functions.

Sleep problems are common in subjects with chronic medical problems and contribute to the burden of the pre-existing pathology. Sleep quality has hetero-

geneous definitions, and it mainly includes problems related to initiating or maintaining sleep, waking early or late, sleep fragmentation, unsatisfactory sleep, and daytime sleepiness and tiredness. Sleep restores the energy to feel ready to start a new day, therefore defects in sleep quality prevent individuals from feeling active and fresh. The consequences of disturbed sleep are tiredness, anxiety, exhaustion, concentration difficulties, and depression [5].

Sleep problems are common in patients undergoing HD [4, 5]. Despite geographical heterogeneity, more than half of the patients have been reported to complain of poor sleep quality [5].

Renal transplantation is the treatment of choice in restoring renal functions, however, even successful transplantation may not be sufficient for all psychological problems to resolve. Anxiety about graft survival, the use of immunosuppressant agents and facing their potential side effects or complications, need for hospitalization due to comorbidities are ongoing stressors. Sleep quality may be considered to form the top of the iceberg of psychological well-being. Sleep problems have been reported to persist even after transplantation in kidney recipients. In a report from China, renal transplant recipients had poorer sleep quality than the general population. Nearly one-third of transplant cases showed impaired sleep quality [13]. This ratio was higher in our study group. We have observed that sleep problems are not ameliorated even if the uremia control is successful (in successful transplant recipients).

In a study evaluating the effect of kidney transplantation on the quality of sleep, the investigators assessed kidney transplant recipients with the PSQI 1-month before, and 3 and 6 months after transplantation. They have shown that sleep quality improved significantly 6 months following transplantation [14]. In our study, at least 6 months have elapsed after the transplant surgery

in the latter group. This seems to be sufficient time for this group of patients to start and adapt to their new lives. In a study to evaluate the sleep quality of kidney transplant recipients, the mean PSQI of kidney transplant patients was 6.46 ± 3.71 , which was found to be significantly lower than the patients undergoing HD (8.52 ± 3.81 , $p < 0.001$) [15].

In the study by Liaveri et al, the authors observed that despite improving kidney functions and several aspects of quality of life, transplantation did not appear to have any beneficial effect on self-reported sleep quality [16]. Brekke et al. reported that poor sleep quality was common in kidney transplant recipients, and sleep quality improved in only about half of the patients after kidney transplantation [17].

Some limitations of our study need to be mentioned. First, the study population included is not very large. Another fact is that the outcomes reflect self-report inventories and are subjective, therefore a recall bias should be considered. However, self-reported questionnaires are widely used methods to measure depression and anxiety.

Conclusions. Sleep patterns serve as reliable indicators of overall well-being and have a significant impact on both physical and mental health. Recognizing sleep-related disturbances and enhancing sleep quality can play a vital role in improving the physical and psychological health of individuals with kidney disease. As a result, assessing sleep behavior should be a key consideration during the follow-up of patients undergoing either HD or renal transplantation. While conducting detailed investigations to diagnose sleep problems in kidney patients can be challenging, evaluating sleep quality through brief and straightforward interviews can offer valuable clinical insights.

Conflict of interest statement. The authors declare no conflict of interest.

Funding source. No funding has been received.

The authors' contributions.

E. Parmaks z: Data collection and analysis;

E. T. Parmaks z: The study design, writing.

References:

1. Roumelioti ME, Argyropoulos C, Buysse DJ, et al. Sleep quality, mood, alertness and their variability in CKD and ESRD. *Nephron Clin Pract.* 2010;114:277-287. doi: 10.1159/000276580.
2. Murtagh FE, Addington-Hall J, Higginson IJ. The prevalence of symptoms in end-stage renal disease: a systematic review. *Advances in Chronic Kidney Disease.* 2007;14:82-99. doi: 10.1053/j.ackd.2006.10.001.
3. Williams S, Han M, Ye X, Zhang H, Meyring-Wösten A, Bonner M, et al. Physical Activity and Sleep Patterns in Hemodialysis Patients in a Suburban Environment. *Blood Purif.* 2017;43(1-3):235-243. doi: 10.1159/000452751.
4. Elder SJ, Pisoni RL, Akizawa T, Fissell R, Andreucci VE, Fukuhara S, et al. Sleep quality predicts quality of life and mortality risk in haemodialysis patients: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). *Nephrol Dial Transplant.* 2008.Mar;23(3):998-1004. doi: 10.1093/ndt/gfm630.
5. Mirghaed MT, Sepehrian R, Rakhshan A, Gorji H. Sleep Quality in Iranian Hemodialysis Patients: A Systematic Review and Meta-analysis. *Iran J Nurs Midwifery Res.* 2019 Nov 7;24(6):403-409. doi: 10.4103/ijnmr.IJNMR_184_18.
6. World Health Organization: Human organ transplantation. <http://www.who.int/transplantation/organ/en/>
7. Kovacs AZ, Molnar MZ, Szeifert L, Ambrus C, Molnar-Varga M, Szentkiralyi A, et al. Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between renal transplant recipients and waitlisted patients on maintenance dialysis. *Nephrol Dial Transplant.* 2011; 26:1058-1065. doi: 10.1093/ndt/gfq476.
8. Franke GH, Reimer J, Philipp T, et al. Aspects of quality of life through end-stage renal disease. *Qual Life Res.* 2003;12:103-115. doi: 10.1023/a:1022238707028.
9. Pretto CR, Winkelmann ER, Hildebrandt LM, Barbosa DA, Colet CF, Stumm EMF. Quality of life of chronic kidney patients on hemodialysis and related factors. *Rev Lat Am Enfermagem.* 2020;28:e3327. doi:10.1590/1518-8345.3641.3327.
10. Rosenberger J, van Dijk JP, Prihodova L, Majernikova M, Nagyova I, Geckova AM, et al. Differences in perceived health status between kidney transplant recipients and dialyzed patients are based mainly on the selection process. *Clin Transplant.* 2010 May-Jun;24(3):358-65. doi: 10.1111/j.1399-0012.2009.01080.x.
11. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;28:193-213. doi: 10.1016/0165-1781(89)90047-4.

12. Ağargün My, Kara H, Anlar Ö. Pittsburgh Uyku Kalitesi İndeksi'nin Geçerliliği ve Güvenirliği. Turk Psikiyatri Derg. 1996;7:107-15.
13. Xie J, Wang L, Tang X, Yi Y, Ding S, Yan J, et al. Sleep Quality and Related Psychosocial Variables Among Renal Transplant Patients. Transplant Proc. 2018 Dec;50(10):3426-3433. doi: 10.1016/j.transproceed.2018.06.030.
14. Hasanzamani B, Pourranjbar E, Rezaei Ardani A. Comparing Sleep Quality in Patients Before and After Kidney Transplantation. Iran J Kidney Dis. [Internet]. 2020 Mar;14(2):139-144. Available from: <http://www.ijkd.org/index.php/ijkd/article/viewFile/4776/1137>. (Last accessed: 26.06.2023).
15. Sabbatini M, Crispo A, Pisani A, Gallo R, Cianciaruso B, Fuiano G, et al. Sleep quality in renal transplant patients: a never investigated problem. Nephrol Dial Transplant. 2005 Jan;20(1):194-8. doi: 10.1093/ndt/gfh604.
16. Liaveri PG, Dikeos D, Ilias I, Lygkoni EP, Boletis IN, Skalioti C, et al. Quality of sleep in renal transplant recipients and patients on hemodialysis. J Psychosom Res. 2017 Feb;93:96-101. doi: 10.1016/j.jpsychores.2016.12.013.
17. Brekke FB, Waldum-Grevbo B, von der Lippe N, Os I. The effect of renal transplantation on quality of sleep in former dialysis patients. Transpl Int. 2017 Jan;30(1):49-56. doi: 10.1111/tri.12866.