

Brief communication

Sleep quality in caregivers of patients with end-stage renal disease

Aikaterini Arvaniti,¹ Stylianos Panagoutsos,² Paschalis Steiropoulos,³
Angeliki Zoumpouli,⁴ Konstantia Kantartzi,² Maria Samakouri¹

¹Department of Psychiatry, Democritus University of Thrace, Alexandroupolis,

²Department of Nephrology, Democritus University of Thrace, Alexandroupolis,

³Department of Pulmonology, Democritus University of Thrace, Alexandroupolis, Greece

⁴South London and Maudsley NHS Foundation Trust, London, UK

ARTICLE HISTORY: Received 5 October 2021/Revised 22 November 2021/Published Online 21 February 2022

ABSTRACT

The aim of this study was to evaluate the self-reported quality of sleep among caregivers of patients who are receiving hemodialysis (HD) and peritoneal dialysis (PD). In 64 caregivers of patients of the University General Hospital of Evros in Northeastern Greece, who were receiving HD and PD, the following instruments were administered: Pittsburgh Sleep Quality Index (PSQI), Zung Depression Rating Scale (ZDRS), Self-Anxiety Scale (SAS), Well – Being Index (WHO- 5). The mean PSQI value of caregivers was 5.27 ± 3.40 and 39% of them had poor sleep quality. “Poor sleepers” had significantly lower levels of quality of life ($p=0.02$), elevated levels of anxiety ($p=0.006$) and higher scores in the depression scale ($p=0.009$) compared to “good sleepers”. In the regression analysis depression was found to have the greatest contribution to the variability of ‘sleep quality’ (standardized beta = 0.62, $p<0.001$) and quality of sleep seemed to improve as years of dialysis that the patient underwent increased (standardized beta = -0.28 , $p=0.007$). Physicians should screen caregivers’ sleep quality, especially during the first stages of the illness.

KEYWORDS: Sleep quality, caregivers, hemodialysis, peritoneal dialysis.

Introduction

Many physical illnesses and psychiatric disorders, but also psychological reactions to common stressful life events, can influence the quantity and quality of sleep. Inadequate sleep can reduce the ability to think and to regulate emotions, it can also cause memory problems and can weaken the immune system.¹ Moreover, sleep disturbances may increase the proneness to accidents or injuries and negatively affect the life-work balance and the general health and safety.² It is well known that people involved in the care of patients with chronic illnesses usually have more sleep disturbances than the general population.³

The number of patients with chronic kidney disease and the accompanying need for renal replacement ther-

apy has increased significantly and is affecting around 35% of those over 70 years.⁴ The literature dealing with sleep problems of caregivers of patients with chronic kidney disease is still quite limited.

The aim of this study was to evaluate the self-reported quality of sleep among caregivers of patients on hemodialysis (HD) and peritoneal dialysis (PD).

Material and Method

Sample

The sample of this study consisted of 64 caregivers of HD and PD patients. The patients were receiving HD and PD in the two dialysis units of the University General Hospital of Evros in Northeastern Greece. The study

was approved by the local ethical committee of the University General Hospital of Evros and informed consent was obtained from the study participants.

Questionnaires

The following instruments were administered:

1. Pittsburgh Sleep Quality Index (PSQI): This is a self-rated scale that measures the subjective reports of people's quality of sleep and sleep disturbances during the last month.⁵ PSQI is an established international instrument for both assessment and prognosis of sleep disturbances in psychiatric and non-psychiatric patients, used in both clinical practice and research. Scores ≤ 5 indicate a good quality of sleep.
2. Zung Depression Rating Scale (ZDRS): This is a self-rated scale and consists of 20 items. The higher the score, the worse the depression. The validation of the Greek version was performed by Fountoulakis et al (2001).⁶
3. Self-Anxiety Scale (SAS): This is a self-rated scale which consists of 20 items. The higher the score, the worse the anxiety. The validation of the Greek version of SAS was performed by Samakouri et al (2012).⁷
4. Well-Being Index (WHO-5): This is a questionnaire that consists of 5 items and which measures the person's current quality of life. The lower the score, the worse the quality of life. WHO-5 has been adequately studied in terms of its psychometric properties and has been translated in more than 30 languages.⁸

Also, demographic and clinical data were collected: age, gender, education, occupation, income, BMI, hours of daily care, affinity/ relationship to the patient, whether other carers were also involved in patient's care, total duration of time of the patient in dialysis, type of dialysis.

Statistical analysis

Statistical comparisons among "good sleepers" and "poor sleepers" were performed using the t test when data were normally distributed (WHO and SAS scores); otherwise, the Mann-Whitney U test was performed (ZDRS scores). Normality of the data was determined with the use of the Shapiro-Wilk test and quantile – quantile (Q-Q) plots. In order to determine the specific factors of the sleep quality, a backward multiple regression analysis was used. Model diagnostics were examined using residual plots versus predicted plots and Q-Q plots. Our models were also checked for multicollinearity by estimating the variance inflation factor (VIF). All

model assumptions were met adequately. Independent variables were demographic and clinical data, as well as measurement scores. A $p < 0.05$ was considered statistically significant. Statistical analyses were performed using SPSS Statistics 24.0 (IBM).

Results

Description of the sample

The mean age of the sample of caregivers was 56 ± 13 years (min=24 years and max=79 years), the majority of which is women (64%). Forty-five per cent have only finished primary school. It appears that offsprings (28%) and spouses (27%) tend to be the main caregivers. Seventy-three per cent of the participants were overweight (BMI>25). The average of daily care was 2 hours (SD=0.86); the range varying from 1 to 4 hours of daily care. The majority of the participants (62.5%) reported that they receive additional help from other caregivers. Half of the sample did not answer the question about their income. From the patients associated with the caregivers of the current study 86% were undergoing hemodialysis and 14% peritoneal dialysis. The mean duration of patient time in dialysis was 5.47 years (SD=4.60).

Sleep quality

According to their PSQI scores, 25 (39%) caregivers had poor sleep quality, although only four of them had reported sleep disturbances, when asked, before the completion of the test. The mean PSQI value of caregivers was 5.27 ± 3.40 . "Poor sleepers" had significantly lower levels of quality of life, significantly elevated levels of anxiety and significantly higher scores in the depression scale (table 1).

In the regression analysis (backward elimination method) was found that from all the factors that were included in the analysis (demographic and clinical variables, as well as measurement scores), it was mainly three, namely: the carer's age, the duration that the patient was undergoing dialysis and self-rating scores of depression, that explained 43% of the sleep quality variability. Depression was found to have the greatest contribution to the variability of sleep quality ($\beta=0.21$, standardized beta=0.62, $p < 0.001$) (table 2).

Discussion

There has been a limited amount of research into the sleep of caregivers of patients undergoing dialysis.^{9,10} In our study the percentage of caregivers with poor sleep quality was 39% and their mean PSQI value was 5.27 ± 3.40 . These values indicate milder sleep impair-

Table 1. Comparison between “Good” and “Poor” sleepers

	Good sleepers (PSQI≤5) (N=39)	Poor Sleepers (PSQI>5) (N=25)	p
WHO-5 Mean (±SD) ¹	15.90 (±5.88)	12 (±7.07)	0.02
SAS Mean (±SD) ¹	32.03 (±6.65)	37.76 (±9.31)	0.006
ZDRS Median (range) ²	32 (21–50)	37 (21–57)	0.009

WHO-5: Well-Being Index, SAS: Self-Anxiety Scale, ZDRS: Zung Depression Rating Scale

¹T-test was used, ²Mann Whitney U test was used

Table 2. Factors affecting sleeping quality – Multiple regression analysis

Variables	β	SE (β)	95% CI	Standardized beta	p
Age	−0.05	0,026	(−0,10–0,002)	−0.21	0.04
Patient's time on dialysis	−0.21	0,07	(−0.36–0.06)	−0.28	0.007
ZDRS	0.21	0,04	(0.14–0.28)	0.62	<0.001
Gender	0.25	0.72	(−1.20–1.69)	0.04	0.73

F (4,58)=11,02, p<0,001, R²=43,2%

ZDRS: Zung Depression Rating Scale

ment comparing to those in relative studies.^{9,10} However, the mean score of PSQI does not seem to differ much in a relevant study focusing on caregivers of patients with a mild cognitive impairment.¹¹

Among all the factors that were included in the regression analysis, three explained 43% of the sleep quality variability, namely the carer's age, the duration that the patient was undergoing dialysis and self-rating score of depression. More precisely, the increase in the depression scores in ZDRS was associated with a significant increase in the scores of the sleep quality scale (that means poorer sleep quality), whereas an increase of the age and the duration that the patient is on dialysis were associated with significantly lower scores in the PSQI (that means better sleep quality). Depression seems to have the most important contribution in the variability of PSQI.

The bidirectional association between depression and bad sleep quality has been widely acknowledged in literature.^{12,13} In our study, there was an unexpected result, namely the fact that quality of sleep seemed to improve as years of dialysis that the patient underwent increased. One could expect that accumulation of tiredness would have a negative effect on sleep quality. However, this finding could be explained as caregiver's acceptance and adjustment with the patient's illness as years pass by. It is likely that the first period after the

diagnosis and the decision about dialysis, including the acquaintance with the process of dialysis, potentially has a harmful effect on sleep quality than the next period when a routine and some adjustment to the processes are established. Initially caregivers have to undertake their caring duties abruptly and potentially under extreme circumstances whereby they not only have to deal with a personal shock, but also need to provide psychological support to the patient. Furthermore, it appears that there is no specific guidance or help from the health system in their undertaking such a big and difficult task.¹⁴ Physicians should screen caregivers for depression and poor sleep quality, especially during the first stages of the illness and help them by providing support interventions and therapeutic strategies on maintaining and improving their health and quality of life while performing their caregiving duties. These findings evoke many questions about potential interventions during first period mentioned above (potentially at the beginning of dialysis).

Important limitations in our study were: (a) the data collection finished earlier than planned because of the negative reaction mainly of the female patients. It is likely that there is a stigma attached to the term “caregiver”, especially when used about people who until recently had another role in relation to them (e.g., spouse, son), (b) the results are based on self-rated questionnaires so it is hard to objectify the findings.

References

1. Rasch B, Born J. About sleep's role in memory. *Physiol Rev* 2013, 93:681–766, doi: 10.1152/physrev.00032.2012
2. Akerstedt T, Fredlund P, Gillberg M, Jansson B. A prospective study of fatal occupational accidents - relationship to sleeping difficulties and occupational factors. *J Sleep Res* 2002, 11:69–71, doi: 10.1046/j.1365-2869.2002.00287.x
3. Carter PA. Family caregivers' sleep loss and depression over time. *Cancer Nurs* 2003, 26:253–259, doi: 10.1097/00002820-200308000-00001
4. O'Callaghan CA, Shine B, Lasserson DS. Chronic kidney disease: a large-scale population-based study of the effects of introducing the CKD-EPI formula for eGFR reporting. *BMJ Open* 2011, 1:e000308, doi: 10.1136/bmjopen-2011-000308
5. 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
6. Fountoulakis KN, Iacovides A, Samolis S, Kleanthous S, Kaprinis SG, Kaprinis GS et al. Reliability, validity and psychometric properties of the Greek translation of the Zung Depression Rating Scale. *BMC Psychiatry* 2001, 1:1–8, doi: 10.1186/1471-244X-1-6
7. Samakouri M, Bouhos G, Kadoglou M, Giantzelidou A, Tsolaki K, Livaditis M. Standardization of the greek version of Zung's Self-rating Anxiety Scale. *Psychiatriki* 2012, 23:212–220, PMID: 23073544
8. Topp CW, Østergaard SD, Søndergaard S, Bech P. The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychother Psychosom* 2015, 84:167–176, doi: 10.1159/000376585
9. Celik G, Annagur BB, Yilmaz M, Demir T, Kara F. Are sleep and life quality of family caregivers affected as much as those of hemodialysis patients? *Gen Hosp Psychiatry* 2012, 3:518–524, doi: 10.1016/j.genhosppsych.2012.01.013
10. Avşar U, Avşar UZ, Cansever Z, Yucel A, Cankaya E, Certez H et al. Caregiver Burden, Anxiety, Depression, and Sleep Quality Differences in Caregivers of Hemodialysis Patients Compared With Renal Transplant Patients. *Transplant Proc* 2015, 47:1388–1391, doi: 10.1016/j.transproceed.2015.04.054
11. Lee D, Heo SH, Yoon SS, Chang D-I, Lee S, Rhee H-Y et al. Sleep Disturbances and Predictive Factors in Caregivers of Patients with Mild Cognitive Impairment and Dementia. *J Clin Neurol* 2014, 10:304–313, doi: 10.3988/jcn.2014.10.4.304
12. Selvi Y, Aydin A, Boysan M, Atli A, Agargun MY, Besiroglu L. Associations between chronotype, sleep quality, suicidality, and depressive symptoms in patients with major depression and healthy controls. *Chronobiol Int* 2010, 27:1813–1828, doi: 10.3109/07420528.2010.516380
13. Tsuno N, Besset A, Ritchie K. Sleep and Depression. *J Clin Psychiatry* 2005, 66:1254–1269, doi: 10.4088/jcp.v66n1008
14. Kalra L, Evans A, Perez I, Melbourn A, Patel A, Knapp M et al. Training carers of stroke patients: randomized controlled trial. *BMJ* 2004, 328:1099–1011, doi: 10.1136/bmj.328.7448.1099

Σύντομο άρθρο

Ποιότητα ύπνου σε φροντιστές ασθενών με νεφρική ανεπάρκεια

Αικατερίνη Αρβανίτη,¹ Στυλιανός Παναγιώτσος,² Πασχάλης Στειρόπουλος,³ Αγγελική Ζουμπούλη,⁴ Κωνσταντία Κανταρτζή,² Μαρία Σαμακουρή¹

¹Πανεπιστημιακή Ψυχιατρική Κλινική, Ιατρική Σχολή, Δημοκρίτειο Πανεπιστήμιο Θράκης, Αλεξανδρούπολη,

²Πανεπιστημιακή Νεφρολογική Κλινική, Ιατρική Σχολή, Δημοκρίτειο Πανεπιστήμιο Θράκης, Αλεξανδρούπολη,

³Πανεπιστημιακή Πνευμονολογική Κλινική, Ιατρική Σχολή, Δημοκρίτειο Πανεπιστήμιο Θράκης, Αλεξανδρούπολη,

⁴South London and Maudsley NHS Foundation Trust, Λονδίνο, Ην. Βασίλειο

ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 5 Οκτωβρίου 2021/Αναθεωρήθηκε 22 Νοεμβρίου 2021/Δημοσιεύθηκε Διαδικτυακά 21 Φεβρουαρίου 2022

ΠΕΡΙΛΗΨΗ

Σκοπός αυτής της μελέτης ήταν να αξιολογήσει την ποιότητα ύπνου μεταξύ των φροντιστών ασθενών με νεφρική ανεπάρκεια τελικού σταδίου, που υποβάλλονται σε αιμοκάθαρση (ΑΜΚ) και περιτοναϊκή κάθαρση (ΠΚ). Σε 64 φροντιστές ασθενών του Πανεπιστημιακού Γενικού Νοσοκομείου Έβρου, στη Βορειοανατολική Ελλάδα, οι οποίοι υποβάλλονται σε αιμοκάθαρση (ΑΜΚ) και περιτοναϊκή κάθαρση (ΠΚ), χορηγήθηκαν τα ακόλουθα ερωτηματολόγια: Pittsburgh Sleep Quality Index (PSQI), Zung Depression Rating Scale (ZDRS), Self-Anxiety Scale (SAS), Well-Being Index (WHO-5). Η μέση τιμή της κλίμακας PSQI των φροντιστών ήταν $5,27 \pm 3,40$ και το 39% από αυτούς είχαν κακή ποιότητα ύπνου. Οι φροντιστές με κακή ποιότητα ύπνου είχαν σημαντικά χαμηλότερα επίπεδα ποιότητας ζωής ($p=0,02$), αυξημένα επίπεδα άγχους ($p=0,006$) και υψηλότερα σκορ στην κλίμακα κατάθλιψης ($p=0,009$) σε σύγκριση με τους φροντιστές με καλή ποιότητα ύπνου. Στην ανάλυση παλινδρόμησης διαπιστώθηκε ότι η κατάθλιψη είχε τη μεγαλύτερη συμβολή στη μεταβλητή της «ποιότητας του ύπνου» (standardized beta=0,62, $p<0,001$). Η ποιότητα του ύπνου του φροντιστή φαίνεται ότι βελτιώνεται καθώς τα χρόνια της αιμοκάθαρσης στα οποία υποβάλλεται ο ασθενής αυξάνονται (standardized beta=-0,28, $p=0,007$). Οι επαγγελματίες υγείας πρέπει να ελέγχουν την ποιότητα του ύπνου των φροντιστών, ειδικά κατά τα πρώτα στάδια της νόσου των ασθενών που αυτοί φροντίζουν.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Ποιότητα ύπνου, φροντιστές, αιμοκάθαρση, περιτοναϊκή κάθαρση.