ORIGINAL RESEARCH

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Sleep Quality, Depression, Hopelessness, and Quality of Life in Elderly Hemodialysis Patients

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Abstract

Objective: This study aimed to assess and compare the relationships between depression, hopelessness, sleep, and quality of life in two age groups of elderly and young patients with end-stage renal disease undergoing hemodialysis (HD).

Materials and Methods: The study included 130 patients under follow-up for hemodialysis (55 aged <60 years and 75 aged ≥60 years). Depression levels, sleep quality, and quality of life of all participants were evaluated using the Beck depression inventory (BDI), Beck hopelessness scale (BHS), the Pittsburgh sleep quality index, and the short form-36, respectively.

Results: Of the participants, 55% (n=72) were female, and 45% (n=58) were male. The mean age was 59.48±14.57 years. There was no significant difference between the age groups concerning the BHS scores (6.82±4.73 vs. 6.57±4.20) (p=0.756). However, the BDI scores were significantly higher among younger participants (38.67±19.45 vs. 23.45±17.13) (p<0.001). Also, the sleep quality of the elderly group was significantly worse than the younger group (5.16±2.93±6.49±3.01) (p=0.013). Concerning the health-related quality of life, physical performance (45.81±19.33 vs. 39.49±13.07) and mental health (44.63±18.69 vs. 36.80±16.49) subscales were significantly lower in the elderly group (p=0.028 and p=0.013, respectively.

Conclusion: We conclude that age is a significant factor requiring consideration when assessing and managing patients under HD. Although the functional capacity and sleep quality deteriorate with age, younger HD patients are more disadvantaged concerning the possibility of depression. Thus, we suggest age-specific approaches in HD patients with a multidisciplinary team.

Keywords: Sleep, quality of life, depression, hope, elderly, hemodialysis

Introduction

Chronic renal failure is a well-known public health problem, which can result in end-stage renal disease (ESRD) and necessitates renal replacement therapies such as renal transplantation or hemodialysis (HD)/peritoneal dialysis (1). The availability of HD significantly increased in the last decade. However, the prevalence of ESRD also increased and reached 11-13% (2). This rise is related not only to changes in demography and aging but also to the increase in co-morbid diseases such as diabetes and hypertension (3).

Like other chronic diseases, ESRD deteriorates life quality and increases the incidence of psychopathological conditions compared to the normal population (4). The prevalence of depression is about 2-10% in the general population. However, it may reach 23-29% in people with chronic renal failure (5,6). Despite the escalation of depression in this population, there is no report investigating its relationship to hope and suicidal tendencies in patients on maintenance dialysis.

On the other hand, sleep is a dynamic condition with significant influences on daily functions, including mental and physical health (7). Poor sleep quality may even disturb emotions and thoughts. Patients with poor sleep quality have a poor quality of life with many physical or emotional symptoms, such as concentration difficulties, tiredness, decreased pain tolerance, loss of appetite, depression, and anxiety (8). The survival rates in ESRD patients have increased in relation to renal replacement

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therapies and other therapeutic interventions, which increased the significance of evaluating health-related quality of life (HRQoL) in these patients (9).

Given the extended life expectancy in ESRD patients, the follow-up of quality of life, depression, hopelessness, and sleep becomes more important in elderly patients.

This study aimed to assess and compare the relationships between depression, hopelessness, sleep, and quality of life in two age groups of elderly and young patients with ESRD.

Materials and Methods

Study design

The study was conducted in a cross-sectional design. All participants gave written individual informed consent to participate. The study protocol was approved by the Local Ethics Committee at Malatya Turgut Özal University Medical Faculty and conducted according to the criteria of the Helsinki Declaration. Informed consent was obtained from all the patients included in the study.

Setting

This study was conducted at the department of nephrology at Malatya Training and Research Hospital from July 2018 to January 2019. Established in 1939, the study hospital currently provides secondary-level healthcare services in eastern Turkey with 1.040 inpatient beds, 240 outpatient clinics, 23 surgical intervention rooms, a 90-bed capacity intensive care unit, and a HD unit able to serve 29 simultaneous patients.

Participants

Patients >18 years of age with ESRD, who were receiving HD for at least 3 months were included in the study. The exclusion criteria of the study were patients not able to complete the study questionnaire due to cognitive impairment (n=2), active psychosis (n=1), a history of recent hospitalization (n=2), history of malignancy (n=1). Data could be collected from 130 patients out of the 150 patients under treatment (Figure 1). All patients under follow-up were invited to join the study without sampling.

Variables

Age, gender, marital status, cigarette smoking, dialysis access, dialysis duration, body mass index (BMI), hemoglobin, albumin, C-reactive protein, ferritin, intact parathyroid hormone (iPTH), lipid parameters, and serum 25-hydroxyvitamin D [25(OH) D] were assessed in all patients. Blood samples for laboratory parameters were collected on the day of the survey. Blood samples were taken from the patients just before the dialysis session. Serum 25(OH) D levels were measured by liquid chromatography-tandem mass spectroscopy (Agilent Technologies, Santa Clara, CA, USA), the measurement of iPTH

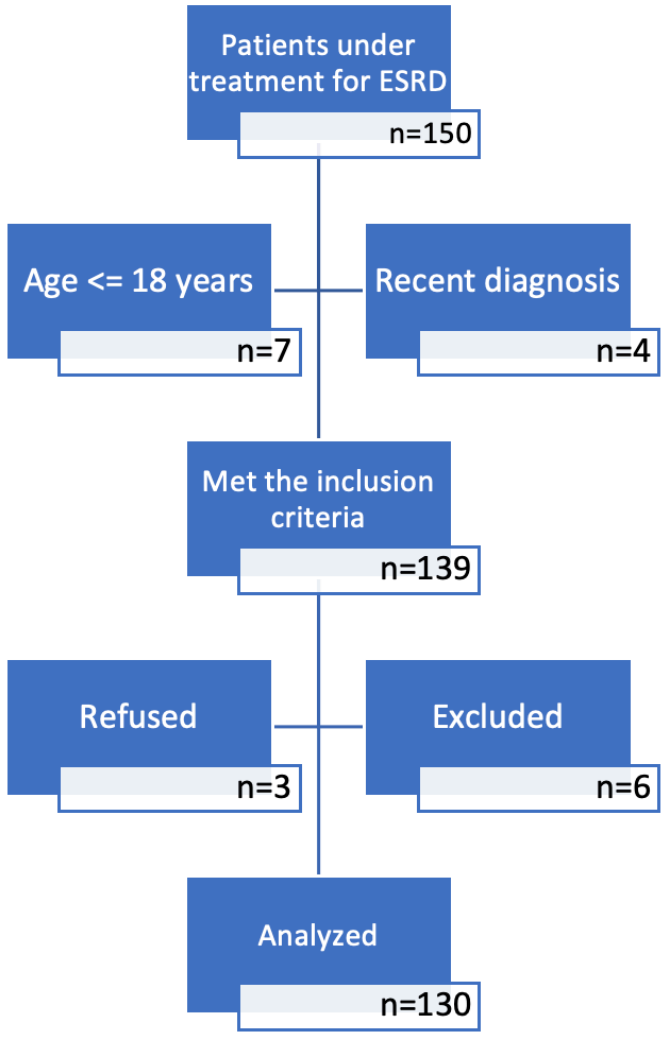

Figure 1. Study flow diagram

levels was made by the chemiluminescence method (ADVIA centaur XPT immunoassay, Siemens, Erlangen, Germany) (10,11). Ferritin levels were measured by ferritin immunoassay (ADVIA Centaur XPT immunoassay, Siemens, Erlangen, Germany), hemoglobin was measured by fluorescence flow cytometry (Sysmex XN 2000, Norderstedt, Germany) (12,13). Albumin and lipid parameters were measured by spectrophotometry (Beckman Coulter AU 2700, Krefeld, Germany) (14). C-reactive protein was measured by the immunonephelometric method (NFL BN-II, Erlangen, Germany) (15).

Short form-36 health survey (SF-36)

The SF-36 consists of eight dimensions, generating a profile of HRQoL (16). These dimensions are: 1) Physical functioning, 2) Role limitations due to physical functioning, 3) Bodily pain, 4) General health perceptions, 5) Vitality, 6) Social functioning, 7) Role limitations due to emotional functioning, and 8) Mental health. Raw scores are transformed into a score between zero and a hundred for each dimension. Higher scores indicate better health.

Beck's depression inventory (BDI) and the Beck hopelessness scale (BHS)

To facilitate the investigation of despair in various psychopathological situations, Beck has established a tool designed to reflect the negative expectations of the participants (17). The BHS and the BDI were used in this study. The BHS has 20 true/false statements, of which 9 are false, and 11 are correct. Each correct answer is scored as 1, calculating the total "hopelessness score," giving a score range between 0 and 20. The cut-off points are categorized as follows: 0-4: Minimum hopeless, 5-8: Mild hopeless, 9-13: Moderately hopeless, and 14-20: Severe hopeless. Additionally, we defined a score of ≥9 as a suicide predictor in people with serious diseases (4). On the other hand, BDI has questions that describe attitudes and symptoms concerning depression. It comprises 21 groups of statements, and each group investigates a type of depression symptom. The higher the score displayed, the greater is the intensity of symptoms. Cut-off points used for BDI are defined as follows: Minimal depression: 0-11, mild depression: 12-19, light depression: 20-35, and severe depression: 36 and above (18).

Sleep quality

The Pittsburgh sleep quality index (PSQI) was used to assess sleep quality. The standard (past month) version was used at the screening visit, and a modified (past week) version was used at all subsequent administrations. The scores ranged from 0 to 21, with higher values indicating poorer sleep quality (19). A score higher than 5 indicates poor sleep quality.

Functional capacity

Patients' functional dependency was assessed by the activities of daily living (ADL) and Instrumental Activities of Daily Living (IADL) tests. The Barthel index of ADL was used for evaluating physical disabilities (20). This scale includes dressing, bathing, grooming, using the toilet, eating, transferring, and incontinence. Scores can range from 0 to 100, and higher scores indicate independence. On the other hand, the Lawton index was used to evaluate the disability in IADL. This scale aims to find out subject performance in the following activities: Doing laundry, shopping, taking medicines, housekeeping, food preparation, using the telephone, using transportation, and managing money (21). Higher scores indicate higher independence according to this scale.

Bias

All patients under follow-up were invited to join the study to prevent selection bias. Furthermore, the data collection was done by the same researcher to decrease measurement bias.

Statistics

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 software (SPSS Inc., Chicago, IL, USA). Independent samples t-test and chi-square tests were used to compare numerical and categorical variables between the age groups. Besides, the Pearson's correlation test was used to identify if there was any correlation between the changes in outcomes (i.e., if the change scores in depression, sleep, and quality of life outcomes correlated with each other). The threshold for statistical significance was set to $p<0.05$.

Results

Data of 130 participants were analyzed. While 55% (n=72) of patients were female, 45% (n=58) were male. The mean age was 59.48±14.57 years. Patients were divided to two groups based on age: ≥60 and <60 years. There was no significant difference between the two groups regarding HD duration and BMI. However, when the laboratory results were evaluated, PTH was high in the young age group, while vitamin D levels were found to be significantly low (p=0.006, p=0.047: Respectively) (Table 1). Also, functional capacity assessment, ADL and AIDL were significantly higher in the younger group (Table 2).

The total BHS score ranged from 1 to 19 in the whole group, with a median of 5 points. According to the BHS, 56 (43.1%) patients had minimal, 40 (30.8%) light, 19 (14.6%) moderate, and 15 (11.5%) had severe hopelessness symptoms. When young and old HD patients were compared, there was no significant difference between the scores (Table 2).

BDI scores were significantly higher among the younger participants (Table 2). The BDI score ranged from 4 to 60, with a median score of 29.8. According to the cut-off scores, the proportions of mild, moderate, and severe depression were 18.5% (n=24), 23.8% (n=31), and 35.4% (n=46), respectively. Of the patients, 78 (60.0%) had poor sleep quality. The sleep quality of the elderly group was significantly worse than the younger group (Table 2).

BHS showed a positive correlation with the BDI (r=0.364, p<0.001) and a negative correlation with the Barthel index of ADL (r=-0.173 p=0.049). On the other hand, PSQI positively correlated with age (r=0.282, p=0.001) and BMI (r=0.249, p=0.004).

Concerning the HRQoL, physical performance, and mental health subscales were significantly lower in the elderly group (Table 3).

Discussion

In our study, ESRD HD patients aged 60 years and older had lower functional capacity and depression, similar hopelessness, and poorer sleep quality than similar patients aged less than 60

Table 1. Comparison of sex, dialysis duration, BMI, and laboratory variables between the age groups

	Young (n=55)	Older (n=75)	p
Sex n (%)			
Women	34 (61.8%)	38 (50.7%)	0.206
Men	21 (32.2%)	37 (49.3%)	
Under dialysis since (months) median (min-max)	48 (2-204)	44 (4-204)	0.786
BMI (kg/m^2)	24.82 (17.26-36.0)	24.50 (16.00-42.8)	0.913
Laboratory values			
Urea (mg/dL)	135 (83-216)	130 (67-219)	0.882
Creatinine (mg/dL)	8.25 (2.8-18.25)	7.20 (2.25-13.88)	0.072
Uric acid (mg/dL)	6.4 (4.3-10.9)	6.3 (4.8-8.90)	0.316
Total protein (g/dL)	7 (5.2-8.2)	7. (5.5-8.2)	0.530
Albumin (g/dL)	3.6 (2.0-4.4)	3.6 (2.0-4.4)	0.758
Calcium (mg/dL)	8.8 (7.2-9.9)	8.8 (7.8-11.5)	0.442
Phosphorus (mg/dL)	5 (2.1-9.3)	4.5 (3-9.1)	0.218
Parathormone (PTH) (pg/mL)	447.9 (14.52-1881)	354 (54.95-1228)	0.022*
Vitamin D (ng/mL)	8.47 (3-54.46)	11.71 (3-93.43)	0.049*
C-reactive protein (mg/L)	0.54 (0.003-3.81)	0.79 (0.04-14.67)	0.272
Ferritin (mL/ng)	600.87±425.62	570.12±350.58	0.917
Hemoglobin (g/dL)	11.2 (7.4-14.4)	11.10 (7.20-14.6)	0.567

BMI: Body mass index, *p<0.05 significant

Table 2. Functional capacity, depression, and sleep quality assessment of the groups

Functional assessment	Young (n=55)	Older (n=75)	p
Barthel ADL	100 (15-100)	75 (10-100)	<0.001*
Lawton brody IADL	5 (1-8)	3 (1-8)	<0.001*
BDI	6 (1-18)	5 (1-19)	<0.001*
BHS	36 (8-63)	17 (4-63)	0.915
PSQI	4 (1-14)	5 (1-13)	0.003*

Data are presented as mean ± standard deviation. ADL: Activities of daily living, IADL: Instrumental activities of daily living, BDI: Beck depression inventory, BHS: Beck hopelessness scale, PSQI: Pittsburgh sleep quality index, *p<0.05 significant

Table 3. Health-related quality of life assessment of the age groups

SF-36	Young (n=55)	Older (n=75)	p
PF	45.81±19.33	39.49±13.07	0.028*
SF	44.82±16.98	41.94±15.29	0.313
PR	17.54±22.35	11.17±16.11	0.061
ER	12.021±16.23	12.62±14.14	0.824
MH	44.63±18.69	36.80±16.49	0.013*
V	29.21±18.52	24.54±14.44	0.109
P	37.40±17.35	34.48±14.31	0.295
GH	28.18±16.66	23.66±13.49	0.091

Data are presented as mean ± standard deviation. PF: Physical functioning, SF: Social functioning, PR: Physical role limitations, ER: Emotional role limitations, MH: Mental health, V: Vitality, P: Pain, GH: General health, *p<0.05 significant

years. However, there was no significant difference between the two age groups regarding the quality of life, except for physical functioning and mental health. Also, there was no significant difference in the BHS scores concerning the age groups. Furthermore, both the BHS and PSQI showed some correlations with the other variables.

The prevalence of geriatric depression increases rapidly with the steady aging of the population and the increase in chronic diseases with advancing age (22). Depression has been reported in up to 70% of HD patients (23,24). Tsevi et al. (25) reported that the occurrence of depression was associated with the duration of HD in patients undergoing HD treatment. In another study, it was emphasized that depression was associated with various markers of HD proficiency, such as high blood pressure, serum albumin concentration, and serum creatinine concentration. However, in these studies, patients were not grouped by age (24).

Despite the well-known strong relationship between hopelessness and depression, our study reveals that hopelessness and depression are partly different phenomena. The hopelessness levels in the young and old groups were close to each other, while the depression rate was significantly higher in the young group (26). Similarly, Andrade et al. (4) found a high prevelance of hopelessness, suicidal ideation, and depression symptoms in HD patients. In our study, in the despair assessment according to age, BHS values were very close to each other, but it is surprising that BDI values were higher in younger HD patients. A possible

explanation for this finding could be that younger people affected by a debilitating chronic disease are more vulnerable because of their impossibility to accomplish plans for their life. Despite the fact that depression is a common disorder in the general elderly population, younger HD patients should be regularly evaluated for depression.

Most HD patients suffer from poor sleep quality. Our study showed that 60% of HD patients had poor sleep quality. Furthermore, there was also a correlation between sleep quality and age as well as BMI. Likewise, other studies have verified a significant relationship between sleep quality and increasing age (27,28).

Increased age-related changes (physical limitations, use of various medications, and lifestyle changes) appear to affect the sleep quality of HD patients. It has been shown in several studies that patients receiving HD treatment have significantly poorer sleep quality compared to the general population (29,30). We found that the majority of patients receiving HD treatment had poor sleep quality. Additionally, we identified an association between poor sleep quality with age and BMI. Hydarinia Naieni et al. (31) reported that sleep quality was significantly associated with age in HD patients, while another study showed that sleep quality had a significant relationship with BMI and diabetes (32). According to our study, quality of life was significantly lower in the elderly group with sleep disorders. Pain, depression, and sleep disorders due to chronic diseases cause a decrease in quality of life. In our study, physical performance and mental health subscale scores of the SF-36 were significantly lower in the elderly group. Similar to our study, Zouari et al. (33) emphasized that being 60 years or older is associated with a poor quality of life.

The aging population and the increase in the number of patients suffering from chronic diseases highlight the imperative links between mental, social and physical health (4,26,29). In addition, thanks to advances in the treatment of chronic kidney disease, many patients can live to old age. In recent years, it has been noticed that many nephrologists actually act as "amateur geriatric specialists", especially by the American and United Kingdom nephrology associations, and steps have been taken to improve kidney education in this area (34). Both specialties are very familiar with the concept of patient-centered care. However, renal services usually focus on holistic symptom control, dietary changes, and the psychological impact of kidney disease, while geriatric comprehensive assessment focuses on functional status, cognitive impairment, and multiple drug use and aims to maintain or improve the quality of life and prevent it future readmissions (35-37). However, there is no specialization in this field in our country. Therefore, the treatment of HD patients should be organized by a multidisciplinary team consisting of nephrologists, geriatricians and psychiatrists.

Study Limitations

Our study should be interpreted in light of some limitations. It is a descriptive study in a local sample with limited generalizability of the findings. Multi-center studies with control groups are needed to verify the results.

Conclusion

We conclude that age is a significant factor requiring consideration when assessing and managing patients under HD. Although the functional capacity and sleep quality deteriorate with age, younger HD patients are more disadvantaged concerning the possibility of depression. Thus, we suggest age-specific approaches in HD patients with a multidisciplinary team.

Ethics

Ethics Committee Approval: The study protocol was approved by the Local Ethics Committee at Malatya Turgut Özal University Medical Faculty (IRB number: E-23536505-604.02) and conducted according to the criteria of the Helsinki Declaration.

Informed Consent: Informed consent was obtained from all the patients included in the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: F.D.Y., İ.P., Concept: F.D.Y., Design: F.D.Y., İ.P., Data Collection or Processing: İ.P., Analysis or Interpretation: F.D.Y., Literature Search: F.D.Y., İ.P., Writing: F.D.Y., İ.P.

Conflict of Interest: No conflict of interest was declared by the authors.

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