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DEPRESSION AND QUALITY OF LIFE RELATED FACTORS IN HEMODIALYSIS PATIENTS

HEMODİYALİZ HASTALARINDA DEPRESYON VE YAŞAM KALİTESİ İLE İLİŞKİLİ FAKTÖRLER

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Abstract

Aim: Depression is the most common psychiatric disorder affecting patients on hemodialysis (HD) and has been associated with impaired Quality of Life (QoL). This study aimed to investigate the prevalence of depression and the relationship between depression, QoL, and demographic factors in HD patients.

Methods: Short form 36 (SF–36) and Beck's depression inventory (BDI) were employed to assess the relationship between depression, QoL and demographics in 50 hemodialysis patients. The relationship between scores of BDI and SF–36, and annual biochemical and demographic data were then evaluated.

Results: Mean age of the patients was 56.4 ±16.4 years and the mean HD duration was 57.11 ±39.09 months. The incidence of depression (BDI>14) was 36%. Age, hemoglobin, ferritin, body mass index (BMI), and Kt/V values were observed to be significantly correlated with the QoL scores ($p<0.05$ for all). These scores, however, were not related to dialysis duration, serum albumin, CRP, calcium, phosphorus, and parathormone values. The target level for hemoglobin, age <45 years, and ideal body weight were associated with high SF–36 social functioning score ($p<0.05$).

Conclusions: The results of this study showed that the depressive symptoms were as high as 36% among the study group linked to poor QoL. Interestingly, annual mean values of Kt/V and the biochemical parameters were not related to BDI scores. Higher levels of ferritin (800) (negatively) and hemoglobin (>11 g/dL) / ideal BMI (18–25 kg/m2) / younger age (18–45 year) (positively) were related to some SF–36 scores. The study emphasizes that hemodialysis patients should also be evaluated for depression and QoL, to optimize clinical outcomes with the help of nephrologists and psychiatrist.

Keywords: Quality of life, depression, hemodialysis

Öz

Amaç: Depresyon hemodiyaliz hastalarını etkileyen en yaygın psikiyatrik bozukluktur ve bozulmuş yaşam kalitesi ile ilişkili olduğu düşünülmektedir. Bu çalışmada hemodiyalize giren hastalarda depresyon ile yaşam kalitesi ve demografik faktörler arasındaki ilişki araştırılmıştır.

Yöntemler: Diyalize girmekte olan elli (n: 50) hemodiyaliz hastasına depresyon, yaşam kalitesi (quality of life, QoL) ve demografik veriler arasındaki ilişkiyi değerlendirmek için kısa form 36 (SF-36) ve Beck depresyon envanteri (BDI) anketleri uygulandı. BDI ve SF-36 skorları ile yıllık biyokimyasal ve demografik veriler arasındaki ilişki değerlendirildi.

Bulgular: Hastaların yaş ortalaması 56,4 ± 16,4 yıl, ortalama HD süresi 57,11 ± 39,09 ay idi. Depresyon insidansı (BDI> 14 olarak belirlendiğinde) %36 idi. Yaş, hemoglobin, ferritin, vücut kitle indeksi (VKİ) ve Kt/v değerleri QoL skorları ile anlamlı olarak korele bulundu (hepsi için $p<0.05$). Ancak QoL skorları diyaliz süresi, serum albümin, C reaktif protein, kalsiyum, fosfor ve parathormon değerleri ile ilişkili değildi. Hemoglobin için hedef seviyede olma, hasta yaşının kırk beşin altında olması, ideal vücut ağırlığında olma hali ise yüksek sosyal fonksiyon skoru (SF-36 alt analizi) ile anlamlı ölçüde ilişkiliydi ($p<0.05$).

Sonuç: Bu çalışmada hemodiyaliz hasta grubunda depresyon sıklığı %36 olarak bulunmuş ve bu durumun kötü yaşam kalitesi skorları ile ilişkili olduğu gösterilmiştir. İlginç olarak iyi diyalizin bir göstergesi olan Kt/v'nin ve hastaların biyokimyasal parametrelerinin QoL ile ilişkisi bulunmamıştır. Ferritinin yüksek olması negatif olarak (>800 mg/dL); hemoglobinin> 11 g/dL'nin üzerinde olması, ideal vücut ağırlığında olmak (VKİ 18-25 kg/m2) ve 18-45 yaş aralığında olmak pozitif olarak bazı SF-36 skorlarıyla ilişkili bulunmuştur. Bu çalışma hemodiyaliz hastalarının iyilik hallerini sağlamak için nefrolog ve psikiyatrların birlikte çalışması gerektiğini vurgulamaktadır.

Anahtar Kelimeler: Yaşam kalitesi, depresyon, hemodiyaliz

Introduction

Depression is the most common psychiatric illness affecting patients with end-stage renal disease (ESRD)[1]. The combination of disturbing physical symptoms and psychological distress results in significantly reduced QoL, thereby leading to the development of depression[2-4].
Despite many studies being carried out in this research area, depression in hemodialysis patients is yet to be completely understood and cured[5]. Beck's Depression Inventory is the standard questionnaire used to monitor depressive symptoms in chronic hemodialysis patients[6]. SF–36 is the most commonly employed instrument that measures health-related quality of life through a well-documented scoring system[7]. Depression and quality of life are intertwined processes. Therefore, they are recommended to be evaluated in combination.
A majority of the previous studies have been conducted by comparing sectional data of the monthly laboratory results of patients with depression, and their QoL scores. In contrast to this mean value of the annual laboratory data of the patients was calculated and its relationship with Beck's and SF-36 scores was examined in the present study.

Materials and Methods

- *Patients*

Fifty hemodialysis patients were included in this cross-sectional and observational study, carried out from January 2017 to December 2017. Patients with malignant diseases, acute infections, acute coronary syndrome, or decompensated heart failure were excluded from the study. Patients over the age of 18 years, with informed consent, participated in this study. Patient history, physical examination, monthly and annual averaged data of the biochemical tests and hemodialysis adequacy were recorded for each patient. BDI and SF–36 QoL questionnaires were both implemented by a single physician.
BDI and SF–36 were translated into Turkish and applied to all the patients. BDI is a questionnaire bearing 21 questions, each one having four possible answers, with scores ranging from 0 to 63. The symptoms of depression during the last week were measured; increased scores indicated the severity of depression. A score of 14 points and above was considered to be the limit for depression[8].
SF–36 evaluates the quality of life in eight sub-titles within two basic components, i.e., the physical components and the mental components. The scales measure Emotional Role Strength, Energy Viability, Vitality, Mental Health, Social Functioning, Physical Function, Physical Role Strength, Pain and General health perception. High scores indicate well-being; well-being increases when the pain rate is low. The results of this questionnaire were also compared with the results of the questionnaire that targeted the general community of Turkey[9]. This study was approved by the local Ethics and Research Committee of the University Hospital.

- *Statistical method*

The mental health score from SF–36 and BDI instruments of the patients were compared and it was observed that the study was consistent. Pearson's *r* correlation test was utilized for this purpose. A comparison between the patients and the results of the Turkish version of SF–36 was made using the chi-square test. The SPSS 20 program was used for the statistical analysis of the data.

Results

Of the 50 patients, 27 were males. The demographic characteristics of the patients are summarized in Table 1. BDI and SF–36 scores in HD patients and in the general community are shown in Table 2. According to BDI, depression frequency was estimated to be 36% (18/50) in the patients; 43.5% in females and 29.6% in males. SF–36 sub-analysis scores (general health perception, pain score) of the seven patients who died within one year after implementation of the instrument were not found to be statistically significant, although their scores were lower than those of the patients alive.

Table 1. Demographic features of hemodialysis patients participating in the study

Variables	
Female(n=23)	58.8±15.8
Male(n=27)	54.4±17
Total(n=50)	56.4±16.4
Tobacco use n (%)	14 (%28)
Cigarette pack-year	31±23.55
Alcohol (%)	6 (%12)
Primary Kidney Disease	
Hypertension	16 (%32)
Diabetes mellitus	12 (%24)
Idiopathic	5 (%10)
Chronic Glomerulonephritis	4 (%8)
Neurogenic	4 (%8)/
Bladder/Stone	2 (%4)
Polycystic kidney disease	2 (%4)
Tubulointerstitial nephritis	1 (%2)
Other	4 (%8)
Arteriovenous fistula/Catheter	36/14 (%72/28)
HBV (+)/HCV (+)	2 (%4)/2 (%4)

The patients were divided into three groups according to their BMIs as: <18, 18–25 (normal), and 25 kg/m2 (overweight). The scores for physical function (p=0.016), energy-vitality (p=0.011) and mental health (p=0.033) were significantly better in patients with normal weight than in those who were overweight. The patients were also divided for age and Kt/V. The scores of BDI and SF–36 in different patient groups are depicted in Table 2. The patients were categorized on the basis of dialysis vintage as <24 months, 24–60 months and >60 months (Table 3). According to the mean annual levels of hemoglobin, albumin, parathormone, CRP, and ferritin of the patients, BDI and SF–36 scores are summarized in Table 4.

Discussion

In addition to the metabolic, cardiovascular, hematologic and bone mineral disorders in patients on chronic dialysis program, poor QoL and depression are common problems. Depression is the most frequent psychological disorder affecting this group[10,11]. At the same time, depression is associated with increased morbidity and mortality in ESRD[12]. According to DOPPS (The Dialysis Outcomes and Practice Patterns Study), the depression frequency in hemodialysis patients has been reported to be about 20% in America and Europe. The relative risk of mortality in patients with depression has been found to be increased by 23%.

Although it has been discussed in the previous studies as to which scoring system would better detect depression in the dialysis patients, most studies have been carried out using BDI as the instrument for detection of depression in these patients[13,14]. Depression frequency was observed to be 36% in the present study, according to BDI. Likewise, depression frequency has been reported by other authors as 33%, 26.7%, 25.3% and, 28%[5,11,15,16].

Table 2. Relationship between gender, weight, age, Kt/v, URR, and survival by SF 36 and Beck's score

	Beck's Depression Analysis	SF36 Physical functioning score	SF36 Physical role functioning Score	SF36 Emotional role functioning Score	SF36 Energy Vitality Score	SF36 Mental Health Score	SF 36 Social Functioning Score	SF36 Pain Score	SF 36 General Health Perception Score
Female (n:23)	14.2±9.6	43.4±31	34.1±23.8	25±25.5	45.4±25.4	68.3±25.9	71.5±37.6	73.7±26.5	39.7±25
Male (n:27)	14±11.8	58.8±30.9	22.2±25.3	18.5±24.6	59.7±28.6	75.6±19.2	75±29.4	74.7±28.6	49.5±30
P	0.944	0.089	0.101	0.372	0.074	0.261	0.723	0.903	0.228
Turkey's Median Female	.	80.6±21.7	82.9±28.6	89.0±22.5	63.4±13.7	70.1±11.4	90.1±12.9	81±20.2	69.1±16.9
Turkey's Median Male	.	87.2±17.1	89.8±19.3	92.8±15.1	65.7±11.9	71±10.6	91.7±12.8	85.1±16.4	73.6±14.9
P*Patient- Turkey's Median Female	.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P*Patient- Turkey's median Male	.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alive (n:43)	12.5±9	54.5±30	29.5±24.8	22.7±25.1	55.4±26.8	73.1±22.9	74.4±31.4	75.1±26.6	48±27.5
Exitus (n:7)	25.1±16.6	29±39.7	10±22.3	10±22.3	35±33.7	65.4±19.4	65±48.7	67±36.4	20±20.3
P	0.55	0.149	0.335	0.264	0.428	0.897	0.259	0.849	0.152
BMI<18 kg/m^2 (n:3)	15.3±11.5	56.6±37.5	16.6±28.8	16.6±28.8	51.6±42.5	53.3±40.4	58.3±52	55.8±43.7	38.3±40.7
BMI 18–25 kg/m^2 (n:27)	12.5±7.1	63±27.7	25±25.4	25±25.4	63.9±22.1	79.6±12.4	77.8±26.5	79.4±23.1	52.8±24.6
BMI>25 kg/m^2 (n:20)	15.9±14.9	36.7±30	17.5±24.4	17.5±24.4	39.7±27.9	65.7±27	70±38.3	70.3±29.8	36.2±29
P	0.573	0.016*	0.298	0.577	0.011*	0.033**	0.528	0.268	0.126
Age 18–45 (n:12)	11.3±7.2	70.8±25.7	25±26.1	25±26.1	69.1±28.3	75.3±24.4	75±36.5	70.6±28.9	55.4±26.9
Age 45–65 (n:18)	12.7±11.3	48.3±33.8	30.5±25	25±25.7	49.8±27.8	68.8±28.3	70.8±34	75.1±27.2	46.7±32
Age>65 (n:20)	17±11.8	43.4±29.2	26.3±25.6	15.7±23.8	46.5±25	73.8±14.5	75±31	75.7±28	37.2±23.3
P	0.29	0.049***	0.814	0.463	0.07***	0.703	0.917	0.871	0.206

*Statistically significant difference in physical functioning, energy vitality, and mental health scores was found between BMI 18–25 kg/m^2 and >25.
** Statistically significant difference in mental health score was found between BMI 18–25 kg/m^2 and <18 kg/m^2
*** Statistically significant difference in physical functioning and energy vitality score was found between the patients with age 18–45 and age >65
Beck's depression inventory and Turkey's median scores do not exist in the literature. BMI: Body mass index, SF–36: Short form 36

Table 3. Relationship between dialysis-associated data by SF 36 and Beck's score

	Beck's Depression Analysis	SF36 Physical functioning score	SF36 Physical role functioning Score	SF36 Emotional role functioning Score	SF36 Energy Vitality Score	SF36 Mental Health Score	SF 36 Social Functioning Score	SF36 Pain Score	SF 36 General Health Perception Score
Monthly Kt/v, <2 median (25)	12.5±11.5	58.4±29.9	26±25.4	20±25	62.6±25.7	79.6±14	84±22.6	82.8±23.2	53.7±26.9
Monthly Kt/v, >2 median (25)	15.6±10	45.2±32.5	29.1±25.1	22.9±25.4	43.6±27.2	64.7±27.2	62.5±38.6	65.4±29	36.2±26.8
P	0.307	0.147	0.664	0.688	0.016	0.02	0.021	0.025	0.028
Yearly Kt/v, <2 median (25)	13.3±10.7	54.8±32.2	21.1±25.1	19.2±24.8	56.6±27.2	76.2±17.3	75.4±29.4	75.3±27.8	48.3±30.8
Yearly Kt/v, >2median (25)	14.8±11	48.6±31.3	34.7±23.5	23.9±25.5	49.5±28.7	67.9±27	71.1±37.2	73±27.6	41.5±24.7
P	0.632	0.506	0.057	0.519	0.38	0.201	0.655	0.769	0.404
Yearly URR, <Median (25)	14.1±11.3	55.3±29.9	23±25.4	21.1±25.1	58±26.9	75.6±17.3	77.4±29.3	75.8±28	48.9±30.4
Yearly URR, Median (n:25)	14±10.4	48±33.7	32.6±24.3	21.7±25.3	48±28.5	68.6±27.2	69±36.9	72.5±27.2	40.9±25.1
P	0.951	0.424	0.188	0.936	0.216	0.283	0.381	0.673	0.324
Duration of dialysis, <24 month (n:13)	13±8	60±30.9	25±26.1	20.8±25.7	57.7±26	76.6±20.9	73.9±31.2	71.8±26.9	48±28
Duration of dialysis, 24–60 month (n:13)	16.3±14.9	54.2±36.8	26.9±25.9	26.9±25.9	49.6±31.3	69.3±20.8	61.5±30.8	73.2±30.6	38.4±29.7
Duration of dialysis >60 month (n:24)	13.5±9.7	46.6±29.2	29.1±25.1	18.7±24.7	53.1±27.6	71.8±24.7	79.6±34.5	76±27	47.3±27.7
P	0.696	0.479	0.895	0.644	0.774	0.722	0.285	0.905	0.611

URR: Urea reduction rate

Table 4. Relationship between yearly median albumin, hemoglobin, parathormone, C-reactive protein, ferritin by SF36 and Beck's score

	Beck's Depression Analysis	SF36 Physical functioning score	SF36 Physical role functioning Score	SF36 Emotional role functioning Score	SF36 Energy Vitality Score	SF36 Mental Health Score	SF 36 Social Functioning Score	SF36 Pain Score	SF 36 General Health Perception Score
Albumin, <3.5 g/dL (n:27)	15.5±11.6	47±32.6	25.9±25.4	16.6±24	47.3±27.1	74±19.2	67.5±36.8	76.1±23.9	43.8±30.5
Albumin, >3.5 g/dL (n:23)	12.3±9.7	57.9±29.9	29.5±25.1	27.2±25.4	60.6±27.6	70.3±26.4	80.6±26.6	72±31.6	46.7±25.2
P	0.307	0.234	0.621	0.141	0.096	0.580	0.17	0.611	0.729
Hb <11 g/dL (n:34)	15.3±11.9	49.5±35.4	25.7±25.3	21.2±25	50.3±30.4	72.4±25.1	65.9±34.5	72.1±27.2	42±29.9
Hb, >11 g/dL (n:16)	11.5±7.5	56.8±22	31.2±25	21.8±25.6	59.3±21.4	72.2±16.8	89±23.6	78.7±28.2	51.5±23.2
P	0.248	0.453	0.479	0.932	0.295	0.980	**0.02**	0.434	0.271
PTH<300 pg/mL (n:22)	17.2±12.2	46.5±30.7	25±25.5	13.6±22.7	46.8±29.2	70±20.7	65.3±37.9	66.2±28.1	38.9±27.1
PTH 300–500, pg/mL (n:10)	7.7±3.8	54.5±30.5	35±24.1	30±25.8	58.3±20.1	81.2±17.7	92.5±12	88.7±15.3	50±24.6
PTH >500, pg/mL (n:18)	13.7±10.4	57.3±34.1	26.4±25.7	26.4±25.7	58.8±29.6	70.1±26.9	72.7±31.3	76.1±29.3	50.3±30.9
P	0.064	0.561	0.576	0.135	0.344	0.390	0.096	0.901	0.384
CRP <0.8 mg/dL (n:23)	12.8±8.9	54.1±33.1	28.2±25.3	26±25	60.4±28.4	74.5±20.3	74.4±31.8	75.2±25	49.6±27.9
CRP >0.8 mg/dL (n:27)	15.1±12.2	50±30.8	26.9±25.4	17.3±24.2	47±26.3	70.4±24.5	72.5±34.6	73.4±29.8	41.1±28
P	0.464	0.653	0.855	0.224	0.094	0.527	0.846	0.826	0.292
Ferritin<100 mg/L (n:3)		70±30	16.6±28.8	33.3±28.8	90±13.2	76±6.9	87.5±21.6	93.3±11.5	71.6±32.1
100–800 mg/L (n:22)		54.5±31.8	25±25.5	18.1±24.6	56±25.7	69.2±25.8	69,.3±35.2	72±28.6	50.1±28.4
>800 mg/L (n:25)		47.2±31.8	31.2±24.7	22.9±25.4	46.2±27.7	74.7±20.7	75.5±32.4	73.9±27.5	37.2±25.1
P		0.449	0.529	0.576	0.028*	0.686	0.622	0.46	0.069

* Statistically significant difference was observed between the patients with ferritin<100 and ferritin >800. Hb: Hemoglobin, PTH: parathormone, CRP: C-reactive protein

In the present study, SF–36 scores were detected to be significantly lower than that observed in community SF–36 study in Turkey[9]. Also, the literature reports another study that estimated a decrease in health-related quality of life in a dialysis patient group[17].

The mental health and energy vitality scores were observed to be statistically better in patients with normal BMI as compared to that in patients who were underweight or overweight. The scores of patients aged 18–45 years were statistically significantly better in terms of mental health and energy vitality than those of patients aged over 65 years. SF–36 QoL scores were more favorable in patients with normal BMI and in those below 45 years of age.

In patients with a monthly median Kt/V value of less than 2, scores for energy vitality, mental health, social functioning, pain, and general health perception were statistically significantly better than in those patients with Kt/V above 2. The fact that Kt/V is insufficient in determining the prognosis of patients with malnutrition and low body surface area, may explain this result. This relationship was established with the monthly median Kt/V values and not by the annual median Kt/V and URR values. Therefore, it can be argued that the monthly Kt/V value is more effective in assessing QoL and BDI scores.

It was observed that the patients with mean annual hemoglobin (Hb) above 11 g/dL had statistically better social functioning scores than patients with Hb levels less than 11 g/dL. The patients with a CRP reference value of less than 0.8 mg/dL were found to have better overall health perception scores than patients with a CRP score above 0.8 mg/dL. It is expected that the target level of hemoglobin and CRP would contribute to the wellbeing of the patients.

When the patients were divided into three groups according to the annual mean ferritin values, the energy vitality score of the patients with low ferritin (<100) was observed to be better than those with higher ferritin levels. Annual hemoglobin level was significantly higher in patients with higher energy vitality score and low ferritin levels (11.09 ±1.62) than in those with high ferritin levels (10.25 ±1.05) (p=0.033). Considering that this difference may be manifested by inflammation and dialysis adequacy, the annual mean CRP, albumin, monthly Kt/V, and annual mean Kt/V values of patients with higher ferritin levels were compared and no statistically significant difference was found between them. The reason for obtaining this result may be the fact that the number of patients with low ferritin level was limited to 3 and also the fact that patients with low energy require continuous intravenous iron or erythropoietin.

One of the limitations of the present study was that the diagnosis of depression was made on the basis of the BDI scale and was not based on DSM 4 criteria. Therefore, it is quite possible that the frequency of depression found in this study could be inaccurately high. At the same time, annual laboratory values of the patients were compared using a single questionnaire. The scientific reliability of the data would have been higher, if the study would have been conducted by implementing the questionnaires at 3 or 6 months interval through a year. The limited number of patients, the use of a single hemodialysis center, and not considering seasonal differences at all are other limitations of the study.

Conclusion

This study employed the BDI instrument for detection of depression in hemodialysis patients. Depression was found to be highly prevalent in these patients with a score of 36%. SF–36 scoring evaluation revealed lower QoL in these patients as compared to that in the general population. Interestingly, yearly or monthly mean values of Kt/V and biochemical parameters, except hemoglobin and ferritin values, were not related to BDI scores. Preventing an increase in the ferritin levels, maintenance

of hemoglobin values at target levels, and ensuring ideal body weight may help improve QoL in these patients. In the HD patient group, it is difficult to clarify whether QoL is decreased by depression or depression is caused by decreased QoL. Therefore, the authors advise that hemodialysis patients should also be evaluated for depression and QoL for optimizing clinical outcomes, by the cooperation of nephrologists and psychiatrists.

Author contributions

All authors contributed to the study conception and design. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical approval

This study, in which patients participated on a voluntary basis, was conducted in accordance with all ethical procedures /standards and the Declaration of Helsinki.
The study was approved by the Ethics Committee Çukurova University (2018/76).

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