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Original Research

Assessment of symptom frequency and severity in hemodialysis patients using the dialysis symptom index (DSI); A single center experience

Do we ignore non-fatal symptoms in hemodialysis patients?

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Abstract

Aim: Hemodialysis (HD) patients may experience many symptoms, such as fatigue, muscle cramps, headaches, and decreased sexual desire, with the severity of these symptoms varying individually. This study aimed to evaluate the frequency and severity of symptoms in HD patients using the dialysis symptom index (DSI), which provides an assessment of non-fatal physical and emotional symptoms that negatively affect quality of life.

Material and Methods: Patients aged 18 years and over who received hemodialysis treatment for at least three months at the hemodialysis unit of Giresun Training and Research Hospital, who agreed to participate in the study and signed the consent form, and who were conscious and had no communication problems were included in the study. Data were collected using a face-to-face interview method and the Dialysis Symptom Index.

Results: Of the 97 patients included in the study, 53 were male, 44 were female, and the mean age was 58 years. There was a statistically significant difference in DSI scores between male and female patients. Female patients complained of physical and emotional symptoms more often than male patients. The most common and most severe symptom described by the patients, according to DSI, was feeling tired/decreased energy (90.7%) and decreased interest in sexual intercourse (92.8%). More than half of the patients in the study complained of muscle cramps (62.9%), numbness and tingling in the feet (54.6%), feeling sad (73.2%) and dry skin (72.2%).

Discussion: Symptoms of patients receiving HD treatment should be monitored at regular intervals, and the awareness of health professionals providing care to this patient group should be increased.

Keywords

Hemodialysis, Dialysis Symptom Index, Physical and Emotional Symptoms

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Introduction

Chronic renal failure (CRF) is a significant health problem with increasing prevalence worldwide, including in Turkey. According to the 2022 reports of the Turkish Society of Nephrology, there are a total of 13,725 patients receiving renal replacement therapy for end-stage renal failure (ESRF) in Turkey, and 10,287 of these patients receive hemodialysis (HD) treatment [1]. The mortality rate in the HD patient population is as high as 24% per year and which is higher than that of many cancers [2]. The growing population of dialysis patients has increased interest in improving palliative care.

Many symptoms, such as fatigue, muscle cramps, headaches, and decreased sexual desire, may occur in HD patients, and the severity of these symptoms varies individually. Although the physical and emotional symptoms in this population are similar to those of many cancer patients, they are not as well recognized in cancer patients [3]. The aging of hemodialysis patients in the last decade has also changed the symptom profile of this patient group [4]. Healthcare professionals are often unaware of many symptoms experienced by HD patients. Inadequate understanding of symptoms leads to insufficient treatment [2, 5]. The use of tools such as the Dialysis Symptom Index (DSI), which enables the evaluation of non-fatal physical and emotional symptoms that negatively affect the quality of life in HD patients, can increase awareness and improve palliative care.

This study was conducted to determine the most common and most distressing physical and emotional symptoms in patients receiving HD treatment in our unit and to determine whether any biochemical and demographic factors affect these symptoms.

Material and Methods

Patients aged 18 years and over who received hemodialysis treatment for at least three months in the Hemodialysis Unit of Giresun Training and Research Hospital, who agreed to participate in the study, signed the consent form, were conscious and did not have any communication problems were included in the study. A total of 97 patients who met these criteria were interviewed by the researcher during the dialysis session and completed the DSI form, which consists of 30 items. Responses were obtained using a 5-point Likert scale. Symptoms experienced in the last week were recorded as '0 = none, 1 = a little, 2 = sometimes, 3 = very little, 4 = very much'. Demographic data and biochemical parameters were recorded from patient files.

Statistical Analysis

Excel 2013 (Microsoft, WA, USA), XLSTAT 2021 (Addinsoft, New York, USA), and GraphPad Prism 9.0.1 (GraphPad Software, San Diego, CA) were used for statistical analysis. The conformity of continuous variables to a normal distribution was investigated using Shapiro-Wilk tests. Gaussian variables were expressed as mean ± standard deviation (SD), and non-gaussian variables were expressed as median (25th percentile - 75th percentile).

Ethical Approval

This study was approved by the Ordu University Clinical Research Ethics Committee (Date: 2022-02-25, No: 44).

Results

Of the 97 patients included in the study, 53 were male and 44 were female, with a mean age of 58 years. Approximately 30% of the patients had coronary artery disease (CAD), and 19% had cerebrovascular disease (CVD) as comorbidities. Fifty-three percent of the patients were smokers, and 37% were alcohol users. The mean Dialysis Symptom Index (DSI) score was 31.8 ± 12.8. There was a statistically significant difference in DSI scores between male and female patients. Female patients complained of physical and emotional symptoms more than male patients (29.2 ± 11.5 vs. 35.0 ± 13.7, p = 0.026, respectively). Patients with CAD had statistically significantly higher DSI scores than those without CAD (35.9±12.4, 29.7±12.7, p= 0.030, respectively). Although the DSI scores of hemodialysis patients with LVH were higher, the difference was not statistically significant (34.1 ± 14.0 vs. 31.0 ± 12.7, p = 0.396, respectively). Clinical and demographic data of the patients included in the study are presented in Table 1. The most common and most severe symptoms described by patients according to the DSI was feeling tired/decreased energy (90.7%) and decreased interest in sexual intercourse (92.8%). More than half of the patients in the study complained of muscle cramps (62.9%), numbness and tingling in the feet (54.6%), feeling sad (73.2%), and dry skin (72.2%). The distribution of symptoms experienced by the patients according to the DSI is presented in Table 2. The mean hemoglobin and albumin levels were 11.6 ± 2.0 g/dL and 38.9 ± 4.3 g/L, respectively. The mean calcium, inorganic phosphate, and magnesium levels were 8.4 ± 0.65, 4.41 ± 1.11, and 2.34 ± 0.37 mg/dL, respectively. The mean levels of C-reactive protein (CRP), one of the inflammatory markers, were 5.97 (2.33-14.25) mg/dL, and ferritin levels were 826 (476-1276) ng/dL. When vitamin levels were analyzed, the folate level was 4.28 (3.07-6.99) µg/L and vitamin b12 level was 402 (331-569) ng/L. The biochemical data of the study group are presented in Table 3.

Discussion

End-stage renal failure causes many symptoms, most notably cardiovascular disease, and is accompanied by various comorbidities, including the psychological impact of undergoing hemodialysis three times a week. Developments such as the increase in the dialysis patient population, the aging of this population, and increased use of erythroid stimulating agents

Table 1. Clinical findings of hemodialysis patients (n=97)

Characteristic	n (%)
Age (year)	58.8 ± 12.2
Gender (M/F)	53/44
Duration of hemodialysis (months)	30 (12 – 72)
Urea Reduction Rate (%)	73.0 ± 6.9
Kt/V	1.44 ± 0.20
History of coronary artery disease, n(n (%)	29 (% 29.9)
History of cerebrovaskulercerebrovascular disease ,disease, n (%)	19 (%19,6)
History of hip fracture, n(n (%)	6 (%6.2)
History of cigarette smoking, n(n (%)	52 (%53.6)
History of alcohol consumption, n(n (%)	36 (%37.1)
DSI (Mean point ± SD) (10-150)	31.8 ± 12.8

(ESAs) in treatment will ensure that the physical and emotional symptoms of this patient group are more recognized, and their care is improved by using the DSI [2].

In this study, the most severe and frequent symptoms experienced by HD patients were fatigue/decreased energy (90.7%) and decreased interest in sexual intercourse (92.8%). Similar to our study, Yurtsever S. et al. found that the rate of experiencing fatigue in HD patients was 92.5% [6]. In another study by Steven D et al., fatigue/decrease energy was found in 69% of HD patients [5]. Decreased interest in sexual intercourse, one of the most common and most severe symptoms experienced by HD patients, was found at a very high rate of 92.8% in our study. Decreased interest in sexual intercourse in HD patients was found to be 23.5% in the study by Mi-Kyoung et al. and 36% in the study by Steven D. et al., with frequencies quite different from our study [3, 7]. It is known that sexual desire is largely related to age. The difference in results between studies might be related to age, gender, and cultural differences.

In our study, feeling sad was found to be among the most frequent and severe symptoms experienced by patients, with a high rate of 73.2%. In other studies, conducted in HD patients, 20%-42.8% of patients reported feeling sad [3, 5, 7]. In our study, skin dryness was described by 72.2% of the patients, whereas it was found to be 72% in the study by Steven D. et al. and 63% in the study by Mi-Kyoung et al. [5, 7]. Although the pathophysiology of muscle cramps in HD patients is not fully understood, it has been reported that 33-78% of patients receiving dialysis treatment complain of muscle cramps [8, 9, 10]. In our study, muscle cramps were among the most common

Table 3. Laboratory findings of hemodialysis patients (n=97)

	Mean ± SD or Median
Creatinine, mg/dL	6.73 ± 2.14
Urea, mg/dL	113.9 ± 28.7
Albumin, g/L	38.9 ± 4.3
WBC, x10^9/L	6.12 (4.85 – 7.18)
Lymphocyte, x10^9/L	1.45 ± 0.58
HaemoglobinHemoglobin, g/dL	11.6 ± 2.0
LDH, U/L	194 (167 – 231)
Ferritin, ng/mL	826 (476 – 1276)
CRP, mg/L	5.97 (2.33 – 14.25)
Calcium, mg/dL	8.40 ± 0.65
Phosphorus, mg/dL	4.41 ± 1.11
Magnesium, mg/dL	2.34 ± 0.37
Folic acid, µg/L	4.28 (3.07 – 6.99)
Vitamin B12, ng/L	402 (331 – 569)
Uric acid, mg/dL	5.65 ± 0.95

Table 2. Prevalence and severity of symptoms (DSI)

	Not at all n(n (%)	A little bit n(n (%)	Some-what n(n (%)	Quite a Bit n(n (%)	Very much n(n (%)
1.Constipation	68 (%70.1%)	1 (%1.0%)	6 (%6.2%)	16 (%16.5%)	6 (%6.2%)
2. Nause	79 (%81.4%)	0	12 (%12.4%)	5 (%5.2%)	1 (%1.0%)
3. Vomiting	84 (%86.6%)	1 (%1.0%)	7 (%7.2%)	5 (%5.2%)	0
4. Diarrhea	92 (%94.8%)	1 (%1.0%)	2 (%2.1%)	1 (%1.0%)	1 (%1.0%)
5. Decreased apetiteappetite	80 (%82.5%)	1 (%1.0%)	6(%6.2%)	6 (%6.2%)	4 (%4.1%)
6. Muscle cramps	36 (%37.1%)	4 (%4.1%)	16 (%16.5%)	30 (%30.9%)	11 (%11.3%)
7. Swelling in legs	82 (%84.5%)	1 (%1.0%)	9 (%9.3%)	4 (%4.1%)	1 (%1.0%)
8. Shortness of breath	66 (%68.0%)	5 (%5.2%)	14 (%14.4%)	9 (%9.3%)	3 (%3.1%)
9. LighteadednessLightheadedness or dizziness	60 (%61.9%)	4 (%4.1%)	18 (%18.6%)	13 (%13.4%)	2 (%2.1%)
10. Restless legs or difficulty keeping legs still	77 (%79.4%)	2 (%2.1%)	6 (%6.2%)	11 (%11.3%)	1 (%1.0%)
11. Numbness or tingling in feet	44 (%45.4%)	4 (%4.1%)	17 (%17.5%)	28 (%28.9%)	4 (%4.1%)
12. Feeling tired or lack of energy	9 (%9.3%)	2 (%2.1%)	10 (%10.3%)	43 (%44.3%)	33 (%34.0%)
13. Cough	80 (%82.5%)	7 (%7.2%)	4 (%4.1%)	4 (%4.1%)	2 (%2.1%)
14. Dry mouth	43 (%44.3%)	2 (%2.1%)	19 (%19.6%)	28 (%28.9%)	5 (%5.2%)
15. Bone or joint pain	52 (%53.6%)	3 (%3.1%)	20 (%20.6%)	18 (%18.6%)	4 (%4.1%)
16. Chest pain	86 (%88.7%)	4 (%4.1%)	5 (%5.2%)	3 (%2.1%)	0
17. Headache	50 (%51.5%)	3 (%3.1%)	15 (%15.5%)	26 (%26.8%)	3 (%3.1%)
18. Muscle soreness	61 (%62.9%)	6 (%6.2%)	16 (%16.5%)	12 (%12.4%)	2 (%2.1%)
19. DiffucultyDifficulty concentrating	87 (%89.7%)	2 (%2.1%)	3 (%3.1%)	5 (%5.2%)	0
20. Dry skin	27 (%27.8%)	20 (%20.6%)	37 (%38.1%)	13 (%13.4%)	0
21. Itching	52 (%53.6%)	3 (%3.1%)	24 (%24.7%)	12 (%12.4%)	6 (%6.2%)
22. Worrying	30 (%30.9%)	5 (%5.2%)	20 (%20.6%)	29 (%29.9%)	13 (%13.4%)
23. Feeling nervous	38 (%39.2%)	2 (%2.1%)	15 (%15.5%)	27 (%27.8%)	15 (%15.5%)
24. Trouble falling asleep	42 (%43.2%)	6 (%6.2%)	18 (%18.6%)	16 (%16.5%)	15 (%15.5%)
25. Trouble staying asleep	93 (%95.9%)	3 (%3.1%)	0	1 (%1.0%)	0
26. Feeling irritable	77 (%79.4%)	5 (%5.2%)	13 (%13.4%)	2 (%2.1%)	0
27. Feeling sad	26 (%26.8%)	3 (%3.1%)	19 (%19.6%)	38 (%39.2%)	11 (%11.3%)
28. Feeling anxious	60 (%61.9%)	7 (%7.2%)	18 (%18.6%)	11 (%11.3%)	1 (%1.0%)
29. Decreased interestininterest in sex	7 (%7.2%)	9 (%9.3%)	22 (%22.7%)	41 (%42.3%)	18 (%18.6%)
30. Difficulty becoming sexually aroused	15 (%15.5%)	21 (%21.6%)	32 (%33.0%)	27 (%27.8%)	2 (%2.1%)

and severe symptoms experienced by patients (62.9%). Muscle cramps are encountered more frequently in patients with high interdialytic weight gain and significant fluid withdrawal during dialysis. Since this may vary depending on individual factors such as fluid intake habits and dietary non-compliance, we believe that differences between these studies may be due to these factors. Feeling anxious was recorded as one of the symptoms experienced frequently and severely experienced by 69.1% of the patients. In the study by Mi-Kyoung et al., 59.6% of the patients reported feeling anxious, whereas in another study conducted in HD patients, this rate was recorded at 28% [5, 7]. In our study, more than half of the patients reported numbness or tingling in the feet, dry mouth, irritability, and difficulty falling asleep.

When the demographic data of the patients who participated in the study were evaluated, a statistically significant difference was found in DSI scores between male and female patients. Women receiving HD treatment experience physical and emotional symptoms more frequently and more severely than men (35.0 ± 13.7, 29.2 ± 11.5, p = 0.026, respectively). Similar to our study, other studies conducted in HD patients have also shown that women experience more frequent and severe symptoms than men [11]. We believe that this might be attributed to the fact that women continue their duties in social life and are less likely to receive social support compared to men.

Studies have shown that the symptoms of chronic dialysis patients are more stable than those of oncology patients [12]. A group of multiple related symptoms is referred to as a symptom cluster. Various studies have shown that many simultaneous symptoms occur in clusters in chronic diseases. Although there are differences in symptom clusters across studies, emotional, uremic, skin, and gastrointestinal symptom clusters are the most widely accepted classifications in the HD patient group. Although symptom clusters are more stable in dialysis patients, there is still variability. Similar to the study by Marques Shek Nam et al., in our study found that fatigue/lack of energy, numbness or tingling sensation in the feet, and muscle cramps symptoms included in the uremic symptom cluster, were the most common symptoms. Similarly, decreased interest in sexual desire in the gastrointestinal symptom cluster, feeling sad in the emotional symptom cluster, and dry skin in the skin symptom cluster were identified as the most commonly suffered symptoms [13]. Emotional symptoms, which are known to be common in dialysis patients, have been reported to be present in one out of every three patients. Psychological symptoms were evaluated in two studies on symptom clusters [14, 15]. Psychological symptoms in HD patients, as in other individuals in society, can lead to negative impacts in daily life. Evaluating emotional symptoms and referring patients to the appropriate specialist is expected to contribute to their well-being.

The presence of comorbid diseases in the majority of HD patients is well known. In our study, a statistically significant difference was found between the frequency and severity of symptoms in HD patients with and without coronary artery disease (CAD) (35.9 ± 12.4 vs. 29.7 ± 12.7, p = 0.030, respectively). This was thought to be due to the increased incidence of symptoms, such as hypotension and dizziness, in patients with CAD as maintaining hemodynamic stability during dialysis is more challenging in these patients. Although DSI scores were higher in patients with cerebrovascular disease (CVD) compared to those without CVD, they did not reach statistical significance (34.1 ± 14.0 vs. 31.0 p = 0.396).

Conclusion

In our study, we found that the most common and severe symptoms experienced by HD patients were fatigue/decreased energy and decreased interest in sexual intercourse. Physical symptoms such as muscle cramps, dry mouth, and dry skin, and emotional symptoms such as anxiety and sadness, were experienced by more than half of the patients. The symptom burden of this patient group can be determined by using the validated DSI to identify the non-fatal symptoms of HD patients. This approach has the potential to improve the quality of life for patients by increasing the awareness of healthcare professionals serving HD patients.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or compareable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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