



## ORIGINAL ARTICLE

## The Effects of the Symptoms Experienced by Patients Undergoing Hemodialysis Treatment on their Comfort Levels

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### Abstract

**Background:** Hemodialysis treatment has many physical or psychological symptoms such as anorexia, dryness of the mouth and discomfort. This study aims to the effects of symptoms in patients receiving hemodialysis treatment on their comfort levels.

**Methods:** This is cross-sectional study. The population of consisted of patients aged over 18 who received treatment at three hemodialysis centers in Elazig province and two in Bingol province. Sampling method was not used as it was aimed to reach the whole population. The research was carried out with 363 patients (84% of the population) meeting the research criteria. The data was collected between June-October 2019. Personal Information Form, Hemodialysis Comfort Scale (HDCS), and Dialysis Symptom Index (DSI) were used to obtain the data. Number, percentage, mean, standard deviation, and Linear regression analysis were used to analyze the data.

**Results:** The symptoms experienced by patients were found to be effective on their comfort levels and R was 0.463 and R<sup>2</sup> was 0.215. It was found that 21.5% of the total variance in the HDCS dependent variable was explained by the DSI total score and the result was found to be statistically significant ( $p < 0.001$ ).

**Conclusion:** It was concluded that the symptoms experienced by patients had effects on their comfort levels.

### Keywords

Hemodialysis, Comfort, Symptom, Nursing

### Abbreviations

HD: Hemodialysis; RRT: Renal Replacement Therapy; TSD: Turkish Society of Nephrology; CRF: Chronic Renal Failure; DSI: Dialysis Symptom Index; HDCS: Hemodialysis Comfort Scale

### Introduction

Hemodialysis (HD) treatment is the most preferred renal replacement therapy method by patients with end-stage renal failure in Turkey. According to the Turkish Society of Nephrology (TSD) Registry 2019 Report; the point prevalence of end-stage renal failure requiring renal replacement therapy (RRT) in Turkey was calculated as 988.4 per million populations as of the end of 2018 [1]. Hemodialysis treatment is one of the most preferred treatment methods in patients with end-stage renal failure but it causes many symptoms that affect patients' quality of life on the other hand [2,3].

Individuals receiving hemodialysis treatment have many physical or psychological symptoms such as anorexia, dryness of the mouth, diarrhea, constipation, nausea-vomiting, swelling in legs, muscle cramps, dizziness, drowsiness, restless legs syndrome, dry skin, coughing, pruritus, sleep disorders, concentration difficulties, chest and back pains, nervousness, sexual dysfunction, and discomfort [3,4]. In the study conducted by Zamanian and Kharameh (2015) with patients with end-stage renal failure in Iran, it was stated that the intensive physical symptom was fatigue (85.3%), and the most common psychological symptom was restlessness (77.9%) [5]. In the study conducted by Karabulutlu, et al. (2011), it was determined that patients experienced the most decrease in energy and fatigue since the onset of the disease and that these symptoms were associated with their disease [6]. In patients receiving hemodialysis treatment, along with frequent symptoms, many

factors such as physical activity difficulties, change of eating habits, breakdown of family and friend relationships, restriction in social life, and negative impact of working life can negatively affect patients' quality of life and overall comfort [7].

Comfort, which is a very complex concept with many dimensions, has been studied by many theorists in nursing [8]. In nursing models, comfort is considered as a function of nursing and is deemed as one of the results of nursing care. It is the goal and desired outcome of nursing care today [8,9]. Besides, it is one of the most important elements of nursing care demanded by patients and their families [10]. Nurses should take appropriate nursing measures and take necessary interventions to increase the comfort of patients and to meet their comfort needs [11]. In the literature, it is seen that patient comfort is generally at a moderate level in hemodialysis patients, however, the number of studies evaluating comfort and associating comfort to clinical findings was not sufficient [12,13]. Based on the duty of providing patient comfort, which is an indispensable part of the nursing profession, emphasized by many nurse theorists, a study on the determination of the effects on symptoms and comfort levels in patients receiving hemodialysis treatment has not been found in the literature. Due to the symptoms caused by hemodialysis treatment in sick individuals, there may be changes in the comfort of individuals, the research result is expected to reveal these changes.

This study aims to the effects of symptoms in patients receiving hemodialysis treatment on their comfort levels.

## Methods

### Type of research

This is a cross-sectional study.

### Place and period of research

The research was carried out in three hemodialysis centers in Elazig province and two hemodialysis centers located in Bingol province, in Turkey, between the dates of June-October 2019.

### The population and sample of research

The population of research consisted of patients receiving hemodialysis treatment at three hemodialysis centers in Elazig province and two centers in Bingol province. Sampling method was not used as it was aimed to reach the whole population. The research was carried out with 363 hemodialysis patients meeting the research criteria and 84% of the population was reached.

### Inclusion and exclusion criteria of the study

18 years and older patients without communication problems, receiving hemodialysis treatment for at least

6 months, and patients without a psychiatric diagnosis were taken in the study.

Patients who did not want to participate in the study, filled out the data collection form incomplete and became infected were excluded from the study.

### Data collection

The data were collected between June-October 2019 by visiting the hemodialysis centers by the researcher. The patients received hemodialysis treatment 3 stages per week in two groups (1<sup>st</sup> group; Monday-Wednesday-Friday and 2<sup>nd</sup> group; Tuesday-Thursday-Saturday). The researcher visited hemodialysis centers every day of the week (except Sunday). During the period when patients receive hemodialysis treatment and while the patient feels comfortable, the data were collected by face-to-face interview technique.

**Data collection tools:** In the collection of data, "Personal Information Form", which was prepared by the researcher and contains the socio-demographic characteristics of patients receiving hemodialysis treatment and problems related to hemodialysis treatment, the "Dialysis Symptom Index" that aims to evaluate the symptoms due to hemodialysis, and the "Hemodialysis Comfort Scale" that aims to evaluate patients' comfort levels were used.

### Personal information form

This form that was prepared by the researcher consists of descriptive information about patients undergoing hemodialysis such as age, gender, marital status, education level, employment status, economic status, number of children, meeting his/her own need independently, the presence of the person to assist during care and the person who provided assistance in care, duration of receiving hemodialysis treatment, existence of chronic disease other than chronic renal failure (CRF), and preexisting chronic disease. The personal information form consists of 13 questions, 3 of which are open-ended.

### Dialysis symptom index (DSI)

The Dialysis Symptom Index was developed by Weisbord, et al. in 2004 to evaluate physical and emotional symptoms and their severity [14]. Turkish validity and reliability of the Dialysis Symptom Index was performed by Onsöz and Usta Yesilbakan (2013) and the Cronbach's alpha coefficient of the DSI was found as 0.83 [15].

DSI contains 30 symptoms that describe a particular physical or emotional symptom. The symptoms experienced in the last 7 days are answered as yes-no, where an answer of 'no' indicates that there is no symptom and 'yes' shows that there is a symptom. If the answer of patient is 'yes', how much the symptom affects is evaluated with a 5-point Likert scale, where 1 = none and 5 = severe. The scores obtained are summed and

the total scale score is obtained. This value varies between 0 and 150. The closer the total scores reached to 150 points, the more the effect of the mentioned symptom increases [15]. In this study, the Cronbach's alpha of the scale was found 0.87.

### Hemodialysis comfort scale (HDCS)

Hemodialysis Comfort Scale (HDCS), which was developed by Sahin Orak, et al. in 2017 and validity and reliability was performed, is a reliable scale used to evaluate the comfort of patients receiving hemodialysis treatment for at least six months [12]. Hemodialysis Comfort Scale is a 5-point Likert-type scale and consists of 9 items and 2 subscales; the subscale "Relief" and subscale "Overcoming". 4<sup>th</sup> item of this scale is scored reversely, whereas other items (1-3, 5-9) are scored

as "never" 5 points and "always" 1 point. The least and highest scores that can be obtained from HDCS, subscale relief and subscale overcoming is 9.00-45.00; 3.00-15.00; and 7.00-30.00 respectively. The increase in the score shows that the comfort level increases. The Cronbach's Alpha values of the Hemodialysis Comfort Scale, subscale of overcoming and subscale of relief were found as 0.87, 0.85, and 0.88 respectively [12]. In this study, the Cronbach's Alpha of the scale was found as 0.74.

### Data analysis

Statistical analysis of the data was evaluated using SPSS 23 (Statistical Package for Social Science) package program. In the analysis of the data; number and percentage were used to evaluate the socio-demographic

**Table 1:** Socio-demographic characteristics of patients.

Variables	X ± SD	Number	Percent (%)
<b>Age</b>	59.17 ± 14.84		
<b>Number of Children</b>	3.77 ± 2.69		
<b>Duration to Undergo Hemodialysis (Years)</b>	5.87 ± 5.00		
<b>Gender</b>			
Female		147	40.5
Male		216	59.5
<b>Marital Status</b>			
Married		271	74.7
Single		37	10.2
Divorced		55	15.2
<b>Educational Level</b>			
Non-literate		95	26.2
Literate		50	13.8
Primary		116	32.0
Secondary		75	20.7
Higher education and above		27	7.4
<b>Economic status</b>			
High		26	7.2
Medium		138	38.0
Low		199	54.8
<b>Employment status</b>			
Employed		17	4.7
Unemployed		185	51.0
Retired		161	44.4
<b>Meeting his/her own needs</b>			
Able		250	68.9
Unable		113	31.1
<b>The presence of chronic disease other than CRF</b>			
There is a chronic disease		285	78.5
There is no chronic disease		78	21.5
<b>Total</b>		363	100

\*More than one answer was given, X ± SD: Mean ± Std. Deviation.

characteristics of the patients, and standard deviation, mean, minimum and maximum values were used to evaluate the scores from the scales. The Cronbach  $\alpha$  reliability coefficient was used to determine the internal consistency of HDCS and DSI scales. Linear regression analysis was used to evaluate the effects of hemodialysis symptoms on patients' comfort level. The suitability of the data to normal distribution was analyzed with Kolmogorov-Smirnov and Shapiro-Wilk tests, whereas non-parametric tests were used for non-normally distributed variables. In the research, statistical significance level was accepted as  $p < 0.05$ .

### Ethical principles

Prior to the data collection, ethical approval (Decision number: 2019/272) was obtained from the Ethics Committee of Scientific Research and Publication, Health Sciences of a University. Written institution consent was obtained from hemodialysis units. Permission was obtained from the authors via e-mail, who made the validity-reliability analysis for the scales used in the study. The individuals who will participate in the research were informed about the purpose of the research and what they are expected to perform, their written and verbal consent was obtained, and they were asked to sign the informed consent forms.

### Results

The mean age of patients receiving hemodialysis treatment was  $59.17 \pm 14.84$  years and the mean of their number of children was  $3.77 \pm 2.69$ . It was determined that 40.5% of the patients were female, 74.7% were married, 32% were primary school graduates, 54.8% of them had poor economic level, 51% were unemployed, and 68.9% could meet their own needs independently. The mean duration to undergo hemodialysis was  $5.87 \pm 5.00$  years and 78.5% of the patients were found to have an additional chronic disease in addition to chronic renal failure (Table 1).

It was observed that the patients received a total of  $20.05 \pm 6.50$  points from the Hemodialysis Comfort Scale (HDCS), patients' comfort levels were found to be below the mid-level, they were found to get  $5.25 \pm 2.66$  points and  $14.79 \pm 4.63$  points from the subscale relief and subscale overcoming, respectively. Patients got  $67.72 \pm 24.56$  points from the Dialysis Symptom Index and the symptoms experienced by them were found to

be at moderate level (Table 2).

The dialysis-related symptoms experienced by patients were found to be intensive. Examining the symptoms experienced by patients undergoing hemodialysis treatment, it was found that the symptoms of a feeling of fatigue and decrease in energy ranked first among the most frequent symptoms with **84.0%**, whereas the symptom of difficulty in concentrating ranked second with **51.8%**. Besides, it was found that dry skin, nervousness, bone or joint pain, sleep-related symptoms, feeling sad, and numbness in feet were experienced intensely (Table 3).

The linear regression enter method was used to evaluate the effects of hemodialysis-related symptoms on patients' comfort level. It was found that the symptoms experienced by patients were effective on their comfort levels and  $R = 0.463$ ,  $R^2 = 0.215$ . It was found that 21.5% of the total variance in the HDCS dependent variable was explained by the Dialysis Symptom Index total score and the result was found to be statistically significant ( $p < 0.001$ ). According to the result of the regression analysis, dialysis-related symptoms were found to have negative effects on the comfort levels of patients ( $B: -0.123$ ) (Table 4).

Linear regression enter method was used to evaluate the effects of each of the dialysis-related symptoms independently on the comfort level of the patients. 30 dialysis-related symptoms were taken as the independent variables, while HDCS overall score was the dependent variable. It was found that many symptoms experienced by patients were effective on the comfort level of patients ( $R = 0.600$ ,  $R^2 = 0.302$ ) and the result was statistically significant ( $p < 0.001$ ). It was determined that 30% of the total variance in the HDCS dependent variable was explained by these symptoms. The symptoms such as constipation, poor appetite, swelling in legs, dryness of the mouth, headache, being anxious, and feeling nervous were found to be effective on the comfort level (Table 5).

### Discussion

In this study, DSI was used to evaluate the dialysis-related symptoms experienced by patients. It was found that, patients were experience a moderate level symptom. In the study carried out by Akgoz, et al., the symptoms experienced by patients were at moderate

**Table 2:** Distribution of hemodialysis comfort scale (HDCS) and dialysis symptom index (DSI) scores of patients receiving hemodialysis treatment.

Scale	Min-Max Value that can be taken	Min-Max Value Obtained	X $\pm$ SD
Subscale Relief	3.00-15.00	2.00-10.00	5.25 $\pm$ 2.66
Subscale Overcoming	7.00-30.00	7.00-30.00	14.79 $\pm$ 4.63
HDCS Overall	9.00-45.00	9.00-36.00	20.05 $\pm$ 6.50
DSI Overall	0-150	5.00-126.00	67.72 $\pm$ 24.56

**Note:** X  $\pm$  SD: Mean  $\pm$  Std. Deviation.

**Table 3:** Frequency of symptoms experienced by patients receiving hemodialysis treatment by dialysis symptom index.

	No		Never		Rarely		Sometimes		Slightly		Usually	
	N	%	N	%	N	%	N	%	N	%	N	%
Constipation	141	38.8	22	6.1	28	7.7	115	<b>31.7</b>	6	1.7	50	13.8
Nausea	167	46.0	21	5.8	47	12.9	99	<b>27.3</b>	3	0.8	26	7.2
Vomiting	181	49.9	40	11.0	39	10.7	79	<b>21.8</b>	3	0.8	21	5.8
Diarrhea	262	72.2	40	11.0	18	5.0	35	<b>9.6</b>	3	0.8	5	1.4
Poor appetite	134	36.9	13	3.6	48	13.2	115	<b>31.7</b>	13	3.6	40	11.0
Muscle cramps	71	19.6	13	3.6	43	11.8	130	<b>35.8</b>	8	2.2	98	27.0
Swelling in legs	239	65.8	30	8.3	36	<b>9.9</b>	27	7.4	9	2.5	22	6.1
Dyspnea	196	54.0	27	7.4	24	6.6	73	<b>20.1</b>	7	1.9	36	9.9
Drowsiness/Dizziness	105	28.9	5	1.4	26	7.2	119	<b>32.8</b>	11	3.0	97	26.7
Restless legs syndrome	269	74.1	23	6.3	17	4.7	14	3.9	3	0.8	37	<b>10.2</b>
Numbness or tingling in the feet	102	28.1	26	7.2	22	6.1	67	18.5	8	2.2	138	<b>38.0</b>
Feeling of fatigue and decrease in energy	7	1.9	2	0.6	15	4.1	27	7.4	7	1.9	305	<b>84.0</b>
Coughing	238	65.6	29	8.0	39	<b>10.7</b>	37	10.2	1	0.3	19	5.2
Dryness of the mouth	87	24.0	25	6.9	42	11.6	102	<b>28.1</b>	13	3.6	94	25.9
Bone or joint pain	114	31.4	18	5.0	25	6.9	52	14.3	4	1.1	150	<b>41.3</b>
Chest pain	248	68.3	30	8.3	23	6.3	36	<b>9.9</b>	8	2.2	18	5.0
Headache	106	29.2	6	1.7	43	11.8	98	27.0	7	1.9	103	<b>28.4</b>
Muscle pain	140	38.6	18	5.0	54	14.9	78	<b>21.5</b>	5	1.4	68	18.7
Concentration difficulties	60	16.5	9	2.5	30	8.3	52	14.3	24	6.6	188	<b>51.8</b>
Dry skin	3	0.8	14	3.9	161	<b>44.4</b>	96	26.4	38	10.5	50	13.8
Itching	111	30.6	19	5.2	37	10.2	105	<b>28.9</b>	5	1.4	86	23.7
Being anxious	102	28.1	21	5.8	76	20.9	41	11.3	21	5.8	102	<b>28.1</b>
Feeling nervous	68	18.7	14	3.9	44	12.1	57	15.7	24	6.6	156	<b>43.0</b>
Difficulty falling asleep	104	28.7	17	4.7	29	8.0	58	16.0	13	3.6	142	<b>39.1</b>
Difficulty in maintaining sleep	102	28.1	14	3.9	29	8.0	67	18.5	11	3.0	140	<b>38.6</b>
Feeling uncomfortable	63	17.4	18	5.0	64	17.6	65	17.9	33	9.1	120	<b>33.1</b>
Feeling sad	40	11.0	19	5.2	53	14.6	78	21.5	33	9.1	140	<b>38.6</b>
Feeling anxious	60	16.5	24	6.6	69	19.0	56	15.4	37	10.2	117	<b>32.2</b>
Absence of sexual appetite	81	22.3	103	28.4	42	11.6	65	<b>17.9</b>	16	4.4	56	15.4
Difficulty in getting sexual satisfaction	81	22.3	103	28.4	41	11.3	66	<b>18.2</b>	16	4.4	56	15.4

**Table 4:** Examining the effects of dialysis-related symptoms on the comfort level of patients using regression analysis.

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	F	Sig	R	R <sup>2</sup>
	B	SE	Beta	t					
Constant	28.360	0.889		31.901	<b>0.000</b>				
DSI Overall	-0.123	0.012	-0.463	-9.936	0.000	98.720	0.000 <sup>b</sup>	0.463 <sup>a</sup>	<b>0.215</b>

<sup>a</sup>Dependent variable: HDCS overall; <sup>b</sup>Predictors: (Constant): DSI overall.

level [16], while in the study of Taskin Yilmaz, et al., the symptoms experienced were at low level [17]. In a study carried out in Iran, patients' symptoms were at high level [5]. In this research, factors such as advanced

age of patients, long dialysis durations, and the presence of additional comorbid diseases in addition to CRF were thought to increase the symptoms experienced by them.

**Table 5:** The effect of each of the dialysis-related symptoms independently on the comfort level of the patients.

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	F	Sig	R	Adjusted R <sup>2</sup>
	B	SE	Beta	t					
<b>Constant</b>	29.667	1.565		18.956	<b>0.000</b>	<b>6.223</b>	<b>0.000<sup>b</sup></b>	<b>0.600<sup>a</sup></b>	<b>0.302</b>
<b>Constipation</b>	0.340	0.173	0.095	1.969	<b>0.049</b>				
<b>Nausea</b>	-0.132	0.408	-0.033	-0.323	0.747				
<b>Vomiting</b>	0.153	0.417	0.036	0.367	0.714				
<b>Diarrhea</b>	0.379	0.269	0.066	1.409	0.160				
<b>Poor appetite</b>	-0.909	0.193	-0.241	-4.709	<b>0.000</b>				
<b>Muscle cramps</b>	-0.145	0.185	-0.039	-0.782	0.435				
<b>Swelling in legs</b>	-0.496	0.230	-0.114	-2.156	<b>0.032</b>				
<b>Dyspnea</b>	-0.362	0.227	-0.097	-1.596	0.111				
<b>Drowsiness/Dizziness</b>	-0.047	0.194	-0.014	-0.241	0.810				
<b>Restless legs syndrome</b>	0.323	0.209	0.081	1.550	0.122				
<b>Numbness or tingling in the feet</b>	-0.140	0.165	-0.045	-0.850	0.396				
<b>Feeling of fatigue and decrease in energy</b>	-0.400	0.305	-0.064	-1.313	0.190				
<b>Coughing</b>	-0.453	0.308	-0.099	-1.471	0.142				
<b>Dryness of the mouth</b>	-0.528	0.196	-0.151	-2.700	<b>0.007</b>				
<b>Bone or joint pain</b>	0.038	0.171	0.013	0.223	0.824				
<b>Chest pain</b>	0.065	0.316	0.015	0.207	0.836				
<b>Headache</b>	-0.498	0.186	-0.149	-2.678	<b>0.008</b>				
<b>Muscle pain</b>	0.299	0.214	0.087	1.400	0.163				
<b>Concentration difficulties</b>	-0.093	0.182	-0.027	-0.509	0.611				
<b>Dry skin</b>	-0.161	0.292	-0.029	-0.552	0.581				
<b>Itching</b>	0.022	0.168	0.007	0.133	0.895				
<b>Being anxious</b>	0.513	0.189	0.155	2.712	<b>0.007</b>				
<b>Feeling nervous</b>	-0.430	0.183	-0.128	-2.344	<b>0.020</b>				
<b>Difficulty falling asleep</b>	-0.556	0.649	-0.180	-0.857	0.392				
<b>Difficulty in maintaining sleep</b>	0.385	0.657	0.123	0.586	0.559				
<b>Feeling uncomfortable</b>	-0.173	0.356	-0.049	-0.488	0.626				
<b>Feeling sad</b>	0.352	0.308	0.092	1.144	0.253				
<b>Feeling anxious</b>	-0.724	0.391	-0.203	-1.850	0.065				
<b>Absence of sexual appetite</b>	10.988	5.973	2.893	1.840	0.067				
<b>Difficulty in getting sexual satisfaction</b>	-11.094	5.969	-2.922	-1.859	0.064				

<sup>a</sup>Dependent variable: HDCS Overall; <sup>b</sup>Predictors: (Constant), Constipation, Nausea, Vomiting, Diarrhea, Poor appetite, Muscle cramps, Swelling in legs, Dyspnea, Drowsiness/Dizziness, Restless leg syndrome, Numbness or tingling in the feet, Feeling of fatigue and decrease in energy, Coughing, Dryness of the mouth, Bone or joint pain, Chest pain, Headache, Muscle pain, Concentration difficulties, Dry skin, itching, Being anxious, Feeling nervous, Difficulty falling asleep, Difficulty in maintaining sleep, Feeling uncomfortable, Feeling sad, Feeling anxious, Absence of sexual appetite, Difficulty in getting sexual satisfaction.

In this research, patient's comfort level was the moderate level. Unlike our study, in their study investigating the comfort levels of HD patients, Sahin Orak, et al., found that patient's comfort level was found to be above the moderate level [12]. In their quasi-experimental study examining the effect of progressive relaxation exercises applied to HD patients on their comfort level, Turgay, et al., determined that patients in the both groups, the pre-test mean scores of HDCS were found to be moderate and compatible with our research find-

ings [18]. There was a limited number of studies in the literature about the comfort levels of HD patients. In the studies conducted, it was found that the comfort levels of the patients were at a moderate level and our research result was compatible with the literature.

It was determined that the symptoms of a feeling of fatigue and decrease in energy ranked first among the most frequent symptoms with 84.0%, whereas the symptom of difficulty in concentrating ranked second

with 51.8% and dry skin ranked third with 44.4%. Göris, et al. found that the most frequent symptoms experienced by patients undergoing dialysis were the feeling of fatigue and decrease in energy [19]. Different studies in the literature indicated that the feeling of fatigue and the decrease in energy were the symptoms frequently experienced [5,20,21]. Our research result was determined to be compatible with the literature. Factors such as the fact that the disease is chronic, being constantly dependent on hemodialysis machine, difficulty of diet, physical and psychological negative effects of the disease, as well as limited social relationships, and difficulties in maintaining daily life activities were among the reasons that the vast majority of patients experience the symptoms of fatigue intensely [21]. It was found that concentration difficulties ranked second among the most frequent experienced symptoms. In a study carried out in Sri Lanka using DSI, 59.9% of the patients were found to experience the symptom of concentration difficulties [22]. Change in blood flow due to dialysis, and excessive fatigue is thought to be effective in the concentration difficulties symptom experienced by patients. Dry skin symptom was found to be ranked third among the symptoms experienced. Senanayake, et al. determined that 46.3% of the patients experienced dry skin symptom [22]. This result was found to be compatible with the results of our research. Factors such as the accumulation of residual substances in the skin due to failure to remove from the body, and the fact that skin loses its humidity due to advanced age are effective in experiencing dry skin and pruritus symptoms [23]. In our study, it is thought that the advanced age of the patients increases the frequency of dry skin symptom.

In our study, it was found that the dialysis-related symptoms negatively affect the comfort levels of the patients and the result was statistically significant ( $p < 0.001$ ). The dialysis-related symptoms were found to affect the patient's comfort levels with a high rate as 21.5%. In our study, it was found that the dialysis-related symptoms negatively affect the comfort levels of the patients and the result was statistically significant. Dialysis-related symptoms such as constipation, poor appetite, swelling in legs, dryness of the mouth, headache, being anxious, and feeling nervous were found to be effective on the comfort level ( $p < 0.05$ ).

Many physical and psychological symptoms such as fatigue, muscle cramps, nervousness, pain, sleep disorders, discomfort, dry skin, poor appetite, nausea, and vomiting are seen in patients on hemodialysis treatment [5,16] and these symptoms can negatively affect the self-care strength and vital activities of hemodialysis patients [24]. One of the most important problems experienced by hemodialysis patients and negatively affects their quality of life is sleep problems. Caliskan found that sleep disorder, which is based on pruritus symptoms in HD patients, affects patients' daily comfort levels negatively [25]. A study conducted in New York

concluded that HD patients experience intense sleep disorders, and that sleep disorders affect the daily lives of patients [26]. Sleep problems in hemodialysis patients; It may be due to such as; pathophysiological reasons (fluid, acid-base and electrolyte disorders, anemia, iron deficiency, uremic toxins), lifestyle related reasons for HD implementation (HD sessions being too early or late hours, home away from the hemodialysis center, and the long waiting time to return home from the shuttle bus service), and psychological reasons (such as dependence on dialysis machine, depression, anxiety) [27]. These also negatively affect the comfort of the patients. Seeman, et al., determined that HD patients experience psychological disorders such as depression and anxiety [28]. In a study conducted with HD patients, it was found that 74.2% of the patients experienced pain after dialysis and the quality of life of those who experienced pain was low [29]. Sadigova, et al., found that 74.2% of patients receiving HD treatment experienced pain after dialysis, and those who experienced pain had poor quality of life [29].

It was found that dialysis patients need help at various levels while performing their daily life needs such as moving, shopping, participating in social activities, cooking, excretion, nutrition [30]. Göris found that HD treatment and its symptoms affect patients' family relationships and social lives negatively, including marital adjustment [19]. Sexual dysfunction is a common problem in CRF patients [31,32]. It was found that sexual disorders have negative effects on self-esteem in interpersonal relations [31,33]. In the studies conducted, it was found that the symptoms experienced negatively affect the quality of life of the patients, their work, marriage and family relations [7,14,19]. As can be seen from our research findings and literature studies, individuals who receive HD treatment experience many hemodialysis symptoms that negatively affect their daily life activities, make life difficult, make themselves dependent on someone else, and affect their comfort. The fact that hemodialysis treatment spreads over a few days of the week and the symptoms are intense negative affects the working lives and economic levels of the patients. In addition, symptoms such as fatigue/decreased energy, sleep disorders, sexual dysfunction, itching, and pain were affected patients' life routines and disrupt their comfort.

### Strength and limitations of the study

During the hemodialysis treatment, patients report that they experience many symptoms. Many symptoms experienced with the DSI are considered together. The fact that this is the first study in the literature on how symptoms affect patient comfort is a strength aspect of the research. Besides, the limitation of the study is that patients receiving hemodialysis treatment in two provinces in eastern Turkey were included in the study. It is recommended to investigate the subject with larger

sample groups. In addition, patients who did not speak Turkish could not be included in the study. This is another limitation of the research.

## Conclusion and Recommendations

The HD symptoms experienced by the patients were found to be moderate. It was determined that the most common symptoms were feeling of fatigue and decrease in energy, concentration difficulties, dry skin, bone and joint pain, and sleep-related symptoms. Hemodialysis treatment-related symptoms were found to have negative effects on the comfort levels of patients. As understood from our research findings and literature studies, individuals receiving HD treatment experience many hemodialysis symptoms that negatively affect their daily life activities, make life difficult, make themselves dependent to someone else and affect their comfort. It is thought that the comfort levels of the patients will increase with the proper management of many symptoms experienced.

In line with these results:

- Providing training to nurses working at the haemodialysis centre on symptom management in order to alleviate the problems of fatigue and decreased energy, difficulty concentrating, dryness of the skin, bone joint pain and sleep that patients undergoing haemodialysis experience with intensity,
- Rearrangement of ergonomic conditions in haemodialysis units in order to increase the comfort level of patients,
- Nurses' evaluation of risk factors for symptoms affecting patients' comfort level,
- It is recommended that more comprehensive studies be conducted to understand the factors affecting the comfort level of patients.

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## Conflict of Interests

The authors declare that they have no conflict of interests.

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## Author Contributions

Concept - A.H. D.D. R.; Design - A.H. D.D. R.; Supervision - A.H. D.D. R.; Resources - A.H. D.D. R.; Materials - A.H. D.D. R.; Data Collection and/or Processing - A.H. D.D. R.; Analysis and/or Interpretation - A.H. D.D. R.; Literature Search - A.H. D.D. R.; Writing Manuscript - A.H. D.D. R.; Critical Review - A.H. D.D. R.; Other - A.H. D.D. R.

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