Original investigation

The Relationship Between Fluid Control and Disease Adaptation Levels with Symptoms in Patients Undergoing Hemodialysis

Derya Atik[1] , Hilal Karatepe[1] , Ulviye Ozcan Yuce[1]

[1]Osmaniye Korkut Ata University, Faculty Of Health Sciences, Nursing Division, Osmaniye, Turkey

Cite this article as: Atik D, Karatepe H, Ozcan Yuce U. The Relationship Between Fluid Control and Disease Adaptation Levels with Symptoms in Patients Undergoing Hemodialysis J Basic Clin Health Sci 2020; 4:264-270.

ABSTRACT

Objectives: This study was performed with the goals of increasing quality of life and improving health condition in chronic renal failure patients undergoing haemodialysis treatments through increasing adaptation to fluid limitations, determining knowledge, behaviour, and attitudes regarding fluid control, guiding future studies by determining the physical, social, and psychological adaptation levels, and determining the relationship between symptoms with levels of fluid control and adaptation to the chronic disease.

Methods: A prospective, descriptive, cross-sectional design was conducted. Ninety-five patients undergoing haemodialysis treatment were included in the study in a dialysis unit. The data were collected using The Patient Identification Form, The Dialysis Symptoms Index, Fluid Control in Haemodialysis Patients Scale and Adaptation to Chronic Illness Scale.

Results: The most common symptoms were found to be respectively fatigue and decreases in energy (50.5%), bone and joint pain (41.1%), and difficulties remaining asleep (41.1%). The mean total ACIS score was found to be 81.61±8.93, mean total FCHPS score was found to be 49.88±4.88. An increase in the positive attitudes regarding fluid control was seen alongside an increase in general adaptation to the disease, where the fluid control levels of patients increased as their level of physical adaptation to the disease increased in a statistically significant level (p<0.05). The total and sub dimension scores of the scales were found to change in a parallel manner.

Conclusion: Disease adaptation levels and fluid control attitudes were found to be related to some symptoms.

Keywords: fluid control, chronic disease, adaptation, symptoms, haemodialysis

INTRODUCTION

The most common method used to treat end stage renal failure is haemodialysis (HD). There are important changes affecting patients in the HD process. These are limitations to fluid and food intake, being tied to a machine, and the differences in quality of life emerging as a result (1). Fluid control and dietary limitations constitute the most important problems encountered by HD patients (2, 3). Eating and drinking, which are basic human needs, are related to many personal and social factors for individuals, and it is thus very difficult for individuals to give up or change their dietary behaviour (4). In the process of chronic diseases, all of the changes in human life make adaptation to the disease more difficult. Maladaptation to fluid control and treatment may emerge in HD patients. Not achieving adaptation to the disease is an important problem with regard to present health condition and quality of life (2, 5). The health condition and quality of life of patients can be improved through ensuring that the patients

show psychological, physical, and social adaptation to the disease, removing the factors that affect the adaptation process negatively, and increasing the effectiveness of treatments (1). The adaptation levels and fluid intake control levels of chronic renal failure (CRF) patients who are treated with HD are factors that definitely affect the symptoms of the patients. Additionally, the frequency and intensity of the symptoms experienced by the patient affect fluid control levels and disease adaptation levels. A HD nurse should evaluate patients in a holistic manner and provide care and training according to the needs of patients. Nurses should be able to evaluate the symptoms that may arise in patients, the adaptation levels of the patients, and their fluid control levels. Through the evaluation of these factors, which all have effects on each other, the nurse would recognize the patient better and make up for the lack of care, training, or counselling better. In the literature, no studies evaluating physical, social, and psychological

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disease adaptation in CRF patients could be found. For this reason, this study was performed with the goals of increasing quality of life and improving health condition in CRF patients undergoing HD treatments through increasing adaptation to fluid limitations, determining knowledge, behaviour, and attitudes regarding fluid control, guiding future studies by determining the physical, social, and psychological adaptation levels, and determining the relationship between symptoms with levels of fluid control and adaptation to the chronic disease.

METHODS

Aim: The aim of this study was to determine the relationship between symptoms in CRF patients undergoing HD treatments and levels of adaptation to the disease and fluid control.

Design of the research: This research is a prospective, descriptive, cross-sectional type of research.

Location and time of the research: This study was conducted at Osmaniye State Hospital between April 2018 and June 2018.

Universe and sample of the research: The universe of the study consisted of 98 patients being treated for chronic HD at the Osmaniye State Hospital Dialysis Unit between April and June 2018. No sample selection was made and the whole of the universe was attempted to be reached. Three of the 98 patients being treated at the HD unit were excluded from the study since their general health condition was not good, and the study was completed with 95 patients.

Hypothesis: There is a relationship between the symptoms observed and levels of adaptation to the disease and fluid control in CRF patients undergoing HD treatments, and adaptation to the disease and fluid control levels can affect symptom development.

Research questions:
1. What is the disease adaptation level of patients undergoing HD?
2. What is the fluid control level in patients undergoing HD?
3. Is there a relationship between fluid control and disease adaptation levels in HD patients?
4. What are the symptoms seen in patients undergoing HD?
5. Is there a relationship between symptom development in CRF patients undergoing HD and disease adaptation levels or fluid control levels?

Data collection tools: The data were collected using The Patient Identification Form, The Dialysis Symptoms Index, Fluid Control in Haemodialysis Patients Scale and Adaptation to Chronic Illness Scale.

The Patient Identification Form: In this questionnaire, personal characteristics (sex, age, education level, marital status, occupation, employment status), and disease related characteristics (reason of CRF, smoking status, additional chronic diseases beyond CRF, blood pressure, BMI, fasting blood sugar, Triglycerides, LDL, HDL, Total cholesterol, dry weight, and symptoms) were questioned.

The Dialysis Symptoms Index (DSI): This scale was developed by Weisbord et al. (2004) to evaluate physical and emotional symptoms as well as their intensity in patients undergoing dialysis (6). Its adaptation to Turkish was performed by Önsöz and Yeşilbakan (2013) (7). The DSI includes 30 items which each indicate a specific physical or emotional symptom. Patients are asked to define the presence of each symptom (Yes/No) in the last 7 days.

Fluid Control in Haemodialysis Patients Scale (FCHPS): This scale was developed by Coşar and Pakyüz (2012) and consists of 24 items evaluating fluid control in HD patients and 3 sub-dimensions, namely "information", "behaviour", and "attitude" (1). The answers to the items are scored in a three way Likert type scoring, where "I agree" corresponds to 3 points, "undecided" corresponds to 2, and "I do not agree" corresponds to 1 point. Items 6, 7, 18, 19, 20, 21, 22, 23, and 24 are scored inversely. The lowest score that can be attained from the scale is 24 while the highest is 72, and higher scores are interpreted as increasing adaptation to fluid control. In the study by Coşar and Pakyüz, the Cronbach alpha value of the scale was found to be 0.88 (1).

Adaptation to Chronic Illness Scale (ACIS): The scale was developed by Atik and Karatepe (2016) is a 5-point Likert scale (7). It includes totally 25 item under 3 sub dimensions namely physical adaptation, social adaptation and psychological adaptation. Items 1., 9., 10., 13., 14., 15., 16., 18., 22., 23., 24. measure physical adaptation (maximum 55, minimum 11 points), items 2., 3., 5., 7., 17., 19., 25. measure social adaptation (maximum 35, minimum 7 points), items 4., 6., 8., 11., 12., 20., 21. measure psychological adaptation (maximum 35, minimum 7 points). While calculating the scale points, total scale point is taken, and scale point is calculated by dividing this with the number of items. Scale scoring is as follows: 1=I totally disagree, 2=I Agree, 3=Undecided, 4=I Agree and 5=I completely agree. Items 5., 6., 12., 17., 19., 20., 24., 25. are scored inversely. Total points taken from the scale is 125. The increase in the score means that the level of adaptation of patients with the disease is also increased. Cronbach alpha value of the scale was found to be 0.88.

Ethical permission: Ethics Committee approval (Osmaniye Korkut Ata University Ethics Committee, 28.04.2018–74) was obtained for the research. written permission was obtained from the authority for the application. The aim, plan, and benefits of the study were explained before the patients were applied to the study. Oral consent was obtained from the patients. The data were obtained with face-to-face interviews for 20 minutes.

Statistical analysis: Data were analyzed in the statistical package program. Continuous variables are used mean ± standard deviation and numbers (percentages). For categorical variables independent samples t test, one-way anova and Pearson correlation analysis were used. A p value of <0.05 was considered statistically significant.

RESULTS

The socio demographic and clinical characteristics of HD patients in the study were given in Table 1 and 2.

Most of the patients participating in the study were found to be male (56.8%) and married (88.4%). A larger rate of elementary school graduates (35.8%) and housewives (37.9%) were present in the sample. 91.6% of the participants were found to be unemployed and 17.9% were found to smoke. When the causes of chronic renal failure were questioned, 46.3% of the patients responded to diabetes mellitus. 87.3% of the patients had hypertension, diabetes mellitus, or both. The BMI of the majority of the patients (62.1%) were within normal limits. Fasting blood sugar and HbA1 c mean values were found to be above normal limits, while the mean dry weight was found to be 69.25±17.56 (Table 1, Table 2).

The distribution of symptoms according to the self-reports of the HD patients included in the study was given in Table 3.

When the symptoms among the HD patients were examined, the three most common symptoms were found to be respectively fatigue and decreases in energy (50.5%), bone and joint pain (41.1%), and difficulties remaining asleep (41.1%) (Table 3).

The chronic disease adaptation and fluid control levels of the HD patients were given in Table 4.

Table 1. Demographic and clinical characteristics of hemodialysis patients (n: 95)

Characteristics	n	%	Characteristics	n	%
Gender			Marital Status		
Female	41	43.2	Married	84	88.4
Male	54	56.8	Single	11	11.6
Education Level			Chronic Disease		
Illiterate	31	32.6	HT	37	38.9
Literate	12	12.6	DM	18	18.9
Primary education	34	35.8	HT+DM	28	29.5
Secondary Education	14	14.7	Other	12	12.7
Higher Education	4	4.2			
Occupation			BMI (kg/m2)		
Housewife	36	37.9	<18.5	10	10.5
Employee	1	1.1	18.5–24.9	59	62.1
Retired	24	25.3	25–29.9	18	18.9
Officer	2	2.1	30–34.9	7	7.4
Freelance	17	17.9	35–39.9	0	0
Other	15	15.8	>40	1	1.1
			CRF cause		
Working condition			HT	34	35.8
Full-time	3	3.2	DM	44	46.3
Part-time	5	5.3	Nephrotic syndrome	4	4.2
Not working	87	91.6	Congenital	2	2.1
			Other	11	11.6
Smoking					
Yes	17	17.9			
No	78	82.1			
Age (mean) (min-max)	54.08±15.26 (18–79)				

CRF: chronic renal failure; **HT:** hypertension; **DM:** diabetes mellitus; **BMI:** body mass index. Continuous variables are presented as mean ± standard deviation, categorical variables are presented as number (percentage).

Table 2. Clinical characteristics of patients (Continuous variables) (n: 95)

Characteristics	mean ± sd
Total cholesterol (mg/dL)	175.16±50.61
Systolic BP (mmHg)	120.02±21.81
Diastolic BP (mmHg)	71.78±12.29
FBG (mg/dL)	137.40±62.78
HbA1 c (%)	8.71±14.76
HDL (mg/dL)	36.04±14.03
LDL (mg/dL)	97.84±54.48
Triglyceride (mg/dL)	177.75±114.44
Dry weight (kg)	69.25±17.56

FBG: fasting blood glucose; **LDL:** low-density lipoprotein; **HDL:** High Density Lipoprotein; **BP:** blood pressure.

Table 3. Symptoms of hemodialysis patients (n: 95)

	Symptoms developed due to CRF*	n	%
1	Fatigue and decreased in energy	48	50.5
2	Bone and joint pain	39	41.1
3	Difficulties remaining asleep	39	41.1
4	Foot numbing and tingling	37	38.9
5	Dry mouth	37	38.9
6	Feeling sad	37	38.9
7	Difficulty falling a sleep	33	34.7
8	Dizziness	33	34.7
9	Appetite	31	32.6
10	Muscle cramps	31	32.6
11	Swelling in the legs	31	32.6
12	Feeling uncomfortable	30	31.6
13	Nausea	29	30.5
14	Dry skin	29	30.5
15	Headache	28	29.5
16	Difficulty holding legs still	26	27.4
17	Itch	26	27.4
18	Feeling angry	26	27.4
19	Chest pain	25	26.3
20	Constipation	25	26.3
21	Shortness of breath	25	26.3
22	Coughing	20	21.1
23	Muscle pain	20	21.1
24	Anxious	19	20
25	Feeling anxious	17	17.9
26	Diarrhea	17	17.9
27	Vomit	16	16.8
28	Decreased interest in sexual intercourse	15	15.8
29	Decreased sexual satisfaction	8	8.4
30	Difficulty concentrating	8	8.4

*Complications are not developed in each patients, so n has changed because multiple complications can change in the same patient.

Table 4. ACIS and FCHPS points averages

Scales	Min-Max	Mean ± Std. Deviation
ACIS total	64–99	81.61±8.93
Physical adaptation	22–49	37.91±4.80
Social adaptation	12–28	21.71±3.66
Psychological adaptation	14–29	21.97±3.15
FCHPS total	33–60	49.88±4.88
Knowledge	13–21	17.03±2.02
Behavior	14–31	24.52±3.23
Attitude	6–17	10.74±2.63

ACIS: adaptation to chronic illness scale; **FCHPS:** fluid control in hemodialysis patients scale.

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Table 5. The relationships between ACIS and FCHPS points averages ("r" values of the correlation analysis)

Scales	Physical adaptation	Social adaptation	Psychological adaptation	FCHPS total	Knowledge	Behavior	Attitude
ACIS total	0.837**	0.700**	0.745**	0.171	0.018	0.070	0.206*
Physical adaptation		0.321**	0.474**	0.220*	0.091	0.128	0.175
Social adaptation			0.333**	0.038	-0.066	-0.004	0.136
Psychological adaptation				0.105	-0.012	0.008	0.160
FCHPS total					0.599**	0.761**	0.530**
Knowledge						0.351**	-0.072
Behavior							0.052

*P<0.05. **P<0.01

Table 6. The relationships between some clinical characteristics, ACIS and FCHPS points averages ("r" values of the correlation analysis)

Variables	HbA1 c	Triglyceride	LDL	HDL	TC	Systolic BP	Diastolic BP	Dry weight	ACIS total	FCHPS total
FBG	0.390**	-0.118	0.105	0.228*	-0.112	-0.025	-0.117	0.098	-0.043	0.037
HbA1 c		-0.043	0.128	0.305**	-0.058	-0.363**	-0.034	-0.042	0.012	0.043
Triglyceride			0.360**	-0.428**	0.093	-0.150	-0.015	0.324**	0.104	-0.029
LDL				0.075	0.092	-0.164	0.052	0.176	0.027	0.003
HDL					0.133	-0.226*	-0.133	-0.155	0.007	0.214*
TC						-0.099	-0.108	-0.004	-0.076	-0.005
Systolic BP							0.545**	0.011	-0.237*	-0.056
Diastolic BP								0.068	-0.063	-0.013
Dry weight									0.039	-0.075
ACIS total										0.171

*P<0.05. **P<0.01

TC: total cholesterol; **FBG:** fasting blood glucose; **LDL:** low-density lipoprotein; **HDL:** high density lipoprotein; **BP:** blood pressure; **ACIS:** adaptation to chronic illness scale; **FCHPS:** fluid control in hemodialysis patients scale.

As a result of statistical analysis, the mean total ACIS score of the HD patients included in the study was found to be 81.61±8.93, while their mean total FCHPS score was found to be 49.88±4.88 (Table 4).

The relationship between the chronic disease adaptation levels and the mean total and sub dimension scores of the fluid control scale in HD patients was given in Table 5.

As a result of the statistical analysis, an increase in the positive attitudes regarding fluid control was seen alongside an increase in general adaptation to the disease, where the fluid control levels of patients increased as their level of physical adaptation to the disease increased in a statistically significant level (p<0.05). The total and sub dimension scores of the scales were found to change in a parallel manner (Table 5).

The relationship between clinical variables and chronic disease adaptation levels and mean FCHPS total scores was given in Table 6.

As a result of statistical analysis, the systolic blood pressure values of the patients were found to decrease as disease adaptation levels increased, and HDL levels were found to increase as fluid control levels increased (p<0.05) (Table 6).

The mean scale scores of the patients according to their symptoms were evaluated using the independent sample t test. The scores

that exhibited statistically significant differences according to the presence of symptoms were given in Table 7.

The fluid control information levels of the HD patients who stated that they experienced fatigue and decreased energy were seen to be lower. The physical adaptation to chronic disease levels of the HD patients who stated that they experienced the symptoms of bone and joint pain, leg swelling, and headaches were found to be lower. The fluid control behaviour levels of the patients who stated that they experienced foot numbing and tingling were found to be lower. Among the patients who stated that they felt sad, social adaptation to chronic disease levels were found to be lower while general fluid control levels and fluid control information levels were found to be higher. The psychological adaptation levels of the patients who stated that they experienced difficulty falling asleep and constipation were found to be lower. The patients who stated that they experienced dizziness were seen to have lower general fluid control levels and lower levels of information and behaviour on fluid control. The fluid control levels of the patients who stated that they were anxious were seen to be better (p<0.05) (Table 7).

Whether the ACIS and FCHPS mean scores of the HD patients were affected by clinical and personal characteristics or not were evaluated using the independent samples t test and one-way ANOVA. However, a statistically significant difference between groups was observed in none of the variables (p>0.05).

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Table 7. According to the symptoms seen in hemodialysis patients ACIS And FCHPS points average (n: 95)

Symptoms developed due to CRF*	ACIS total	Physical adaptation	Social adaptation	Psychological adaptation	FCHPS total	Knowledge	Behavior	Attitude
Fatigue and decreased in energy Yes No						17.54±1.93 16.54±2.01 p=0.016		
Bone and joint pain Yes No		36.17±5.04 39.12±4.27 p=0.003						
Foot numbing and tingling Yes No							25.35±3.02 24.00±3.27 p=0.046	
Feeling sad Yes No			20.45±3.65 22.51±3.46 p=0.007		48.59±5.13 50.70±4.58 p=0.039	16.29±1.83 17.50±2.01 p=0.004		
Difficulty falling asleep Yes No				21.09±3.28 22.45±3.00 p=0.045				
Dizziness Yes No					51.66±4.42 48.93±4.89 p=0.009	17.78±1.84 16.62±2.01 p=0.007	25.42±2.96 24.04±3.28 p=0.048	
Appetite Yes No							25.48±3.22 24.08±2.98 p=0.043	
Swelling in the legs Yes No		36.48±4.81 38.66±4.69 p=0.038						
Headache Yes No		35.96±4.56 38.73±4.69 p=0.010						
Constipation Yes No				20.56±3.18 22.51±2.98 p=0.007				
Anxious Yes No					47.57±4.79 50.46±4.76 p=0.021			

ACIS: adaptation to chronic illness scale; **FCHPS:** fluid control in hemodialysis patients scale.

DISCUSSION

Haemodialysis, which is an indispensable part of the chronic renal failure treatment process, causes serious changes in the life of individuals. Symptoms that emerge and the additional problems that arise during the treatment process affect adaptation to the disease. The diet and fluid intake of the patients, their sleep patterns, social activities, psychological needs, physical sufficiency, and many such factors get affected and change. Patients who can adapt to those changes can manage the disease better and increase their quality of life.

When the symptoms among the HD patients were examined, the three most common symptoms were found to be respectively fatigue and decreases in energy, bone and joint pain, and difficulties remaining asleep. In a study by Akyüz (2016), a large majority of HD patients reported fatigue. In a study by Yurtsever and Bedük (2003), 54.95% of the patients reported "severe" fatigue (10). Sheshadri et al. (2019) reported that 73% of HD patients experienced fatigue, 56% had sleeplessness symptoms, and that most of the patients additionally reported muscle cramps, muscle

pain, bone pain, and joint pain. These study results support our finding (11).

According to our findings, the fluid control adaptation of the HD patients can be said to be on a moderate level. In a study by Kızılcık Özkan et al., the fluid control adaptation levels of HD patients were found to above average with a mean value of 52.2±5.8 (12). In a study by Coşar and Pakyüz (2012), the FCHPS scores of HD patients were found to be above average (1), while the mean FCHPS sore of HD patients was found to be 52.93±6.07 in a study by Koşar et al. (2018) (13) and 51.23±5.88 in a study by Yılmaz Karabulutlu and Çayır Yılmaz(2018) (14). These results all support our findings. Beerendrakumar et al. (2018) determined that 22% of 100 HD patients exhibited mild deviations from the fluid limitation guidelines (15). Barnett et al. (2008) provided training to 25 patients who did not comply with dietary and fluid limitations and raised adaptation to fluid limitations to 71% from 47% (16). In another study conducted by Rambod et al. (2010), 56% of HD patients were found not to comply with fluid limitations (17). In another study, Iborra-Moltó et al. (2012) reported that more than half of the HD patients believed that they complied to fluid

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limitations to a degree while more than a third had high levels of adaptation (18). These results concur with our study.

According to our findings, the levels of adaptation to chronic disease among HD patients in both total score and the physical, social, and psychological sub dimensions can be said to be on a moderate level. Barbosa and Valadares (2009) reported that HD patients often denied treatment related facts or became discouraged (19). In older sources, HD adaptation problems such as denial, depression, and increased weight can be seen to be evaluated (20–22). No studies evaluating adaptation to disease generally, physically, socially, and psychologically could be found.

In our study, it was found that the fluid control levels of the patients increased alongside disease adaptation levels. Kim and Kim (2012) found that HD patients managed fluid intake through interpersonal relationships as well as diet and exercise (22). In a study by Mersal et al. (2016), patients who had high levels of information on adaptation to diet and those who had positive attitudes towards diet adaptation were stated to have better fluid and diet adaptation (23).

In our study, the fluid control information levels of patients who stated that they experienced symptoms of fatigue and decreased energy were found to be worse. Similarly, Frazão et al. (2014) reported that a lack of information on the disease in HD patients led to maladaptation to treatment (24).

In our study, the psychological adaptation levels of the patients who stated that they had difficulty falling asleep to chronic disease were found to be lower. Gerogianni et al. (2014) reported that HD patients, alongside other physical complaints, experienced problems falling asleep and had low sleep quality, which was related to various psychosocial factors (25). Thus, it can be said that the low motivation of patients who experience sleep problems to maintain health negatively affects disease adaptation.

In our study, the general fluid control levels of patients who stated that they were anxious were seen to be better. In studies examining the disease adaptation process of HD patients, it has been reported that in the first phase of adaptation where symptoms related to the chronic disease first start to emerge, the individual may experience anxiety through the thought that his/her life is in danger. In later phases, the person feels hope and feelings of getting rid of the disease with the help of treatment (26, 27). The reason behind the better fluid control levels of anxious patients may be the patients experiencing the phase where their efforts to improve their health increases.

CONCLUSION

As a result, the fluid control adaptation levels and chronic disease adaptation levels of the patients with CRF were found to be on a moderate level. The three most common symptoms were found to be respectively fatigue and decreases in energy, bone and joint pain, and difficulties remaining asleep. General disease adaptation levels were found to be related to fluid control attitudes where the fluid control levels of the patients increased alongside increasing physical adaptation to disease levels. Fluid control information levels were found to be related to experiencing fatigue and decreased energy. Bone and joint pain, leg swelling, and headaches were found to be related to physical adaptation to disease levels. Leg numbing and tingling were found to be related to fluid control behaviours. Feeling sad was found to be related to social adaptation to disease levels. Difficulty falling asleep and constipation were found to be related to psychological adaptation to disease levels. Vertigo was found to be related to general fluid control levels, lack of appetite was found to be related to fluid control habits, and anxiety was found to be related to general fluid control levels. Adaptation to HD treatments is a multidimensional and difficult problem for patients, their relatives, and health professionals. This problem affects not only fluid control levels but the disease process as a whole. Through a patient oriented holistic approach, adaptation levels and the factors causing maladaptation should be determined, professional sharing of information and counselling should be performed with an empathic approach to gain control over the care and treatment of the patient, and the quality of life of the patients should thus be increased.

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