



Determination of adaptation levels and applications for fistulas care and protection to disease of patients with arteriovenous fistula

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ABSTRACT

Introduction: The aims of this study were to the determinate adaptation to chronic disease, applications for arteriovenous fistula (AVF) care, protection of hemodialysis (HD) patients with an AVF, and to determine the relationships between adaptation and application.

Methods: This research is a prospective, descriptive, and cross-sectional type of research. Sample of the study accounted for 180 patients who underwent HD. Research was completed with 114 patients. The research was conducted from July 2019 to September 2019, in two different dialysis centers in Osmaniye Province. The data were collected using The Patient Identification Form and Adaptation to Chronic Illness Scale. Mean \pm Standard deviation, percentages, and independent samples t-test analysis was used.

Results: When the scale scores of the patients participating in the study were evaluated, determined to level of total adaptation with chronic disease and physical adaptation was to above the average score (40.24 ± 5.99). Social adaptation (21.82 ± 6.39) and psychological adaptation (22.91 ± 5.39) levels can be said to be moderate. Individuals who exercised with the ball to mature the fistula, who was careful to dress and keep the area dry on the 1st day of the operation, who was careful not to apply lotion to the fistula area, and who complied with the fluid restriction were found to have higher levels of adaptation with the disease.

Conclusion: As a result, it is observed that the general and physical adaptation levels to chronic disease are above the average, and social and psychological adaptation levels are medium-level. However, it is observed that the adaptation level of the participants who stated that they performed all applications for AVF care and protection properly is higher. In line with these findings, the adaptation level of patients should be increased by a patient-centered and multifaceted approach.

Keywords: Hemodialysis; arteriovenous fistula; adaptation; care; nursing

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INTRODUCTION

Arteriovenous fistula (AVF) is the most reliable and long-term function in permanent vascular access in hemodialysis (HD) procedure, which is the most important treatment method for patients with chronic renal failure (CRF) (1). All processes after

AVF surgical creation require good and sufficient follow-up and care.

Due to long-term HD of an HD patient, lifespan and quality of life are directly related to vascular access (2). In this period, patient education and orientation are significant, but AVF protection and care may be insufficient if the adaptation level of the patient to disease is low. Complications that may occur due to inadequate knowledge and care for AVF protection in HD patients can be significantly associated with a disease process, quality of life and death (3).

Understanding, managing, and sense-making/giving meaning constitute a sense of harmony. In other words, the person needs to understand what the situation is, to decide how to deal with this situation and to give meaning to the situation to constitute a sense of harmony and adapt to the situation. Thus, a person can live in safety by estimating what is happening and can happen in the internal and external environment and his/her strength organizing his/her feelings and behaviors accordingly (4). Hemodialysis patients may experience uncertainty/obscure about their diseases and lives, and this situation may cause physiological, psychological, and social stressors. Experiences about the disease, lack of knowledge, personality structure, and lack of social-psychological support may affect the adaptation levels to the disease negatively by making it difficult to control the disease process. To increase the level of adaptation level to the disease, first of all, it is necessary to determine the aspect of the patient's adaptation problem, to determine the factors affecting the adaptation level and then to provide the necessary elements such as education, consulting, and psychological-social support. The patient with a high level of adaptation to the disease will manage better this process and will be willing to meet all necessary care and information requirements, especially AVF care and protection. Increasing the adaptation level to the disease will enable the patient to speak the same language as the health-care professionals and the patient to perform the applications which health-care professionals expect from the patient (3-5).

The nephrology nurse should assist the patient and family adaptation to end-stage renal disease, stimulating their ability for self-care and helping them to

achieve the optimal level of well-being and independence. These topics highlight the importance of promoting the development of self-care behaviors with AVF, to maintain access under the best conditions possible because its state influences the effectiveness of the dialysis treatment. Nurses have a key role in promoting the development of self-care behaviors, through the information provided to the person intending to encourage the use of its potential for acquisition of knowledge, skills, and behaviors. The development of self-care behavior allows the active involvement of the patient in disease management, enabling early detection of possible complications of the AVF (6,7).

The individual is a physiological, psychological, and social being. A physiological insufficiency naturally affects his/her psychological and social aspects. Besides medical interventions, patient education should ensure the patient's adaptation to the disease and support his/her psychological and social aspects. Nurses use their knowledge to influence the state of health of the person positively. Interventions performed by nurses facilitate an individual's adaptation to the disease. The aim of the nurse helps the individual's adaptation to the disease process with physiological needs, roles, and health-related changes (8,9). End-stage renal disease patients should be educated to maintain and preserve the AVF in the best condition (10).

In the literature review conducted in line with this idea, no study analyzing the relationship between direct adaptation to chronic disease and AVF care and protection, and the applications for AVF care and protection was found. Therefore, the aim of this research is to determine the adaptation level to chronic disease and the applications for AVF care and protection of patients with CRF who undergo AVF and HD and to examine the effects of adaptation to a disease for AVF care and protection.

METHODS

This research is prospective, descriptive, and cross-sectional. Research was made between September 2019 and July 2019, in two different dialysis centers in Osmaniye, Turkey. The population has consisted of 180 patients who underwent HD. The sampling method is not used. A total of 61 patients of the 180 patients received treatment

in the Hemodialysis Unit were excluded as they did not have AVF and five patients of the 180 patients refused to participate in the research. The inclusion criteria for the patients were as follows: Patients aged 18 years old or over, patients with no communication problems, patients who are capable of answering all questions, patients accepting the interview, and patients having AVF and speaking Turkish.

Primary outcome

In patients with CRF who underwent HD treatment with AVF, the adaptation level to the disease may affect the applications for AVF care and protection.

Secondary outcomes

1. What is the adaptation level of patients with CRF who underwent HD with AVF?
2. What are the applications for AVF care and protection of patients with CRF who underwent HD with AVF?
3. Is there a relationship between the applications for AVF care and protection and adaptation level to the diseases of the patients with CRF who underwent HD with AVF?

Instruments

In the research, data were collected using patient identification form and adaptation to chronic disease scale.

Patient identification form

In this form, personal characteristics (sex, age, education, marital status, occupation, and employment status), characteristics related to diseases and AVF (cause of CRF, use of tobacco and alcohol, whether there is a patient with chronic disease in the family, a complication due to AVF, duration of HD procedure, the recent AVF creation area, the number of AVF creation, AVF used time, blood pressure, body mass index, pre-prandial blood glucose, blood urea nitrogen, creatinine, HbA1c, hematocrit, hemoglobin values, and applications for AVF care and protection) were included in the study.

Questions examining the applications for AVF care and protection were prepared following the literature knowledge (11-15).

Adaptation to chronic illness scale

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

The implementation of the research

Data were obtained through face-to-face interviews with each patient for 20 minutes.

Ethical permission

Ethics Committee approval (Osmaniye Korkut Ata University Ethics Committee, 06/05/2019-11351) 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, frequency (n), and percentage (%). For categorical variables, independent samples t-test, Pearson correlation analysis, and crosstabs were used. $p < 0.05$ was considered statistically significant.

TABLE 1. Sosya demographic and clinical characteristics of patients (n: 114)

Characteristics	n	%	Characteristics	n	%
Gender			Chronic disease in the family		
Female	88	42.1	Yes	42	36.8
Male	66	57.9	No	72	63.2
Marital status			Smoking		
Married	86	75.4	Yes	27	23.7
Single	28	24.6	No	87	76.3
Occupation			Alcohol		
Housewife	46	40.4	Yes	1	0.9
Employee	9	7.9	No	113	99.1
Retired	34	29.8	Duration of hemodialysis		
Officer	3	2.6	0-6 months	12	10.5
Freelance	19	16.7	7-12 months	5	4.4
Other	3	2.6	1-3 years	30	26.3
Education level			3-5 years	14	12.3
Illiterate	30	26.3	>5 years	53	46.5
Literate	4	3.5	AVF operation area		
Primary education	47	41.2	Left distal	3	2.6
Secondary education	22	19.3	Left proximal	107	93.9
Higher education	11	9.6	Right distal	1	0.9
Working condition			Right proximal	3	2.6
Full-time	5	4.4	Number of AVF operation		
Part-time	3	2.6	1	68	59.6
Not working	106	93.0	2	38	33.3
The cause of CRF			3	6	5.3
HT	40	35.1	4	1	0.9
DM	16	14.0	>5	1	0.9
HT+DM	38	4.4	Duration of AVF		
Glomerulonephritis	6	13.2	3-6 months	14	12.3
Other	15	33.3	7-12 months	7	6.1
Complications developed due to AVF*			1-2 years	27	23.7
Yes	48	42.1	3-5 years	17	14.9
No	66	57.9	>5 years	49	43.0
Age (year)	55.94±14.05		BMI (kg/m ²)	24.70±4.75	
Hct (%)	34.54±6.70		Creatinine (mg/dl)	5.15±6.20	
FBG (mg/dl)	141.40±69.44		Hb (g/dl)	12.34±9.36	
Blood urea nitrogen (mg/dl)	26.86±23.88		Systolic BP (mmHg)	119.68±15.08	
HbA1c (%)	6.83±1.95		Diastolic BP (mmHg)	72.18±11.35	

CRF: Chronic renal failure, HT: Hypertension, DM: Diabetes mellitus, BMI: Body mass index, FBG: Fasting blood glucose, BP: Blood pressure, AVF: Arteriovenous fistula, Hb: Hemoglobin, Hct: Hematocrit. Continuous variables are presented as mean±standard deviation, categorical variables are presented as number (percentage)

RESULTS

The socio-demographic and clinical characteristics of patients in the study are given in Table 1.

The majority of patients included in the research; male (57.9%), married (75.4%), primary school graduate (41.2%), housewife or retired (70.2%), non-smoking (76.3%), and non-drinking patients (99.1%), and patients do not actively work during the day (93%). AVF was created once to 59.6% of patients with CRF who underwent HD with AVF, and 57.9% of patients with CRF who underwent HD with AVF had no complications due to AVF creation. About 43% of with CRF who underwent HD with AVF had been treated with HD with AVF for more than 5 years (Table 1).

The responses of the patients to the questions evaluating the applications for AVF care and protection are shown in Table 2.

When the applications for AVF care and protection for HD patients were examined, it was observed that a great number of patients answered “No” to the applications of “I don’t apply a washing glove/bathroom glove or massage on my fistula,” “I don’t use cream or lotions to my arm with a fistula,” “I don’t lie on my arm with a fistula,” and “I do not do heavy work and lift weights with my arm where the fistula is placed” (Table 3).

The point average of adaptation to chronic diseases of HD patients with AVF is shown in Table 3.

When the scale point averages were examined considering arithmetic average, it was observed that general adaptation and physical adaptation levels to chronic disease were higher than the scale point average and social adaptation and psychological adaptation levels were medium-level.

TABLE 2. The applications for arteriovenous fistula care and protection (n:114)

Applications	Yes n (%)	No n (%)
1 In the 1 st days, I keep my arm in which AVF was created, high above the level of the heart	93 (81.6)	21 (19.4)
2 In the 1 st days, I follow daily dressing and keep the surgery/operation area dry for 48 hours	103 (90.4)	11 (9.6)
3 I do exercises with a plastic ball until the fistula develops	97 (85.1)	17 (14.9)
4 I don't lie on my arm with a fistula	61 (53.5)	53 (46.5)
5 I don't apply a washing glove/bathroom glove or massage on my fistula	29 (25.4)	85 (74.6)
6 I avoid clothes that tighten my arm with a fistula	102 (89.5)	12 (10.5)
7 I don't wear watches or wristbands which could tighten the fistula	99 (86.8)	15 (13.2)
8 I do not do heavy work and lift weights with my arm where the fistula is placed	88 (77.2)	26 (22.8)
9 I don't use cream or lotions to my arm with a fistula	82 (71.9)	32 (28.1)
10 I check my fistula every day	109 (95.6)	5 (4.4)
11 I pay attention to the signs of redness and swelling in my arm with a fistula	111 (97.4)	3 (2.6)
12 I control a rhythmic vibration/buzzing sensation called “Trill” in my fistula	110 (96.5)	4 (3.5)
13 I pay particular attention to whether the fistula is more painful or warmer than usual	111 (97.4)	3 (2.6)
14 I don't take blood pressure on my arm with a fistula	111 (97.4)	3 (2.6)
15 I don't allow for pressure applications such as bloodletting, injection, and serum procedure on my arm with a fistula to stop bleeding	113 (99.1)	1 (0.9)
16 I must tell the health-care personnel that I have a fistula	113 (99.1)	1 (0.9)
17 I keep my fistula area clean	114 (100)	0
18 I protect the fistula area from trauma	114 (100)	0
19 I protect my fistula area from excessive heat and cold	114 (100)	0
20 I don't get blood drawn and get serum procedure performed on my arm with a fistula	114 (100)	0
21 As excessive pressure may cause the fistula to stop, I do not press too hard the needle's exit points at the end of dialysis	114 (100)	0
22 I do not pull the grafts out for at least 2 hours, which are placed to stop bleeding after dialysis	114 (100)	0
23 “Hypotension” due to excessive fluid removal may cause the fistula to become stopped and blocked, thus I apply fluid restriction	105 (92.1)	9 (7.9)

AVF: Arteriovenous fistula

Independent sample t-test was used to evaluate the changes in the point average of patient's adaptation level to chronic disease depending on applications for AVF care and protection, and statistically significant results are presented in Table 4.

When the changes in the adaptation levels of HD patients with AVF depending on applications for AVF care and protection were examined, it was observed that the patients who answered: "Yes" to the applications of "In the 1st days, I follow daily dressing and keep the surgery/operation area dry for 48 hours" and "I do exercises with a plastic

ball until the fistula develops" have higher levels of general adaptation and psychological adaptation to chronic disease; and it was observed that the patients who answered "No" to the applications of "I don't use cream or lotions to my arm with a fistula," have higher all parameters of the adaptation scale to chronic disease; and it was observed that the patients who answered "Yes" to the applications of "Hypotension" due to excessive fluid removal may cause the fistula to become stopped and blocked, thus I apply fluid restriction" have higher social adaptation level ($p \leq 0.05$) (Table 4).

Although there was no statistical significance in other applications for AVF care and protection, it was observed that the patients who perform the procedure properly have higher adaptation level ($p \geq 0.05$).

In our research, when the effects of the personal and disease-related variables on the adaptation level to the disease were examined, it was determined that the adaptation level to the disease was not significantly affected by the personal and disease-related variables ($p \geq 0.05$).

TABLE 3. The point average of the adaptation to chronic illness scale

	Min-Max	Mean±SD
ACIS total	52-118	85.32±14.50
Physical adaptation	21-52	40.24±5.99
Social adaptation	7-34	21.82±6.39
Psychological adaptation	10-35	22.91±5.39

ACIS: Adaptation to chronic illness scale

TABLE 4. Changes in the adaptation levels of patients with AVF depending on applications for AVF care and protection (n:114)*

	Applications	ACIS total	Physical adaptation	Social adaptation	Psychological adaptation
2	In the 1 st days. I follow daily dressing and keep the surgery/operation area dry for 48 hours				
	Yes	86.41±14.35			23.30±5.33
	No	74.87±12.21			19.27±4.71
		t=2.19			t=2.40
		p=0.031			p=0.018
3	I do exercises with a plastic ball until the fistula develops				
	Yes	86.75±13.53			23.32±5.23
	No	77.46±17.59			20.52±5.79
		t=2.17			t=2.00
		p=0.033			p=0.048
9	I don't use cream or lotions to my arm with a fistula				
	Yes	87.96±13.37	41.12±5.75	22.60±6.31	23.52±5.19
	No	78.62±15.37	38.04±6.13	19.77±6.27	21.34±5.64
		t=-2.77	t=-2.22	t=-2.12	t=-1.96
		p=0.007	p=0.29	p=0.036	0.050
23	"Hypotension" due to excessive fluid removal may cause the fistula to become stopped and blocked, thus I apply fluid restriction				
	Yes			22.18±6.37	
	No			17.66±5.36	
				t=2.06	
				p=0.042	

ACIS: Adaptation to chronic illness scale, AVF: Arteriovenous fistula. *Statistically significant results at $p \geq 0.05$ were presented in the table

TABLE 5. The relationship between the applications for AVF care and protection and personal and disease-related variables (n:114)*

	Applications	Female	Male	χ^2
1	In the 1 st days, I keep my arm in which AVF was created, high above the level of the heart			
	Yes	44	49	5.51
	No	4	17	$p=0.01$
23	"Hypotension" due to excessive fluid removal may cause the fistula to become stopped and blocked, thus I apply fluid restriction			
	Yes	47	58	3.85
	No	1	8	$p=0.04$

AVF: Arteriovenous fistula. *Statistically significant results at $p \geq 0.05$ were presented in the table

In our research, when the effects of the personal and disease-related variables analyzed on the applications for AVF care and protection were examined, it was observed that the difference of the parameters of "On the 1st days, I hold/keep my arm where AVF was created, high above the level of the heart" and "Hypotension" due to excessive fluid removal may cause the fistula to become stopped and blocked, thus I apply fluid restriction", between the groups in terms of sex variable was statistically significant ($p \leq 0.05$) (Table 5).

DISCUSSION

Patients undergoing HD due to CRF have to adapt to a restrictive lifestyle. As a compelling disease experience in the bio-psycho-social aspect, CRF is a period that makes the coping capacity of the patients difficult and complicates the adaptation (17). Physiological, psychological, and social adaptation to the disease process will be important in improving the quality of life by positively affecting the patient's self-care applications.

In the results of the research, it was determined that the general adaptation and physical adaptation levels to the chronic disease were higher than the scale point average, and the social and psychological adaptation levels were medium-level. Although no studies are measuring the physical psychology social adaptation level in the literature, there are researches related to different dimensions of adaptation, knowledge level affection adaptation, and social-psychological support level. In the researches of Karabulutlu and Yilmaz (2018) and Cosar and Pakyuz (2012), it was observed that the adaptation of patients who receive HD treatment was medium-level (18,19). In the research conducted

by Balim and Pakyuz (2016), it was observed that individuals receiving HD treatment had low adaptation levels to a fluid restriction (20). In a research, it was determined that as the control of health-care personnel increased in HD centers, patients were more anxious and active coping methods were used frequently, and the adaptation was decreased, the individual took responsibility for his/her health, the control feeling of the patient on disease and treatment was increased, the adaptation to treatment in the home HD was better (21). Mittal et al. (2000) reported that HD patients feel physically and mentally insufficient compared to the general population and those with other chronic diseases (22). In Weil's study (2000), it was concluded that HD patients adapt to situational changes by thinking realistically and maintaining hope (23). In the literature, it was determined that the features of the HD center affected the patient's adaptation to the treatment and inadaptability of the patients was increased in centers serving more than 60 patients (24). In the research of Muz et al. (2018), it was determined that 43.6% of HD patients (n = 58) stuck to diet partially (25). In the research of Korkmaz (2016), it was determined that more than half of the patients did not stick to a diet (64.2%) and fluid restriction (60.0%) in the past 2 weeks (26).

Twenty-three applications for fistula care and protection were examined in the patients within the scope of the research and it was observed that more than 90% correct procedure was performed to 15 of these patients. The most care and protection applications which are not adapted are as follows; "I don't apply a washing glove/bathroom glove or massage on my fistula," "I don't use cream or lotions to my arm with a fistula," "I don't lie on my arm with a fistula,"

and “I do not do heavy work and lift weights with my arm where the fistula is placed.” In our research; swelling and redness symptoms are observed in 97.4% of patient’s arms with fistula, and 100% of the patients stated that they protect from trauma. In the researches of Tuzun Ozdemir and Akyol (2019), they stated that 86.7% of the participants observed the entry/access point of fistula in terms of swelling and redness symptoms and 42% of the participants protected the arm with fistula from traumas. In the same research, it was stated that the first test results were medium-level following the scale point average of self-care behaviors related to AVF (60.95 ± 10.55 ; min-max = 35-75) (27). Guven and Turac (2015), in their research, reported that patients had a medium-level of knowledge about AVF care, in the research conducted by Bicer et al. (2013), it was stated that 73.2% of the patients performed fistula care before the education/training and Pessoa and Linhares (2015) stated that the knowledge of the patients about AVF care was insufficient in their researches, and in the same research they stated that 40% of the patients did exercises with soft objects and 43.3% of the participants avoided traumas and 36.7% of the participants avoided heavy lifting (12,28,29). Akyol and Karadakovan (2002) reported that they found general self-care power in HD patients high (30). In the research of Yang et al. (2019), approximately 69.9% of the AVF self-care behaviors of HD patients were found to be low or medium-level (11). In the research of Sousa et al. (2018), the ratio of self-care behavior of patients was found to be 71% (13). Clementino et al. (2018) reported that the rate of the correct procedure of self-care of the patients for AVF ranged from 62.5% to 100% (14). Ozen et al. (2016) researched the knowledge and attitudes of patients related to AVFs and stated that the most common and applied applications were “not to measure blood pressure” and “not to draw blood on the arms with fistulas” in their researches (15).

In our research, it was determined that sex did not affect the level of adaptation to chronic disease. In the literature, it was found that researches where adaptation was more specifically evaluated and that sex did not differ in fluid control adaptation (20,31-33).

CONCLUSION

As a result, it is observed that the general and physical adaptation levels to chronic disease are above the average, and social and psychological adaptation levels are medium-level. However, it is observed that the adaptation level of the participants who stated that they performed all applications for AVF care and protection properly is higher. In line with these findings, the adaptation level of patients should be increased by a patient-centered and multifaceted approach. Areas, where patients have adaptation problems, should be determined and professional support should be provided on these issues. Nurses who have an important place among health-care professionals should be planners, practitioners, evaluators, and innovators in care in this field. When the adaptation level is increased in every aspect, the patient will behave more adaptable with the health-care professionals, will perform more accurate applications both in the hospital and in the private field, will manage the disease processes more accurately, and increase the quality of life will be inevitable.

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