

Original Article

Assessment of Knowledge Level and Training Needs about Diabetic Foot Care Practices of Diabetic Patients Undergoing Hemodialysis

Muzeyyen Ataseven

Istanbul Medipol University, Vocational School of Health Services, Beykoz, Istanbul, Turkey

Selda Selimoglu Namoglu

Istanbul Medipol University, Vocational School of Health Services, Beykoz, Istanbul, Turkey

Semiha Akin, BSc, RN, MSc, PhD

Professor, University of Health Sciences, Hamidiye Faculty of Nursing, Uskudar, Istanbul, Turkey

Correspondence: Semiha Akin, University of Health Sciences, Hamidiye Faculty of Nursing, Uskudar, Istanbul, Turkey. Email: semihaakin@yahoo.com

Abstract

Aim: The purpose of this study is to assess the level of knowledge and education needs for diabetic foot care practices in patients undergoing hemodialysis.

Methods: This research is a descriptive cross-sectional study. The sample consisted of diabetic patients undergoing hemodialysis (N=150). Data were obtained using the Patient Information Questionnaire and Foot Care Practices Assessment Questionnaire.

Results: The mean age of the sample was 67.0 ± 11.0 and 55.3% were female. Nearly sixty percent (58.8%) did not do anything at the occurrence of diabetic foot wounds. Nearly ninety percent (88%) had diabetes education. Among those who received diabetes education, a small percentage of the sample had education about the medication (20.7%), foot care (18.7%), follow-up of diabetic complications (14.7%) and foot examinations (3.3%). Foot Care Practices Assessment Questionnaire (57.1 ± 12.1) score indicated that practices for the prevention of diabetic foot wounds were insufficient.

Conclusion: The patients have not received sufficient education about foot care and not performed practices such as examining the color changes in the feet, cutting nails and occurrence cracks in heels.

Keywords: Hemodialysis, Diabetes, Diabetic Foot, Education

Background

Chronic renal failure is a progressive and irreversible disease associated with the regulation of fluid-electrolyte balance via metabolic and endocrine functions of the kidney as a result of reduced glomerular filtration rate (Bicer et al., 2013, Kafkia, Vehvilainen-julkunen and Sapountzi-Krepia 2014). According to Turkey Kidney Disease Prevalence Survey (2009) results, chronic renal failure in our country is drawing attention as a major public health problem. According to the Turkish Nephrology Registry 2016, diabetes, hypertension and glomerulonephritis are the first three causes of renal failure in patients who underwent Renal

Replacement Therapy for the first time (Suleymanlar et al., 2017).

Diabetes has been identified as important public health and is among the top four causes of death worldwide (International Diabetes Federation Diabetes Atlas, 2009; ADA, 2015). Inadequate glycemic control has been shown to play a major role in the development of kidney damage in diabetic patients prone to kidney disease (Yenicesu, 2008). Diabetes-related chronic hyperglycemia causes negative effects on the kidneys, nerves, and vessels resulting in foot ulcers (Hailu et al., 2012; ADA, 2015).

By applying hemodialysis, morbidity and mortality rates associated with renal failure are

controlled, complications are prevented and quality of life is improved (Çamsarı, 1997; Kalender et al., 2002; Oygur et al., 2003). If diabetes which causes chronic renal failure cannot be controlled, complications such as diabetic nephropathy, diabetic neuropathy, and diabetic foot can develop. Diabetic foot ulcers are a major cause of morbidity and mortality as well as high cost and deterioration of quality of life (Nural & Hintistan, 2015). Diabetic foot is a problem that can lead to organ loss with the addition of increased interstitial fluid volume and pressure and infection to the ischemia background and it is frequently caused by concomitant peripheral arterial disease (Yucel & Sunay, 2016). Amputation in diabetic patients is reported to be 15-20 times more frequent than in non-diabetic patients, and the risk of developing foot ulcers during their lifetime is reported to be 15-20% higher in patients with diabetes (Aydoğan et al., 2010; Yekta et al., 2011). Foot ulcers can be significantly reduced by the knowledge of diabetic patients about the disease and foot care and taking precautions for risk factors.

Factors affecting the adequacy of hemodialysis include fistula care, adherence to recommended medication and medical nutrition therapy, adherence to hemodialysis sessions and duration, but most patients are unaware of these factors (Kulkarni, 2006; Aydoğan et al., 2010). Therefore, health team members in hemodialysis centers are trying to raise awareness with patient education in many subjects such as fistula care, catheter care, nutrition, physical exercise, and psychological support. Inadequate information about foot care practices in diabetic patient education which is one of the leading factors in chronic renal failure and receiving hemodialysis treatment may result in diabetic foot and amputation during hemodialysis. The purpose of this study is to assess the level of knowledge and education needs for diabetic foot care practices in patients undergoing hemodialysis.

Study questions

1. What is the level of knowledge of diabetic patients undergoing hemodialysis on foot care practices?
2. Is there any difference between the levels of knowledge of foot care practices of diabetic patients undergoing hemodialysis treatment according to personal characteristics?

3. What are the patient training requirements for diabetic foot care in diabetic patients undergoing hemodialysis treatment?

Methods

Research setting and Study design: The study was carried out in a dialysis unit of private university hospitals and two private dialysis centers. This study is descriptive and cross-sectional.

Research population and sample: The study population consisted of 150 individuals who underwent hemodialysis with the diagnosis of diabetes among 500 patients who underwent hemodialysis treatment in a dialysis unit affiliated to a private university hospital and two private dialysis centers in 2018.

The sample of the study consisted of 150 individuals who were at least 18 years old, volunteered to participate in the study and ongoing treatment with the diagnosis of diabetes, underwent hemodialysis with the diagnosis of chronic renal failure in a dialysis unit and two private dialysis centers. The criteria for inclusion in the study were determined as follows: 1) being treated with a diagnosis of diabetes at the hemodialysis center, 2) to be 18 years or older, 3) agree to participate in the study, 4) having the appropriate general situation for the survey and 5) Patients who can understand and speak Turkish.

Ethical considerations: Ethics committee approval and institutional permission were obtained before the study. The individuals who volunteered to participate in the study confirmed that they were informed about the aim of the study and the information obtained will remain confidential.

Data collection: Research data were obtained from June-July 2018 using two questionnaires. The researcher read the questionnaires to the patients and their responses were marked appropriately. Data collection tools were created by the researchers using the relevant literature and applied during the data collection process.

Data collection tools

1. Patient Information Form: This questionnaire contains questions to determine the characteristics of the individual and the disease. The questionnaire included questions about the diagnosis and management of diabetes and about foot health (history of foot wounds, attitudes for the care of the wound).

2. Foot Care Practices Assessment

Questionnaire: The questionnaire includes questions about the practices that the patients should follow while performing foot care and to measure their knowledge about foot care. The form developed by researchers using the literature related to the subject contains 27 questions (Olgun, 2012; Pehlivan & Gunaydin, 2016).

Foot Care Practices Assessment Questionnaire is the 4-point Likert scale. The patients were asked to read each question carefully and to respond to how much, they paid attention to each application by choosing one of four statements.

For each statement, the answers were "I never did", "Sometimes I do", "I do" and "I always do". In this form, patients were asked to respond as "I never did" (1 point), "Sometimes I do" (2 points), "I do" (3 points) and "I always do" (4 points) to the behaviors such as color change control in the foot, crack in the foot, wound control, attention to shoe characteristics, method of cutting toenails, controlling the feet for deformity.

The lowest score and highest score to be obtained from the Foot Care Practices Assessment Questionnaire were determined as 37 and 87, respectively.

Statistical analysis: SPSS 15.0 for Windows (Statistical Program for Social Sciences) was used for statistical analysis.

Descriptive statistics were given as mean, standard deviation, minimum, maximum for numerical variables. While the numeric variables do not show the normal distribution condition, independent two-group comparisons and independent group comparisons of more than two were performed using the Mann Whitney U test and Kruskal Wallis tests, respectively. Subgroup analyses in more than two of the group were performed with the Mann Whitney U test and interpreted with Bonferroni correction.

The relationship between numerical variables was analyzed by Spearman Correlation Analysis because the parametric test condition was not provided. The statistical significance level was accepted as $p < 0.05$.

Results

Sociodemographic and clinical characteristics

of the sample: More than fifty (55.3%) of the sample was female and the mean age was $67.0 \pm$

11.0. Nearly half (43.3%) of the patients were primary school graduates and most (58%) were retired.

The mean life span with the diagnosis of diabetes in the study group was 190.0 ± 136.8 months. The mean fasting blood glucose value of the group was 201.4 ± 90.5 , and the mean HbA1c value was 6.6 ± 1.3 . The duration of dialysis was 75.0 ± 66.2 months. 4.7% of the patients undergo hemodialysis twice a week and 95.3% three times a week (Table 1).

Diabetic foot wounds and education about diabetic foot care

More than fifty percent (56%) of the patients have reported a history of diabetic foot wounds. Diabetic foot wound developed 55.8 ± 56.0 months after the diagnosis of diabetes. 32.7% of the study group had surgery for diabetic foot wounds. Nearly sixty of the patients (58.8%) stated that they did not do anything when foot wound occurs (Table 2).

Nearly ninety percent (88%) of the patients were educated about diabetes. Seventy-two percent of the study group stated that they did not receive training on diabetic foot wounds and 56.7% of the patients stated that they received diabetes education from doctors and nurses. Ninety percent of the patients reported that they wanted to receive training in diabetic foot care at the hemodialysis center where they are currently present (Table 3).

Medical nutrition (95.3%), blood sugar follow-up (93.3%) and weight follow-up (76%) were the main subjects of the diabetes education program. Only 18.7% of the sample group received foot care education and 13.3% were provided with foot examination education (Table 3).

Within the scope of the patient education program in hemodialysis centers, it was reported that 90% of their received training on fistula care, 84% on transportation/transfer information, 82.7% on patient rights and 82.7% on drug use (Table 3).

The patients stated that they wanted to receive training in diabetic foot care practices in hemodialysis centers, and they wanted to be informed about the most common home dressing method and frequency (90%), first aid (76.7%) and foot wound (74.7%) in case of falls and foot injuries (Table 3).

Table 1. Personal characteristics of patients (N=150)

	<i>n</i>	<i>%</i>
Gender		
Male	67	44.7
Female	83	55.3
Age		
	<i>Mean ± SD (Min-Max)</i>	
	67.0 ± 11.0 (37-91)	
Marital status		
Married	86	57.3
Single	30	20.0
Separated living / Divorced	34	22.7
Education		
Illiterate	36	24.0
Literate	23	15.3
Primary school graduate	65	43.3
Secondary school graduate	16	10.7
High school graduate	8	5.3
Graduate	2	1.3
Type of diabetes treatment		
Oral antidiabetic agents	27	18.0
Insulin treatment	121	80.7
Blood sugar monitoring	1	0.7
Medical nutrition therapy	1	0.7
Individual perceptions of compliance with diabetes treatment		
“I am fully compliant”	65	43.3
“I am barely compliant”	54	36.0
“I am in general compliant”	21	14.0
“I am mostly compliant”	10	6.7
Dietary restriction		
“Yes, I follow”	63	42.0
“No, I do not follow”	87	58.0
	<i>Mean ± SD (Min-Max)</i>	
Duration of dialysis treatment (months)	75.0 ± 66.2 (2-364)	
Duration of diabetes diagnosis	190.0 ± 136.8 (1-600)	
HbA1c level (%)	6.6 ± 1.3 (3.9-11)	
Fasting blood sugar value	201.4 ± 90.5 (76-498)	

Table 2. Results associated with diabetes education in patients with foot sores and dialysis patients (N=150)

	<i>n</i>	%
The patients who have had a history of diabetic wound	84	56.0
	<i>Mean ± SD (Min-Max)</i>	
The time between diagnosis of diabetes and the development of diabetic foot wound	55.8 ± 56.0 (1-348)	
The presence of surgical intervention related to a diabetic foot wound	49	32.7
Responses of individuals about behaviors exhibited when diabetic wound develops		
“I do not do anything”	67	58.8
“I visit the physician”	14	12.3
“I try to manage with diabetic wounds with my approaches or remedies”	33	28.9
The status of receiving education about diabetes		
Yes	132	88.0
No	18	12.0
Receiving a training/education about foot wounds		
Yes	42	28.0
No	108	72.0
Health professional who provided education about diabetes		
Only nurse	55	36.7
Nurse and physician	85	56.7
Only physician	10	6.7
The personal perceptions about the need for training/education about diabetic foot care		
“I need education about diabetic foot care”	135	90.0
“I do not need education about diabetic foot care”	15	10.0

Table 3. Subjects of education received by diabetic patients (N=150)

	<i>n</i>	%
Topics of Education Received by Diabetic Patients		
Medical nutrition	143	95.3
Blood sugar monitoring	140	93.3
Weight tracking	114	76.0
Hyperglycemia	31	20.7
Drug use	31	20.7
Foot care	28	18.7
Hypoglycemia	24	16.0

Blood pressure monitoring	23	15.3
Complications of diabetes	22	14.7
Foot examination	20	13.3
Eye examination	19	12.7
Exercise habits	14	9.3
Daily activities	13	8.7
Oral care	10	6.7

Topics of Education Received in Diabetic Patients in the Dialysis Center

Fistula care	135	90.0
Transport / transfers	126	84.0
Patient rights	124	82.7
Drug use	124	82.7
Nutrition	113	75.3
Catheter care	111	74.0
Psychological support	109	72.7
Home care	104	69.3
Dialysis treatment process	101	67.3
Physical exercise	101	67.3

Topics that Diabetic Patients Need to be Educated

Method of foot dressing at home	135	90.0
First intervention in case of fall, collision	115	76.7
Information on the foot injury	112	74.7
Controlling wound on the feet and heels	105	70.0
Crack control in standing and heel	104	69.3
Use of foot cream	99	66.0
Controlling the temperature of the water to which he washes his feet	95	63.3
Special foot gymnastics for diabetics	94	62.7
Toenail cutting method	93	62.0
Standing color change and temperature control	90	60.0
Regular walking	87	58.0
Choosing the right shoe	85	56.7
Frequency of gymnastics	83	55.3
Socks selection	81	54.0
How to warm the feet	75	50.0

Table 4. Responses to foot care assessment questionnaire (N=150)

	“I never did”		“Sometimes I do”		“I do”		“I always do”	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
I check the color of my feet	74	49.3	51	34.0	22	14.7	3	2.0
I check the my feet in terms of crack wound	66	44.0	52	34.7	31	20.7	1	0.7
I check the sole of my feet	65	43.3	50	32.7	35	23.3	0	0
I cut the nails of my toes	60	40.0	50	33.3	37	24.7	3	2.0
I walk regularly	61	40.7	52	34.7	30	20.0	7	4.7
I pay attention to the socks	59	39.3	55	36.7	31	20.7	5	3.3
I check the iner sides of my shoes	53	35.3	57	38.0	33	22.0	7	4.7
I pay attention to the characteristics of my shoes	46	30.7	61	40.7	37	24.7	6	4.0
I use foot cream for moisturizing the skin of my feet	53	35.3	51	34.0	38	25.3	8	5.3
I pay attention to the temperature water for washing	48	32.0	53	35.3	39	26.0	10	6.7
I wash my feet using hot water	60	40.0	47	31.3	32	21.3	11	7.3
I check the interdigital areas of my feet	56	37.3	41	27.3	44	29.3	9	6.0
I do foot exercise	57	38.0	47	31.3	36	24.0	10	6.7
Foot deformity	65	43.3	35	23.3	40	26.7	10	6.7
I clean my feet every day	50	33.3	42	28.0	45	30.0	13	8.7
I use arch support	53	34.7	49	32.7	41	27.3	7	4.7
I walk at home barefoot	56	37.3	37	24.7	50	33.3	7	4.7
I check the temperature of my feet every day	57	38.0	35	23.3	49	32.7	9	6.0
My relatives help me to examine my feet	58	38.7	36	24.0	46	30.7	10	6.7
I checking my foot for tingling	48	32.0	44	29.3	52	34.7	6	4.0
I keep feet warm	52	34.7	35	23.3	52	34.7	11	7.3
I taking measures for prvention of calluses on my foot	56	37.3	32	21.3	52	34.7	10	6.7
I pay attention to foot care training	63	42.0	30	20.0	49	32.7	8	5.3
I pay attention to keep my shoes clean	51	34.0	32	21.3	57	38.0	10	6.7
I change my socks	51	34.0	30	20.0	57	38.0	12	8.0
I try not to stand on foot	52	34.7	32	21.3	56	37.3	10	6.7
I try to keep my feet dry	57	38.0	27	18.0	54	36.0	12	8.0

Table 5. Comparison of the total score means of the Foot Care Practices Assessment Questionnaire with patient characteristics (N=150)

	<i>Foot Care Practices Assessment Questionnaire total score</i>		
	<i>Mean ± SD</i>	<i>Median</i>	<i>p</i>
Doing regular exercise			
Yes	49.8 ± 10.3	47	0.004*
No	58.1 ± 12.0	58	
History of diabetic wound development			
Yes	56.8 ± 12.4	54	0.65
No	57.6 ± 11.6	58	
The history of surgical interventions related to a diabetic foot wound			
Yes	56.1 ± 11.7	55	0.48
No	57.6 ± 12.2	55	
Responses of individuals about behaviors exhibited when diabetic wound develops			
“I do not do anything”	53.8 ± 11.3	50	0.002*
“I do not do anything”	54.4 ± 9.3	52	
“I try to manage with diabetic wounds with my own approaches or remedies”	63.2 ± 12.4	63	
The status of receiving education about diabetes			
Yes	56.9 ± 12.3	55	0.45
No	58.7 ± 10.0	56.5	
Health professionals provided education about DM			
Nurse	53.0 ± 10.0	48	0.001*
Physician and nurse	58.7 ± 12.5	59	
Only physician	66.4 ± 10.9	67.5	
The personal perceptions about the need for training/education about diabetic foot care			
“I need education about diabetic foot care”	57.3 ± 12.1	55	0.56
“I do not need education about diabetic foot care”	55.5 ± 12.4	49	

*p < 0.05

Independent sample t-test

Mann-Whitney U test

Diabetic foot care practices of diabetic patients undergoing hemodialysis treatment

The patients were asked to choose the most appropriate answers from “I never did”, “I do sometimes”, “I do” or “I definitely do” for each of the statements to evaluate their knowledge about diabetic foot care practices. The average score of the Foot Care Practices Assessment Questionnaire was 57.1 ± 12.1 points.

Most of the sample reported that they did not control their feet for color change (49.3%) and the foot skin for crack development (44%). A large proportion of patients reported that they did not check their feet daily for the deformity (43.3%) and temperature change (38.8%). Most patients reported that they did not control the skin between the toes (37.3%) and did not use the insole (34.7%) (Table 4).

A significant proportion of the patients reported that they were walking with their bare feet at home (37.3%), did not control their feet for tingling/numbness (32.0%) and did not take precautions for the formation of calluses on the feet (37.3%) (Table 4).

A significant proportion of the sample stated that they did not change their socks every day (34.0%), that they did not comply with the training they received in foot care (42.0%) and that they did not pay attention to dry feet (38%) (Table 4).

Variables associated with diabetic foot care practices in diabetic patients receiving hemodialysis

The mean scores of the Foot Care Practices Assessment Questionnaire were compared according to the characteristics of the patients for diagnosis and treatment (Table 5).

The mean total score of Foot Care Practices Evaluation Form of the patients who reported exercised was statistically lower than the scores of patients who did not exercise ($p = 0.004$). However, there was no statistically significant difference between the total score means of the Foot Care Practices Assessment Questionnaire according to the perceptions of the type of diabetes treatment and patients' compliance with the treatment ($p > 0.05$). When compared the mean total scores of Foot Care Practices Assessment Questionnaire according to the characteristics of foot wound of patients; the mean scores of Foot Care Practices Assessment Questionnaire of the patients who reported that

they did not do anything when foot wounds occurred were found to be statistically significantly lower than those of the patients who tried to heal the wound by their methods ($p = 0.002$).

Comparing the total scores of Foot Care Practices Assessment Questionnaire according to the characteristics of diabetes education, the mean total score of the patients who reported that they received diabetes education from the nurse was found to be statistically significantly lower than the scores of the patients who were educated only by “physician” and “physician and nurse” ($p = 0.001$). However, there was no statistically significant difference between the mean scores of the Foot Care Practices Assessment Questionnaire according to the status of receiving diabetes training and willingness to receive training on foot wound ($p > 0.05$).

Discussion

Diabetic patients experience neuropathy, microvascular and macrovascular complications when hyperglycemia cannot be managed effectively. In the first place among these problems are diabetic foot wounds. One of the most effective approaches is to provide training on foot care practices for the prevention of diabetic foot wounds. Effective and continuous training programs are needed to prevent complications, to ensure metabolic control and to improve the quality of life in patients with diabetes (Turkish Diabetes Yearbook, 2016-2017).

When the studies on diabetes patients in the world and our country are examined, it is seen that there are many studies on the prevention and management of diabetes complications. It is noteworthy that most of the research is conducted in areas such as exercise, nutrition in diabetic individuals, treatment management and education, diabetes complications and developing of life quality. This study aimed to determine the educational needs and priorities of diabetic hemodialysis patients regarding foot care practices and to shed light accordingly on educational programs.

Diabetes requires the individual to take active responsibility in the management and monitoring of treatment. In diabetes management, it is of the most important that the patient learns what diabetes is and methods to combat it. Thus, self-follow-up skills of the patients develop and their

ability to cope with the problems related to the disease they face their daily lives is supported (Funnel et al., 2009). Acute metabolic problems associated with diabetes, as well as chronic complications in care are important as a cause of morbidity and mortality. Chronic complications such as cardiovascular diseases, cerebrovascular diseases, peripheral vascular diseases, diabetic retinopathy, diabetic nephropathy, neuropathy, and diabetic foot wound may develop (Nese & Ouyolu, 2006).

It has been reported that approximately 15% of diabetic patients have at least stage 2 diabetic foot complications and approximately 6% of them can improve to amputation (ADA, 2015). Patients with diabetic foot lesions experience physical losses, quality of life decreases significantly and lead to a dependent life together with labor losses. Most of the foot ulcers can be prevented when the education of diabetic patients, determination of risk factors and proper foot care practices, compliance with diabetes treatment and regulation of fasting blood sugar were provided (Kulkarni, 2006). Important preventive strategies are care practices such as self-foot examination, the use of special footwear and the reduction of traumas. In a study conducted to determine the level of knowledge about the treatment of diabetic patients, it was found that most of the patients do not have enough information about their disease (Hailu et al., 2012).

In a study conducted by Nural and Hintistan (2015) found that 33.8% of the patients had a history of foot wounds and 38% had a diabetic foot wound treatment. Nearly thirty percent (27%) of individuals who developed diabetic wounds on their feet stated that they went to a doctor (Nural & Hintistan, 2015). By Yucel and Sunay (2016) in a study conducted to evaluate the knowledge, attitudes, and behaviors of diabetic patients about diabetic foot and foot care, no significant relationship was found between the duration of diabetes mellitus diagnosis and the level of knowledge about a diabetic foot. However, there is a relationship between the attitude and behavior level, thus it is reported the attitude and behavior score of patients who followed up during 1-5 and 5-10 years by the diagnosis of diabetes mellitus was lower compared to patients who followed up during "10-20 years" and "more than 20 years."

In a study by Batkın and Cetinkaya (2005), 88.3% of diabetes mellitus patients reported that they received diabetes-related education, and 18.4% reported that they received foot care-related education (Batkın & Cetinkaya, 2005). Sozen (2009) reported that 44.9% of individuals with diabetes who applied to diabetes education center did not receive foot care education. In a study by De Berardis et al. (2005) in a study conducted with Type 2 diabetes patients in Italy, it was found that 39.9% of the patients followed up in the diabetes outpatient clinic did not receive foot care training. In this study, 88% of diabetic patients undergoing hemodialysis received diabetes-related training and 28% stated that they received training in foot care. According to these results; it is evident that patients do not receive sufficient training in diabetic foot care and that their self-care behaviors and knowledge need to be improved.

In a study by Nural and Hintistan (2015), 75% of the diabetic patients participating in diabetes education stated that they received training from nurses, 15% from doctors and nurses, and 81.1% of the patients stated that they wanted to receive education about a diabetic foot. In this context, research is parallel and indicates that foot care is not a priority issue in the context of diabetes education. In parallel with the results of Nural and Hintistan, many of (36.7%) the diabetic patients stated that they received training from nurses, 56.7% from doctors and nurses, and 90% stated that they wanted to receive training about a diabetic foot.

Informing hemodialysis patients about their diseases; improves compatibility to treatment and diet, prevents complications and maintains hemodialysis effectively. In this study, it was reported that most of the hemodialysis patients in the dialysis centers of diabetic received training on fistula care (90%), transportation/transfer (84%), patient rights (82.7%) and drug use (82.7%). In this study, it was also questioned the patients who wanted to receive education on which subjects. The patients stated that they wanted to be informed about the method and frequency of dressing at home (90%), first aid (76.7%) and foot wound (74.7%) in case of fall and foot impact. Therefore, arranging individualized training programs in dialysis centers where patients receive regular treatment may improve the patient's adaptation to the disease.

Among the high-risk patients in terms of diabetic foot; individuals with the previous history of diabetic foot, impaired mobility, neuropathy and/or ischemic vascular disease, severe visual impairment, poor foot hygiene, alcohol and smoking, non-diabetes education, elderly diabetic patients, poor metabolic control, foot deformity / wrong shoe selection and long-term complications are included (Yılmaz & Bahceci, 2003). One study (2005) found that diabetes mellitus patients did not have knowledge about subjects such as washing of feet (51%), controlling between the toes (21%), selection of appropriate socks (18%), walking with bare feet (11.6%), nail cutting technique/care (9.5%), appropriate shoe selection (5.1%), exercise (3.1%) and foot skin control (0.7%) and did not behave appropriately (Batkın & Cetinkaya, 2005). In the study of Hasnain and Sheikh (2009), stated that the level of patients's knowledge about subjects such as the use of warm water in foot washing (49.3%), changing daily socks (16.7%), drying between the feet (16.7%), checking the feet once daily (41.3%), to control the foot-washing water temperature (55.3%), not to leave the feet wet (30.7%), comfortable shoe selection (48.7%) in diabetic disease was very low. In a study by Nural and Hintistan (2015) was determined that their knowledge and attitudes of diabetic patients of regular walking (40%), regular foot care (63.5%), attention to socks characteristics (20.3%) and foot gymnastics (75.6%) are low. Therefore, the research are in parallel with the results of other studies. In light of these results, it is seen that patients lack information about foot care.

Diabetic patients should learn; what is diabetes, treatment options, monitoring blood sugar parameters, prevention, detection and treatment methods of chronic complications, awareness of patients planning pregnancy, prevention of acute complications, information and use of diabetes medications, psychological support, and physical activity are listed (Funnel et al., 2009). Nural and Hintistan (2015) stated that 75.6% of diabetic patients do not know whether there is special foot gymnastics for diabetics, 40.5% do not walk, 55.4% never do leg and foot gymnastics. In this study, the total scores of the Foot Care Practices Assessment Questionnaire were lower than those of the patients who did not exercise. In this context; it shows that the patients do not

understand the importance of exercise and why they should exercise, and they do not have enough information about this parameter required for foot care. Communicating with health institutions is crucial for achieving metabolic control in patients with diabetes and evaluating compliance with treatment.

Limitations of the study

The findings of the study only provide information about patients treated in the three special hemodialysis centers. The fact that the study was conducted in the group with a high average age and low education level is thought to affect the results of the study. Different results can be obtained if this study is conducted on a group with different sociodemographic characteristics.

Conclusion

This study shows that hemodialysis patients do not receive training in foot care practices and do not perform any check practice such as foot color change control, nail cutting and crack heel control. Diabetic hemodialysis patients need regular training on foot care. Patient education, training of health professionals, and keeping the information up-to-date will ensure that the proper care and behavior of patients about diabetes and its treatment.

Acknowledgment: We thank all patients who participated in the study

References

- American Diabetes Association. (2015). Standards of Medical Care in Diabetes. *Diabetes Care*. 38: 33-40.
- Aydogan, U., Akbulut, H., & Doganer, Y.C. (2010). Diyabetik ayak [Diabetic Foot.]. *TAF Preventive Medicine Bulletin*. 9: 375- 382.
- Batkın, D., & Cetinkaya, F. (2005). The Knowledge, attitude and behaviours of the diabetic patients on diabetic foot and foot care. *Journal of Health Sciences*. 14: 6-12.
- Bicer, S., Sahin, F., & Sarıkaya, O. (2013). The Analysis of information levels of hemodialysis patients about sufficient dialysis and training these patients in this topic. *Bozok Medical Journal*. 3: 36-43.
- Camsarı, T. (1997). (Editor). *Dialysis Proficiency. Hemodialysis Physician's Handbook*. Kayseri, Erciyes University Press.109-14.
- De Berardis, G., Pellegrini, F., Franciosi, M., Belfiglio, M., DiNardo, B., Greenfield, S., et al. (2015). QuED Study Group-Quality of Care and Outcomes in Type 2 Diabetes. Are type 2

- diabetic patients offered adequate foot care? The role of physician and patient characteristics. *Diabetes Complications*. 19: 319-27.
- Funnel, M.M., Brown, T.L., Childs, B.P., Haas, L.B., Hosey, G.M., Jensen, B., et al. (2009). National standards for diabetes self-management education. *Diabetes Care*. 32: 87-94.
- Hailu, E., Mariam, W.H., Belachew, T., & Birhanu, Z. (2012). Self-care practice and glycaemic control amongst adults with diabetes at the Jimma University Specialized Hospital in South-West Ethiopia: A Cross-sectional study: Original Research. *African Journal of Primary Health & Family Medicine*. 4: 1-6.
- Hasnain, S., & Sheikh, N.H. (2009). Knowledge and practice regarding foot care in diabetic patients visiting diabetic clinics in Jannah Hospital, Lahore. *Journal of Pakistan Medical Association*. 59: 687-90.
- International Diabetes Federation Diabetes Atlas. (2009), 4th Edition, <http://www.diabetesatlas.org/>. Erişim tarihi: 16.06.2018.
- Kafkia T, Vehviläinen-Julkunen V, Sapountzi-Krepia D. Assessment and management of pain in haemodialysis patients: A pilot study. *Prog Health Sci* 2014, 4 (1), 53-60
- Kalender, B., Erdogan, M.S., Sengul, E., Serdengeçti, K., Ereğ, E., & Yılmaz, A. (2002). The relationship between nutritional status and dialysis adequacy in hemodialysis patients. *Cerrahpaşa Medical Journal*. 33: 222-30.
- Kulkarni, K.D. (2006). Value of diabetes self-management education. *Clinical Diabetes*. 24: 54-54.
- Nese, C.A., & Ovayol, N. (2006). Diabetic foot and care [Diabetic foot and care]. *Ataturk University School of Nursing Journal*. 9: 89-97.
- Nural, N., & Hintistan, S. (2015). Investigating the knowledge and attitude related to foot care of diabetic patients. *Anatolian Journal of Nursing and Health Sciences*. 8: 116-124.
- Olgun, N. (2012). Chronic Diseases and Care In: Durna Z (Editor). Istanbul, Nobel Medical Bookstores. 291-329.
- Oygar, D., Altıparmak, M.R., Apaydın, S., Pekpak, M., Ereğ, M., & Serdengeçti, K. (2003). Survival in hemodialysis patients and factors affecting survival. *Turkish Journal of Nephrology Dialysis and Transplantation*. 12: 52-60.
- Pehlivan, E., & Gunaydın, Y. (2014). HbA1c levels and related factors in patients with Type II diabetes admitted to the endocrine outpatient clinic of Elazığ Training and Research Hospital. *Inonu University Journal of Health Sciences*. 3: 6-11.
- Sozen, E. (2009). Investigation of diabetic foot care behaviors according to diabetic foot. Dokuz Eylül University Internal Diseases Nursing Master's Thesis (master's thesis). Suleymanlar, G., Ates, K., & Seyahi, N. (2017). The Republic of Turkey, Joint Report of Ministry of Health and Turkish Nephrology Association. Ankara, Turkish Nephrology Association Publications. 3-11.
- Turkish Diabetes Yearbook 2016-2017. Turkish Diabetes Association and Turkish Diabetes Foundation Publications, 85-92.
- Yekta, Z., Pourali, R., Nezhadrahim, R., Ravanyar, L., & Ghasemi-rad, M. (2011). Clinical and behavioral factors associated with management outcome in hospitalized patients with diabetic foot ulcer diabetes. *Metabolic Syndrome and Obesity: Targets and Therapy*. 4 (oct): 371-5.
- Yenicesu, M. (2008). Chronic Kidney Disease. Arık N, Dilek M. (Ed). *Nephrology [Nephrology]*. 2nd Edition Character Color Inc. Istanbul. 318-55.
- Yılmaz, T., & Bahceci, M. (2003). Modern Treatment of Diabetes Mellitus. In: Buyukbese M. (Eds.). Istanbul. Ozlem Graphic Printing. 137-14.
- Yucel, F., & Sunay, D. (2016). Assessment of knowledge, attitudes and behaviors of diabetic patients about diabetic foot and foot care. *Ankara Medical Journal*. 16: 270-84