

ORIGINAL
INVESTIGATION

Knowledge and Practice of Foot Care in Diabetic Inpatients: A Descriptive Cross-Sectional Study

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ABSTRACT

Objective: To determine whether diabetic patients have adequate information regarding foot care.

Materials and Methods: We evaluated history of diabetic foot ulcer (DFU) and data on self-foot care practices collected through face-to-face interviews from 64 diabetic inpatients in a university hospital. Foot care practices were scored based on 20 questions. Questions under the categories of “beware of risky behavior,” “foot and nail care,” and “elaborate on footwear” were grouped, and the practice subscores and total scores were calculated. A total score of >70% was assessed as “good practice”, 50%–70% as “satisfactory practice,” and <50% as “poor practice.”

Results: Fourteen (21.9%) patients had previous or ongoing DFU and five (7.8%) had undergone amputation. Only 44% of the patients stated that they had been informed about the prevention of diabetic foot after the diagnosis was established. This group differed from the uninformed group significantly in terms of regular medical control ($p=0.006$). The average foot care practice score was 72 for the informed group and 49 for the uninformed group; the percentage of “good practice” score was 46% in the informed group and 11% in the uninformed group. The percentages of having good practice score were found to be significantly high in women, those without DFU, and those informed about foot care ($p<0.01$).

Conclusion: Foot care practices of the patients were found to be mainly inadequate. Health care providers and diabetic patients should be encouraged for good foot care practices.

Keywords: Diabetic foot, foot care practice, knowledge

INTRODUCTION

Diabetes is one of the most common chronic diseases worldwide, and approximately 371 million people are carriers of this disease. The development risk of diabetic foot ulcer (DFU) through a lifetime, one of the most common and important complication in diabetic patients, ranges from 10% to 25% (1). While 14%-24% of DFU infections have resulted in amputation, the reason of 85% non-traumatic amputations is DFU (2). DFU and its complications cause inconvenience to diabetic patients and their families and are a considerable financial burden for the health systems and society (3). In England, the annual cost of DFU and lower extremity amputations performed due it was nearly 840 million dollars to the national health services in 2012 (4). In addition to DFU-associated expenses, such as medical examination, follow-up physician visits, and treatment expenses, there are indirect DFU-associated expenses, such as decrease in patients' labor productivity, shortening of life expectancy, and their relatives' participation. Considering all these costs, 7%-20% of the total diabetes expenditures of Europe and North America can be DFU-associated (5).

Attributes of health professionals regarding providing information about diabetes are among the factors that may be effective in reducing DFU (6). The aim of DFU prevention should be to teach self-foot care to patients and to examine their foot at each reconsultation. Studies have reported that training increases the knowledge about diabetic foot and the tendency to care for their feet in high-risk patients, thus, decreasing the frequency of DFU and amputation (7, 8).

Many studies worldwide have shown that a greater proportion of diabetic patients have poor knowledge about diabetic foot care (9-11). However, diabetic foot care can be improved through simple health education, information, and practice. It is reported that post-training practices aid the recovery of DFU and reduce foot problems, such as callus and callosities (12). Practice or application of the knowledge is more important than its level because it has been shown that diabetic patients having adequate knowledge about foot care do not apply it in their daily life (13).

In this study, we aimed to evaluate the foot care practices and knowledge of the diabetic inpatients about foot care in Endocrinology and Metabolic Diseases Clinic of Health Practices and Research Center of Ondokuz Mayıs University.

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MATERIALS and METHODS

This institution-based descriptive cross-sectional study was conducted between January and March 2016 at the Endocrinology and Metabolic Diseases Clinic of Health Practices and Research Center of Ondokuz Mayıs University. In total, 76 diabetic patients from the clinic participated. A total of nine patients had an active DFU. Two mentally ill patients were excluded from the study and 10 patients rejected to participate; thus, 64 patients were included in the study. The response rate was 86.5%.

The questionnaire developed by the researchers of this study was based on the Nottingham Assessment of Functional Footcare whose validity and reliability has been proven in the assessment of foot care practices, with some modifications to reflect cultural differences and was administered to patients through face-to-face interviews (14). The questions related to the sociodemographic information, history of diabetes, and DFU were included in the first part of the questionnaire and 20 questions related to footcare practices were included in the second part. All research data were based on the information collected from the patients themselves, except the information about DFU, which was obtained from the patients' clinical documents. Each correct answer scored one point. Questions were grouped under three main categories mentioned below, and the practice subscores and total scores were calculated [(Correct answer/Question number) × 100]:

1. Beware of risky behavior (six items):

- Consulting a doctor when a wound is present on foot
- Not using open-toe slippers at home
- Not using a foot warmer, heating stove, hot water bottle, etc. to heat foot
- Not self-treating callosity, scleroderma
- Not walking barefoot at home, in the garden, and street
- Not wearing open-toe shoes

2. Foot and nail care (nine items):

- Controlling toe web daily
- Daily foot control of cracks, wounds, or discoloration
- Checking the sole daily, if necessary with a mirror
- Cleaning/washing foot with a soap and warm water daily
- Checking the temperature of water used for washing foot
- Drying foot, including toe web, after each wash
- Applying moisturizer on dry foot skin
- Cutting toe nails when they are soft
- Cutting toe nails straight across

3. Elaborate on footwear (five items)

- Wearing shoes or slippers with socks
- Changing socks every day
- Checking the material tag when buying socks
- Buying correct size shoes that fit perfectly
- Checking the inside of shoes every time before wearing

4. Total score: Beware of risky behavior score+Foot and nail care score+Elaborate on footwear score

A total score of >70% was assessed as "good practice," 50-70% as "satisfactory practice," and <50% as "poor practice."

Results were presented as mean±standard deviation or percentage, as appropriate. Chi-square test was used to determine the statistical significant effect of sociodemographic factors on foot care practice scores. For normal distribution, the Student's t-test or Mann-Whitney U test was used to compare the arithmetic mean of foot care practice scores between the informed and uninformed groups.

The Statistical Package for Social Sciences (SPSS) version 22.0 (IBM Corp.; Armonk, NY, USA) program was used for statistical computation, and $p < 0.05$ was considered statistically significant.

RESULTS

The mean age of patients was 54.9 ± 11.5 years [95% confidence interval (CI), 54.7-55.1], and the average duration of their diabetes was 10.2 ± 7.1 years (95% CI, 9.8-10.6; Table 1). Fourteen pa-

Table 1. Sociodemographic characteristics of the study group

Characteristics	N (%)
Gender	
Male	24 (38)
Female	40 (62)
Educational Level	
Not graduated	26 (41)
Primary and secondary schools	27 (42)
High school and above	11 (17)
Smoking	
Yes	5 (8)
No	45 (70)
Quitted	14 (22)
Use of Alcohol	
Yes	2 (3)
No	62 (97)
Duration with diabetes (year)	
0-4	19 (30)
5-9	12 (19)
10+	33 (51)
Smoking	
Yes	5 (8)
No	45 (70)
Quitted	14 (22)
Use of Alcohol	
Yes	2 (3)
No	62 (97)
Duration with diabetes (year)	
0-4	19 (30)
5-9	12 (19)
10+	33 (51)

tients (21.9%) had a previous or ongoing DFU and five (7.8%) had undergone amputation.

Only 28 (44%) patients had been informed about the prevention of diabetic foot after the diagnosis of diabetes. A total of 27 (96.4%) patients in the informed group stated that they visited a doctor regularly since diagnosis, whereas only 11 (69.4%) in the uninformed group stated having visited a doctor. There was a statistically significant difference between the two groups ($\chi^2=7.53$; $p=0.006$). Out of the 28 patients who were informed regarding the prevention of diabetic foot, only four (14.3%) were diagnosed with DFU. However, 10 (27.8%) patients in the uninformed group were diagnosed with DFU, almost twice the rate seen in the informed group [risk=1.37; (95% CI, 0.898-2.101)].

As shown in Table 2, the total foot care practice scores of the patients in the informed group were significantly higher than those in the uninformed group ($t=4.45$; $p<0.001$). While all subscores and total scores excluding foot and nail care were determined as “good practice” in the informed group, the scores in the “beware of risky behavior” and “elaborate on footwear” categories were determined as “satisfactory practice” and the scores in “foot and nail care” category and total scores were determined as “poor practice” in the uninformed group.

Total foot care practice scores of the patients who had a previous or ongoing DFU (42.1 ± 19.4) were significantly lower than those without DFU (64.0 ± 21.19 ; $t=3.66$; $p=0.001$).

It was observed that only 26.6% of the study group had “good practice” scores in foot care. While “good practice” scores were found to be significantly high in women, previously informed patients, and patients without DFU, the level of education did not have an impact on the foot care practice scores (Table 3).

DISCUSSION

One of the five major objectives of St. Vincent Declaration issued in 1989 in Europe was to reduce diabetes-associated amputations by 50%. Efforts toward this target included the diagnosis of individuals with high DFU risk, their optimal metabolic control, and follow-up, as well as self-foot examination and patient training by improving their foot care knowledge (15). However, diabetic patients having foot care knowledge were determined to be in the range of only 33%-48% even in recent researches (12, 16). This rate was about 44% in our study. Although physicians play an important role in informing patients about foot care, in an Italian study, half of the patients stated that the doctors did not perform foot examination (17). Moreover, 28% of the patients stated as not being informed regarding foot care, indicating that the knowledge

Table 2. Distribution of foot care-related attitudes of the study group, on the basis of being informed of foot care

Foot care practices	Practice scores of			Test results	p
	informed group	Uninformed group			
Beware of risky behaviour	75.6±20.4	61.1±23.2		U=338.0	0.020
Elaborate on footwear	72.9±28.3	62.8±23.4		U=370.0	0.138
Foot and nail care	69.0±28.1	33.9±20.1		t=5.50	<0.001
Total practice score	72.0±22.0	49.3±8.7		t=4.45	<0.001

Table 3. Distribution of practice scores about foot care by demographic variables

Variables	Foot Practice Score			Test result
	Good N (%)	Satisfactory N (%)	Poor N (%)	
Gender				
Male	3 (13)	7 (29)	14 (58)	$X^2=13.4$; $p=0.001$
Female	14 (35)	20 (50)	6 (15)	
Educational Level				
Not graduated	6 (23)	12 (46)	8 (31)	$X^2=0.61$; $p=0.962$
Primary and secondary school	8 (30)	10 (37)	9 (33)	
High school and above	3 (27)	5 (46)	3 (27)	
Information regarding DFU				
Yes	13 (46)	10 (36)	5 (18)	$X^2=10.7$; $p=0.005$
No	4 (11)	17 (47)	15 (42)	
Diabetic foot ulcer				
Yes	1 (7)	4 (29)	9 (64)	$X^2=9.6$; $p=0.008$
No	16 (32)	23 (46)	11 (22)	

DFU: diabetic foot ulcer

and practices related to foot care of patients are highly associated with the conduct of doctors. In addition, inadequate knowledge of patients about this issue may be due to the lack of doctor-patient communication and busy working hours of doctors and nurses. However, since patient training is one of the most important factors for DFU prevention, it should be integrated with routine foot care of patients at every stage. For example, a foot care-related training program in India, wherein more than 3.000 primary care physicians participated, was found to be quite informative by participants. Inclusion of patients' training in the first stage will be a cost-effective way to alleviate the burden of diabetes complications as well as satisfying the necessity of knowledge and practices of health care personnel on this issue (12). In the current study, 14% of the patients informed regarding foot care have been diagnosed with DFU, while 28% of the uninformed patients have DFU. DFU is closely related to foot care knowledge and self-care ability (18). Ideal self-care ability includes daily foot control, proper foot hygiene, avoiding barefoot walking, wearing appropriate shoes and socks, cutting toenails regularly, protecting foot from injury, early medical care for foot wounds, and routine foot examination by a specialist trained in diabetic foot complications (19). Many studies have revealed that DFU and amputations increased in patients who did not follow these practices (20). In this study, the result that the DFU prevalence was lower in patients who were informed about foot care compared to those in the uninformed group supports this hypothesis. The importance of informing diabetic patients has been increasingly perceived in our country, and patients diagnosed with diabetes have been informed in diabetes training polyclinics created in second- and third-level health facilities.

In this study, the mean practice score of foot care was 59 for all patient groups. Studies performed in our country and the other countries found that the mean practice score varied between 38 and 74, and foot care practice scores were higher in patients previously informed about foot care (9, 21, 22). According to these studies, being informed about foot care probably increases the positive and correct attitudes for foot care. However, Valk et al. (7) advocated that patient education might reduce DFUs and amputations, particularly only in high-risk patients. The source of these contradictory outcomes may be due to the person training the patient or the time and duration of education about foot care practice.

Only a quarter of the patients in this study were at "good practice" level for foot care and most of them were women. While studies conducted in Asia and Africa have shown that men have higher foot care practice scores (9, 11, 12). Women had higher scores in studies conducted in developed countries (17, 23, 24). This contrast results can be explained by the socioeconomic status and cultural pattern, but they can also result from religious differences. In Islamic societies, most patients wash their feet since ablutions before worship is mandatory; regardless of whether they were informed about foot care or not. However, the subscore of foot and nail care was the lowest, particularly in the uninformed group. A good practice score of diabetic foot care was determined to be nearly 10%-22% in the researches performed in the developing countries informing patients, while useful, it is not the only factor affecting attitudes. Studies have also revealed that even diabetic patients having sufficient information about foot care may not practice them

daily (13). Thus, not only it is important to inform patients of foot care, but also not to neglect foot examination in control visits and to re-inform patients. Additionally, a lower educational level could play a role in daily foot care practice, because the percentage of not graduated persons aged ≥ 45 years was 31.6% in males and 52.9% in females in the current study. In a national survey conducted in Turkey in 2013, the percentage of not graduated persons aged ≥ 45 years was 16% in males and 43% in females (25). The high rates of ungraduated people in our study may have been due to the working group consisting of individuals with illness who were treated at the hospital. The International Working Group on the Diabetic Foot (IWGDF) declares that taking necessary measurements toward providing quality care for all diabetic patients, regardless of their age, geographical location, and social status, is mandatory, and if the IWGDF proposals are followed up, advanced foot care practices will ensure reduction of lost limbs worldwide (26).

CONCLUSIONS

Although patients are trained or informed regarding foot care have better foot care practices, an inadequate practice is noticed generally. In this regard, both health care providers and diabetic patients should be encouraged for good foot care practices.

Study Limitations

The major limitation of our study is that the data were collected through verbal responses. It does not represent the society because the study was performed on patients treated in a third-stage health facility.

Ethics Committee Approval: Ethics committee approval was received for this study from Ondokuz Mayıs University Clinical Research on 25 December 2015 (Protocol No: KAEK 2015/477).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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