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Predictors of Foot Care Behavior in Adults with Type-2 Diabetes: Self-Efficacy and Quality of Life

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ABSTRACT

Purpose: This study aimed to determine foot self-care behavior, self-efficacy, and quality of life levels of adults with type-2 diabetes mellitus and to identify the predictors of foot self-care behavior.
Method: A descriptive-correlational research design was used for the study, which included the participation of 150 individuals between the ages of 18 and 65 with type-2 diabetes mellitus. A personal information form, the Foot Self-Care Behavior Assessment Form, SF-36 Quality of Life Survey, and Type 2 Diabetes Self-Efficacy Scale were used for the collection of research data.
Results: It was found that education educational status, age group, duration of diabetes, presence of chronic disease other than diabetes, exercise, HbA1C level, their diet+foot control, medical treatment, exercise status, self-efficacy sub-dimensions' and total scores, and physical functioning, social functioning, role limitations due to physical problems, role limitations due to emotional problems, energy/vitality, mental health, pain, and general health perception sub-dimension scores of the quality of life were the factors that predicted the foot self-care behavior score of the participants ($p<0.001$). These factors were found to account for 86.3% of the variance in foot self-care behavior.
Conclusion and Suggestions: In final, it was determined that the level of self-efficacy scores and the quality of life of the participants had a effect on predicting foot self-care behavior.

Tip 2 Diyabeti Olan Yetişkin Bireylerde Ayak Bakım Davranışının Yordayıcıları: Öz Etkililik ve Yaşam Kalitesi

Makale Bilgileri

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Ayak Öz-Bakım Davranışı,
Öz-Etkililik,
Yaşam Kalitesi,
Hemşirelik.

ÖZ

Amaç: Bu çalışmada tip 2 diyabeti olan yetişkin bireylerin ayak öz bakım davranışları, öz- etkililik ve yaşam kalitesi düzeylerini değerlendirmek ve ayak öz bakım davranışınının yordayıclarını belirlemek amaçlanmıştır.
Yöntem: 18-65 yaş arası tip 2 diyabeti olan 150 kişinin dahil edildiği bu çalışmada tanımlayıcı-ilişkisel araştırma deseni kullanılmıştır. Araştırma verilerinin toplanmasında kişisel bilgi formu, Ayak Öz Bakım Davranışı Değerlendirme Formu, SF-36 Yaşam Kalitesi Ölçeği ve Tip 2 Diyabetlilerde Öz-Etkililik Ölçeği kullanılmıştır.
Bulgular: Bireylerin ayak bakım davranış puanını yordayan değişkenlerin eğitim durumu, yaş grupları, diyabet süresi, diyabet dışında kronik hastalık, egzersiz yapma durumu ve HbA1C düzeyi, öz-etkililik diyet+ayak kontrolü alt boyutu, tıbbi tedavi alt boyutu, fiziksel egzersiz alt boyutu, öz-etkililik toplam puanı, yaşam kalitesi fiziksel fonksiyon, fiziksel rol, emosyonel rol, enerji/canlılık, ruhsal, sosyal, ağrı ve genel sağlık alt boyutlarının olduğu saptanmıştır ($p<0,001$). Ayak bakım davranışını yordayan bu faktörlerin ayak bakım davranışı üzerindeki değişimin %86.3'ünü açıkladığı saptanmıştır.
Sonuç ve Öneriler: Sonuç olarak araştırmada bireylerin öz-etkililik düzeyinin ve yaşam kalitesinin ayak bakım davranışını yordamada bir etkiye sahip olduğu belirlenmiştir.

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INTRODUCTION

Diabetes-related complications, which are preventable, can present a significant disease burden for individuals if not properly managed. One of these complications is diabetic foot disease (DFD). It is a fairly common problem seen in diabetic patients that result from neuropathy and peripheral vascular occlusions in the lower extremities (American Diabetes Association [ADA], 2020). DFD delays the healing process, requires long-term care, affects quality of life, creates a financial burden, may lead to lower limb amputations, and increases risk of mortality (Pourkazemi et al., 2020). It has been reported that sociodemographic and health factors such as age, education level, gender, diabetes distress, family support, foot-care knowledge, and foot wound history can affect foot self-care behavior (Sari et al., 2020; Yıldırım Usta et al., 2019). Having adequate knowledge about foot care and applying proper foot care practices have been shown to reduce DFD complications and the risk of amputation (Bus et al., 2020; Haq et al., 2017). It is clear that individuals with diabetes should perform regular foot self-care to minimize diabetic foot complications. A study on DFD found that a majority of the participants had a positive attitude and practiced behavioral controls on diabetic foot self-care (Narmawan et al., 2018).

In diseases like type-2 diabetes, which require consistent care and treatment, it is necessary to ensure the continuity of positive health behaviors. In addition, higher levels of self-efficacy provide to positive health outcomes (Tharek et al., 2018). The ability to perform targeted behaviors in the face of obstacles is referred to as self-efficacy (Bandura, 1994). This concept expresses to self-care behaviors related to adopting goal-directed behavior, regular monitoring of blood sugar levels, following a diet, physical activity, foot self-care, and adherence to medical treatment (Tharek et al., 2018). Studies have shown there to be a positive relationship between self-efficacy and foot self-care behavior, where individuals with higher levels of self-efficacy tend to demonstrate better foot-care behaviors (Ahmad Sharoni et al., 2018; Biçer & Enç, 2016; Nuh et al., 2019; Pourhaji et al., 2016). On the other hand, foot self-care behaviors, it is also important to consider the impact that the related complications of diabetes have on quality of life, specifically in terms of the changes they can precipitate in the physical, psychological, work, social life, and interpersonal relationships of diabetic individuals. (Altınok et al., 2016; Trikkalinou et al., 2017). In the relevant literature, the importance of foot care behavior is emphasized in the prevention of the complications of diabetes, especially the diabetic foot, which negatively affects the quality of life (Sothornwit et al., 2018; Vymětalová, & Zeleníková 2019). Khunkaew et al. (2019), in their study, identified a relationship between quality of life and foot self-care, showing that personal foot self-care training, including personal care management practices, helped to improve diabetic patients' quality of life.

While the literature includes a number of studies evaluating the relationship between foot self-care and self-efficacy (Goodall et al., 2020; Lee et al., 2019; Wendling & Beadle, 2015), only a limited amount of research has been specifically conducted on the relationship between foot self-care behavior status, level of self-efficacy, and quality of life in adults with type-2 diabetes mellitus (DM). So, this study was conducted to determine the level of foot self-care behavior, self-efficacy, and quality of life of adult individuals with type-2 DM and to investigate the factors predicting foot self-care behavior.

Research Questions:

- How the mean scores of foot care behaviors of adults with type-2 DM differ according to their sociodemographic and disease/health-related characteristics?
- What is the relationship between the mean total and subdimension self-efficacy scores, mean quality of life subdimension scores of adults with type-2 DM and their foot self-care behavior status?
- What are the determining factors affecting the foot self-care behavior of adults with type-2 DM?

METHOD

Research Design

This was a descriptive correlational study.

Research Sample

In the study, 19 independent variables were identified as determinants of foot self-care behavior in adult individuals with type-2 DM. Taking into account the number of independent variables, the minimum number of samples required within the framework of 95% power, 0.05 significance level, and 0.15 (effect size on foot care behavior variable) effect size was calculated as 137 individuals (Cohen et al., 2003). Assuming a 10% nonresponse rate in the data collection tools, the study group of the research included 150 individuals. For sample selection, the convenience sampling method was used. The inclusion criteria were ages of 18 and 65, have been diagnosed with type-2 DM for a period of 6 months or longer. Patients who had verbal communication problems, diabetic foot disease, type 1 DM, and diagnosed with gestational diabetes mellitus were excluded from the study.

Research Instruments and Processes

Data were collected using Personal Information Form, Foot Self-Care Behavior Assessment Form, SF 36 Quality of Life Scale, Type 2 Diabetes Self-Efficacy Scale. The research data were collected between 15 August 2019 and 27 November 2019. The research was carried out in the internal medicine polyclinics of Karaman State Hospital in central Anatolia in Turkey. In this region, there are 3 internal medicine polyclinics responsible for managing diabetic patients.

***Personal Information Form**:* The researcher prepared a two-part personal information form that includes a total of 21 questions related to socio-demographic (age, gender, marital status, education status, working status, perception of economic status, place of residence, living situation (with whom)) health-disease characteristics (diabetes duration, regularly take blood glucose measurement, diabetes treatment method, regular use of medications, other chronic disease(s), frequency of visiting the doctor for diabetes control, regularly exercise, received education about diabetes). The diabetes treatment method was based on participants' self-report. The diabetes treatment method used by participants is classified as "diet", "diet+exercise", "oral anti-diabetic drug insulin", "oral diabetic drug + insulin".

Foot Self-Care Behavior Assessment Form: This form was created based on a search of the relevant literature by the researchers to evaluate the foot self-care practices of individuals with Type-2 DM (Embil et al., 2018; D'Souza et al., 2017; Narmawan et al., 2018; Schaper et al., 2019; Wendling & Beadle, 2015). The final version of the form was created after taking the opinions of five public health nursing experts. Following the evaluation of concordance between the raters, it was found that there was no statistically significant difference in the foot self-care behavior scores (Kendall's W= 0.182, p=0.551). The form features a total of 16 positive questions. Responses of ‘yes, always’ to all questions, which include the options of ‘yes, always, “sometimes”, and “no, never”, indicate positive foot self-care behavior. Per the recommendations provided on foot self-care, all the items related to foot self-care in the Foot Self-Care Behavior Assessment Form should regularly be done on a daily basis (ADA, 2020; Embil et al., 2018; Schaper et al., 2019). In the evaluation of the form, the number of “yes, always” responses to the foot self-care behavior of individuals was determined. Individuals who marked “yes, always” on all 16 questions of the form were evaluated as having good foot self-care behavior status. The number of marked “yes, always” was used as continuous data. Reduction the number of marked "yes, always" was evaluated as poor foot self-care behavior.

SF 36 Quality of Life Scale: This scale, which is used in practice and in general population studies, was developed by Ware and Sherboume (1992) to evaluate the quality of life in patients over the course of their last four weeks. Koçyiğit et al. (1999) performed the validity and reliability tests for

the adaptation of the scale to Turkish society. In the reliability study, Cronbach's alpha values of the subdimension items were found to be between 0.73-0.76. The scale consists of 36 items and the following eight subdimensions: physical functioning, social functioning, role limitations due to physical problems, role limitations due to emotional problems, energy/vitality, mental health, pain, and general health. Each subdimensions is evaluated in the range of 0 and 100 points. The scale does not have a total score. Higher scores on each dimension indicate higher quality of life as it relates to health (Koçyiğit et al., 1996; Ware & Sherboume, 1992). In this study, Cronbach's alpha values of the subdimensions quality of life were found to be between 0.91-0.99.

Type 2 Diabetes Self-Efficacy Scale: Van Der Bijl et al. (1999) developed this scale. It evaluates the self-efficacy of type 2 diabetes patients in diabetes management. The Cronbach's alpha value was reported as 0.81 and the variance as 55% (Van Der Bijl et al.1999). In the Turkish validity and reliability study of the scale conducted by Kara et al. (2006), the Cronbach's alpha value of the scale was calculated to be 0.89, and the correlation between the items was found to be 0.91, which confirmed the validity and reliability of the Turkish version (Kara et al., 2006). The scale consists of 20 items. The items of the scale were measured using a 5-point Likert-type scoring system (5=Definitely Yes, 4=Yes, 3=Neither yes nor no, 2=No, 1=Definitely No). The scale has three dimensions: diet+foot control, medical treatment, and physical exercise. The lowest possible score on the scale is 20, while the highest is 100. Higher scores indicate a higher level of self-efficacy (Van der Bijl et al., 1999; Kara et al., 2006). In this study, the cronbach's alpha value of the scale was calculated as 0.99.

Data Analysis

The data was analyzed using the IBM SPSS 22.0 package software. The data of the study were processed in a computer environment, and were used for descriptive statistics. The Kolmogorov-Smirnov test and Q-Q plot graphs were used to test whether the data set had normal distribution. The independent sample t-test, one-way anova test, mann-whitney U test, and multiple regression analysis were used in the data analysis. Bonferroni corrected ANOVA test was used to determine the difference in groups of more than two. Multiple regression analysis involving the use of the backward method was applied to identify the predictors of foot self-care behavior. In the analysis, for categorical variables, 1 was used as the base category for groups with risk factors. A p-value of <0.05 was considered as statistically significant.

Ethic

Ethical approval was obtained from Ethics Committee of Non-Interventional Clinical Research of Health Sciences Faculty of Selcuk University (decision dated 27.02.2019 and numbered 2019/217). Permission was obtained from the institution where the research was performed. Informed consent was obtained from all individuals participating in the study.

RESULTS

Sociodemographic Characteristics and Foot Self-Care Behavior

Evaluation of the sociodemographic characteristics of the participants showed that 65.3% were female, 58.7% were 51 years old or older (the mean age of the participants was 49.37±12.58 (minimum:23 maximum:64)), 61.3% were married, and 34.7% were literate. Furthermore, it was found that 56.0% of the participants were unemployed, 88.0% received social security, 72.7% perceived their economic status as moderate, 47.3% resided in the city, and 30.7% lived with their spouse and children (Table 1).

A significant difference was identified in the mean score on foot self-care behavior according to age group ($p<0.05$), educational status, employment status, economic status, place of residence and the people with whom they lived ($p<0.001$). There was no significant difference between the mean score

of foot self-care behavior and gender, marital status (p>0.05) (Table1).

Table 1. *Comparison of Foot Self-Care Behavior Status and Sociodemographic Characteristics of The Participants*

Variable	n (%)	Foot Self-Care Behavior Mean±SD	p value
Age (years)[a]			
18-28	10 (6.7)	11.80±6.61[c]	
29-39	26 (17.3)	8.80±7.32	0.012*
40-50	26(17.3)	5.30±6.88	
51 years and older	88(58.7)	2.51±4.94	
Gender[b]			
Female	98 (65.3)	4.56±6.64	0.399
Male	52 (34.7)	5.01±6.47	
Marital status[b]			
Married	92(61.3)	4.41±6.29	0.053
Single	58(38.7)	5.22±7.02	
Education status[a]			
Literate	52(34.7)	1.80±4.23	
Primary school graduate	43(28.7)	2.37±4.56	0.000**
Middle school+high school graduate	32(21.3)	7.46±7.55	
University graduate	23(15.3)	11.78±5.99[c]	
Working status[b]			
Employed	66(44.0)	6.98±7.15	0.000**
Unemployed	84(56.0)	2.92±5.47	
Perception of economic status[a]			
Good	14 (9.3)	12.42±6.07[c]	0.000**
Medium	109(72.7)	4.79±6.48	
Poor	27(18.0)	0.26±0.82	
Place of residence[a]			
Village	30(20.0)	1.00±2.74	0.000**
Town	49(32.7)	3.93±5.95	
City	71(47.3)	6.87±7.32[c]	
Living situation (with whom)[a]			
Spouse	44(29.3)	4.65±6.74	
Spouse and children	46(30.7)	3.97±5.77	0.000**
Children + first degree relatives	20(13.3)	1.80±3.96	
Alone	40(26.7)	7.17±7.61[c]	

*p<0.05, **p<0.001 [a]One way anova test [b]independent sample t test [c]Bonferroni corrected ANOVA test

Health-disease Characteristics and Foot Self-care Behavior

Evaluation of the distribution of the health-disease characteristics of the participants showed that 62.7% had diabetes for 6 years or more (the mean diabetes duration (years) was 9.50±6.23 (minumum:1-maximum:25)), 74.7% did blood sugar measurements regularly, 36.7% used only insulin as a treatment, 60.0% used antidiabetic drugs regularly, 56.0% had no other chronic diseases, 70.0% visited the doctor for diabetes control every 0-6 months, 28.7% exercised, and 15.3% received training on diabetes, the majority of whom also received education on the meaning of diabetes (6.7%). The mean HbA1c level of the participants was 10.30±3.43, and it was found that 65.3% of the participants did not smoke, and that 87.3% did not drink alcohol (Table 2).

There was a significant difference in the mean score of foot self-care behavior according to the health-disease chacracteristics (p<0.001). It was determined that those who had diabetes for between 0-5 years, those whose blood sugar was regularly monitored, who have diet+ exercise treatment method for diabetes, those who did not have any other chronic diseases, those who visited the doctor for diabetes control every 0-6 months, those who exercised, and those who received training about diabetes had a higher mean foot self-care behavior score (Table 2).

Table 2. *Comparison of Foot Self-Care Behavior and Health-Disease Features of the Participants*

Variable	n (%)	Foot self-care behavior Mean±SD***	p value
Diabetes duration (years)[a]			
0-5	56(37.3)	8.44±7.09	0.000**
6 years or more	94(62.7)	2.48±5.08	
Regularly take blood glucose measurement[a]			
Yes	112(74.7)	6.07±6.91	0,000**
No	38(25.3)	0.64±2.73	
Diabetes treatment method[b]			
Diet Diet+exercise	15 (10.0)	7.73±7.82	0.000**
Oral anti-diabetic drug Insulin	20(13.3)	8.94±7.21[d]	
Oral diabetic drug + insulin	37(24.7)	7.37±6.96	
	55(36.7)	2.16±4.64	
	23(15.3)	1.13±3.64	
Regular use of medications[c]			
Yes	90(60.0)	7.33±7.12	0.000**
No	60(40.0)	0.74±2.35	
Other chronic disease(s)[c]			
Yes	66(44.0)	2.47±5.08	0.000**
No	84(56.0)	6.46±7.07	
Frequency of visiting the doctor for diabetes control[c]			
0-6 months	105(70.0)	6.58±7.00	0.000*
7 months and above	45(30.0)	0.29±1.24	
Regularly exercise[a]			
Yes	43(28.7)	12.11±6.35	0.000**
No	107(71.3)	1.72±3.64	
Received education about diabetes[a]			
Yes	23(15.3)	11.78±6.69	0.000**
No	127 (84.7)	3.43±5.69	

*p<0.05, **p<0.001 ***SD:standart deviation [a]Mannwhitney- U test [b]One way anova test [c]independent sample t test [d]Bonferroni corrected ANOVA test

Foot Self-Care Behavior, Self-Efficacy and Quality of Life Scores

Those who responded 'yes' on the foot self-care behavior form had a mean score of 4.72±6.57 on the form. The mean total self-efficacy score was 62.78±23.13. On the quality of life, the participants' mean mental health sub-dimension score was 51.91±27.20 and this sub-dimension mean score is higher than other sub-dimensions of quality of life (Table 3).

Table 3. *Foot Self-Care Behavior Status, Mean Self-Efficacy and Quality of Life Scores of the Participants*

Variable	Mean±SD	Minumum-Maximum
HbA1c (%)	10.30±3.43	6.10-21.50
Foot self-care behavior		
Number of "yes, always"	4.72±6.57	0-16
Number of "sometimes"	2.64±4.87	0-16
Number of "no, never"	8.66±7.32	0-16
Self-efficacy level		
Diet+foot control sub-dimension	38.16±14.06	12-60
Medical treatment sub-dimension	14.92±5.88	5-25
Physical exercise sub-dimension	9.68±3.69	3-15
Self-efficacy total	62.78±23.13	20-100
Level of quality of life		
Physical functioning	32.06±40.79	0-100
Physical role limitations	27.50±44.18	0-100
Emotional role limitations	43.77±48.87	0-100
Energy/vitality	34.02±28.33	0-100
Mental health	51.91±27.20	0-100
Social functioning	45.00±35.44	0-100
Pain	41.06±31.75	0-100
General health	29.53±28.54	0-95

Self-Efficacy Level and Sub-Dimensions As Predictors of Foot Self-Care Behavior

The participants' self-efficacy sub-dimension scores and total scores were found to have a highly significant effect on predicting foot self-care behavior ($p<0.001$). According to the regression analysis, the diet+foot control, medical treatment, and physical exercise sub-dimensions and self-efficacy total scores were found to have a positive effect on predicting foot self-care behavior. Diet+foot control sub-dimension (β=0.863), medical treatment sub-dimension (β=0.691), physical exercise sub-dimension (β=0.745), and self-efficacy total scores (β=0.468) accounted for 74.2% (adjusted R^2= 0.742) of the variance in foot self-care behavior (Table 4).

Table 4. *The Participants' Self-Efficacy Total and Its Subdimensions' Scores As Predictors of Foot Self-Care Behavior*

				Collinearity	
Determinants	**β**	**t**	**p**	**Tolerance**	**VIF**
Diet+foot control subdimension	0.863	6.345	0.000*	0.236	3.215
Medical treatment subdimension	0.691	5.642	0.000*	0.423	3.402
Physical exercise subdimension	0.745	4.635	0.000*	0.627	4.327
Self-efficacy Total	0.468	9.356	0.000*	0.342	4.304
R^2=0.756	Adjusted R^2= 0.74	F=2681.37	p<0.000*		

Quality of Life Sub-Dimensions as Predictors of Foot Self-Care Behavior

It was found that the participants' quality of life subdimension scores had a highly significant effect on foot self-care behavior ($p<0.001$). According to regression analysis, physical functionality, physical role limitations, emotional role limitations, energy/vitality, mental health, social functioning, pain, and general health sub-dimensions were found to have a positive effect on foot self-care behavior. Physical functionality (β=0.478), physical role limitations (β=0.245), emotional role limitations (β=0.365), energy/vitality (β=0.204), mental health (β=0.653), social functioning (β=0.746), pain (β=0.746) =0.452), and general health (β=0.742) total scores accounted for 64.5% (adjusted R^2= 0.645) of the variance in foot self-care behavior (Table 5).

Table 5. *The Participants' Quality of Life Sub-Dimension Scores Predictors As of Foot Self-Care Behavior*

				Collinearity	
Determinants	**β**	**t**	**p**	**Tolerance**	**VIF**
Physical Functioning	0.478	3.686	0.000*	0.768	4.678
Role limitations due to physical problems	0.245	4.923	0.000*	0.652	4.158
Role limitations due to emotional problems	0.365	6.325	0.000*	0.752	4.360
Energy/Vitality	0.204	3.045	0.000*	0.675	4.023
Mental Health	0.653	4.023	0.000*	0.842	4.129
Social functioning	0.746	8.426	0.000*	0.743	3.324
Pain	0.452	5.327	0.000*	0.601	3.946
General health	0.742	7.325	0.000*	0.553	4.327
R^2=0.807 Adjusted R^2= 0.645		F=3421.523	p<0.000*		

*p<0.001

Determinant Factors of Foot Self-Care Behavior

The educational status (β=0.458), age group (β=0.486), duration of diabetes (β=0.748), presence of chronic disease other than diabetes (β=0.632), exercise (β==0.672) and HbA1C level (β=0.408) of the participants were found to have an effect on foot self-care behavior (p<0.001), while the gender of the participants had no impact on foot self-care behavior (p>0.05).Diet+foot control sub-dimension (β=0.745),medical treatment sub-dimension (β=0.406), physical exercise sub-dimension (β=0.418), self-efficacy total score (β=0.632), physical functionality (β= 0.758), physical role limitation (β=0.637), emotional role limitation (β=0.743), energy/vitality (β=0.734), mental health (β=0.684), social functioning (β=0.745), pain (β=0.763) and general health (β=0.845) sub-dimension scores of the participants were found to have an effect on foot self-care behavior (p<0.001), accounting for 86.3% (adjusted R^2= 0.863) of the variance in foot self-care behavior (Table 6).

Table 6. *Determinant Factors Affecting Foot Self-Care Behavior in Individuals*

				Collinearity	
Determinants	**β**	**t**	**p**	Tolerance	VIF
Gender (1=woman)	0.253	7.862	0.329	0.635	2.462
Educational status (1=Literate)	0.458	6.235	0.000*	0.689	2.789
Age groups (1= 51 years and over)	0.486	6.765	0.000*	0.745	2.045
Duration of diabetes mellitus (1= 6 years and over)	0.748	7.631	0.000*	0.607	1.065
Another chronic disease (1=Yes)	0.632	3.462	0.000*	0.890	1.078
Regular exercise	0.672	4.235	0.000*	0.812	2.324
HbA1c level (Continuous)	0.408	3.748	0.000*	0..637	3.245
Diet + foot control sub-dimension (Continuous)	0.745	3.632	0.000*	0.807	3.456
Sub-dimension of medical treatment (Continuous)	0.406	3.754	0.000*	0.654	3.047
Physical exercise sub-dimension (Continuous)	0.418	5.308	0.000*	0.782	2.048
Total Self-efficacy (Continuous)	0.632	5,624	0.000*	0.654	3.078
Physical functioning (Continuous)	0.758	6.324	0.000*	0.892	4.325
Role limitations due to physical problems (Continuous)	0.637	7.289	0.000*	0.637	3.782
Role limitations due to emotional problems (Continuous)	0.743	7.036	0.000*	0.764	3.654
Energy/Vitality (Continuous)	0.734	6.245	0.000*	0.639	3.045
Mental health (Continuous)	0.684	3.709	0.000*	0.745	3.652
Social functioning (Continuous)	0.745	4.327	0.000*	0.908	3.487
Pain (Constant)	0.763	6.308	0.000*	0.746	3.458

General Health (Continuous)	0.845	5.078	0.000*	0.635	2.045
R^2=0.843	Adjusted R^2= 0.863		F=6378.451	p<0.001*	

DISCUSSION

This study was conducted to determine the level of foot self-care behavior, self-efficacy, and quality of life of adult individuals with type-2 DM and to investigate the factors affecting foot self-care behavior. It was determined that the mean foot self-care behavior score of the participants with type-2 DM was low. Literacy, being 51 years of age and older, having diabetes duration of 6 years and more, having other chronic diseases than diabetes, exercise, HbA1C level, self-efficacy, and quality of life were all determined to have an effect on predicting foot self-care behavior.

In this study, the participants' mean score on the foot self-care behavior was 4.72±6.57, indicating that their foot self-care behavior was generally poor. Other studies on this subject support this finding (Çelik et al., 2021; Pourkazemi et al., 2020; Sari et al., 2020). In contrast to these, one study reported that individuals with type-2 DM had high levels of knowledge about foot self-care (Magbanua & Lim-Alba 2017). These results are important insofar as proper foot self-care behavior can prevent or delay diabetes-related complications, such as diabetic foot disease.

When the literature on the subject is examined, it has been reported that sociodemographic (Abete et al., 2018; Alhuqayl et al., 2019; Indrayana et al. 2019; Pourkazemi et al., 2020; Sari et al., 2020; Yılmaz Karadağ et al. 2019) and disease characteristics (Indrayana et al. 2019; Ilter et al., 2019; Ketema et al., 2020; Pourkazemi et al., 2020; Saber & Daud 2018; Sahamim et al., 2021; Toygar et al., 2020; Yılmaz Karadağ et al., 2020) may affect on predicting the foot care behavior score. According to the results of multiple regression analysis, in present study, age, educational status, duration of diabetes, presence of chronic diseases other than diabetes, and HbA1c all affect foot self-care behavior status. In a study reporting similar results to those of the present one, age, low level of education, presence of long-term diabetes, and lack of diabetes training were reported as predictors of foot self-care behavior (Sari et al., 2020). In summary, it can be stated that both the health and demographic characteristics of individuals with type-2 diabetes play a role in foot self-care behavior. To improve foot self-care behavior, it is recommended to identify and closely monitor diabetic patients, especially individuals who are at high-risk according to these aforementioned variables.

The present study found that there was a significant relationship between the type-2 DM participants' scores on the quality of life subdimensions and their foot self-care behavior scores. Indeed, measuring quality of life is the first step in developing prevention strategies and action protocols aimed at reducing health problems (Palomo-López et al., 2019). Alshayban and Joseph (2020), reported in their study that the quality of life of individuals with type-2 DM was moderate, and that more than a quarter of the individuals were in poor health, results that could be attributed to the number of diabetes-related complications that the individuals had. Khunkaew et al. (2016), in their study, reported that the participants' health-related quality of life was good, and that less than a third of the participants had received training on foot self-care management. In the same study, they noted that while almost all the participants washed their feet every day, most of them did not control the water temperature, did not use moisturizing cream on their feet, and did not have a mirror to check the bottom of their feet, which was due to a lack of knowledge about how to use the mirror in a foot examination (Khunkaew et al., 2019). In another study, poor quality of life was shown to be associated with higher rates of hospitalization and mortality in individuals with type-2 DM (Wukich & Raspovic, 2018).

A previous study on this subject highlighted that diabetic foot complications have a greater negative impact on quality of life compared to other complications associated with diabetes, such as diabetic retinopathy, end-stage kidney failure, or coronary artery disease, and that training in foot self-

care is important for achieving a better quality of life in terms of health (Sothornwith et al., 2018). Another study found that level of quality of life in patients with diabetes was related to the duration of diabetic foot ulcers - the longer the duration, the lower the quality of life (Vymětalová & Zeleníková, 2019). Considering the present study's findings, it can be said that maintaining foot health improves the quality of life of individuals and ensures the continuity of walking ability, which means that providing training to diabetic patients on diabetes management and foot self-care behaviors can have a positive effect on their quality of life.

The present study found there to be a highly significant relationship between the participants' subdimension and total scores on the self-efficacy and their foot self-care behavior scores. Self-efficacy refers to the ability to perform a particular action (Bandura, 1994). The literature on the subject stresses that individuals with diabetes can benefit from self-efficacy-oriented training. Empowerment programs too have been shown to positively affect foot self-care behavior (Ahmad Sharoni et al., 2018; Jiang et al., 2019; Dwa & Panthee, 2021). The concept of self-efficacy should therefore be included in diabetes training to improve foot self-care behavior. Given that self-efficacy in health-related behavior has been proven to have a significant effect on improving the health behavior of individuals, training programs aimed at increasing the self-efficacy of individuals are recommended.

In a study by Bahador et al. (2017), a training program on foot self-care that was administered to diabetic patients reportedly increased their self-efficacy and the rate at which they applied foot ulcer self-care, and it had the impact of effectively reducing the formation of new ulcers and complications. In another study, it was reported that a nursing intervention program based on the theory of self-efficacy was effective in promoting foot self-care (Alagamy et al., 2019). However, in contrast to the results from the present study and those mentioned above, one study reported that there was no significant relationship between self-efficacy and foot self-care performance in individuals with type-2 DM (Wendling & Beadle, 2015). Based on these findings, it can be recommended that the self-efficacy levels of individuals as it relates to foot self-care behavior should be evaluated, and that individual care programs should be developed to ensure effective foot care.

CONCLUSION AND SUGGESTIONS

It was determined that the mean foot self-care behavior score of the participants with type-2 DM was low. Literacy, being 51 years of age and older, having diabetes duration of 6 years and more, having other chronic diseases than diabetes, exercise, HbA1C level, self-efficacy, and quality of life were all determined to have an effect on foot self-care behavior.

Preventive measures should be planned to prevent the development of diabetic foot, and strategies should be developed to promote proper foot self-care behavior. Primary care nurses are best positioned, in terms of their interaction with patients, to evaluate the individual perceptions that adult individuals with Type-2 DM have on disease management and contribute to developing programs aimed at increasing levels of self-efficacy. Lastly, high-risk groups in terms of diabetic foot may be identified, and these individuals may be monitored and provided training to build their awareness and skills. In addition, strengthening programs can be planned to increase the self-efficacy level of these individuals. In order to raise awareness about the disease, structured training programs on diabetes management and foot self-care behaviors can be developed based on individual characteristics.

LIMITATIONS

This study had some limitations. The sample included individuals with type 2 DM who presented to a local hospital. The participants were selected by convenience sampling. Therefore, the results cannot be generalized to other individuals with type 2 diabetes. Another limitation of the study, in this study, only adults were included as age group. In addition only the predictors of adults foot care behavior were examined. In futures research, age groups can be given comparatively in terms of the variables examined

in this study.

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Conflict of Interest

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Author Contributions

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