ENDOCRINOLOGY RESEARCH AND PRACTICE

SOCIETY OF ENDOCRINOLOGY AND METABOLISM OF TURKEY

ORIGINAL ARTICLE
Endocrinol Res Pract. 2026;30(4):219-226

Prevalence and the Determinants of Foot Ulcers Among Patients with Diabetes Mellitus: A Nationwide Survey (TEMD-2 Diabetic Foot Study)

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Received: November 25, 2025
Revision Requested: June 1, 2026
Last Revision Received: June 4, 2026
Accepted: July 2, 2026
Publication Date: August 1, 2026

Cite this article as: Cetinarslan B, Demirci I, Haymana C, et al. Prevalence and the determinants of foot ulcers among patients with diabetes mellitus: A nationwide survey (TEMD-2 diabetic foot study). *Endocrinol Res Pract.* 2026;30(4):219-226.

DOI: 10.5152/erp.2026.25794

ABSTRACT

Objective: The prevalence of diabetic foot (DF) increases with the prolonged life expectancy. Identification of factors associated with an increased risk of DF is crucial to establish preventive measures. This study aimed to update the frequency of DF and assess risk factors for DF among patients with diabetes mellitus (DM) across tertiary care centers in Türkiye.

Methods: Turkish nationwide survey of glycemic and other Metabolic parameters of patients with Diabetes mellitus-2 (TEMD-2) study is a national multicenter cross-sectional survey that included patients with DM in 70 centers in Türkiye. Current or past physician-diagnosed DF was recorded and confirmed by physical exam. Along with the common comorbidities, foot-related risk factors, including ulcer, previous amputation history, and Charcot foot, were recorded in patients with a history of DF.

Results: The study included 5570 patients with DM (mean age: 56.3 ± 12.7 years, women: 59.4%). The prevalence of DF was 4.7%. Male sex, lower educational level, peripheral artery disease, retinopathy, neuropathy, and poor glycemic control were independently associated with a DF diagnosis. Statin use was associated with lower DF risk among type 2 diabetic patients. Among foot-related factors, ulcers were the most frequent finding in half of the patients with DF.

Conclusion: The prevalence of DF in this study was similar to the European average. Although several non-modifiable and modifiable factors were independently associated with an increased risk of DF, statin use was associated with a beneficial effect.

Keywords: Diabetic foot, diabetic foot ulcer, diabetes complications, prevalence, risk factors, type 1 diabetes mellitus, type 2 diabetes mellitus

Introduction

The prevalence of diabetic foot (DF) increases with prolonged life expectancy, and the lifetime risk of developing DF is reported to be 19%-34%. Twenty percent of people with DF require lower extremity amputation, and there has been a significant increase in the last 5-10 years. This increase is obvious, especially in young diabetics, racial and ethnic disadvantaged groups, and groups with low socioeconomic levels. Forty to sixty percent of non-traumatic foot amputations are due to diabetes.[1]

Diabetic foot ulcers are associated with a 5% mortality rate in the first 12 months and a 42% mortality rate within 5 years. There is an approximately 2.5-fold increase in the relative risk of death in diabetics with a recent foot ulcer history. Within 4 years following the initial amputation, the need for amputation of the other leg occurs in more than 50% of cases.[2]

The presence of diabetic neuropathy is the most important factor in the development of DF. Forty percent of patients are accompanied by peripheral arterial disease, in which recovery is slower, and the risk of amputation and mortality is higher. Even among patients with wound healing, the recurrence rate is high, with approximately 40% of patients experiencing recurrence within 1 year.[2,3]

The absence of symptoms in a patient with diabetes does not exclude foot disease. It is necessary to identify high-risk feet at risk of developing DF, perform regular foot examinations, and treat risk factors that may cause foot lesions.

There is limited data determining the frequency, risk factors, and current situation of DF in the local context. Therefore, this study sought to determine the frequency of patients with a

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history of DF and associated risk factors among patients with type 1 and type 2 diabetes mellitus.

Methods

The TEMD-2 survey was performed as a nationwide, multicenter project from October 2022 to January 2023. Thirty-six cities and 70 tertiary healthcare units specialized in diabetes care in all the statistical regions of Türkiye participated in the survey. Participating centers were selected to achieve broad geographic representation. To ensure nationally representative coverage, study sites were allocated according to the Nomenclature of Territorial Units for Statistics (NUTS) classification system at the NUTS 2 level, which divides Türkiye into 26 statistical subregions. Hospitals were recruited from each NUTS 2 region proportional to regional population size and healthcare infrastructure. Consecutive patients aged over 18 years and under follow-up in the same study center for at least 1 year were included. Because the number of DF cases per center was limited and the primary objective was estimation of patient-level associations, a conventional logistic regression model was used. The diabetes types of the patients comprising the study population are shown in Figure 1.

TEMD-2 DF study included only patients diagnosed with type 1 and type 2 diabetes; patients with other forms of diabetes, and 27 cases with unknown DF data were excluded. Finally, data from 5570 patients, 4931 of whom had type 2 diabetes and 639 of whom had type 1 diabetes, were evaluated (Figure 1).

The study was approved by the local and central ethics committees of Gülhane Training and Research Hospital (Approval no: 2022/1, Date: April 6, 2022). All patients signed informed consent before data collection.

Demographic and clinical characteristics of the patients included in the study were recorded. Patients with and without a history of DF were compared, and a subgroup analysis was performed for patients with type 1 and type 2 diabetes.

Age, sex, diabetes type and duration, marital status, education and income level, smoking, exercise history, body mass index (BMI, kg/m^2), diabetes complications, dyslipidemia, presence of hypertension, total number of medications, statin and insulin usage status, and HbA1c levels were noted. Glycemic control was defined as an HbA1c level <7%. Statin use was defined as the use of any statin-containing medication, regardless of dose, for at least 1 year. Dyslipidemia was defined as either current statin use or an LDL cholesterol level above the target value for the patient's cardiovascular risk category. In addition, foot-related risk factors such as ulcer, previous amputation history, and Charcot foot were questioned in the patients with a history of DF.

MAIN POINTS

- The TEMD-2 study demonstrated a 4.7% prevalence of diabetic foot among patients with diabetes treated at tertiary care centers in Türkiye.
- The prevalence of previous foot ulceration and lower-extremity amputation was comparable between patients with type 1 and type 2 diabetes.
- Male sex, lower educational and income levels, poor glycemic control, peripheral artery disease, diabetic neuropathy, and diabetic retinopathy were independently associated with diabetic foot.
- Statin use was associated with a lower risk of diabetic foot among patients with type 2 diabetes.
- These findings provide contemporary nationwide data on the burden and risk factors of diabetic foot in tertiary diabetes care in Türkiye.

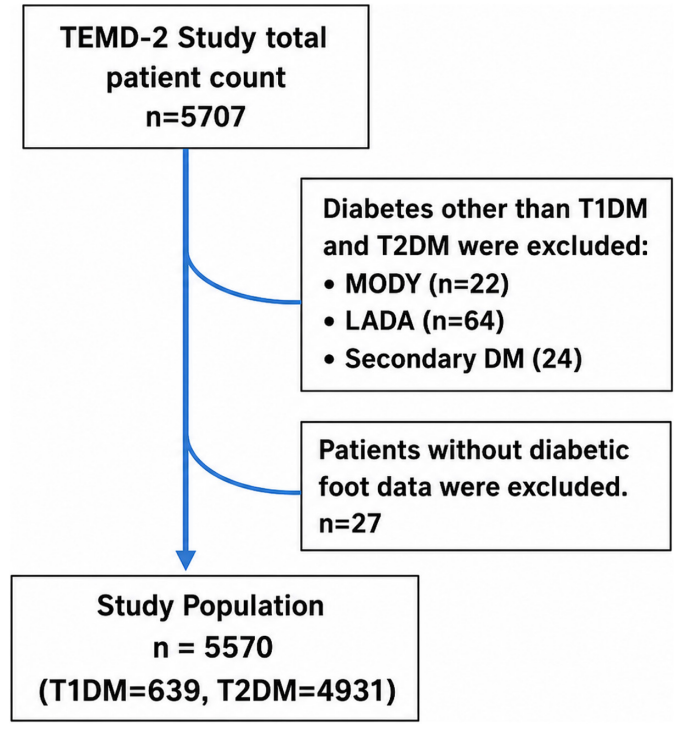


Figure 1. Consort diagram of the study.

Statistical Analysis

Data analysis was performed using SPSS Statistics for Windows, version 25.0 (SPSS Inc., Chicago, IL). Continuous variables are presented as mean ± SD when normally distributed and as median (IQR) when non-normally distributed. All continuous variables demonstrated approximately normal distribution and were analyzed using Student's *t*-test, whereas categorical variables are summarized as frequencies (n) and percentages (%). The Kolmogorov–Smirnov test was applied to evaluate the normality of data distribution. Comparisons between groups were conducted using the chi-square test for categorical data and either the Student's *t*-test or the Mann–Whitney *U*-test for continuous data, depending on distribution characteristics. To identify factors independently associated with DF, a multivariable logistic regression analysis was carried out. Variables showing significant associations in univariate analyses, as well as those considered potential predictors irrespective of statistical significance, were included in the multivariate model. Model adequacy was evaluated using the Hosmer–Lemeshow test and the likelihood ratio test. The Hosmer–Lemeshow goodness-of-fit test showed adequate calibration ($\chi^2 = 7.65$, $P = .468$). Multicollinearity was assessed using variance inflation factors (VIFs). All VIF values were below 2.5, indicating no significant multicollinearity. A two-sided *P*-value of ≤.05 was considered indicative of statistical significance.

Results

Two hundred and sixty-two (4.7%) of 5570 patients who were included in the study had a history of DF. Patients with a history of DF

were significantly older (59.0 ± 10.6 years) and had a longer diabetes duration (16.7 ± 8.8 years) ($P < .001$).

Of the patients with a history of DF, 119 (45.4%) were female, and 143 (54.6%) were male, and their education and income levels were found to be lower than those without a history of DF ($P < .001$). Their marital and smoking status were similar. Although BMI was similar in both groups, patients with a history of DF were taller. It was observed that the group with a history of DF had exercised less frequently ($P = .004$). The incidences of macro and microvascular complications of diabetes were significantly higher, and glycemic control was worse in the patients with a history of DF ($P < .05$). The frequencies of dyslipidemia and hypertension were similar in both groups. Additionally, both the number of patients using insulin and the total number of medications were higher in the DF group ($P < .001$, $P < .001$) (Table 1).

Male sex, low education level, presence of peripheral artery disease, retinopathy and neuropathy, and poor glycemic control were found

Table 1. Demographic and Clinical Characteristics and Foot-Related Risk Factors of the Patients with and Without Diabetic Foot

	Total (n = 5570)	Diabetic Foot (+) (n = 262) 4.7%	Diabetic Foot (−) (n = 5308) 95.3%	*P*
Sex, n (%)				
Women	3309 (59.4)	119 (45.4)	3190 (60.1)	**<.001***
Age (year), mean ± SD	56.3 ± 12.7	59.0 ± 10.6	56.2 ± 12.8	**<.001***
Diabetes mellitus duration, years, mean ± SD	13.3 ± 8.3	16.7 ± 8.8	13.2 ± 8.3	**<.001***
Education, n (%)				
≥High school	2157 (40.2)	69 (26.7)	2088 (40.8)	**<.001***
≤Primary school	3413 (59.8)	193 (73.3)	3220 (59.2)	**<.001***
Married, n (%)	4410 (82.9)	221 (87)	4189 (82.7)	.087
Income rate, n (%)				**<.001***
Low	3630 (67.6)	203 (79.6)	3427 (67)	
Middle	1444 (26.9)	45 (17.6)	1399 (27.4)	
High	288 (5.6)	7 (2.7)	288 (5.6)	
BMI (kg/m^2), mean ± SD	30.9 ± 6.8	30.2 ± 6.4	30.9 ± 6.8	.098
BMI (categories), n (%)				.533
<18.5 kg/m^2	52 (0.9)	4 (1.5)	48 (0.9)	
18.5-24.9 kg/m^2	902 (16.2)	48 (18.3)	854 (16.1)	
25-29.9 kg/m^2	1819 (32.7)	86 (32.8)	1733 (32.7)	
≥30 kg/m^2	2785 (50.1)	124 (47.3)	2661 (50.2)	
Height (cm), mean ± SD	163.5 ± 9.7	166.1 ± 9.6	163.0 ± 9.7	**<.001**
Smoking, n (%)	1259 (22.6)	61 (23.3)	1198 (22.6)	.763
Exercise, n (%)	2413 (43.3)	91 (34.7)	2322 (43.7)	**.004***
Diabetes complications, n (%)				
CAD, n (%)	1083 (20.2)	92 (37.2)	991 (19.4)	**<.001***
PAD, n (%)	250 (4.7)	89 (38.2)	161 (3.1)	**<.001***
CVD, n (%)	184 (3.3)	15 (5.9)	169 (3.2)	**.030***
Retinopathy, n (%)	967 (19.4)	122 (53.0)	845 (17.8)	**<.001***
Neuropathy, n (%)	1576 (30.5)	169 (71.3)	1407 (28.5)	**<.001***
Nephropathy, n (%)	1603 (28.8)	106 (40.5)	1497 (28.2)	**<.001***
Comorbid Disease				
Dyslipidemia	5310 (95.3)	252 (96.2)	5058 (95.3)	.652
Hypertension	2908 (52.8)	147 (57.0)	2761 (52.6)	.18
Laboratory				
Mean HbA1c, %	8.06 ± 1.96	8.80 ± 2.14	8.02 ± 1.95	**<.001***
HbA1c <7%, n (%)	1896 (34)	60 (22.9)	1836 (34.6)	**<.001***
HbA1c >9%, n (%)	1422 (25.5)	109 (41.6)	1313 (24.7)	**<.001***
Treatment				
Statin, n (%)	1909 (34.3)	77 (29.4)	1832 (34.5)	.095
Insulin, n (%)	2594 (46.6)	169 (64.5)	2425 (45.7)	**<.001***
SGT2-inhibitor use, n (%) (only T2DM)	1700 (30.5)	65 (27.5)	1635 (34.8)	.126
Medication count, mean ± SD	4.5 ± 2.7	5.0 ± 2.9	4.4 ± 2.7	**.001***

BMI, body mass index; CAD, coronary artery disease; CVD, cerebrovascular disease; HbA1c, glycated hemoglobin; PAD, peripheral artery disease. Bold values indicate statistical significance ($p < 0.05$)
**P* values < .05 and statistically significant.

to be independent risk factors for DF by the regression analyses ($P < .05$), (Table 2).

In the subgroup analyses comparing type 1 and type 2 diabetic patients with a history of DF, the prevalence of DF was 4.1% and 4.8% in type 1 and type 2 DM, respectively. The male sex was more prominent in type 1 DM. Although type 1 DM patients with DF were younger (mean age 46.4 ± 12.2 vs. 60.4 ± 9.5) ($P < .001$), their mean duration of diabetes was longer (21 ± 10.7 vs. 16 ± 8.4 years) ($P = .008$). Patients with type 1 DM had significantly higher education levels and exercised more frequently ($P < .001$, $P = .010$, respectively). The mean BMI of type 1 DM patients was 24.9 ± 4.6 kg/m^2, significantly lower than that of type 2 DM patients (30.8 ± 6.3 kg/m^2) ($P < .001$). There was no difference in both groups in terms of macro- and microvascular complications, except for CVI (20% in type 1 DM vs. 4.3% in type 2 DM, $P = .002$), comorbid conditions, and glycemic control (Table 3).

In the regression analyses of the clinical characteristics of type 1 and type 2 diabetic patients with a history of DF, male sex, retinopathy, and neuropathy were predictive risk factors for DF in the type 1 DM group. Because of the limited number of DF events in T1DM patients (n = 26), multivariable analysis was considered exploratory and results were interpreted cautiously, and some factors such as income status, BMI, exercise status, and statin use could not be evaluated. In the type 2 DM group, male sex, low education and income levels, lack of exercise, microvascular complications, and poor glycemic control were determined as predictive risk factors. Statin use was associated with low risk for DF in type 2 diabetic patients. SGLT2 inhibitor use and hypoglycemia were not identified as independent risk factors for diabetic foot (Figure 2, Table 1).

The evaluation of foot-related risk factors of type 1 and type 2 diabetic patients with a history of DF showed that the DF complication was caused by an ulcer in 50% of type 1 and 48.7% of type 2 diabetic patients. It was found that 19% of patients with DF resulted in amputation in both groups, and Charcot foot was only seen in 1% of type 2 diabetic patients (Figure 3).

Discussion

This study found an overall prevalence of DF of 4.7% among patients with diabetes mellitus, similar to rates previously reported in Europe (1.7%-4.8%) but lower than the global prevalence of 6.3% in a recent meta-analysis.[4,5] In a more recent cohort study from Austria, the prevalence was 1.31%, and this was attributed to the exclusion of those with a history of DF at the first visit.[6] In a study from southeastern Ethiopia, the prevalence of DF was reported as 11.2%.[7]

Various large-scale studies have reported that the incidence of DF in men is approximately 1.5 times higher than in women, with a male predominance.[5,8,9] Two different studies from Türkiye on DF ulcers showed that DF incidence was higher in males, which was a predictive factor for amputation.[10,11] In another study examining 600 patients with DF ulcers with a mean age of 62.3 ± 10.3 years and diabetes duration of 17.4 ± 7.4 years, 96.8% of the patients had type 2 diabetes and 68.17% were male.[12] Similarly, the number of male patients was significantly higher in the current DF group. Male predominance for DF is explained by the fact that men are taller than women, have higher foot pressure, and women's compliance with preventive foot care and self-care recommendations is better than men's. It has also been suggested that the higher prevalence of peripheral neuropathy, peripheral artery disease, and cardiovascular disease in men may contribute to this outcome.[13]In the current study, the height of the patients with DF was significantly higher than that of patients without DF. Also, male sex was an independent risk factor for DF in patients with both type 1 and type 2 diabetes in adjusted analysis.

Table 2. Regression Analysis of Diabetic Foot Risk Factors

	OR (95% CI)	*P*
Age (per 1 year increase)	0.991 (0.975-1.008)	.298
Sex (female)	0.450 (0.317-0.639)	**<.001**
Diabetes mellitus duration (per 1 year increase)	1.016 (0.994-1.038)	.167
Education, ≥high school	0.585 (0.392-0.874)	**.009**
Low income		.096
Middle income	0.768 (0.506-1.167)	.216
High income	0.352 (0.119-1.040)	.059
Exercise	0.709 (0.500-1.003)	.052
CAD	0.992 (0.664-1.482)	.968
PAD	13.642 (9.107-20.435)	**<.001**
CVD	0.838 (0.407-1.727)	.632
Retinopathy	1.774 (1.217-2.586)	**.003**
Neuropathy	3.578 (2.431-5.265)	**<.001**
Nephropathy	1.328 (0.938-1.879)	.109
HbA1c, %	1.128 (1.039-1.226)	**.004**
Insulin treatment	0.967 (0.907-1.031)	.613
Medication count	1.108 (0.744-1.651)	.307
SGT2-inhibitor use	0.771 (0.527-1.130)	.183
Hypoglycemia	1.276 (0.897-1.816)	.176

CAD, coronary artery disease; CVD, cerebrovascular disease; HbA1c, glycated hemoglobin; PAD, peripheral artery disease. Bold values indicate statistical significance (p < 0.05)

Table 3. Comparative Analysis of the Features in Patients with Diabetic Foot, with Type 1 and Type 2 Diabetes Mellitus

	Diabetic Foot (+) T1DM (n = 26) 9.9%	Diabetic Foot (+) T2DM (n = 236) 90.1%	*P*
Sex (female), n (%)	8 (30.8)	111 (47.0)	.114
Age (year), mean ± SD	46.4 ± 12.2	60.4 ± 9.5	**<.001***
Diabetes mellitus duration (year), mean ± SD	21.0 ± 10.7	16.2 ± 8.4	**.008***
Education (≥high school), n (%)	15 (60.0)	54 (23.2)	**<.001***
Married, n (%)	19 (73.1)	202 (88.6)	**.026***
Income rate, n (%)			.682
Low	19 (73.1)	184 (80.3)	
Middle	6 (23.1)	39 (17.0)	
High	1 (3.8)	6 (2.6)	
BMI (kg/m^2), mean ± SD	24.9 ± 4.6	30.8 ± 6.3	**<.001***
BMI (categorical), n (%)			**<.001***
<18.5 kg/m^2	1 (3.8)	3 (1.3)	
18.5-24.9 kg/m^2	13 (50.0)	35 (14.8)	
25-29.9 kg/m^2	7 (26.9)	79 (33.5)	
≥30 kg/m^2	5 (19.2)	119 (50.4)	
Smoking, n (%)	10 (38.5)	51 (21.6)	.054
Exercising, n (%)	15 (57.7)	76 (32.2)	**.010***
Diabetes complications, n (%)			
CAD, n (%)	5 (20.8)	87 (39.0)	.08
PAD, n (%)	8 (32.0)	81 (38.9)	.5
CVD, n (%)	5 (20.0)	10 (4.3)	**.002***
Retinopathy, n (%)	16 (69.6)	106 (51.2)	.094
Neuropathy, n (%)	17 (73.9)	152 (71.0)	.771
Nephropathy, n (%)	13 (50.0)	93 (39.4)	.296
Comorbid diseases			
Dyslipidemia	26 (100)	226 (95.8)	.285
Hypertension	10 (41.7)	137 (58.5)	.112
Laboratory			
Mean HbA1c %	9.1±2.3	8.8±2.1	.207
HbA1c <7%, n (%)	4 (15.4)	56 (23.7)	.337
HbA1c >9%, n (%)	12 (46.2)	97 (41.1)	.62
Treatment			
Statin, n (%)	5 (19.2)	72 (30.5)	.231
Insulin, n (%)	26 (100)	147 (62.3)	**.024***
Medication count, mean ± SD	4.6 ± 3.1	5.0 ± 2.9	.252

BMI, body mass index; CAD, coronary artery disease; CVD, cerebrovascular disease; HbA1c, glycated hemoglobin; PAD, peripheral artery disease.
Bold values indicate statistical significance (p < 0.05).
*P values < 0.05 and statistically significant. Data are presented as mean ± standard deviation (SD) as appropriate.

Both the mean age and duration of diabetes of patients with a history of DF were higher than those without DF in the current study, which aligns with previous studies.[5,11] This can be explained by the cumulative effect of hyperglycemia and the effect of chronic complications. On the other hand, some studies have suggested that older age has a protective effect on DF, and this has been attributed to the fact that young people have more physical activity and are thus more vulnerable to trauma.[14] In the current work, the age difference between patients with and without DF was more pronounced in patients with type 1 diabetes. Even though the type 1 diabetic group was younger, the prevalence of DF was similar to the type 2 diabetic group. Future prospective studies are needed to demonstrate the effect of age on DF.

The group with a history of DF had lower education and income levels in this study. There are some studies that reported that socioeconomic disadvantages and lower education levels were associated with the risk of ulcer formation in DF and minor/major amputation, but it has been suggested that it was challenging to differentiate the independent effects of these factors for DF.[15,16] In this study, a low level of education was identified as an independent risk factor. Moreover, despite the higher education level of type 1 diabetic patients compared to the type 2 diabetics, the education level was quite low in type 1 diabetics with a history of DF.

The examination of the relationship between glycemic control, diabetes-related chronic complications, and DF indicated poorer glycemic control, higher average HbA1c levels, and more frequent micro- and

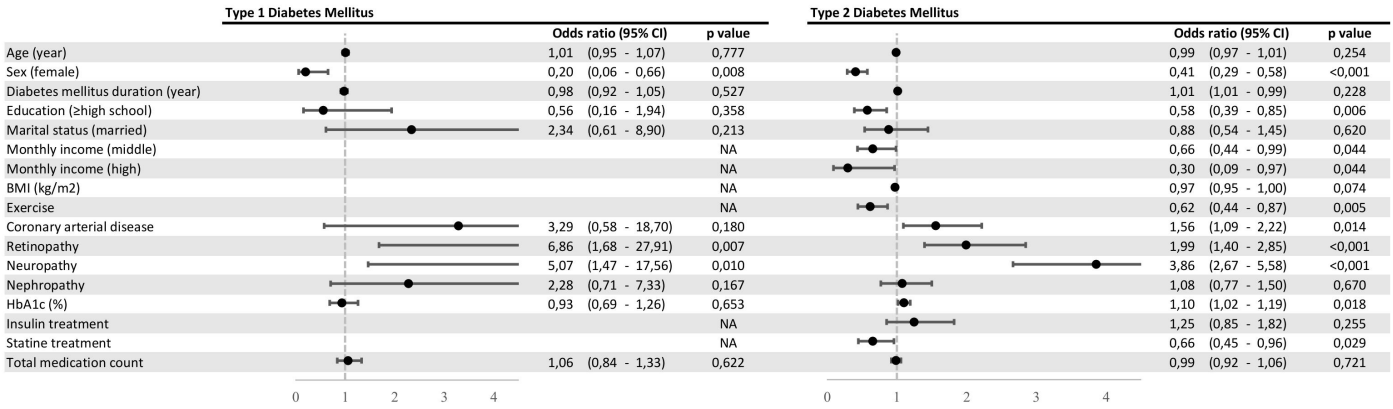


Figure 2. Predictor factors of diabetic foot in type 1 and type 2 diabetic patients.

macrovascular complications in the DF group. The prevalence of comorbidities, such as hypertension and dyslipidemia, was similar in both groups. In the DF group, neuropathy was present in 71.3%, retinopathy in 53%, and nephropathy in 40.5%. A positive association between HbA1c levels and DF has been reported in various studies, but not in others.[6,17,18] This discrepancy may reflect the fact that glycemic control is a modifiable risk factor. Poor glycemic control is also associated with both micro- and macrovascular complications of diabetes. In the DF group, coronary artery disease was detected in 37.2% of patients and peripheral artery disease in 38.2%. A prospective cohort study showed a bidirectional relationship between cardiovascular disease and the development of DF ulcers.[19] In the current study, poor glycemic control and certain diabetes complications, such as peripheral artery disease, neuropathy, and retinopathy, were found to be independent risk factors for DF. Glycemic control is a major determinant of DF as well as of cardiovascular complications of diabetes. The mean HbA1c levels in type 1 diabetic patients with and without DF were similar in the present study. This may be explained by the relatively small number of type 1 diabetic patients with DF. Therefore, it is necessary to investigate this relationship by conducting larger-scale studies that include the same study groups.

The rate of patients with a history of both foot ulcers and amputation as foot-related risk factors was similar in type 1 and type 2 diabetes in the current study (Figure 3). However, since the study design was cross-sectional and foot-related risk factors were recorded based on self-reported forms, amputation type and characteristics could not be documented separately.

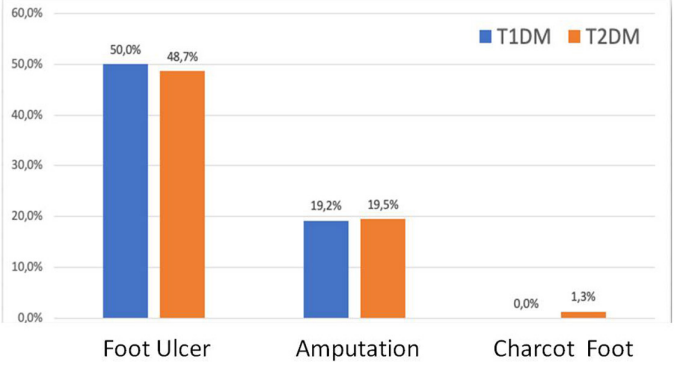


Figure 3. Foot-related risk factors of type 1 and type 2 diabetes patients with a history of diabetic foot.

The Turkish DFI Working Group concluded that diabetes mellitus duration over 20 years, peripheral vascular disease, and diabetic retinopathy history were significant predictors for limb loss.[11] Yesil et al showed that the presence of ischemia, osteomyelitis, and local or diffuse gangrene, and the ulcer depth were independent predictors for foot amputation.[20] A more recent study by Aydın et al revealed that there was a decrease in amputation rates with a multidisciplinary approach. Also, they concluded that the only significant predictive factor for amputation was gangrene.[21] In their single-center study including 400 patients, Evran et al reported that diabetic neuropathy remains a major underlying risk factor for the development of DF. They also identified peripheral arterial disease, osteomyelitis, and higher Wagner grades as negative prognostic factors associated with the need for amputation.[22] Timely intervention with a multidisciplinary approach for the patients at risk of DF would reduce the amputation rate.

Sixty-five percent of the patients in the DF group had been using insulin, while 45.7% of the patients without a history of DF were observed using insulin. A protective effect of insulin and its analogues has been demonstrated previously, but this finding is not in line with some studies that showed a positive relationship between insulin use and foot complications.[15,23] Prospective studies are required to examine this relationship in more detail.

SGLT2 inhibitor use was not associated with an increased risk of DF in the cohort. This finding is consistent with the study by Roussel et al, who demonstrated that SGLT2 inhibitor therapy did not adversely affect amputation rates or wound-healing outcomes in patients with DF ulcers.[24] Although a recent pharmacovigilance analysis reported a potential association between canagliflozin and DF infections, no significant safety signal was detected for empagliflozin or dapagliflozin.[25] Moreover, canagliflozin is not available for clinical use in the country, and none of the patients included in the study received this agent. Therefore, the results provide further real-world evidence supporting the safety of currently used SGLT2 inhibitors with respect to DF risk.

Statin use among patients with type 2 diabetes was associated with a decreased risk of DF. in the current study, consistent with findings from other studies.[26,27]These studies suggested that statin therapy was associated with higher short-term wound-healing rates, possibly through pleiotropic effects on endothelial function, angiogenesis, inflammation, and microvascular perfusion.[27] Unfortunately, patients with type 1 diabetes could not be evaluated due to the limited number of patients.

The strengths of the TEMD-2 study were the multicenter study design, representation of the geographical distribution of Türkiye, and large sample size. The main limitation of this study was its cross-sectional design that did not allow evaluation of causality. Future follow-up studies on patients with DF or DF risk factors are needed.

Conclusion

In this cross-sectional study, the prevalence of DF was similar to the European average. Male sex, low education and income levels, poor glycemic control, peripheral artery disease, neuropathy, and retinopathy were found to be predictive risk factors for DF. One of the most important actions for preventing DF complications in patients with diabetes is to identify high-risk groups for that population and to ensure that protective measures are applied. In order to achieve this goal, well-planned, multicenter, prospective studies are needed in both type 1 and type 2 diabetic patients.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Artificial Intelligence Usage Statement: The authors declared that no Artificial Intelligence Tool was used in the preparation of the manuscript.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Gülhane Training and Research Hospital (Approval no: 2022/1, Date: April 6, 2022).

Informed Consent: Written informed consent was obtained from the patients/patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

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Declaration of Interests: Alev Selek participated in advisory board meetings performed by Novo Nordisk, Novartis, Eli Lilly, and Trispera, and Deva. Obtained congress travel grants from Lilly and Novo Nordisk. Cem Haymana participated in advisory board meetings performed by Sanofi, Novartis, and Boehringer Ingelheim. Serpil Salman participated in speakers' bureaus and advisory boards conducted by AstraZeneca, Eli Lilly, Novo Nordisk, Abdi Ibrahim, and Roche Diagnostics. Alev Selek participated in speakers' bureaus and advisory boards conducted by Novo Nordisk and Abdi Ibrahim Fahri Bayram participated in clinical studies and advisory board meetings conducted by Novo Nordisk, Eli Lilly, MSD, Medtronic, Trispera, Abbott, Sanofi, and Novartis. Zeynep Cantürk, Taner Bayraktaroğlu, Fahri Bayram, İlhan Satman and Alper Sönmez are members of the Editorial Board of Endocrinology Research and Practice. However, their involvement in the peer review process was as solely as an author. Other authors have no conflict of interest to declare.

Funding: The TEMD study has been funded by the Turkish Society of Endocrinology and Metabolism. The funding agencies had no role in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; or the preparation, review, or approval of the manuscript.

References

1. McDermott K, Fang M, Boulton AJM, et al. Etiology, epidemiology, and disparities in the burden of diabetic foot ulcers. *Diabetes Care*. 2023;46(1):209-221. [CrossRef]
2. Armstrong DG, Boulton AJM, Bus SA. Diabetic foot ulcers and their recurrence. *N Engl J Med*. 2017;376(24):2367-2375. [CrossRef]
3. Hoffstad O, Mitra N, Walsh J, et al. Diabetes, lower-extremity amputation, and death. *Diabetes Care*. 2015;38(10):1852-1857. [CrossRef]
4. Boulton AJM, Vileikyte L, Ragnarson-Tennvall G, et al. The global burden of diabetic foot disease. *Lancet*. 2005;366(9498):1719-1724. [CrossRef]
5. Zhang P, Lu J, Jing Y, et al. Global epidemiology of diabetic foot ulceration: a systematic review and meta-analysis. *Ann Med*. 2017;49(2):106-116. [CrossRef]
6. Rossboth S, Rossboth B, Schoenherr H, et al. Risk factors for diabetic foot complications among patients with type 2 diabetes in Austria: a registry-based retrospective cohort study. *Endocrinol Diabetes Metab*. 2021;4(4):e00286. [CrossRef]
7. Negash W, Assefa T, Sahiledengle B, et al. Prevalences of diabetic foot ulcer and foot self-care practice, and associated factors in adult patients with diabetes in south-east Ethiopia. *J Int Med Res*. 2022;50(10):3000605221129028. [CrossRef]
8. Jarl G, Alnemo J, Tranberg R, et al. Gender differences in attitudes and attributes of people using therapeutic shoes for diabetic foot complications. *J Foot Ankle Res*. 2019;12:21. [CrossRef]
9. Sorber R, Abularrage CJ. Diabetic foot ulcers: epidemiology and the role of multidisciplinary care teams. *Semin Vasc Surg*. 2021;34(1):47-53. [CrossRef]
10. Sayiner ZA, Can FI, Akarsu E. Patients' clinical characteristics and predictors for diabetic foot amputation. *Prim Care Diabetes*. 2019;13(3):247-251. [CrossRef]
11. Saltoglu N, Yemisen M, Ergonul O, et al. Predictors for limb loss among patient with diabetic foot infections: an observational retrospective multicentric study in Turkey. *Clin Microbiol Infect*. 2015;21(7):659-664. [CrossRef]
12. Altindas M, Kilic A, Cinar C, et al. The epidemiology of foot wounds in patients with diabetes: a description of 600 consecutive patients in Turkey. *J Foot Ankle Surg*. 2011;50(2):146-152. [CrossRef]
13. Cheng YJ, Gregg EW, Kahn HS, et al. Peripheral insensate neuropathy—a tall problem for US adults? *Am J Epidemiol*. 2006;164(9):873-880. [CrossRef]
14. Dekker RG, Qin C, Ho BS, et al. The effect of cumulative glycemic burden on the incidence of diabetic foot disease. *J Orthop Surg Res*. 2016;11(1):143. [CrossRef]
15. Tatulashvili S, Fagherazzi G, Dow C, et al. Socioeconomic inequalities and type 2 diabetes complications: a systematic review. *Diabetes Metab*. 2020;46(2):89-99. [CrossRef]
16. Riley J, Antza C, Kempegowda P, et al. Social deprivation and incident diabetes-related foot disease in patients with type 2 diabetes: a population-based cohort study. *Diabetes Care*. 2021;44(3):731-739. [CrossRef]
17. Baba M, Davis WA, Davis TME. A longitudinal study of foot ulceration and its risk factors in community-based patients with type 2 diabetes: the Fremantle Diabetes Study. *Diabetes Res Clin Pract*. 2014;106(1):42-49. [CrossRef]
18. Jiang Y, Wang X, Xia L, et al. A cohort study of diabetic patients and diabetic foot ulceration patients in China. *Wound Repair Regen*. 2015;23(2):222-230. [CrossRef]
19. Fang M, Hu J, Matsushita K, et al. 126-OR: long-term consequences of diabetic foot infection: the Atherosclerosis Risk in Communities (ARIC) Study. *Diabetes*. 2022;71(suppl 1):126-OR. [CrossRef]
20. Yesil S, Akinci B, Yener S, et al. Predictors of amputation in diabetics with foot ulcer: single center experience in a large Turkish cohort. *Hormones (Athens)*. 2009;8(4):286-295. [CrossRef]
21. Aydin K, Isildak M, Karakaya J, et al. Change in amputation predictors in diabetic foot disease: effect of multidisciplinary approach. *Endocrine*. 2010;38(1):87-92. [CrossRef]
22. Evran M, Sert M, Akkuş G, et al. Foot ulcer a devastating complication of diabetes mellitus:A single-center experience of 400 patients. *Turk J Endocrinol Metab*. 2021;25(2):133-141. [CrossRef]
23. Zhao J, Deng W, Zhang Y, et al. Association between serum cystatin C and diabetic foot ulceration in patients with type 2 diabetes: a cross-sectional study. *J Diabetes Res*. 2016;2016:8029340. [CrossRef]

24. Dumortier C, Aho Glele S, Rouland A, et al. Effects of sodium-glucose cotransporter 2 inhibitor use on mortality, amputation, and healing in patients with diabetic foot ulcer. *Diabetes Care*. 2026;49(4):674-681. [CrossRef]
25. Jia S, Zeng Q, Zhu P, et al. Pharmacovigilance analysis of the association between SGLT-2 inhibitors and diabetic foot infections using the FAERS database: an observational study. *Diabetes Res Clin Pract*. 2026;232:113109. [CrossRef]
26. Yang TL, Lin LY, Huang CC, et al. Association of statin use and reduced risk of lower-extremity amputation among patients with diabetes: a nationwide population-based cohort observation. *Diabetes Care*. 2016;39(4):e54-e55. [CrossRef]
27. O'Dell B, Rothenberg G, Holmes C, et al. The impact of statin therapy on the healing of diabetic foot ulcers: a case-control series. *Clin Diabetes Endocrinol*. 2024;10(1):19. [CrossRef]

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