

ORIGINAL ARTICLE

The effectiveness of weekly use of foot selfcare checklist in preventing foot ulcers in patients with type 2 Diabetes Mellitus.

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ABSTRACT... Objective: To assess the effectiveness of weekly use of a foot self-care checklist in preventing diabetic foot ulcers in patients with type 2 diabetes mellitus. **Study Design:** Quasi-experimental study. **Setting:** Khyber Teaching Hospital, Peshawar. **Period:** 12 April 2025 to 12 October 2025. **Method:** 140 patients with type 2 diabetes mellitus, divided equally into an intervention group and a control group. Both groups received standard diabetic care, while the intervention group additionally used a foot self-care checklist weekly. Patients were followed for three months. Effectiveness was defined as the absence of foot ulcer development, assessed clinically. **Results:** Out of 140 participants, 109 (77.9%) did not develop a diabetic foot ulcer, whereas 31 (22.1%) developed an ulcer. The incidence of ulcer formation was significantly lower in the intervention group compared with the control group (14.3% vs 30.0%, $p = 0.025$). No significant associations were found between ulcer development and gender, diabetes treatment modality, glycaemic control, education status, residence, prior knowledge of foot self-care, comorbidities, age, or duration of diabetes (all $p > 0.05$). **Conclusion:** Weekly use of a foot self-care checklist significantly reduces the incidence of diabetic foot ulcers in patients with type 2 diabetes mellitus and should be incorporated into routine diabetic management.

Key words: Diabetic Foot Ulcer, Foot Self-care Checklist, Prevention, Type 2 Diabetes Mellitus.

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INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from impaired insulin secretion, insulin resistance, or both. Type 1 diabetes mellitus (T1DM), accounting for 5–10% of cases, arises from autoimmune destruction of pancreatic beta cells, leading to absolute insulin deficiency.¹ Type 2 diabetes mellitus (T2DM), which constitutes approximately 90% of cases, is characterized by insulin resistance despite ongoing insulin production.²

Diabetes is associated with significant long-term complications. Macrovascular complications include ischemic heart disease, cerebrovascular disease, and peripheral vascular disease, which may progress to myocardial infarction, stroke, claudication, and gangrene.³ Microvascular complications involve small vessels and commonly manifest as retinopathy, nephropathy, and neuropathy.⁴

Diabetic peripheral neuropathy is a heterogeneous condition resulting from metabolic and vascular injury due to chronic hyperglycemia. It commonly presents as symmetric polyneuropathy with pain, paresthesia, or may remain asymptomatic, and contributes substantially to the development of diabetic foot ulcers (DFU).⁵ DFU is a severe complication, typically affecting the plantar foot, with a lifetime risk of 19–34%. It is associated with high recurrence rates, increased risk of amputation, and elevated mortality.^{6,7,11}

T2DM is strongly influenced by lifestyle factors, including poor diet and physical inactivity. Effective management through lifestyle modification, medication adherence, regular monitoring, and foot care is essential to reduce complications and improve quality of life.⁸⁻¹¹ As diabetes management largely depends on patients and their families, reliable and effective self-care practices are critically important.¹²

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The rationale of this study was to evaluate the effectiveness of footcare checklist in preventing diabetic foot ulcers (DFUs) among individuals with type 2 diabetes mellitus (T2DM). Despite international guidelines, there is a dearth of localized evidence addressing the efficacy of footcare interventions tailored to our region's unique healthcare landscape. By filling this gap, we aimed to mitigate the burden of DFUs, improve health outcomes, and potentially reduce healthcare costs. This research benefits patients with T2DM, healthcare providers, healthcare systems, and contributes to advancing evidence-based practices and policies in diabetic foot care.

OBJECTIVE

To evaluate the effectiveness of foot selfcare checklist in the prevention of diabetic foot ulcers in type 2 diabetes mellitus.

METHODS

Following clearance of the synopsis after approval from ethical committee 24-6-24, this quasi-experimental study was carried out at Khyber Teaching Hospital from April 12, 2025, to October 12, 2025. A total sample size of 140 patients was calculated using the WHO calculator, keeping a proportion of 23% efficacy of the foot care checklist in preventing diabetic foot ulcers, with a 95% confidence interval and a 7% margin of error.¹³ Two equal groups of patients were created: the Intervention group (Group A, with 70 patients) and the Control group (Group B, with 70 patients). Non-probability consecutive sampling was used.

Patients with peripheral neuropathy, peripheral arterial disease, foot deformities, poor glycaemic management, foot calluses or corns, and smoking were considered at-risk.

Included were patients between the ages of 30 and 70 who had type 2 diabetes mellitus for longer than ten years and were at risk of developing diabetic foot ulcers. Individuals who had a history of peripheral vascular disease or varicose veins, cognitive or communicative problems, diabetic foot ulcers or lower extremity amputations, or type 1 diabetes

mellitus were not included.

Both groups got education on foot care and conventional diabetic care. A foot self-care checklist was given to the intervention group (Figure-1), which included checking the feet every day, washing them with lukewarm water, drying them, applying moisturizer while avoiding the crevices between the fingers, wearing socks, and avoiding poorly fitting shoes. Urdu was used to translate the checklist. The checklist was not given to the control group. Age, gender, length of diabetes, HbA1c control, education level, place of residence, comorbidities, current treatment, and prior foot self-care knowledge were among the baseline data. For three months, the patients were monitored.

Effectiveness was determined by a specialist's clinical examination and was defined as the absence of a foot ulcer during the follow-up period.

SPSS version 23 was used for data analysis. For categorical variables, percentages and frequencies were computed. The Shapiro-Wilk test was used to assess for normality, and the mean $\pm$ standard deviation was computed for age and diabetes duration. Using the Chi-square test or Fisher's exact test, effectiveness was compared between the two groups after being stratified by HbA1c control, age, gender, domicile, and educational attainment. A 95% confidence interval was used to determine whether a p-value of less than 0.05 was statistically significant.

This checklist was obtained from: <https://www.yumpu.com/en/document/read/11390236/foot-care-diabetes-at-work>

RESULTS

A total of 140 participants were included in the study. The overall median age was 51 years (IQR 39.3–61.0), and the median duration of diabetes was 17 years (IQR 13.0–21.0). Other demographics are summarized in the Table-I.

Regarding gender, diabetes treatment mode, glycaemic control, education level, domicile, prior knowledge of foot self-care, and major comorbidities as listed in Table-II, no statistically significant

differences were found between the intervention and control groups.

Foot Care Checklist		
See how well you take care of your foot. Check the box that describes your habits. The more 'yes' boxes you check, the safer your feet will be.		
Foot Care Habits	Yes	No
I check my feet each day for cuts, cracks, splinters, blisters, calluses and redness.		
I call my doctor if a foot problem does not heal in one week or if redness spreads.		
I take off my shoes and socks each time I have a checkup so my feet can be examined.		
I wash my feet each day in warm (NOT HOT) water with mild soap. I dry them well.		
My toenails are trimmed straight across and the edges are smoothed with an emery board.		
I rub lotion or oil on the tops and bottoms of my feet but not between the toes.		
I wear soft, dry socks and shoes or sandals with good support that fit well.		
I check the inside of my shoes for unwanted objects before I put them on.		
I prop up my feet while sitting and move my toes and ankles every few minutes. I cross my legs at my ankles, not at my knees.		
I keep my blood sugar under control with proper eating, activity, and medicine if needed.		
I shop for shoes in the afternoon or evening.		
I never go barefoot even at home.		
Handout		

During follow-up, 31 people (22.1%) developed a diabetic foot ulcer, whereas 109 participants (77.9%) did not. There was a statistically significant correlation between the effectiveness outcome and the study group. According to Table-III, participants in the intervention group showed a reduced incidence of ulcer development than those in the control group ($p = 0.025$).

Gender, diabetes treatment modality, HbA1c control, education level, place of residence, foot self-care awareness, diabetic retinopathy, diabetic nephropathy, hypertension, and stroke did not significantly correlate with effectiveness (all $p >$

0.05). Although they did not achieve statistical significance, heart failure and stroke showed a trend toward correlation (summarized in Table-iv).

The median age and duration of diabetes did not differ significantly between participants who developed ulcers and those who did not, as assessed using the Mann–Whitney U test in Table-v.

TABLE-I

Baseline demographic and clinical characteristics of the study population (N = 140)

Variable	Total n (%) or Median (IQR)
Age, years	51.0 (39.3–61.0)
Duration of diabetes, years	17.0 (13.0–21.0)
Gender	
Male	67 (47.9)
Female	73 (52.1)
Current diabetes treatment	
Oral antidiabetics only	77 (55.0)
Insulin + oral agents	63 (45.0)
HbA1c control	
Poor	45 (32.1)
Intermediate	58 (41.4)
Good	37 (26.4)
Education status	
Illiterate	33 (23.6)
Literate	107 (76.4)
Residence	
Urban	89 (63.6)
Rural	51 (36.4)
Knowledge of foot self-care	
Yes	48 (34.3)
No	92 (65.7)
Comorbidities	
Heart failure	41 (29.3)
Diabetic nephropathy	34 (24.3)
Diabetic retinopathy	39 (27.9)
Stroke	40 (28.6)
Hypertension	31 (22.1)

TABLE-II

Comparison of baseline characteristics between intervention and control groups

	Variable	Group 1, n (%)	Group 2, n (%)
Gender	Male gender	33 (47.8%)	34 (48.6%)
	Female gender	37 (52.2%)	36 (51.4%)
Medications	Oral antidiabetics only	35 (50.7%)	42 (60.0%)
	Insulin + oral agents	35 (50.7%)	28 (40.0%)
Diabetic Control	Poor HbA1c control	18 (26.1%)	27 (38.6%)
	Intermediate HbA1c control	32 (46.4%)	26 (37.1%)
	Good HbA1c control	20 (29.0%)	17 (24.3%)
Education Status	Illiterate	13 (18.8%)	20 (28.6%)
	Literate	57 (81.2%)	50 (71.4%)
Residence	Urban residence	49 (70.0%)	40 (57.1%)
	Rural residence	21 (30.0%)	30 (42.9%)
Prior Knowledge of foot self-care	Yes	21 (30.0%)	27 (38.6%)
	No	49 (70.0%)	43 (61.4%)

TABLE-III

Association between study group and effectiveness outcome

Group	No Ulcer n (%)	Developed Ulcer n (%)	P-Value
Intervention	60 (85.7)	10 (14.3)	0.025
Control	49 (70.0)	21 (30.0)	
Total	109	31	

DISCUSSION

Even though the groups' baseline demographic and clinical features were mostly similar, this study shows that a structured intervention was linked to a considerably decreased incidence of diabetic foot ulcer formation when compared to usual care. This result confirms previous research showing that specific preventive measures can significantly lower the incidence of ulcers in high-risk diabetic groups.^{13,14,15}

The current cohort's median age and diabetes duration indicate a population with a long-standing disease burden, which is in line with earlier findings that found a significant background risk factor for foot problems to be a prolonged duration of diabetes.^{16,17}

However, these factors did not significantly correlate with ulcer development in this analysis, in contrast to a number of longitudinal studies that showed older age and longer duration of diabetes as independent predictors of ulceration.¹⁸

There was no significant correlation between ulcer outcomes and glucose management, as measured by HbA1c categories. On the other hand, other researchers have discovered that inadequate HbA1c control is a significant independent risk factor for diabetic foot ulcers, especially in groups with more severe microvascular disease.¹⁹

Sociodemographic characteristics such as residency, level of education, and past foot self-care expertise did not show a significant correlation with effectiveness outcomes. Conversely, some community-based research has demonstrated that systematic foot-care instruction and more educational attainment dramatically lower ulcer risk, underscoring the possible impact of context-specific implementation and health literacy.^{13,14,15}

The absence of statistically significant associations between most comorbidities and ulcer development is consistent with literature suggesting that single comorbid conditions may exert less influence than the cumulative burden of systemic disease (et al.).

TABLE-IV

Association between baseline variables and effectiveness outcome (N = 140)

Variable	Subgroup	No Ulcer n (%)	Developed Ulcer n (%)	P-Value
Gender	Male	48 (71.6)	19 (28.4)	0.090
	Female	61 (83.6)	12 (16.4)	
Current treatment	Oral antidiabetics only	64 (83.1)	13 (16.9)	0.098
	Insulin + oral agents	45 (71.4)	18 (28.6)	
HbA1c control	Poor	32 (71.1)	13 (28.9)	0.368
	Intermediate	48 (82.8)	10 (17.2)	
	Good	29 (78.4)	8 (21.6)	
Education status	Illiterate	27 (81.8)	6 (18.2)	0.531
	Literate	82 (76.6)	25 (23.4)	
Residence	Urban	71 (79.8)	18 (20.2)	0.470
	Rural	38 (74.5)	13 (25.5)	
Prior Knowledge of foot self-care	Yes	36 (75.0)	12 (25.0)	0.556
	No	73 (79.3)	19 (20.7)	
Heart failure	Present	36 (87.8)	5 (12.2)	0.068
	Absent	73 (73.7)	26 (26.3)	
Diabetic nephropathy	Present	26 (76.5)	8 (23.5)	0.823
	Absent	83 (78.3)	23 (21.7)	
Diabetic retinopathy	Present	28 (71.8)	11 (28.2)	0.283
	Absent	81 (80.2)	20 (19.8)	
Stroke	Present	27 (67.5)	13 (32.5)	0.062
	Absent	82 (82.0)	18 (18.0)	
Hypertension	Present	22 (71.0)	9 (29.0)	0.295
	Absent	87 (79.8)	22 (20.2)	

TABLE-V

Comparison of Continuous Variables by Effectiveness (Mann–Whitney U Test)

Variable	No Ulcer (Median rank)	Developed Ulcer (Median rank)	P-Value
Age	68.22	78.50	0.213
Duration of diabetes	70.95	68.92	0.805

Other study have reported renal disease or peripheral neuropathy as more dominant predictors of ulcer risk.¹⁷

Overall, our data emphasize the relevance of structured preventative treatments in reducing the prevalence of diabetic foot ulcers, as well as the complex nature of ulcer development. The disparities observed when compared to existing literature highlight the impact of population characteristics, healthcare delivery models, and study design

on reported outcomes, implying that prevention strategies should be tailored and integrated into comprehensive diabetes care pathways.

CONCLUSION

The weekly use of a foot self-care checklist dramatically reduces the occurrence of diabetic foot ulcers in individuals with type 2 diabetes mellitus and should be incorporated into normal diabetic therapy.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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1514