INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

ASSESSING KNOWLEDGE AMONG DIABETIC PATIENTS REGARDING DIABETIC FOOT CARE IN TERTIARY HOSPITAL OF PESHAWAR

Original Research (ID: 1681)

Ayaz Ur Rahman*[1], Tariq Khan[2], Zaid Ahmad[3], Syed Hanif Ullah[4], Meraj Khan[5], Zia Shahid[6], Faisal Muhammad[7], Inayat Ullah[8]

[1]Registered Nurse at Rehman Medical Institute Peshawar.
[2]Lecturer at Hallmark College of Nursing and Allied Health Sciences Peshawar.
[3]Department Of Nursing, Govt College of Nursing KTH Peshawar.
[4]Registered Nurse at Pakistan Kidney and Liver Institute and Research Center, Lahore.
[5]Registered Nurse at Shaukat Khanum Memorial Cancer Hospital and Research Center, Peshawar.
[6]Registered Nurse at Institute of Kidney Disease Center, Peshawar.
[7]Registered Nurse at Peshawar General Hospital Peshawar.
[8]Department of Nursing, Rufaidah Nursing College Peshawar.

Corresponding Author: Ayaz Ur Rahman, ayazbsn80@gmail.com, Registered Nurse at Rehman Medical Institute Peshawar.

Acknowledgement: The authors gratefully acknowledge the participants and hospital administrations for their cooperation and support.

Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

Background: Diabetic foot complications remain a preventable yet serious consequence of diabetes mellitus and contribute substantially to ulceration, infection, disability, hospitalization, and lower-limb amputation. In developing healthcare settings, inadequate awareness and inconsistent self-care practices may delay early recognition of foot problems and increase avoidable morbidity. Assessing patients' knowledge and routine practices is therefore essential for identifying educational gaps and strengthening preventive diabetic foot care within hospital-based diabetes services, particularly where routine counseling and screening remain limited.

Objective: This study aimed to assess diabetic foot care knowledge, identify routine practices, and compare knowledge level with foot care behaviors among diabetic patients in Peshawar.

Methods: A quantitative descriptive cross-sectional study was conducted at Kuwait Teaching Hospital, Mercy Teaching Hospital, and Prime Teaching Hospital, Peshawar, from July to December 2025. Through consecutive sampling, 384 diabetic patients aged 18 years or above were recruited. Data were collected with a structured validated questionnaire covering sociodemographic characteristics, knowledge, practices, footwear habits, safety measures, previous foot problems, and education. Descriptive statistics and Chi-square test were used.

Results: Of 384 participants, 130 (33.9%) were aged 46–60 years and 110 (28.6%) were aged 31–45 years. Poor, moderate, and good knowledge were observed in 135 (35.2%), 140 (36.5%), and 109 (28.4%) participants, respectively. Poor, adequate, and good practices were reported by 150 (39.0%), 145 (37.8%), and 89 (23.2%) participants, respectively. Numbness or tingling was reported by 210 (54.7%), pain or cramps by 180 (46.9%), calluses by 160 (41.7%), and current ulcer, blister, or sore by 85 (22.1%). Only 100 (26.0%) had attended foot care education, while 310 (80.7%) wanted further education. Knowledge level was significantly associated with practice ($\chi^2 = 96.4$, df = 4, $p < 0.001$).

Conclusion: Diabetic patients showed important gaps in knowledge and preventive practices. Structured, repeated, and patient-friendly education should be integrated into routine diabetes care.

Keywords: Diabetes Mellitus; Diabetic Foot; Foot Ulcer; Health Knowledge, Attitudes, Practice; Hospitals, Teaching; Patient Education as Topic; Self Care.

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from impaired insulin secretion, reduced insulin sensitivity, or both. Beyond disturbances in blood glucose control, diabetes is strongly associated with long-term complications affecting the cardiovascular system, kidneys, eyes, nerves, and lower limbs. Among these complications, diabetic foot disease remains one of the most serious and preventable causes of disability, hospitalization, infection, and lower-limb amputation. Foot ulcers commonly develop when peripheral neuropathy reduces protective sensation, peripheral vascular disease compromises tissue perfusion, and minor trauma or pressure injuries remain unnoticed until infection or tissue breakdown occurs (1). Globally, diabetic foot ulcers affect a considerable proportion of patients with diabetes, with an estimated prevalence of 6.3%, while the lifetime risk of developing a foot ulcer may reach nearly 25% among individuals living with diabetes (2). The growing burden of diabetes has made diabetic foot care an important public health concern, particularly in low- and middle-income countries where late diagnosis, limited preventive services, and inadequate patient education may worsen clinical outcomes. Diabetes mellitus is now considered one of the fastest expanding global health challenges, and its complications place a substantial burden on patients, families, healthcare systems, and national economies (3). In Pakistan, the scale of the problem is especially alarming. Earlier estimates by the International Diabetes Federation reported that 6.2 million adults aged 20–79 years were living with diabetes in Pakistan in 2003, with projections suggesting a major increase by 2025 (4). More recent national and international estimates have shown a continued rise in diabetes prevalence, with reported rates increasing from 11.77% in 2016 to 16.98% in 2018 and 17.1% in 2019. The International Diabetes Federation further estimated that 26.7% of Pakistani adults had diabetes in 2022, representing more than 33 million affected individuals (5,6). This rising prevalence indicates that complications such as diabetic foot ulcers are likely to become more common unless preventive knowledge and self-care practices are strengthened.

Diabetic foot complications are not merely the result of disease progression; they are often closely linked with preventable behavioral and educational factors. Lack of awareness, poor foot hygiene, walking barefoot, improper footwear, delayed reporting of wounds, inadequate glucose control, and failure to inspect the feet regularly can increase the risk of ulceration and amputation. Conversely, improved knowledge and consistent foot care practices can reduce the occurrence of ulcers and related complications (7). This makes patient education a central component of diabetes management. When individuals understand the importance of daily foot inspection, skin care, nail care, appropriate footwear, early recognition of warning signs, and timely consultation with healthcare professionals, they are more likely to take preventive action before minor problems progress into serious infections. Evidence from different countries shows that knowledge and practice regarding diabetic foot care vary considerably among diabetic populations. In Malaysia, a considerable proportion of patients demonstrated poor foot care habits and inadequate awareness, with 61.8% showing poor practices and 58% having insufficient knowledge regarding foot care. In India, only a small percentage of participants reported receiving foot care information from healthcare professionals. In contrast, findings from China showed relatively better knowledge levels, although good practice did not always match the level of awareness, suggesting that knowledge alone may not automatically translate into appropriate self-care behavior (8). These findings highlight an important gap: patients may either lack adequate information or may fail to apply available knowledge in their daily routines. Therefore, assessing both knowledge and practice is essential for understanding the true preventive behavior of diabetic individuals.

Diabetes education is a continuous and patient-centered process that enables individuals to participate actively in their own care. It helps patients overcome psychological, cultural, and behavioral barriers, improves confidence in self-management, and supports informed decision-making. Foot care education is particularly important because many diabetic foot complications begin silently. A small blister, unnoticed cut, cracked skin, or pressure mark may progress into ulceration when sensory loss is present. Regular foot examination, early identification of skin changes, avoidance of trauma, and timely medical consultation can prevent deterioration and reduce the risk of amputation (9). For this reason, the American Diabetes Association recommends that all diabetic patients should receive education regarding self-foot care to improve awareness and promote safe preventive behavior (10). Healthcare professionals, especially nurses and primary care providers, play a critical role in promoting diabetic foot care. Their responsibilities include educating patients about risk avoidance, encouraging daily foot inspection, guiding appropriate footwear selection, performing routine foot examinations, identifying high-risk patients, and ensuring timely referral and follow-up. The main goals of diabetic foot care are to prevent avoidable injury, detect problems at an early stage, educate patients before complications arise, and maintain regular surveillance for those at increased risk (11). In patients with type 2 diabetes, structured education can improve self-care behavior and reduce the risk of ulceration, amputation, and mortality associated with poor foot care practices (12).

Despite the recognized importance of diabetic foot care, the level of knowledge and the quality of daily foot care practices among diabetic patients in local healthcare settings remain insufficiently explored. In tertiary hospitals, where patients often present with advanced or complicated disease, identifying gaps in knowledge and behavior is especially important. The central research question of the present study is whether diabetic patients attending a tertiary hospital in Peshawar possess adequate knowledge regarding diabetic

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation. ISSN: 3007-2948

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

foot care and whether this knowledge is reflected in their routine foot care practices. It is rational to hypothesize that gaps may exist between what patients know and what they actually practice, and that identifying these gaps can support the development of targeted educational interventions. Therefore, the present study aims to assess the level of knowledge regarding diabetic foot care among diabetic individuals attending a tertiary hospital in Peshawar, identify their existing foot care practices and areas requiring further attention, and compare diabetic foot care knowledge with actual self-care behaviors. By addressing these objectives, the study may provide useful evidence for improving patient education, strengthening preventive strategies, and reducing the future burden of diabetic foot complications in the local diabetic population.

METHODS

A quantitative descriptive cross-sectional study design was used to assess knowledge and practices regarding diabetic foot care among diabetic patients. The study was conducted in three selected private-sector teaching hospitals of Peshawar, namely Kuwait Teaching Hospital, Mercy Teaching Hospital, and Prime Teaching Hospital. The total study duration was six months, from July 2025 to December 2025. This design was considered appropriate because the study aimed to measure the existing level of knowledge and routine foot care practices among diabetic patients at a single point in time, rather than assessing the effect of an intervention or following participants over a prolonged period. The study population comprised adult diabetic patients attending the selected hospitals during the data collection period. The sample size was calculated using the RaoSoft online sample size calculator, with a 95% confidence level, 5% margin of error, and an estimated population size of up to 200,000. Based on these assumptions, the required sample size was 384 participants. Participants were recruited through a consecutive sampling technique, in which eligible diabetic patients were enrolled in sequence until the desired sample size was achieved. This approach allowed practical recruitment of patients from clinical settings during the defined study period.

Patients were included if they were diagnosed with diabetes mellitus, aged 18 years or above, cognitively able to understand and respond to the questionnaire, and willing to participate in the study. Patients below 18 years of age, those who were terminally ill, those with significant mental health problems or impaired cognition that affected their ability to provide reliable responses, and those who declined participation were excluded from the study. These criteria were applied to ensure that participants could provide informed responses regarding their knowledge and self-care practices. Ethical approval was obtained from the Ethical Review Committee of Prime Foundation before the commencement of data collection, under approval reference number Prime/ERC/2025-39. Written informed consent was obtained from each participant after explaining the purpose, objectives, voluntary nature, and expected procedure of the study. Participants were informed that refusal to participate would not affect their treatment or care. Confidentiality and anonymity of the collected data were maintained throughout the study, and the information obtained was used only for research purposes.

Data were collected using a structured and previously validated questionnaire titled “Assessing Knowledge among Diabetic Patients Regarding Diabetic Foot Care at a Tertiary Hospital in Peshawar,” which had originally been used in India (13). The questionnaire was provided to participants along with an information sheet explaining the study in clear and understandable language. The tool included sections related to demographic characteristics, diabetes-related information, history of foot problems, current foot or leg conditions, knowledge of diabetic foot care, daily foot care practices, footwear habits, safety and preventive measures, and previous exposure to foot care education. Participants were guided regarding how to complete the questionnaire, and assistance was provided where clarification was required, without influencing their responses. After completion of data collection, the responses were checked for completeness and entered for statistical analysis. Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables such as gender, educational status, knowledge categories, and foot care practices. Mean and standard deviation were used for continuous variables where applicable. Inferential analysis was performed using the Chi-square test of independence to determine associations between categorical variables, including education level, knowledge regarding diabetic foot care, and reported foot care practices. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 384 diabetic patients participated in the study. The largest proportion of participants belonged to the 46–60 years age group, representing 33.9% (n = 130), followed by the 31–45 years age group at 28.6% (n = 110). Participants aged 18–30 years and those above 60 years were equally represented, with each group comprising 18.8% (n = 72) of the sample. Regarding educational status, 24.7% (n = 95) had completed SSC, 20.8% (n = 80) were illiterate, 18.2% (n = 70) had completed HSSC, 15.6% (n = 60) were undergraduates, 11.7% (n = 45) had BS-level education, and 8.9% (n = 34) had education at master’s level or above. Participants were equally recruited from Kuwait Teaching Hospital, Mercy Teaching Hospital, and Prime Teaching Hospital, with each hospital contributing 33.3% (n = 128) of the total sample. The overall level of knowledge regarding diabetic foot care showed that 36.5% (n = 140) of participants had moderate knowledge, 35.2% (n = 135) had poor knowledge, and 28.4% (n = 109) had good knowledge. The assessment of diabetic foot care practices showed that 39.0% (n = 150) of participants had poor practice, 37.8% (n = 145) had adequate practice, and 23.2% (n = 89) had good practice.

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

The distribution of knowledge levels varied across educational categories. Among illiterate participants, 56.3% (n = 45) had poor knowledge, 31.3% (n = 25) had moderate knowledge, and 12.5% (n = 10) had good knowledge. Among participants with SSC education, 42.1% (n = 40) had poor knowledge, 36.8% (n = 35) had moderate knowledge, and 21.1% (n = 20) had good knowledge. In the HSSC group, poor and good knowledge were each observed in 28.6% (n = 20), while 42.9% (n = 30) had moderate knowledge. Among undergraduate participants, 25.0% (n = 15) had poor knowledge, 41.7% (n = 25) had moderate knowledge, and 33.3% (n = 20) had good knowledge. In participants with BS-level education, 22.2% (n = 10) had poor knowledge, 33.3% (n = 15) had moderate knowledge, and 44.4% (n = 20) had good knowledge. Among those with master's-level education or above, 14.7% (n = 5) had poor knowledge, 29.4% (n = 10) had moderate knowledge, and 55.9% (n = 19) had good knowledge. The comparison between knowledge level and foot care practices showed that among participants with poor knowledge, 66.7% (n = 90) had poor practice, 25.9% (n = 35) had adequate practice, and 7.4% (n = 10) had good practice. Among participants with moderate knowledge, 35.7% (n = 50) had poor practice, 42.9% (n = 60) had adequate practice, and 21.4% (n = 30) had good practice. Among participants with good knowledge, 9.2% (n = 10) had poor practice, 45.9% (n = 50) had adequate practice, and 45.0% (n = 49) had good practice. The Chi-square test of independence showed a statistically significant association between knowledge level and diabetic foot care practice level ($\chi^2 = 96.4$, df = 4, $p < 0.001$).

Regarding previous foot-related problems, 36.5% (n = 140) of participants reported a slow-healing wound lasting more than two weeks, 24.7% (n = 95) reported a previous history of foot ulcer, and 10.4% (n = 40) reported a history of amputation. Current foot or leg problems were also reported by a notable proportion of participants. Numbness or tingling sensation was reported by 54.7% (n = 210), pain or cramps in the legs or feet by 46.9% (n = 180), calluses by 41.7% (n = 160), current ulcer, blister, or sore by 22.1% (n = 85), and blood or discharge on socks by 18.2% (n = 70). For routine foot care practices, 74.2% (n = 285) of participants reported daily foot washing, 65.1% (n = 250) were able to see or reach the bottom of their feet, and 65.1% (n = 250) reported regular toenail cutting. However, only 49.5% (n = 190) reported drying between the toes properly, while 41.7% (n = 160) reported using moisturizing cream. With regard to footwear and socks, 53.4% (n = 205) reported using appropriate footwear such as athletic or leather shoes, while 46.6% (n = 179) reported using inappropriate footwear such as slippers, flip-flops, or high heels. Cotton socks were used by 57.3% (n = 220), whereas 42.7% (n = 164) reported using synthetic or otherwise inappropriate socks.

Safety and preventive practices showed variable responses. Foot soaking was reported by 39.1% (n = 150), checking water temperature before use by 36.5% (n = 140), walking barefoot by 44.3% (n = 170), inspecting shoes before use by 39.1% (n = 150), and smoking by 31.3% (n = 120). In relation to foot care education, 26.0% (n = 100) had attended a foot care education session, 31.3% (n = 120) had read foot care handouts, and 80.7% (n = 310) expressed a desire to receive diabetic foot care education. Domain-wise practice scores showed that foot care practices had the highest mean score of 5.48 ± 1.67, followed by safety and prevention practices with a mean score of 4.89 ± 1.71 and footwear practices with a mean score of 4.36 ± 1.54. Current foot problems had a mean score of 3.12 ± 1.02, while history of foot problems had a mean score of 2.41 ± 0.89. Foot care education had the lowest mean score of 1.84 ± 0.96.

Table: Socio-demographic Characteristics, Knowledge Level, and Foot Care Practice Level of Participants (N = 384)

Variable	Category	Frequency (n)	Percentage (%)
Age group	18–30 years	72	18.8
	31–45 years	110	28.6
	46–60 years	130	33.9
	>60 years	72	18.8
Education level	Illiterate	80	20.8
	SSC	95	24.7
	HSSC	70	18.2
	Undergraduate	60	15.6
	BS	45	11.7
	Master and above	34	8.9
Hospital name	Kuwait Teaching Hospital	128	33.3
	Mercy Teaching Hospital	128	33.3
	Prime Teaching Hospital	128	33.3

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

Knowledge level	Poor knowledge	135	35.2
	Moderate knowledge	140	36.5
	Good knowledge	109	28.4
Practice level	Poor practice	150	39.0
	Adequate practice	145	37.8
	Good practice	89	23.2

Table: Association between Education Level and Knowledge of Diabetic Foot Care (n = 384)

Education Level	Poor n (%)	Moderate n (%)	Good n (%)	Total n (%)
Illiterate	45 (56.3)	25 (31.3)	10 (12.5)	80 (100)
SSC	40 (42.1)	35 (36.8)	20 (21.1)	95 (100)
HSSC	20 (28.6)	30 (42.9)	20 (28.6)	70 (100)
Undergraduate	15 (25.0)	25 (41.7)	20 (33.3)	60 (100)
BS	10 (22.2)	15 (33.3)	20 (44.4)	45 (100)
Master & Above	5 (14.7)	10 (29.4)	19 (55.9)	34 (100)
Total	135	140	109	384 (100)

Table: Chi-square Test and Association between Knowledge Level and Foot Care Practices among Diabetic Participants(n = 384)

Knowledge Level	Poor Practice Frequency Percentage (%)	Adequate Practice Frequency Percentage (%)	Good Practice Frequency Percentage (%)	Total Frequency Percentage (%)
Poor Knowledge (n=135)	90 (66.7)	35 (25.9)	10 (7.4)	135 (100)
Moderate Knowledge (n=140)	50 (35.7)	60 (42.9)	30 (21.4)	140 (100)
Good Knowledge (n=109)	10 (9.2)	50 (45.9)	49 (45.0)	109 (100)
Total	150 (39.1)	145 (37.8)	89 (23.1)	384 (100)
Chi-square test of independence	χ^2 Value	Degrees of Freedom (df)	p-value	
	96.4	4	<0.001	

Table: Frequency and Percentage of Diabetic Foot Care Practices (n = 384)

Item	Yes Frequency and Percentage (%)	No Frequency and Percentage (%)
History of Foot Problems		
Slow-healing wound (>2 weeks)	140 (36.5)	244 (63.5)
History of foot ulcer	95 (24.7)	289 (75.3)
History of amputation	40 (10.4)	344 (89.6)
Current Foot or Leg Problems		
Current ulcer/blister/sore	85 (22.1)	299 (77.9)
Blood/discharge on socks	70 (18.2)	314 (81.8)

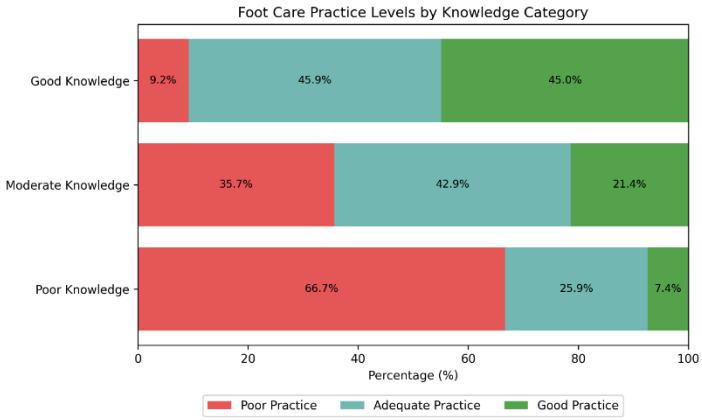
© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

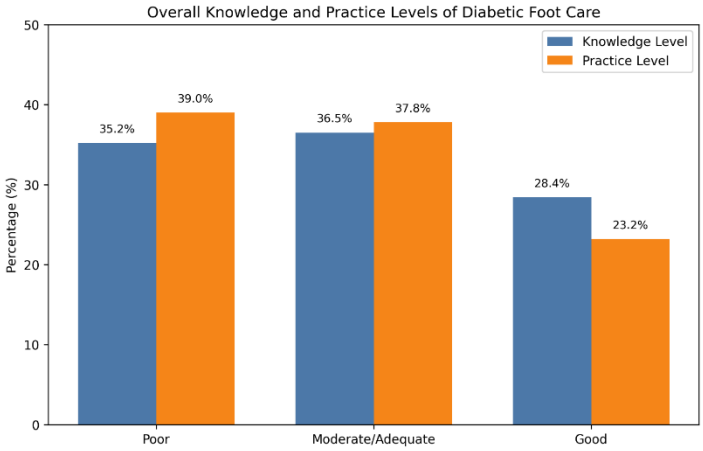
Calluses on feet	160 (41.7)	224 (58.3)
Numbness/tingling sensation	210 (54.7)	174 (45.3)
Pain/cramps in legs/feet	180 (46.9)	204 (53.1)
Foot Care Practices		
Can see/reach bottom of feet	250 (65.1)	134 (34.9)
Daily foot washing	285 (74.2)	99 (25.8)
Dry between toes properly	190 (49.5)	194 (50.5)
Use moisturizing cream	160 (41.7)	224 (58.3)
Regular toenail cutting	250 (65.1)	134 (34.9)
Footwear and Socks Practices		
Appropriate footwear use (athletic/leather)	205 (53.4)	179 (46.6)
Inappropriate footwear use (slippers/flip flops/high heels)	179 (46.6)	205 (53.4)
Cotton socks use	220 (57.3)	164 (42.7)
Synthetic/inappropriate socks	164 (42.7)	220 (57.3)
Safety and Prevention Practices		
Soaking feet	150 (39.1)	234 (60.9)
Checking water temperature	140 (36.5)	244 (63.5)
Walking barefoot	170 (44.3)	214 (55.7)
Inspecting shoes before use	150 (39.1)	234 (60.9)
Smoking	120 (31.3)	264 (68.7)
Foot Care Education		
Attended foot care education	100 (26.0)	284 (74.0)
Read foot care handouts	120 (31.3)	264 (68.7)
Wants foot care education	310 (80.7)	74 (19.3)

Table: Domain-wise Mean and Standard Deviation of Diabetic Foot Care Practices (n = 384)

Domain	Mean	Std. Deviation
History of Foot Problems	2.41	0.89
Current Foot Problems	3.12	1.02
Foot Care Practices	5.48	1.67
Footwear Practices	4.36	1.54
Safety & Prevention	4.89	1.71
Foot Care Education	1.84	0.96

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.





DISCUSSION

This study assessed knowledge and practices related to diabetic foot care among diabetic patients attending tertiary care hospitals in Peshawar. The findings showed that although a proportion of participants had some understanding of diabetic foot care, substantial gaps remained in both knowledge and day-to-day preventive practices. Only 28.4% of participants demonstrated good knowledge, while 36.5% had moderate knowledge and 35.2% had poor knowledge. This pattern indicated that a considerable number of diabetic patients lacked adequate awareness of foot care measures that are essential for preventing ulcers, infections, delayed wound healing, and lower-limb complications. Similar findings were reported in a previous study conducted in Pakistan, where more than half of diabetic patients had insufficient knowledge regarding appropriate foot care (14). A comparable study conducted in Saudi Arabia also reported that only a limited proportion of diabetic patients had good knowledge, suggesting that poor awareness of diabetic foot care remains a concern across different healthcare settings and populations (15). The practice-related findings further demonstrated that knowledge did not fully translate into appropriate self-care behavior. Only 23.2% of participants had good diabetic foot care practices, whereas 39.0% had poor practices and 37.8% had adequate practices. This gap between knowledge and practice was clinically important because diabetic foot complications often develop silently and may progress rapidly when daily preventive behaviors are neglected. Previous literature has similarly shown that even when patients possess a moderate level of awareness, their actual foot care practices may remain inadequate due to behavioral barriers, limited counseling, low perceived risk, financial constraints, cultural habits, or lack of routine reinforcement by healthcare providers (16). Another study also reported that better knowledge did not always guarantee proper practice, emphasizing that patient education must be supported by practical demonstrations, follow-up counseling, and behavior-focused interventions (17).

A statistically significant association was observed between knowledge level and diabetic foot care practices, indicating that participants with better knowledge were more likely to report adequate or good practices. Among participants with poor knowledge, 66.7% had poor practice, while only 7.4% had good practice. In contrast, among those with good knowledge, 45.0% demonstrated good practice and only 9.2% had poor practice. The association between knowledge and practice was highly significant, as shown by the Chi-square test ($\chi^2 = 96.4$, df = 4, $p < 0.001$). These findings supported the view that improving patient knowledge may contribute to better self-care behavior, although education alone may not be sufficient unless it is repeated, understandable, culturally appropriate, and linked with practical skill development. Similar evidence has shown that structured patient education can improve diabetic foot self-care behaviors and reduce risk-related practices (18). Educational interventions have also been reported to produce meaningful improvement in diabetic foot care behavior when they are delivered through organized and patient-centered programs (19). Educational status appeared to have an important relationship with diabetic foot care knowledge. Participants with higher educational attainment showed better knowledge compared with those who were illiterate or had lower levels of formal education. Among illiterate participants, 56.3% had poor knowledge and only 12.5% had good knowledge, whereas among participants with master's-level education or above, 55.9% had good knowledge and only 14.7% had poor knowledge. This finding highlighted the role of literacy and health literacy in understanding disease complications and preventive care instructions. Previous studies have also reported that educational status strongly influences diabetes-related knowledge and self-care activities (20). Similar findings have shown that patients with higher education were more likely to understand diabetic foot care recommendations and apply preventive measures in daily life (21). However, the relationship between education and knowledge should not be interpreted as a reason to focus only on formally educated patients. Instead, it emphasized the need for simple, visual, repeated, and language-appropriate education for patients with low literacy levels.

The detailed practice assessment revealed several clinically relevant concerns. A large proportion of participants reported symptoms suggestive of neuropathy or lower-limb complications, including numbness or tingling sensation in 54.7%, pain or cramps in the legs or feet in 46.9%, calluses in 41.7%, and current ulcer, blister, or sore in 22.1%. Previous slow-healing wounds were reported by 36.5%,

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

while 24.7% had a history of foot ulcer. These findings indicated that many participants already had warning signs or previous complications that could increase their future risk of diabetic foot morbidity. Similar studies from low-resource settings have reported that neuropathic symptoms, high-risk behaviors, and inadequate preventive practices contribute substantially to diabetic foot complications (22). Several daily care practices were also suboptimal. Although 74.2% of participants reported daily foot washing and 65.1% reported regular toenail cutting, only 49.5% dried between the toes properly and only 41.7% used moisturizing cream. Footwear-related practices were also inconsistent, as 46.6% reported using inappropriate footwear such as slippers, flip-flops, or high heels, and 42.7% used synthetic or unsuitable socks. Preventive behaviors were similarly inadequate, with 44.3% reporting barefoot walking, only 36.5% checking water temperature, and only 39.1% inspecting shoes before use. These findings had practical importance because small injuries, burns, pressure areas, fungal infections, or unnoticed foreign bodies inside shoes may progress to ulcers in patients with neuropathy or vascular compromise. Therefore, diabetic foot care education should not remain limited to general advice but should include demonstration of foot inspection, safe nail care, proper drying, moisturizing techniques, footwear selection, and avoidance of barefoot walking.

One of the most important findings was the limited exposure of participants to formal diabetic foot care education. Only 26.0% had attended a foot care education session and 31.3% had read foot care handouts, whereas 80.7% expressed willingness to receive foot care education. This contrast suggested that patients were receptive to learning, but structured educational opportunities were not reaching most of them. Similar patterns have been reported in previous research, where organized foot care education was underused despite its potential to improve patient outcomes (23). The domain-wise analysis also supported this concern, as foot care education had the lowest mean score of 1.84 ± 0.96, while basic foot care practices showed comparatively higher values. These findings strengthened the argument that healthcare facilities should integrate diabetic foot education into routine outpatient and inpatient diabetes care. Previous evidence has also emphasized that educational interventions play a central role in improving awareness, preventive behaviors, and early reporting of foot problems (24). The findings of this study had important clinical and public health implications. Since diabetic foot complications are largely preventable, hospitals should develop structured education protocols for diabetic patients, especially those with poor literacy, previous foot problems, neuropathic symptoms, or unsafe footwear habits. Nurses, physicians, physiotherapists, diabetes educators, and podiatrists can contribute to routine foot screening and counseling. Simple interventions such as illustrated handouts, foot care demonstrations, reminder cards, footwear counseling, and regular follow-up assessment may improve adherence. The high willingness to receive education suggested that patients may respond positively if education is provided in a clear, respectful, and practical manner.

This study had several strengths. It included a relatively large sample of 384 diabetic patients and collected data from three tertiary care hospitals, which improved the breadth of representation within the selected setting. The study assessed multiple dimensions of diabetic foot care, including knowledge, practice, footwear habits, safety behaviors, current symptoms, previous foot problems, and educational exposure. The use of a structured and previously validated questionnaire also strengthened the consistency of data collection. In addition, inferential analysis was performed to examine the association between knowledge and practice, which added analytical value beyond simple descriptive reporting. The study also had some limitations that should be considered while interpreting the findings. The cross-sectional design allowed assessment of knowledge and practices at one point in time, but it did not establish causality. Consecutive sampling may have introduced selection bias, and the inclusion of only selected private-sector hospitals in Peshawar may limit the generalizability of the findings to public hospitals, rural communities, and other regions of Pakistan. The use of self-reported responses may also have introduced recall bias and social desirability bias, as participants might have overreported desirable practices such as daily washing or regular nail care. The study also did not include some clinically relevant variables such as duration of diabetes, type of diabetes, glycemic control, treatment modality, socioeconomic status, previous diabetes education, presence of diagnosed neuropathy, peripheral vascular disease, or history of formal foot examination by healthcare professionals. These factors may influence both knowledge and practice and should be included in future research.

Another important methodological issue was the need for consistency between eligibility criteria and reported findings. If patients with a history of amputation were excluded, then the reported frequency of previous amputation required rechecking or clarification. Similarly, if participants were recruited equally from each hospital, this approach may reflect quota-based recruitment rather than purely consecutive sampling. Addressing these points would improve methodological transparency and strengthen the credibility of the findings. Future studies should consider multicenter designs that include public and private hospitals, rural and urban populations, and patients from different socioeconomic backgrounds. Longitudinal or interventional studies would be useful to determine whether structured diabetic foot education improves knowledge, modifies behavior, and reduces ulcer-related outcomes over time. Qualitative research may also help explore cultural beliefs, financial barriers, footwear preferences, healthcare access issues, and patient perceptions that influence diabetic foot care behavior. Overall, the findings indicated that diabetic foot care knowledge and practices among the studied population were not optimal, and that structured, accessible, and repeated patient education should be prioritized to reduce preventable diabetic foot complications.

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

CONCLUSION

The study concluded that diabetic patients attending tertiary care hospitals in Peshawar had insufficient knowledge and inconsistent practices regarding diabetic foot care. Although some participants were aware of basic preventive measures, many did not follow essential self-care behaviors such as regular foot inspection, safe footwear use, proper hygiene, and avoidance of barefoot walking. Education appeared to play an important role in improving awareness, and better knowledge was linked with safer foot care practices. The findings highlight the need for structured, simple, and repeated foot care education in routine diabetes care, so that patients can recognize risks early, adopt protective habits, and reduce preventable complications such as foot ulcers, infections, and amputations.

AUTHOR CONTRIBUTION

Author	Contribution
Ayaz Ur Rahman	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Tariq Khan	Methodology, Investigation, Data Curation, Writing - Review & Editing
Zaid Ahmad	Investigation, Data Curation, Formal Analysis, Software
Syed Hanif Ullah	Software, Validation, Writing - Original Draft
Meraj Khan	Formal Analysis, Writing - Review & Editing
Zia Shahid	Writing - Review & Editing, Assistance with Data Curation
Faisal Muhammad	Formal Analysis, Writing - Review & Editing
Inayat Ullah	Writing - Review & Editing, Assistance with Data Curation

REFERENCES

1. Untari EK, Andayani TM, Yasin NM, Asdie RH. A Review of Patient's Knowledge and Practice of Diabetic Foot Self-Care. Malaysian J Med Sci. 2024;31(1):33–50.

2. Qasim M, Rashid MU, Islam H, Amjad D, Ehsan SB. Knowledge, attitude, and practice of diabetic patients regarding foot care: Experience from a single tertiary care outpatient clinic. 2021;49:101843.

3. P DT, Munya P. Assess the knowledge and practice on foot self-care among patients with diabetic mellitus. Int J Adv Res Med Surg Nurs. 2020;2(2):36–9.

4. Musaddiq M, Parveen R, Zaib M, Khan AU, Mahmood A, Jaffar G. Knowledge Level of Diabetic Patients about Diabetic Foot Risk Factors. Pakistan J Med Heal Sci. 2022;16(1):795–7.

5. Azeem S, Khan U, Liaquat A. The increasing rate of diabetes in Pakistan: A silent killer. Ann Med Surg . 2022;79(May):103901.

6. Shaqran TM, Alqahtani SN, Alhalafi AF, Alsabeelah NM, Algethmi RA, Azhari AS, et al. Knowledge, Attitude, and Practices Related to Foot Care Among Diabetic Patients in Tabuk City, Saudi Arabia. Cureus. 2023;15(11).

7. Gökdeniz D, Akgün Şahin Z. Evaluation of Knowledge Levels About Diabetes Foot Care and Self-Care Activities in Diabetic Individuals. Int J Low Extrem Wounds. 2022;21(1):65–74.

8. Khan, A., et al. (2021). Knowledge and practices of diabetic foot care in Pakistan. Journal of Diabetes Research, 2021, 1–7.

9. Alshammari, M., et al. (2022). Awareness of diabetic foot care among patients in Saudi Arabia. Healthcare, 10(4), 689.

10. Dikeukwu, S., et al. (2020). Knowledge and practice of foot care among diabetic patients. African Health Sciences, 20(2), 789–795.

11. Zhang, R., et al. (2021). Knowledge-practice gap in diabetic foot care. BMC Endocrine Disorders, 21, 145.

12. Abu-Qamar, L., et al. (2020). Impact of education on diabetic foot care practices. Journal of Nursing Care Quality, 35(3), 245–251.

13. Basu, T., et al. (2023). Effectiveness of educational interventions on diabetic foot care. International Journal of Nursing Studies, 137, 104412.

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

14. Ullah, N., et al. (2022). Role of education in diabetes self-care practices. Pakistan Journal of Public Health, 12(2), 85–90.

15. Mohammed, E., et al. (2021). Knowledge of diabetic foot care in Ethiopia. BMC Nursing, 20(1), 67.

16. Mutebi, J., et al. (2022). Diabetic foot care practices in low-resource settings. PLoS ONE, 17(6), e0269451.

17. Alharbi, K., et al. (2023). Patient education and diabetic foot outcomes. Diabetes Therapy, 14(2), 567–578.

18. Singh, P., et al. (2020). Effect of educational programs on diabetic foot care. Nursing Open, 7(5), 1532–1539.

19. Cahn A, Kulikovsky M, Zucker I. [Diabetic Foot In Israel - Current Status And Future Perspectives]. Harefuah. 2021;160(10):679-84.

20. Yang L, Wu Y, Zhou C, Xie C, Jiang Y, Wang R, et al. Diabetic foot ulcer risk assessment and prevention in patients with diabetes: a best practice implementation project. JBI Evid Implement. 2022;20(4):269-79.

21. Sharif H, Kadir M, Hashmi M, Naz S, Azam I, Imam A, et al. Effectiveness of pictorial educational intervention on foot care among individuals having type 2 diabetes at slums of Karachi, Pakistan: asingle blinded randomized control trial. BMC Public Health. 2025;25(1):3214.

22. Liew H, Pienkowska A, Ang CS, Mahadzir MDA, Goh KFI, Lodh N, et al. Empowering Foot Care Literacy Among People Living With Diabetes and Their Carers With an mHealth App: Protocol for a Feasibility Study. JMIR Res Protoc. 2023;12:e52036.

23. Alkhatieb M, Abdulwassi H, Fallatah A, Alghamdi K, Al-Abbadi W, Altaifi R. Knowledge of Diabetic Foot Among Nurses at a Tertiary Hospital in Saudi Arabia. Med Arch. 2022;76(3):190-7.

24. Xiong C, He Y, Zhang Y, Mai L, Chen J, Zhang Y, et al. Relationship between illness perception and self-management behaviors among Chinese diabetic foot patients. Jpn J Nurs Sci. 2023;20(4):e12550.

© 2026 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.