

Evaluation of Awareness levels about foot care and its impact on foot care practices among Diabetic Individuals in Pakistan

HAMZA AZIZ¹, FATIMA HAYAT², MUHAMMAD IBRAHIM³, MASHAL AZIZ⁴, MAHNOOR KHURRAM⁵, RIMSHA RANA⁶, ROHMA SHAHBAZ⁷

^{1,2,5}HO, Army Medical College Rawalpindi

³HO, Holy Family Hospital Rawalpindi

⁴HO, Shifa International Hospital Islamabad

⁶HO, Nishtar Medical University Multan

⁷HO, CMH, Multan

Correspondence to Dr. Hamza Aziz, Email: hamzaaziz1029@gmail.com, Contact: 03008530549

ABSTRACT

Background: This research covers a very important topic in today's time, diabetic foot care. To prevent its complications, an in depth understanding of awareness levels and practices about foot care among diabetic individuals is very important.

Aim: To assess awareness levels about foot care and its impact on foot care practices among diabetic individuals.

Methods: The population of the study was composed of the diabetic patients coming to outpatient departments in a tertiary care hospital in Rawalpindi. The study was carried out over a period of 6 months from January 2024 to June 2024. The participants were enrolled through non-probability convenience sampling. 266 diabetic patients participated in the research who met the inclusion criteria. Data was collected by using a structured questionnaire.

Results: A total of 266 valid responses were received that were analyzed using SPSS v25, out of which 124 (46.6%) are males and 142 (53.4%) are females. The analysis showed that there is a weak positive correlation between the total knowledge and total practice scores of 0.174 (p value 0.004).

Conclusion: Older patients, male population, patients with other chronic diseases, patients who received a formal education about diabetes foot complications, and patients having diabetes for more than 20 years show greater knowledge and better practice to protect from diabetic foot complications. It is imperative to inform people with diabetes that proper foot care is crucial in preventing the formation of wounds.

Keywords: Diabetes Mellitus, Diabetic Foot, Chronic diseases, foot care practices

INTRODUCTION

Diabetes mellitus, a class of metabolic diseases, is characterized by hyperglycemia brought on by abnormalities in insulin secretion, action, or both. A diabetic foot ulcer is defined as a full-thickness wound that destroys the deep tissues, develops at a level distal to the ankle, and is associated with neurological abnormalities in patients with diabetes. Because of this massive global epidemic of diabetes, both the World Health Organization (WHO) and the United Nations have focused on diabetes as a major global health concern.^{1,2} It is possibly the most significant non-communicable disease promoted by an unhealthy modern lifestyle. Diabetes accounts for close to 3 million deaths annually, making it the fourth leading cause of death globally³. Over the last forty years, there has been a decrease in the death rate from vascular disease among both those with and without diabetes^{4,5}.

Diabetic foot is the most significant complication associated with diabetes, with a high prevalence, mortality rate, and cost. When compared to a person without diabetes, the risk of amputation is 25 times higher in diabetics⁶. According to the American Diabetes Association, daily foot care alone is not enough to prevent half of amputations; rather, a complex series of actions, including self-care and better treatment of ulcers, are needed⁷.

Individuals with diabetic foot problems do not practice proper self-care.⁸ Research has shown that people with diabetic foot problems are less likely to regularly examine and clean their feet, moisturize their skin, take care of their nails, and protect themselves from injuries. They fail to appropriately choose shoes, other foot materials, or seek professional assistance when needed in comparison to those without diabetic foot problems⁹. Diabetes and its complications are highly prevalent in Pakistan³, posing a serious threat to the country's current healthcare system⁹.

Pakistan's first set of national practice guidelines was released in 1999. It was particularly beneficial for standardizing Type-2 diabetes care⁹. Following a diagnosis, it's critical to aid diabetes patients by routinely checking their feet and acquiring

defensive behaviors through instruction¹⁰. Preventing hazards, establishing early diagnosis, teaching the patient how to take care of their feet from the very first visit to the doctor or clinic, and conducting foot evaluations and consistent follow-up at each evaluation are the main purposes of diabetes foot care¹¹.

Diabetes self-care habits include adhering to a strict diet, exercising, taking medication, taking good care of one's feet on a daily basis, checking one's own blood glucose level, and abiding by health regulations¹². People with diabetes who learn self-care techniques reduce their risk of developing diabetic foot ulcers¹¹⁻¹³.

The objective of the study was to assess awareness levels about foot care and its impact on foot care practices among diabetic individuals.

METHODOLOGY

Study design: This descriptive study aimed at evaluating the diabetic person's level of foot care knowledge and self-care practices. The population of the study was composed of the diabetic patients coming to outpatient departments in tertiary care hospitals in Rawalpindi. The study was carried out over a period of 6 months from January 2024 to June 2024. The participants were enrolled through non probability convenience sampling. The study was completed with 266 diabetic patients whose participation in the research was voluntary, and they were fully explained the purpose, benefits, and risks of the study before hand. Data was collected by using a structured questionnaire. After taking informed consent and permission from IRB, the questionnaire was filled outpatients were sent the questionnaire via Google Forms by the researchers for interviewing the participants. A few patients were sent the questionnaire via Google Forms.

Inclusion criteria

- Having type 2 diabetes and being at least eighteen years old
- Giving their free will to participate in the study
- Have type 2 diabetes for a minimum of a year since receiving a diagnosis.
- Being a patient in an outpatient clinic
- Possessing cognitive ability

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Exclusion criteria

- All patients admitted in hospital wards
- Those having impaired cognition
- The ones who did not consent to being interviewed
- The ones who did not completely fill out the questionnaires

Data Collection Tools: The tool used for data collection is a structured questionnaire containing four sections. First containing the patient particulars, whereas the next 2 sections contained questions on knowledge and practices of diabetic foot care, respectively.

Data Collection: The researcher explained the goal of the study to the participants who met the inclusion criteria and assured them that the data they submitted would only be utilized for the study. Both in-person and using Google Forms, the questionnaire was completed. The researchers filled out the forms for the illiterate patients, whereas the literate patients filled out the questionnaires themselves. The questionnaire took, on average, twenty to twenty-five minutes to complete.

Statistical Analysis: Statistical analysis was performed using SPSS version 25. While the numeric variables were summarized by mean ± standard deviation or the median values, categorical variables were expressed with number and percentage. p-value<0.05 was taken as statistically significant.

RESULTS

In total, 266 diabetic patients were surveyed comprising 124 (46.6%) males and 142 (53.4%) females. 86 patients (32.3%) had diabetes for 11-20 years whereas 28 (10.5%) had diabetes for greater than 20 years. 240(90.2%) patients were being treated with oral antihyperglycemics whereas 26 (9.8%) were being treated with insulin. 188 diabetics (70.7%) had received education related to diabetes and its complications.

Table1. Demographic characteristics of 266 diabetic patients attending the Tertiary Care Hospital, Rawalpindi, Pakistan

Demographics	n	Percentage
Gender		
Female	142	53.4
Male	124	46.6
Age Groups (years)		
<45	60	22.6
46-55	94	35.3
55-65	76	28.6
>65	36	13.5
Marital Status		
Single	92	34.6
Married	188	70.7
Educational Status		
Literate	30	11.3
Matric	154	57.9
Primary	40	15.8
Illiterate	42	15.8
Occupational Status		
Employed	106	39.8
Unemployed	160	60.2
Duration of Diabetes (years)		
1-10	152	57.1
11-20	86	32.3
>20	28	10.5
Smoking Status		
Quit	24	9.0
Smoke	28	10.5
Never Smoke	214	80.5
Presence of another chronic disease		
No	82	30.8
Yes	184	69.2
Type of Diabetes Treatment		
Oral medicine	240	90.2
Insulin	26	9.8
Receive Education related to Diabetes		
Yes	78	29.3
No	188	70.7
Foot Problems after Diabetes diagnosis		
Yes	174	65.4
No	92	34.6

Table 2: Responses to questions on knowledge, and practice of diabetic foot among 266 diabetic patients attending the Tertiary Care Hospital, Rawalpindi, Pakistan.

Questions	n (%)
Practice	
Frequency of doing leg and foot exercises	
Never	64 (24.1)
Sometimes	58 (21.8)
Often	4 (1.5)
Always	140 (52.6)
Frequency of doing foot examination	
Never	98 (36.8)
Sometimes	68 (25.6)
Often	58 (21.8)
Always	42 (15.8)
Treating high blood sugar levels correctly	
Never	54 (20.3)
Sometimes	70 (26.3)
Often	46 (17.3)
Always	96 (36.1)
Washing feet daily	
Never	48 (18)
Sometimes	112 (42.1)
Often	52 (19.5)
Always	54 (20.3)
Contacting doctor when necessary	
Never	20 (7.5)
Sometimes	96 (36.1)
Often	48 (18.0)
Always	102 (38.3)
Inspecting shoes before wearing them	
Never	40 (15.1)
Sometimes	134 (50.4)
Often	44 (16.5)
Always	48 (18.0)
Trimming toenails straight and filing edges	
Never	76 (28.6)
Sometimes	89 (33.5)
Often	40 (15.0)
Always	48 (18.0)
Applying lotion/moisturizer on feet	
Never	36 (13.5)
Sometimes	86 (32.3)
Often	100 (37.6)
Always	44 (16.5)
Protecting and keeping feet away from hot and cold temperature	
Never	109 (41.0)
Sometimes	69 (25.9)
Often	28 (10.5)
Always	60 (22.6)
Drying feet and toe webs after washing	
Never	62 (23.3)
Sometimes	100 (37.6)
Often	38 (14.3)
Always	66 (24.8)
Walking bare feet outdoor	
Never	69 (25.9)
Sometimes	105 (39.4)
Often	25 (9.3)
Always	67 (25.1)
Absent or decreased sensations in feet can lead to injuries to feet	
Yes	50 (18.8)
No	216 (81.2)
Foot ulcer can cause pain in foot	
Yes	172 (64.7)
No	94 (35.3)
Changes in foot shape cause foot ulcers	
Yes	114 (42.9)
No	152 (57.1)
Foot ulcers are caused by not taking care of foot	
Yes	44 (16.5)
No	222 (83.5)
Foot ulcers can develop very fast	
Yes	54 (20.3)
No	212 (79.7)
Checking feet every day can prevent foot ulcer	
Yes	42 (15.8)
No	224 (84.2)
Foot care specialist can help in preventing foot injuries	
Yes	28 (10.5)
No	238 (89.5)

Table 1 shows the detailed demographic profile of all patients. 216 (81.2%) of the diabetics didn't know that decreased sensation in feet could lead to injuries, 238 (89.5%) didn't know that visiting a foot specialist regularly could help prevent foot injuries. 224(84.2%) of the patients didn't know that checking feet everyday could protect their feet from ulcers. Table 2 and Table 3 show the responses of all patients to questions on knowledge and practice related to diabetic foot and diabetic foot ulcer. Associations are mentioned in table 4. A general trend of increasing knowledge about diabetic foot complications is seen as the patients get older (p value 0.05). The male population shows a greater knowledge (p value <0.001) and better practice to protect

from diabetic foot complications however the association with practice is not statistically significant. Patients who have other chronic diseases tend to also have a greater knowledge about diabetic foot complications. Patients who received a formal education about diabetes foot complications show better knowledge (p value <0.001) and practice of diabetic foot complications (p value 0.016). Patients having diabetes for more than 20 years also show better knowledge (p value 0.001) and practice (p value 0.82) to protect against diabetic foot complications. There is a weak positive correlation between the total knowledge and total practice scores of 0.174 (p value 0.004).

Table 3: Association of demographic characteristics with total knowledge and practice scores.

Demographic characteristic	Total Knowledge score	P-value	Total Practice score	p-value
Age		0.05		0.719
Less than 45	5.04(SD 1.37)		14.09(SD 5.06)	
45-55	4.76 (SD 1.76)		14.96 (SD 4.88)	
55-65	5.28(SD 1.19)		14.43 (SD 5.90)	
>65	5.44 (SD 0.96)		15.02 (SD 5.34)	
Gender				
Male	5.27 (SD 1.09)	<0.001	15.08 (SD 5.58)	0.22
Female	4.95 (SD 1.52)		14.02 (SD 5.1)	
Working status				
Employed	5.05 (SD 1.34)	0.87	15.89 (SD 5.10)	0.37
Unemployed	5.13 (SD 1.36)		13.6 (SD 5.32)	
Presence of another Chronic disease				
Yes	4.94 (SD 1.56)	0.025	12.33 (SD 3.46)	0.105
No	4.08 (SD 1.13)		15.41 (SD 5.33)	
Treatment type				
Oral antihyperglycemic	5.19 (SD 2.16)	0.002	14.34 (SD 5.24)	0.088
Insulin	4.30 (SD 1.80)		16.11 (SD 6.11)	
Received education related to diabetes				
Yes	5.33 (SD 1.26)	0.07	14.94 (SD 5.37)	0.51
No	4.61 (SD 1.43)		13.48 (SD 5.17)	
Received education related to effect of diabetes on feet				
Yes	5.39 (SD 1.10)	<0.001	15.18 (SD 5.52)	0.016
No	4.41 (SD 1.62)		12.89 (SD 4.52)	
Frequency of visits to a doctor				
Never	4.00 (SD 1.81)	<0.001	13.73 (SD 5.39)	0.011
Once every 2 years	4.80 (SD 1.58)		13.00 (SD 3.97)	
Once a year	5.11 (SD 1.42)		13.91 (SD 5.40)	
Once every 1-6 Months	5.00 (SD 1.37)		16.14 (SD 5.93)	
Once every month	5.61 (SD 0.71)		13.83 (SD 5.34)	
Education level				
Illiterate (no formal education)	5.80 (SD 0.59)	<0.001	11.47 (SD 4.48)	<0.001
5 years of education (primary school)	5.15 (SD 1.25)		14.77 (SD 5.30)	
10 years of education (secondary school)	5.05 (SD 1.36)		15.34 (SD 5.53)	
Graduated	4.33 (SD 1.72)		14.11 (SD 4.06)	
Duration of diabetes				
1-10 years	4.89 (SD 1.49)	0.001	14.53 (SD 5.21)	0.825
10-20 years	5.20 (SD 1.07)		14.31 (SD 5.53)	
More than 20 years	5.92 (SD 0.89)		15.03 (SD 5.66)	

DISCUSSION

The study examined the knowledge and practices of diabetic patients regarding diabetic foot care and the correlation between awareness of the occurrence of diabetic foot problems and their self-care practices to prevent or manage the condition in Pakistan. Diabetic foot is a major complication associated with diabetes, having a high prevalence and mortality rate¹⁴. Hence, it is primary to understand and spread awareness regarding diabetic foot care and management. This study aims at evaluating the awareness levels among diabetics regarding diabetic foot care so a better understanding is made and doctors can help such patients in the future in raising awareness, self-care instructions, and protocols. Of a total number of 266 diabetic patients who participated in this study related to knowledge and awareness regarding diabetic foot care, 86 patients (32.3%) had diabetes for 11-20 years, whereas 28 (10.5%) had diabetes for greater than 20 years. Among this population, 188 diabetics (70.7%) had received education related to diabetes and its complications.

The results showed that foot problems after diabetes diagnosis were prevalent among 65.4% of participants. This is supported by medical literature that states approximately 7% of individuals with peripheral neuropathy develop diabetic foot complications^{15,16}.

A study by Hussain¹⁷ confirmed that a number of diabetic patients develop foot complications early or late in life and that it is significantly associated with male gender. Diabetes can cause impaired blood circulation and nerve damage, particularly when blood sugar levels are challenging to control. Consequently, diabetic patients may develop blisters, foot ulcers, pain, and infections in their feet. These foot related complications may lead to eventual foot amputation, so it is necessary to look after any signs and symptoms in diabetic patients and for them to be self-aware about possible risks¹⁶. Pakistan is a developing country and struggles to maintain an effective healthcare system, with limited diabetic foot complication centers. It is ranked 154th out of 195 countries on overall performance. The pooled prevalence of diabetic foot complications was 12.16%, with an increasing trend observed for the last two decades. The prevalence of diabetic foot

ulcers ranges from 2.1% to 50.9% in Pakistan, according to published data¹⁸.

Patients who received a formal education about diabetes foot complications show better knowledge (p value <0.001) and practice of diabetic foot complications (p value 0.016). Patients who have other chronic diseases tend to have greater knowledge about diabetic foot complications, as per our results from the study. Muhammad-Lutfi AR study suggested that patients who visited diabetic clinics frequently and had diabetes for >5 years had a better overall attitude towards diabetic foot care and had more knowledge. This also correlated with the literacy rate of the patients and their better learning about the care associated with diabetes complications after acquiring years' worth of knowledge of managing diabetes. They have had more opportunities to consult with doctors and nurses, seeking explanations that shorter-term diabetic patients may not have pursued^{15,19,20}. Another study by Husnain R. advocated that healthcare practitioners should not only educate the diabetic patients but also constantly keep reminding them about the complications.

Our results affirmed that the male population shows greater knowledge (p value <0.001) and better practice to protect from diabetic foot complications, which is coherent with the study, which also describes that the male population had better knowledge and understanding as 75.5% of the males said they consulted a doctor for foot wounds compared with 40.0% of females, which was seen as a major difference.²¹ Other studies backed this up as well, showing that female patients had generally less knowledge about diabetic foot complications, especially in some third world countries. Due to social and cultural beliefs, women are often restricted from attaining higher education compared to their male counterparts within the family, leading to a lesser understanding of diabetic foot care among women¹⁴. Results showed that 84.2% of the patients did not know that checking feet every day could protect their feet from ulcers and that foot ulcers are caused by not taking care of feet by 83.5% of participants, which was comparable study whereby foot care was generally inadequate owing to lack of proper knowledge and implementation of foot care practices²¹.

Furthermore, results showed that 81.2% of the diabetics did not know that decreased sensation in feet could lead to injuries, and 238 participants (89.5%) did not know that visiting a foot specialist regularly could help prevent foot injuries. It is backed up by a study, which emphasizes that deficiency in knowledge regarding foot care was the inability to detect minor foot injuries, proneness to foot ulceration, and incapable of inspection of their feet. The obstacle to practicing foot care was primarily due to comorbidity.²² Efforts to augment awareness and practices could help prevent diabetic foot ulcers and amputations eventually. Other studies suggested as well that a large population of diabetic patients were unaware of recommended practices like proper toenail trimming and regular inspection of feet and footwear as per standard guidelines, so it is deemed important that people with diabetic foot complications visit foot specialists/podiatrists so these complications can be managed effectively and timely²³.

Research showed that patients who had diabetes for a longer period had good levels of diabetes related knowledge and understanding^{24,25}. Which was consistent with our result that patients having diabetes for more than 20 years also show better knowledge (p value 0.001) and practice (p value 0.82) to protect against diabetic foot complications. A general trend of increasing knowledge about diabetic foot complications is seen as the patients get older (p value 0.05). It is associated with higher patient exposure to complications associated with diabetes and the years of experience in trying to cater to those complications along with managing them effectively and visiting healthcare providers who are keen on educating their patients about possible risks and how to manage them effectively.

However, there is a weak positive correlation between the total knowledge and total practice scores of 0.174 (p value 0.004) that is backed up by Muhammad-Lutfi AR's publication, which

predicted that there was no significant correlation between patients' demographic characteristics and their level of practice regarding diabetic foot care. Even after multiple hospital admissions due to diabetic foot complications and instructions regarding foot issues, the execution of care and practice remained poor.¹⁵ All research emphasized the need for foot care education programs, especially improving the way of delivering them²¹.

Limitations:

1. The population of the study was composed of individuals with type 2 diabetes mellitus. The results of the study can be generalized only to the patients being diagnosed with type 2 diabetes for at least 1 year.
2. Due to the cross-sectional study design of this study, the direction of casual relationships cannot be properly determined.
3. Careful interpretation of the results for this study needed to be carried out as it is based on a certain population and cannot be generalized to the entire diabetic population of healthcare centers in Pakistan.
4. A numbered participant belonged to urban areas and people from different ethnicities that may produce a varied result.

CONCLUSION

There is a weak positive correlation between the total knowledge and total practice scores. A general trend of increasing knowledge about diabetic foot complications is seen as the patients get older. The male population, patients with other chronic diseases, patients who received a formal education about diabetes foot complications, as well as patients having diabetes for more than 20 years, show greater knowledge and better practice to protect from diabetic foot complications. Therefore, it is imperative to inform people with diabetes that proper foot care is crucial in preventing the formation of wounds.

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1. Conception and design of or acquisition of data or analysis and interpretation of data.
 2. Drafting the manuscript or revising it critically for important intellectual content.
 3. Final approval of the version for publication.
- All authors agree to be responsible for all aspects of their research work.

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