

# Diabetic foot self-care: associated risk factors, awareness and practice among type II diabetic patients

Ghulam Mujtaba Nasir<sup>1</sup>, Haroon Rashid Khan<sup>2</sup>, Khuram Parvez<sup>3</sup>, Juwayria Omar<sup>4</sup>, Muhamamd Imran Sohail<sup>5</sup>

<sup>1</sup>European Fellowship at Robert Gordon University, United Kingdom

<sup>2</sup>Public Health Specialist, Dept. of Community Medicine, Islamabad Medical and Dental College, Bahrakahu Islamabad

<sup>3</sup>Emergency Medicine Consultant, Royal Blackburn Teaching Hospital, United Kingdom

<sup>4</sup>Assistant Professor, Fazaia Medical College, Air University, Islamabad

<sup>5</sup>WHO Polio Eradication Officer, Rawalpindi

## Author's Contribution

<sup>1</sup>Drafting the work or revising it critically for important intellectual content

<sup>2</sup>Final approval of the version to be published

<sup>3,4,5</sup>Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work.

Funding Source: None

Conflict of Interest: None

Received: June 9, 2019

Accepted: November 8, 2019

## Address of Correspondent

Dr. Ghulam Mujtaba Nasir  
Doctoral Researcher, Horizon  
2020, Mari Sklodowska-Curie  
European Fellowship at Robert  
Gordon University, United  
Kingdom

Email: clinix@me.com

## ABSTRACT

**Objective:** To evaluate associated risk factors, awareness and practice level of diabetic foot self-care among type II diabetic patients.

**Methodology:** A cross-sectional study was conducted at outpatient departments of Akbar Khan Niazi teaching hospital and PIMS hospital from June to December, 2018. All adult patients diagnosed as Diabetes Mellitus (DM) type 2 for at least one year without any foot related complication were selected. The questionnaire included on demographics and questions related to diabetes, awareness and practice of foot self-care.

**Results:** A total of 196 patients were enrolled, majority 116 (59.18%) of which had age of 41-60 years with 105 (53.57%) of male participants, 76 (38.78%) patients were illiterate and 93 (47.45%) were unemployed or retired. Majority of the participants 109 (55.61%) had monthly income of 25000-50000. Eighty-eight (44.90%) patients were overweight and 32 (16.33%) obese. Majority 113 (57.65%) had diabetes from 5-10 years. On the basis of HbA1c level only 58 (29.59%) patients had HbA1c level of less than 7.0%. Significant number of patients had poor knowledge (41.3%) and practice level (39.8%) regarding foot care.

**Conclusion:** Almost half of our patients attending primary healthcare centers have limited awareness and practice regarding diabetic foot self-care.

**Key Words:** Diabetic foot, Self-care, Awareness, Practice

**Cite this article as:** Nasir GM, Khan HR, Parvez K, Omar J, Sohail MI. Diabetic foot self-care: associated risk factors, awareness and practice among type II diabetic patients. *Ann Pak Inst Med Sci.* 2019; 15(3): 91-96.

## Introduction

Non-communicable diseases like obesity, diabetes mellitus and hypertension etc are becoming major health problems though out the world. One of the major challenges faced by the world is diabetes mellitus which has significant morbidity and mortality. The incidence of DM is increasing rapidly worldwide both in developing and developed countries. But this trend is more rapid in developing countries mainly due to aging, sedentary lifestyle, unhealthy diet and obesity.<sup>1</sup>

World is facing a sharp rise in prevalence of diabetes mellitus. The incidence of DM was 171 million at the end start of this century but the predictions on the basis of recent data it will reach to 366 million till the year 2030.<sup>2</sup> There are some complications associated with long term diabetes mellitus and one of them is diabetic peripheral neuropathy. Initially it affects functionally then cause structural changes in the long run. Severe morbidities like pain, foot ulcers, loss of sensation, gangrene and amputations are often triggered by neuropathy.<sup>3</sup> Full thickness infiltration of dermis of the foot in a diabetic person is called diabetic foot. Literature has revealed a

diabetic foot development rate of 2.5% in patients of diabetes mellitus each year and 15% of them develop diabetic foot during their life. Optimal metabolic control is the only available measure with proven efficacy in preventing or at least halting the progression of diabetic neuropathy.<sup>4</sup> The complications of diabetic neuropathy in the late phase are mainly irreversible. For better results it should be instituted at early stage.<sup>5</sup> Self-management and education about diabetes are essential elements of diabetes care.<sup>6</sup> Components of diabetes self-care involve, following a diet plan, reduction of weight if obese, increasing physical activity, smoking cessation, self glucose monitoring, foot care, and psychological support. Because the vast majority of day-to-day care in diabetes is handled by the patients and/or their families, there is an important need for reliable and valid measures for self-care in diabetes.<sup>7</sup> Prevention and prophylactic foot care have been advocated to decrease patient morbidity, the utilization of expensive resources, as well as the risk for amputations. These interventions, which include the identification of risk factors, patient education, and intensive podiatric care, have been shown to be both cost-effective and cost-saving.<sup>8</sup> The present study aims to assess knowledge and practice of diabetic patients as regard their own feet care and to calculate the prevalence of diabetic foot among them.

## Methodology

This cross-sectional study was started after taking approval from hospital ethics committee. All the diagnosed patients of diabetes mellitus type 2 were enrolled who visited outpatient departments of Pakistan institute of medical sciences and Akbar Khan Niazi teaching hospital from June to December 2018, Islamabad. A total of 196 patients were included in the study and the sample size was calculated with WHO sample size calculator using 95% confidence level, anticipated population proportion (incidence of diabetes mellitus type 2) of 15%, and absolute precision level of 5%. All adult patients diagnosed as Diabetes Mellitus (DM) type 2 for at least one year without any foot related complication were included in the study. The respondents were interviewed on a pre-tested structured questionnaire after their written informed consent. It was validated in both English and Urdu. The questionnaire included questions on demographics,

diabetes related questions, source of information regarding foot self-care and 19 questions on awareness and practice of foot self-care derived from foot care practices advised by American Diabetic Association, Summary of Diabetes Self-Care Activities and John Hopkins Medical review. Each response for awareness and practice to foot care question was scored either 1 or 0 depending on yes or no respectively. The cumulative score was then classified into: Poor (<50 percentile), Average (50-75 percentile) and Good (>75 percentile). Patients' demographic data were collected for the purpose of analyzing the factors that were associated with knowledge and practice of diabetic foot care. Information such as age, gender, race and the duration since diagnosed with diabetes mellitus were collected together with educational level and household income per month. All the collected data was entered and analyzed with SPSS statistical software version 25. Descriptive statistics like mean and standard deviation for quantitative data and frequency with percentages for qualitative data were calculated. Chi-square test was applied to associate different variables with knowledge and practice. P-value < 0.05 will be considered significant.

## Results

A total of 196 patients were enrolled, majority 116 (59.18%) of which had age of 41-60 years followed by 56 (28.57%) having age more than 60 years. The male 105 (53.57%) had higher number as compared to females 91 (46.43%). Results showed that 160 (81.63%) patients were married followed by 20 (10.20%) divorced or separated. A large portion 76 (38.78%) of participants were illiterate, and 61 (31.12%) were matric. Main bulk 93 (47.45%) of the participants were unemployed or retired and 26 (13.27%) were house wives. Majority 109 (55.61%) had monthly income of 25000-50000. Distribution of demographic characteristics are presented in table I.

The results of study showed that majority (41.3%) of the sample had poor knowledge of diabetic foot self-care, 23.5% had average awareness and only 35.2% had good knowledge of diabetic foot self-care. Similarly, the diabetic foot self-care practice level was also found poor in most (39.8%) of the participants, 24.0% had average practice level and 36.2% patients had well diabetic foot self-care practice.

Different characteristics of the participants were assessed for association with diabetic foot care awareness level and diabetic foot care practice level and presented in table II.

**Table 1: Demographic characteristics**

Demographics	frequency	Percentage
<b>Age of the participant</b>		
20-40	24	12.24%
41-60	116	59.18%
> 60	56	28.57%
<b>Gender of the participant</b>		
Male	105	53.57%
Female	91	46.43%
<b>Marital Status</b>		
Single	16	8.16%
Married	160	81.63%
Divorced/Separated	20	10.20%
<b>Level of Education</b>		
Illiterate	76	38.78%
Matric	61	31.12%
Graduate	42	21.43%
Post Graduate	17	8.67%
<b>Occupation</b>		
Unemployed/retired	93	47.45%
Office job	34	17.35%
Business	43	21.94%
House wife	26	13.27%
<b>Monthly Income</b>		
< 25000	52	26.53%
25000-50000	109	55.61%
> 50000	35	17.86%
<b>Body Mass Index of the participant</b>		
Healthy weight	76	38.78%
Over weight	88	44.90%
Obese	32	16.33%
<b>Duration of Diabetes</b>		
< 5 years	44	22.45%
5-10 years	113	57.65%
> 10 years	39	19.90%
<b>HbA1c level</b>		
< 7.0%	58	29.59%
> 7.0 %	138	70.41%
<b>Diabetic treatment in use</b>		
Tablets	118	60.20%
Tablets + Insulin	42	21.43%
Insulin only	36	18.37%
<b>Source of foot care education</b>		
Doctor	74	37.76%
Diabetic care nurse	53	27.04%
Social media	69	35.20%
<b>Total</b>	<b>196</b>	<b>100.0%</b>

## Discussion

Diabetes is a metabolic syndrome which is associated with many comorbid conditions and risk factors. It is very important to make preventing strategies and properly treating these conditions after occurrence. These factors play an important role in increasing the risk of vascular complications and indirectly increasing the number of diabetic foot and lower limb amputations.<sup>9</sup> A more alarming problem is the huge percentage of over-weight (44.90%) and obese (16.33%) patients in the study group. This necessitates an effective program to deal with it in our community at large and particularly in the risky groups like diabetic patients.

In present study, majority 59.18% of patients had age of 41-60 years followed by 28.57% having age more than 60 years. The proportion of male participants 53.57% was higher as compared to females 46.43%. These findings are similar to previous studies which also showed higher proportion of male patients.<sup>10, 11</sup>

In study sample 38.78% of patients were illiterate, and (31.12%) had education up to matric. Similar trend of education has been found in many other studies conducted in Jordan, Iraq and Egypt. These studies have also showed a quite high proportion of illiterate patients of diabetes mellitus in general population.<sup>12,13,14</sup>

The diabetic control among the patients enrolled for this present study was observed very poor and on the basis of HbA1c level only 29.59% patients had desire HbA1c level of less than 7.0%. The patients having good control of diabetes showed significantly higher proportion of (60.87%) having good awareness level as compared to (39.13%) participants having HbA1c level of > 7.0%. Similarly, the diabetic foot care practice level was also significantly (p-value < 0.05) associated with control of diabetes, indicating a higher ratio of participants in good foot care practice category. The proportion of patients in good practice level category among controlled diabetes patients was significantly higher (59.15% vs. 40.84%) as compared to poor diabetic control group. This result is very similar to previous research findings in Saudi Arabia. Azab found that 21% of patients had a FBG < 4–6 mmol/L<sup>15</sup> and Al-Hussein showed that 21% of the sample had an acceptable HbA1C level of < 7 mmol/L.<sup>16</sup>

**Table II: Association of different factors with foot care Awareness and Practice level.**

	Awareness Level			P-value	Practice Level			P-value
	Poor (n=81)	Average (n=46)	Good (n=69)		Poor (n=78)	Average (n=47)	Good (n=71)	
<b>Age of the participant</b>								
20-40	10	7	11	0.946	7	8	13	0.535
41-60	45	24	34		44	23	36	
> 60	26	15	24		27	16	22	
<b>Gender of the participant</b>								
Male	44	14	30	0.033 *	41	19	28	0.213
Female	37	32	39		37	28	43	
<b>Level of Education</b>								
Illiterate	25	16	20	0.568	24	17	20	0.928
Matric	25	16	27		27	14	27	
Graduate	18	11	17		17	12	17	
Post Graduate	13	3	5		10	4	7	
<b>Body Mass Index of the participant</b>								
Healthy weight	36	21	33	0.839	32	23	35	0.705
Over weight	30	14	25		32	14	23	
Obese	15	11	11		14	10	13	
<b>Duration of Diabetes</b>								
< 5 years	30	5	15	0.011 *	29	8	13	0.039 *
5-10 years	37	30	34		36	27	38	
> 10 years	14	11	20		13	12	20	
<b>HbA1c level</b>								
< 7.0%	13	10	42	0.000 *	13	10	42	0.000 *
> 7.0 %	68	36	27		65	37	29	
<b>Source of foot care education</b>								
Doctor	20	15	22	0.859	21	17	19	0.674
Diabetic care nurse	25	13	19		24	14	19	
Social media	36	18	28		33	16	33	

This study showed that a greater proportion (41.3%) of diabetic patients had a poor knowledge of diabetic foot care, 23.5% had average awareness and only 35.2% had good knowledge of diabetic foot self-care. Similarly, the diabetic foot self-care practice level was also found poor in most (39.8%) of the participants, 24.0% had average practice level and 36.2% patients had well diabetic foot self-care practice. These deficiencies arise from lack of awareness about the warning signs like redness/bleeding occurs between toes; importance of regular inspection of the footwear for objects or torn lining and regular inspection of the feet. The lack of knowledge foot care in our study is consistent with findings by other investigators worldwide.<sup>17,18</sup>

The level of awareness and practice of foot self-care was found to be poor in several studies conducted worldwide.<sup>19-21</sup> The results of our study also showed comparable outcomes of awareness and practice level in our population. The level of awareness and practice is similar to each other, which is in concordance with

studies conducted on foot care practice in some other studies conducted in developing populations.<sup>21, 22</sup> This outcome can be explained by lack of awareness regarding prevention of diabetic foot disease and its major complications, including lower limb amputation. This deficiencies in diabetic foot self care awareness knowledge and practice might be due to lack of awareness programs, and awareness education from doctor and paramedical staff with the doctor in health facilities.

The awareness programs regarding diabetic foot self-care are lacking in our health care facilities and there is an increased need of establishing guidelines and awareness programs for patient's education during admission or at the time of discharge. There were many patients who had long time suffering from diabetes but their knowledge and practice remained poor. The awareness and good practice of diabetic foot self-care has a strong association with role of physicians in passing the knowledge to the patients.

The role of physicians is very important in improving the knowledge and practices regarding foot care. In a study from Italy, more than 50% of the patients reported that they did not have their feet examined by their physician and 28% referred that they had not received foot education. Thus, patients' knowledge and practices are strongly related to physicians' attitudes.<sup>24</sup>

Poor communication between healthcare workers and patients and little amount of time allocated to educate patients due to a busy clinic schedule are usually the reasons for inadequate patient education.<sup>25</sup> In addition physicians should always be up to date with the latest information regarding foot care and consistently reinforce the importance of compliance in patients. This should be a routine practice for all diabetic patients in both in and outpatient setting. Education of good diabetic foot care practice will increase patient's confidence in managing their illness.<sup>26</sup>

## Conclusion

Almost half of our patients attending primary healthcare centers have limited awareness and practice regarding diabetic foot self-care. This level of awareness and practice showed a significant relationship with gender, duration of diabetes mellitus and diabetic control on the basis of HbA1c. Strategies must be planned to develop a primary prevention program involving all health care centers to enhance public awareness of diabetes and its complications.

## References

- Attyia AA, El Bahnasy RE, Abu Salem ME, Al-Batanony MA, Ahamed AR. Compliance of diabetic patients with the prescribed clinical regimen. *Menouf Med J.* 2013;26:54–57.
- Mohammad H, Abdulghani, AlRajeh AS, AlSalman BH, AlTurki LS, AlNajashi NS et al. Prevalence of diabetic comorbidities and knowledge and practices of foot care among diabetic patients: a cross-sectional study. *Diabet Metabol Syndrome Obesity: Targets Therap.* 2018;11:417–425.
- Malik RA, Tesfaye S, Newrick PG, Walker D, Rajbhandari SM, Siddique I, et al. Sural nerve pathology in diabetic patients with minimal but progressive neuropathy. *Diabetologia.* 2005;48:578–585.
- Saurabh S, Sarkar S, Selvaraj K, Kar SS, Kumar SG, Roy G. Effectiveness of foot care education among people with type 2 diabetes in rural Puducherry, India. *Indian J Endocrinol Metab.* 2014;18(1):106–110.
- Khaled Ibraheem AlQurashe. Knowledge and practice of self foot care among type 2 diabetic patients attending Aladil primary health care center in Makkah, Saudi Arabia. *Int J Med Res Prof.* 2018;4(2):53-61.
- Farahat TM, Salama AA, Essa LE. Self-care knowledge among type 2 diabetic patients attending primary healthcare centers, Cairo governorate. *Menoufia Med J.* 2016;29:1060–1065.
- American Diabetes Association. Standards of medical care in diabetes. *Diabetes Care.* 2015; 38:S1–S93.
- Al-Asmary AS, Mostafa SA, Al-Khaldi YM. Diabetic Patients' Knowledge and Practice Regarding Prevention of Diabetic Foot. *Med J Cairo Univ.* 2013;81(2):197-205.
- Li R, Yuan L, Xiao-Hui Guo Lou QQ, Zhao F, Li Shen L, et al. The current status of foot self-care knowledge, behaviours, and analysis of influencing factors in patients with type 2 diabetes mellitus in China. *Int J Nurse Sci.* 2014;3(1):266-271.
- Shaikh ZA, Akhund S, Ali M, Khan MH. Type 2 diabetes, Effects of socio-demographic factors among patients. *Professional Med J.* 2013;20(2):244-249.
- Noaman AA. Assessment of preventive foot care practices among patients with diabetes mellitus type II. *Fac Med Baghdad.* 2017;59(3):244-249.
- Al-Qaddah RM, Al Eyadeh A, Abu-Qamar MZ, Younes N, Al-Ryalat D, Haddad F. Knowledge and practice of foot care among diabetics at King Hussein medical center, Jordan. *J Res Med Sci.* 2016;23(3):55-63.
- Salim KH, Salma KJ. Assessment of self-care knowledge among Type II diabetics mellitus patients at diabetic center in Babylon Governorate/ Iraq. *Int J Scientific Res Pub.* 2016; 6(8): 281-290.
- El-Khawaga G, Abdel-Wahab F. Knowledge, attitudes, practice and compliance of diabetic patients in Dakahlia, Egypt. *Eur J Res Med Sci.* 2015;3(10):40-53.
- Azab AS. Glycemic control among diabetic patients. *Saudi Med J.* 2001;22(5):407–409.
- Al-Hussein FA. Diabetes control in a primary care setting: a retrospective study of 651 patients. *Ann Saudi Med.* 2008;28(4):267–271.
- Hasnain S, Sheikh NH. Knowledge and practices regarding foot care in diabetic patients visiting diabetic clinic in Jinnah Hospital, Lahore. *J Pak Med Assoc.* 2009;59(10):6876-6890.

18. Taksande BA, Thote M, Jajoo UN. Knowledge, attitude, and practice of foot care in patients with diabetes at central rural India. *J Family Med Prim Care*. 2017;6(2):284-287.
19. Qadi M, Al Zahrani H. Foot Care Knowledge and Practice among Diabetic Patients Attending Primary Health Care Centers in Jeddah City. *J King Abdulaziz Uni Med Sci*. 2011;18(2):55-71.
20. Khamseh ME, Vatankhah N, Baradaran HR. knowledge and practice of foot care in Iranian people with type 2 diabetes. *Int Wound J*. 2007;4(4):298–302.
21. Desalu O, Salawu F, Jimoh A, Adekoya A, Busari O, Olokoba A. Diabetic foot care: Self-reported knowledge and practice among patients attending three tertiary hospital in Nigeria. *Ghana Med J*. 2011;45(2):60-65.
22. Chellan G, Srikumar S, Varma AK, Mangalanandan T, Sundaram K, Jayakumar R, et al. Foot care practice – The key to prevent diabetic foot ulcers in India. *The Foot*. 2012;22(4):298–302.
23. Mehmood MK, Parkar AZ, Mustafa NT, Mustafa SS, Makin MA, Alawadi F, et al. Diabetic foot self-care: awareness and practice among type 2 diabetic patients in primary healthcare centers, Dubai Health Authority. *Int J Community Med Public Health*. 2019;6:1-7.
24. De Beradis G, Pellegrini F, Fanciosi M, Belfiglio M, Di Nardo B, Greenfield S, et al. Are Type 2 diabetic patients offered adequate foot care? The role of physician and patient characteristics. *J Diabetes Complications* 2005; 19: 319-327.
25. Ang CL, Lim YJ. Recurrent Admissions for Diabetic Foot Complications. *Mal Orthop J*. 2013; 7: 21-26.
26. Lutfi MAR, Zaraihah MR, Anuar-Ramdhan IM. Knowledge and Practice of Diabetic Foot Care in an In-Patient Setting at a Tertiary Medical Center. *Malaysian Orthopaedic J*. 2014;8(3):222-226.