

Original Research Article

Patients' awareness and extent of self-reported foot care practices in diabetes population

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ABSTRACT

Background: Diabetic foot ulcer is a serious complication of diabetes which results lower extremity amputation. Proper preventative measures, appropriate foot self-care and management of foot ulcer will reduce, delay or prevent the incidence of infection, gangrene, and amputation. This study was intended to assess diabetes patients' awareness and extent of foot care practice at University of Gondar referral Hospital.

Methods: An institutional based cross-sectional study was conducted from March to June 2018. A total of 372 diabetes patients were included in this study. Data were collected through face to face interview using structured questionnaires. The data were analyzed using SPSS version 20. Binary logistic regression analysis was conducted. A p value <0.05 was considered statistically significant.

Results: Of all participants more than half 197 (53%) were male. The age range of participants was 18-90 years. Majority, 65.6 % (with 95% CI 60.8-70.2) of diabetes patients had good foot self-care practice. Poor foot self-care practice was significantly associated with having poor level of awareness about foot care (AOR 12.55, 95% CI, 6.49-24.28) and having no previous information about foot ulcer (AOR 7.03, 95% CI, 2.11-23.46).

Conclusions: Generally, in this hospital most of the study participants had good awareness and practices towards foot self-care. However, selectively majority of patients had poor foot self-care practice regarding; drying of their feet after every wash, change the socks/stockings/ used regularly, and avoid wearing of slippers with no fastening. Foot self-care practices were positively associated with having good awareness about foot care and having previous information about foot ulcer.

Keywords: Foot self-care, Awareness, Practice, Diabetes, Ethiopia

INTRODUCTION

Diabetes mellitus (DM) is a group of chronic metabolic disorders characterized by elevated level of blood glucose that is associated with significant morbidity, mortality and increasing health care cost.¹ The world prevalence of diabetes is 8.5% and it affects 422 million adults, in 2014.² The prevalence of diabetes has been steadily increasing for the past 3 decades and is growing most rapidly in low and middle income countries. According to the International Diabetes Federation (IDF) report, the

prevalence of diabetes in Africa among adults aged 20–79 years was 4.2% in 2017.^{2,3} In Ethiopia diabetes mellitus is emerging as one of the major chronic health problem, and the prevalence adjusted to the national population was 4.4% in 2013.^{4,5}

DM can result in blindness, renal failure, lower limb amputation, coronary artery disease, peripheral vascular disease, stroke and other long-term consequences that have significant impact on the patients quality of life.^{1,2} Of these complications, diabetes related foot problem affects majority of DM patients.⁶

Foot ulcer in patients with diabetes is a global health burden and one of the most feared and common complications of diabetes.^{7,8} It is the most frequently recognized complication of DM that consists of lesions in the deep tissues associated with neurological disorders and peripheral vascular disease in the lower limbs.^{9,10} It has an annual incidence rate of 2 to 4% in developed countries and this prevalence may even be higher in developing countries due to socio-economic differences and variations in standards of care.¹¹ The lifetime risk of DM patients developing a foot ulcer could be as high as 19-34%.¹² Rates of foot ulceration in Africa vary between regions and have been estimated to be between 4 to 19%.¹³ In Ethiopia the incidence and prevalence of foot ulcer is still unknown in the general population.⁴ The study conducted in Northwest and South Ethiopia showed that the prevalence of foot ulcer among diabetes patients is 13.6% and 14.8% respectively.^{14,15} In Ethiopia, diabetes related foot ulcer is major health problem which results 12% of death associated with sepsis.¹⁶

Foot problem complications are the most common cause of hospitalization in the person with diabetes.¹⁷ It is estimated that approximately 20% of hospital admissions among patients with DM are the result of diabetes foot ulcer (DFU).^{18,19} Lower extremity amputation is one of most devastating consequences of DFU and of all amputations in diabetes patients, 85% are preceded by a foot ulceration which subsequently deteriorates to a severe gangrene or infection (9). DFU results not only physical problem but also it affects psychosocial, economic and overall quality of life of DM patients.^{8,20} The risk of foot ulceration and limb amputation increases with older age, long duration of diabetes, poor glycemic control, peripheral neuropathy, cigarette smoking, foot deformities, and peripheral arterial disease.^{12,22}

Early recognition of foot ulcer and treatment of patients at risk for ulcers and amputations can delay or prevent adverse outcomes.²³ DM patients level of awareness and correct foot self-care practices may reduce the risk of diabetes foot complications, ultimately amputation.^{24,25} Even though diabetes foot self-care is an evolutionary process of development of knowledge or awareness by learning that patients do in order to reduce further complication, there is a lack of evidences that assess DM patients awareness and practice regarding foot self-care in Ethiopia. Therefore this study was intend to assess DM patients' level of awareness and practices of foot care.

METHODS

Study area and period

An institutional based cross-sectional study was conducted at University of Gondar Specialized Hospital ambulatory clinic from March to June 2018. The hospital is located 738km northwest Ethiopia from the capital city Addis Ababa. This study include all adult (age 18 years and above) DM patients. Newly diagnosed and DM

patients who had less than one month of duration after diagnosis were excluded in this study.

Sample size

The overall sample size was determined using single population proportion formula. Here we used the expected proportion (p) from previously published study that was done in Felege Hiwot Referral Hospital, Bahir Dar City, North West Ethiopia.²⁷ According to this study the actual number of DM patients having good foot care practice was 54.6% with 95% confidence interval (CI) and margin of error (d) of 5%. The total DM patients registered in this hospital are estimated to be about 3000. By the use of correction formula the final sample size including 10% non-response rate estimated to be 372.

Sampling technique

Convenient sampling technique was used in which all consecutive patients were interviewed until the sample size was reached. To avoid double counting of cases, card number of the participants who had undergone the interview were documented each day. Any patient coming to the clinic at specific day was counterchecked with the document prior to conducting the interview.

Data collection techniques and instrument

The data collection tool had three parts; the socio-demographic, awareness of foot care and practice of foot care. The questionnaire was prepared in English initially and translated to Amharic, the translated version was again translated back to English language to maintain the consistency in the meaning of words or concepts of the data collection tool. The awareness measuring questions was adapted from similar study conducted before.^{20,26-29} Whereas foot self-care practices questionnaire is adapted from validated instrument of Nottingham Assessment of Functional Foot care (NAFF).^{30,31} Data was collected by 5th year pharmacy students through face to face interview of the structured questionnaires.

Data analysis and interpretation

The collected data was cleaned, arranged, coded, checked for completeness and then analyzed by SPSS version 20. Descriptive analysis was used to summarize socio demographic and other baseline information. Summary statistics including standard deviations used for continuous variables. Bivariate logistic regression analysis was used to determine the association between variables and level of foot care practice. A p value <0.05 was considered as a statistically significant.

The level of awareness or knowledge was considered as adequate ($\geq 70\%$), and inadequate ($< 70\%$) depending on previous studies.^{29,32,33} While the overall level of foot care practice $\geq 50\%$ was considered as good and $< 50\%$ poor practice based on NAFF score.^{30,31} All the NAFF

question items had a score of (0-3). In this study DM patients who had a score of 2 or 3 for each questions were considered to have good practice and 0 or 1 score poor practice (Table 4).

RESULTS

Socio-demographic characteristics

Among the total of 372 study participants 197 (53%) of them were male. The mean age was 43.20 (SD±14.96 years) with an age range of 18-90 years. More than half 231 (62.1%) of the study participants were living in urban area. Around 38% of the study participants were can't read and write and 9.6% of DM patients were student (Table 1).

Table 1: Socio demographic characteristics of study participants.

Variable	Frequency	%
Sex		
Male	197	53
Female	175	47
Age in years		
<45	191	51.3
≥45	181	48.7
Marital status		
Married	247	66.4
Unmarried	90	24.2
Divorced	12	3.2
Widowed	23	6.2
Religion		
Orthodox	312	83.9
Muslim	50	13.4
Protestant	10	2.7
Educational status		
Can't read and write	141	37.9
Can read and write only	56	15.1
Grade 1-8	71	19.1
Grade 9-12	37	9.9
College and above	67	18
Occupational status		
Employed	164	44.1
Unemployed	172	46.2
Student	36	9.7
Residence		
Urban	231	62.1
Rural	141	37.9
Cigarette smoking and or alcohol drinking habit		
Yes	98	26.3
No	274	73.7

Clinical characteristics of the study participants

Out of the total study participants 228 (61.3%) of them were DM-type 2. Majority 347 (93.3%) of DM patients had previous information about DFU. Likewise 132 (34.5%) of the patients had previous history of foot ulcer. Around 93 (25%) of DM patients had hypertension as a comorbid condition (Table 2).

Table 2: Clinical characteristics of of study participants.

Variables	Frequency	%
Type of DM		
Type 1	144	38.7
Type 2	228	61.3
Duration of DM		
<5 year	219	58.9
5-10 year	115	30.9
>10 year	38	10.2
Chronic co-morbidity		
Yes	124	33.4
Hypertension	93	25
Heart failure	7	1.9
Dyslipidemia	8	2.2
Other	16	4.3
No	248	66.6
Having previous information about DFU		
Yes	347	93.3
No	25	6.7
Previous history of foot ulcer		
Yes	132	34.5
No	240	64.5
Previous foot check up by healthcare professionals		
Yes	78	21
No	294	79

Awareness of DM patients regarding foot self-care

Of all the participants, only 273 (73%) of DM patients aware that they should inspect their feet everyday regularly. Majority 287 (77.2%) of DM patients didn't know that at what temperature of water they have to wash their feet. Around 34 % of DM patients unaware that they should inspect footwear before they put them on (Table 3).

Patients with diabetes foot self-care practices

The finding of this study showed that majority 244 (65.6%) of DM patients had overall good foot self-care practice. However, more than half 200 (53.8%) of DM patients had poor practice towards drying of their feet after they wash. Majority 271 (72.8%) of the study participants also had poor practice in changing the socks/stockings used regularly (Table 4). In this study the mean practice score was 25.1±6.21 with a range of 5-36 out of possible maximum score of 48.

Factors associated with DM patients' foot self-care practice

The result of study showed that foot self-care practice had a statistically significant association with level of awareness about foot self-care and previous information about DFU. DM patients who had poor level of

awareness or knowledge towards foot self-care had 12 times [AOR 12.55, 95% CI (6.49-24.28)] poor practice as compared to who had good awareness. DM patients who had no previous information about DFU had 7 times [AOR 7.03, 95% CI (2.11-23.46)] poor practice as compared to those had previous information about DFU (Table 5).

Table 3: DM patients' awareness regarding foot self-care.

Items	Yes	No/Don't Know
	N (%)	N (%)
1. DM patients should take medication regularly because they liable to get DM complication.	355 (95.4)	17 (4.5)
2. Controlling blood sugar within normal range can reduce complications due to diabetes.	336 (90.3)	36 (9.7)
3. DM patients should look after their feet because they may not feel a minor injury to their feet.	309 (83.1)	63 (16.9)
4. DM patients should look after their feet because they may get a foot ulcer	329 (88.4)	43 (11.6)
5. DM patients should look after their feet because wounds and infection may not heal quickly.	56 (15.1)	316 (84.9)
6. DM patients shouldn't smoke because smoking will affect the healing process of DFU and it causes poor circulation of blood towards the feet.	145 (39)	227 (61)
7. DM patients should inspect their feet everyday regularly	273 (73.4)	99 (26.6)
8. If you found redness/bleeding in your feet what is the first thing you do?*	223 (59.9)	149 (40.1)
9. DM patients should wash their feet everyday regularly	308 (82.8)	64 (17.2)
10. What temperature of water do you think you should wash your feet in?*	85 (22.8)	287 (77.2)
11. DM patients should inspect footwear before they put them on regularly	246 (65.1)	126 (33.9)
12. DM patients should wear shoes and socks all the times	299 (80.4)	73 (19.6)
13. Know how to cut their toenails properly*	321 (86.3)	51 (13.7)
14. DM patients should consult healthcare professionals at all the times if there is any foot abnormality	258 (69.4)	114 (30.6)

*For these items 'yes' response was DM patients able to respond the correct response.

Table 4: DM patients' foot self-care practices.

Question items	Foot self-care practice	
	Good N (%)	Poor N (%)
1. Do you examine (inspect) your feet?	269 (72.3)	103 (27.6)
2. Do you check your shoes before you put them on?	285 (76.6)	87 (23.4)
3. Do you check your shoes when you take them off?	281 (75.5)	91 (24.5)
4. Do you wash your feet?	310 (83.4)	62 (16.6)
5. Do you check your feet are dry after washing?	206 (55.4)	166 (44.6)
6. Do you dry between your toes?	172 (46.3)	200 (53.8)
7. Do you use moisturizing cream on your feet?	1243 (33.3)	248 (66.7)
8. Do you put moisturizing cream between your toes?	260 (69.9)	112 (30.1)
9. Are your toenails cut?	305 (82)	67 (18)
10. Do you wear slippers with no fastening?	162 (43.5)	210 (56.5)
11. Do you wear shoes without socks/stockings/tights?	197 (53)	174 (47)
12. Do you change your socks/stockings/tights?	101 (27.2)	271 (72.8)
13. Do you walk around the house in bare feet?	336 (90.3)	36 (9.7)
14. Do you walk outside in bare feet?	355 (95.4)	17 (4.6)
15. Do you put your feet near the fire?	329 (88.4)	43 (11.6)
16. Do you put a dry dressing on a graze, cut or burn when you get one?	253 (68)	119 (32)
Overall level of foot self-care practice	N	%
Good	244	65.6
Poor	128	34.4

Table 5: Factors affecting foot self-care practice among patients with diabetes.

Variables	Foot self-care practice		COR With 95% CI	AOR With 95% CI	P value
	Poor (n=128)	Good (n=244)			
Sex					
Female	63	112	1	1	
Male	65	132	0.875 (0.57-1.34)	1.22 (0.56-2.63)	0.614
Marital status					
Married	80	167	1	1	
Unmarried	29	61	0.99 (0.59-1.66)	0.73 (0.24-2.203)	0.572
Divorced	5	7	1.49 (0.46-4.84)	0.58 (0.13-2.65)	0.480
Widowed	14	9	3.25 (1.35-7.82)	0.34 (0.11-1.09)	0.070
Educational status					
Not take formal education	85	112	2.33 (1.49-3.64)	1.09 (0.52-2.29)	0.826
Take formal education	43	132	1	1	
Residence					
Rural	73	68	3.44 (2.19-5.37)	1.87 (0.95-3.68)	0.069
Urban	55	176	1	1	
Cigarette smoking and/or alcohol drinking habit					
Yes	38	60	1.29 (0.80-2.09)	1.00 (0.51-1.95)	0.999
No	90	184	1	1	
Type of DM					
Type 1	56	88	1.38 (0.89-2.13)	1.06 (0.57-1.97)	0.859
Type 2	72	156	1	1	
Duration of the disease					
<5 year	68	151	0.62 (0.31-1.25)	0.88 (0.45-1.71)	0.700
5-10 year	44	71	0.85 (0.40-1.79)	0.39 (0.14-1.17)	0.094
>10 year	16	22	1	1	
Chronic co morbidity					
No	85	163	1.02(0.65-1.60)	1.07 (0.50-2.27)	0.866
Yes	43	81	1	1	
Having previous information about DFU					
No	19	6	6.91 (2.68-17.78)	7.03(2.11-23.46)	0.002*
Yes	109	238	1	1	
Previous history of ulcer					
No	78	162	0.79 (0.51-1.23)	1.33 (0.72-2.45)	0.371
Yes	50	82	1	1	
Level of awareness towards foot self-care					
Poor	107	76	11.26 (6.56-19.34)	12.55 (6.49-24.28)	0.000*
Good	21	168	1	1	

*Statistically significant at p value <0.05, COR: crude odds-ratio; AOR: adjusted odds-ratio.

DISCUSSION

Foot ulcer in patients with diabetes is a serious complication of diabetes which results continuous hospital admissions and lower extremity amputation.^{9,19,33} The purpose of the study was to assess diabetes patient's awareness and their foot self-care practice. The result of this study revealed that more than half (50.8%) of DM patients had good awareness or knowledge towards foot self-care. This finding was in line with the study done in Bahir Dar Ethiopia which shows 56.2% of DM patients had good knowledge.²⁷ This might be explained by the similarity between the study population in sociocultural

and geographical location. The finding of this study was higher than the study conducted in Hawassa, Ethiopia (27.3%) and India (24%) of DM patients had good awareness regarding foot care. This might be due to majority of their study participants were from rural area and housewife.^{16,17} However, the result obtained was lower than other study conducted in Lahore which showed that 86.6% of DM patients had good awareness about their foot care.³⁴ This might be due to the fact that, in Lahore their health facilities provide diabetes guide book that may improve DM patients awareness towards foot self-care which isn't well practiced in Ethiopia.³⁴

In this study even though majority 73.4% of DM patients aware that they should inspect their feet regularly for foot ulcer, around 85% of DM patients didn't understand that foot wounds and/or infection may not heal quickly. This might directly affect the special attention given by themselves if foot ulcer occurs. The result of this study showed that 26% of DM patients had cigarette smoking and/ or alcohol drinking habit. However, more than half (61%) of the study participants unaware that smoking will affect the healing process of foot ulcer and it causes poor circulation of blood towards the feet. The finding of this study is similar with the study done in India around 77.4% DM patients didn't know that smoking causes poor circulation of blood towards the feet.³⁵ The result of this study showed that 40% of DM patients didn't know that what they have to do at the first time if they found redness/bleeding in their feet. Furthermore around 31% of DM patients unaware that they should consult healthcare professionals at any time if there is any foot problem and only 21% of the study participants undertake previous foot check up by healthcare professionals. These implies that continuous counselling and education regarding foot self-care should be given by healthcare professionals and DM patients foot check-up should be considered as other standard investigation done during their follow-up.

In the present study majority (66%) of DM patients had good practice of foot care. This finding is higher than study carried out in Nigeria, Jinnah Lahore and Jordan which shows 10.2%, 29.3% and 18.2% of DM patients had good practice towards foot self-care respectively.^{29,32,33} Such differences could be explained by classification system of practice score in which >70% of total score is considered as good practice in these studies which was not considered in this study. Furthermore more than 93% of DM patients in our study had previous information regarding foot ulcer and this might positively affect their level of practice.

The result of this study showed that DM patients who had previous information about foot ulcer had good practice. This result was consistent with study conducted in Chennai, India.²⁸ This could be explained by the fact that foot-care specific patient education is an essential element of a health system program which significantly improves the patients' knowledge and foot self-care practices.^{24,36} Healthcare professionals had a vital role in improving DM patients' knowledge and practices of foot care. In addition the current study indicated that as DM patients who had poor awareness regarding to foot care had 13 times poor practice as compared to who had good awareness. This result has been consistent with study conducted in Jazan town, Saudi Arabia.³⁷ This might be due to the fact that appropriate foot care practice is positively influenced by patient's awareness and reduced awareness or knowledge could be the greatest barrier to good foot care practices.²⁸

Limitation of the study

The limitation of this study includes; it is a single center study, there will be recall and personal bias during patient interview and patients' answers might be over optimistic. Therefore, interpretation of the findings obtained should be taking into consideration of these limitations.

CONCLUSION

Overall DM patients at this setup had good awareness and practices of foot care. However majority of DM patients had selectively poor practice regarding drying of their feet after they wash, changing regularly the socks/stockings used, wearing of slippers with no fastening, and using of moisturizing cream on their feet. Foot self-care practices were positively associated with having good awareness about foot care and having previous information about foot ulcer. Therefore, intensive foot care educational program needs to be established and adhered through multidisciplinary approach in a way that it is easy to understand and practice. On the other hand, health care facilities need to incorporate foot care services among other routine services like investigations and medication refill.

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