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Knowledge, Practice and Barriers of Diabetic Foot Ulcer Among Diabetic Patients in Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia, 2017

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Abstract
Background: In 2013, globally, there were an estimated 382 million people living with diabetes. In 2005 worldwide 3 %–10 % of people with diabetes have a diabetic foot ulcer. Ethiopian diabetic patient's foot ulcer is main health problem. Diabetic Foot ulcer associated with sepsis results in 12% of death. Understanding of the important factors of diabetic foot ulcer in diabetics' patients will enable high-risk patients to be recognized early.**Objectives:** To determine knowledge, practice and barriers of diabetic foot ulcer among diabetic patients in Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia**Methods**: Researcher conducted a hospital based cross sectional study among diabetic patients who were followed-up in HCSH from April to May, 2017 GCA.A total of 139 diabetic patients were included in the study. Study participants were selected using simple random sampling technique. The data was collected through interview method. Data was analyzed using SPSS version 20.00.Multivariate logistic regression was carried out to identify factors associated with diabetic patients. Adjusted odds ratios with 95% CI were computed to measure the associations between the outcome variable. A p-value of less than 0.05 was considered as significant result.**Results:** Out of 139 diabetic patients, 27.3% and46.8% diabetic patients have good knowledge and practice of diabetic foot ulcer care respectively. The mean score knowledge and practice was 7.1±4.63 and 8.77± 2.27. Practice of diabetic foot ulcer was significantly associated with being female [AOR=0.42; 95% CI: 0.21, 0.86], not using moisturizer for diabetic foot ulcer care [AOR=0.41; 95% CI: 0.20, 0.85], hearing about diabetic foot ulcer care [AOR=36.99; 95% CI: 4.58, 6.95], and age of patients >=61 years [AOR=3.94; 95% CI: .25, 2.38] **Conclusion and recommendation:** Significant proportion of diabetic patients has good knowledge about diabetic foot ulcer care. Nearly half of diabetic patients have good practice of diabetic foot ulcer care. Gender and use moisturizer were identified factors with practice of diabetic foot ulcer care. So, more effort should be put into creating awareness about diabetic foot ulcer. Emphasis also needs to be given for diabetic patients< 61 years old
Keywords: diabetic patients, diabetic foot ulcer, knowledge, practice, and barrier

1. Introduction

1.1. Background

Diabetes mellitus (DM) is a multifaceted, metabolic disorder causing a vital morbidity, mortality and health care expenditure [1, 2]. Prevention and management of diabetes thus desires both public health interventions and continuous medical care for those affected individuals [1].

Diabetes mellitus is an increasing public health problem that harmfully affects the lives of millions of individuals around the world. It causes considerable physical and psychological morbidity, disability and premature mortality among those affected patients and imposes a heavy financial burden on health services [2].

In 2013, globally, there are an estimated 382 million people living with diabetes [3]. The burden of diabetic foot disease is expected to increase given the increasing global prevalence of T2DM. Worldwide, 3 %–10 % of people with diabetes have a foot ulcer (DFU); the lifetime risk for developing DFU is 15 % [4]. Rates of foot ulceration in Africa vary between regions and have been estimated to be between 4 % and 19 % [5]. Ethiopia, which is one of the low-and middle income countries, is at a risk of increased diabetes incidence; where study showed that prevalence was 1.3% in North Ethiopia [6], but 3.64% of prevalence in Northwest of Ethiopia [7] .

Diabetic foot complications are familiar in diabetic patients and are measured one of the most expensive diabetes complications to treat [8]. It is estimated that about 5% of all patients with diabetes present with a history of foot ulceration, and the annual incidence is 2-3% [9]. Those complications arise mainly from the disruption of the vascular system which can result in inadequate circulation to the peripheral body [10]. The most (60–80%) of foot ulcers will heal, while 10–15% of them will remain active, and 5–24% of them will finally go ahead to limb amputation within a period of 6–18 months after the first assessment[11].

Diabetic foot ulcers considerably contribute to morbidity and mortality of patients with diabetes mellitus. The diabetic patients with foot ulcers need long-standing hospitalization and carry the risk of limb amputation [12]. In addition to the direct costs of foot complications, there are also indirect costs concerning to loss of productivity, individual patients and family costs, and loss of health related quality of life. Te lifetime risk of a

person with diabetes developing a foot ulcer could be as high as 25%, and it is understood that every 30 seconds a lower limb is lost somewhere in the world as a consequence of diabetes [13].

In low-and middle income countries, foot ulcers are one of the most feared and common complications of diabetes. Ethiopian diabetic patient's foot ulcer is main health problem. Diabetic foot ulcer associated with sepsis results in 12% of death [14]. They are a main cause of disability, morbidity, and mortality among diabetic patients, and it has been estimated that 15% of all people with diabetes will have an ulcer at some stage of their life [14]. In Ethiopia, diabetic mellitus is acknowledged as one of the main non-communicable diseases, yet the accurate prevalence, progress, and associated barriers are not well documented and updated regularly [15, 16]. Therefore, this study aims to determine knowledge, practice and barriers of Diabetic Foot Ulcer among Diabetic Patients in Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia.

2. Methods and Materials

2.1 Study Area and Period

This study was conducted in Hawassa University Comprehensive Specialized Hospital (HUCSH) found in Hawassa city, Southern Nations and Nationalities Peoples Region (SNNRP). The City is located 273KM South of Addis Ababa on the shores of Lake Hawassa the Great rift valley. Hawassa is Capital of SNNPRS and Sidama zone. According to the health facilities there are 1 referral hospital, 1 general hospital, 3 private hospitals, 7 health centers, 15 health post, 47 private clinics, 12 diagnostic laboratories, 12 pharmacies in the city administration. HUCSH has 9 wards, 4 OPD with 400 beds total. It has one diabetic clinic, and internal medicine ward have 6 public and 12 private rooms with 40 beds.

There is a unit called diabetic clinic in (HUCSH) where diabetic patients have follow-up. There are 1337diabetic patients who have follow up at HUSCH. Every Wednesday, in average 47 patients visit the clinic within a day and 188 patients within a month. The study was conducted from April to May, 2017 GC.

2.2. Study Design

The hospital based cross sectional study was conducted to determine the knowledge, practice and barriers about diabetic foot ulcer among diabetic patients in Hawassa university comprehensive specialized hospital (HUCSH) in 2017.

2.3 Population

2.3.1. Source population: This study includes all diabetes mellitus patients who attend the diabetic follow-up clinic in Hawassa University comprehensive specialized hospital.

2.3.2. Study population: This study includes those diabetes mellitus patients who attend the diabetic follow-up clinic in Hawassa University comprehensive specialized hospital during the study period

2.4 Inclusion and Exclusion Criteria

2.4.1 Inclusion Criteria: those adult diabetes mellitus patients, who attend the diabetic follow-up clinic in Hawassa University comprehensive specialized hospital during the study period, were included in the study

- Patient who is over 18 years of age, both male and female, with type I or type II diabetes whose diagnosis had occurred at least six months earlier.

2.4.2 Exclusion Criteria

- Diabetic patients who had traumatic ulcer due to car accident and those diabetic patients who were severely ill and unable to exchange a few words throughout the study period were excluded.

2.5 Sampling and sampling procedures

The sample size was determined using a single population proportion sample size assessment method by assuming that the prevalence of knowledge of diabetic foot ulcer is 50% (to obtain the maximum representative sample size since no similar study was found in the area) with 95% confidence interval.

The selection of study population was includes every Wednesday, in average 47 patients visit the clinic within a day and 188 patients within a month. The study subjects were selected by using simple random sampling techniques the required number of subjects was selected in every Wednesday in one month period until to reach 139 study subjects.

Sample size determination formula:

It was calculated from the formula, $n = \frac{\left(Z\alpha/2\right)^2 P(1-P)}{d^2}$

n_n= initial sample size derived from estimation formula

$z_{\alpha/2}$= The confidence interval, i.e 1.96 to be 95% confident

P =Proportion of diabetic foot ulcer prevalence is 50% (0.5)

d = Is the marigin of error to be tolerated and a value of 5% is taken.

n_s= Source population

$n = (1.96)^2\ 0.5(1-0.5) / 0.05^2 = 384$

Because the population size under consideration is less than 10,000, the above formula was modified by the following sample correction method:

$nf = ni/(1+\frac{ni}{N}) = 384/(1+384/188) = 384/3.04 = 126.2 \approx 126$

Total Sample size = 10% non-response rate + nf = 126 + 12.6 = 138.6 ≈ **139**

2.6 Variables

Dependent Variables

- Knowledge, and practice about diabetic foot ulcer

Independent Variables

- Socio-demographic factors: age, sex, marital status, religion, educational status, average monthly income, occupation, residence
- type of diabetes,
- family history of diabetes,
- type and duration of treatment,
- adherence to treatment and follow-up,
- self-blood sugar monitoring and glycemic control,
- counseling about DFU from health care workers,
- foot care; hygiene, type of foot wear, nail cutting ,use of moisturizer, walking bare foot,

2.1. **Operational Definitions**

Thirteen questions were asked regarding knowledge and practices of foot care. Each correct answer was given one mark. Scores were classified as follows

1. **Knowledge about diabetic foot ulcer:** Knowledge of patients' relating to diabetic foot ulcer and foot-care practice was assessed by using close-ended questions with two options. A correct answer was coded as '1' and an incorrect answer as '0'; then score was computed. Patients were labeled as have good knowledge of diabetic foot ulcer if the score is greater than 70 % and have poor knowledge if the score is less than 70 % [17].

1.1. **Good Knowledge about Diabetic Foot ulcer.** If score is more than 70% (9-13)

1.2. **Poor Knowledge about Diabetic Foot ulcer**. If score is less than 70% (<9)

2. Diabetic Foot ulcer care practice- foot care practice performed by patients to prevent diabetic foot ulcer was assessed using 'yes/no' questions about each foot care practice they put in to action. An answer 'yes' was coded as '1' and 'no' was coded as '0'; then the score was computed. Patients were labeled as to have good practice if the score is greater than 70% and have poor practice if the score is less than 70%[17]

2.1. **Good Diabetic Foot ulcer Practice**. If score is more than 70% (9-13)

2.2. **Poor Diabetic Foot ulcer Practice**. If score is less than 70% (<9) [17].

2.7 Data Collection and Analysis

2.7.1 Data Collection

The data was collected using face to face interview method. The questionnaire was covered socio-demographic information; knowledge, and practices questions regarding diabetic foot ulcer among diabetic patients.

2.8 Data Quality Control

The questionnaire was initially prepared in English, and then it was translated to study subjects' local language (Amharic) for field work purpose by a language expert. Then the translated version was again translated back to English language by a different language expert to maintain the consistency in the meaning of words or concepts of the data collection tool. The questionnaire pretest was done on 5% of the sample population on randomly chosen a sample of diabetic patients who have follow up in Adare hospital.

Two days training was given to all data collectors and supervisors to had common understanding on the data collection tools and process. Every day after data collection, questionnaires was reviewed and checked for completeness by the supervisors and principal investigator and the necessary feedback was given to data collectors immediately. The data was cleaned and coded before entering in to computer.

2.9. Data analysis

After data collection, each questionnaire was checked for completeness and code was given before data entry. Data was cleaned and entered into computer by using the SPSS version 20.0.

Frequency, percentage, cross tabulation and descriptive summaries were used to describe the study variable using univariate analysis.

Simple binary logistic regression analysis for each independent variable was performed against the dependent variable (Knowledge, and practice about diabetic foot ulcer) to see the impact of each factor on the pattern of diabetic foot ulcer among diabetic patients, the dependent variable, in the sampled participants, without adjusting for the effect of other variables.

Those independent variables found to be significant in the simple binary logistic regression analysis at a cut-off point of p-value < 0.25 with 95% confidence interval will be included in a multivariate binary logistic regression model [18, 19].

Adjusted odd ratio (AOR) with 95% Confidence Interval (CI) and p-value was computed to measure the associations between the outcome variable and the explanatory variables. A p-value of less than 0.05 was considered as a significant result.

Goodness of the models was also tested by diagnosing correctness of formulation of the models using Hosmer-Lemeshow test and the one which is found to be greater than the significance level (p value =0.05) will be accepted [20, 21].

Ethical clearance

Before began to conduct this study, investigator obtained approval and supporting letter from the ethical review Board of Hawassa University, College of Health Sciences. Everything about the research was explained to the participants in detail. The participants were given a chance to decide on whether to participate or not in the study and this ensured the right of self-determination and independence. The participants who participated gave a verbal consent. The data obtained was treated secretly with no name and identification number tag on it. This study didn't cause any physical or psychological harm to the participant and they weren't exploited in any way. The participants were treated with respects and their rights to privacy and confidentiality was observed through obscurity.

3. Results

Socio-demographic and economic characteristics

A total of 139 diabetic patients were participated in this study with a response rate of 100%. Out of 139 diabetic patients, 70(50.4%) were male and 69(49.6%) were female. Majority 53 (38.1%) of participants were found in the age group between 40-60 years and 48(34.5%) were above 60 years. The mean age of the study population was 51.43±13.8 years. More than half 73(52.5%) of the study subjects were orthodox follower and the 45 (32.4%) of the study participants were protestant follower (**Table 1)**

Out of 139 the study participants, more than three-fourth 121(87.1%) of them were married. Considering place of residence almost all 116(83.5%) of the patients were from urban area. Regarding education of the respondent, nearly half 59(42.4%) of the study participants were attended primary education, and the rest 27(16.5%) of study participants were attended secondary education (**Table 1)**

Table 1: Socio-demographic characteristics of diabetic patients in Hawassa University Comprehensive Specialized Hospital in July 2017

Variables	Frequency (N=139)	Percent (%)
Age (year)		
21-40	38	27.3
41-60	53	38.1
>=61	48	34.5
Gender		
Male	70	50.4
Female	69	49.6
Marital status		
Married	121	87.1
Single	6	4.3
Widowed	12	8.6
Occupation		
House wife	54	38.8
Civil servant	33	23.7
Merchant	17	12.2
Farmer	11	7.9
Others	24	17.3
Religion		
Orthodox	73	52.5
Protestant	45	32.4
Muslim	9	6.5
Others (catholic)	12	8.6
Education of respondents		
Cannot read and write	30	21.6
Primary school	59	42.4
Secondary school	27	19.4
College and above	23	16.5
Place residency		
Rural	23	16.5
Urban	116	83.5
Monthly income(birr)		
<1000	42	30.2
1000-3000	66	47.5
3001-5000	22	15.8
>5000	9	6.5
Duration of DM (year)		
<10 year	67	48.2
10-20 year	36	25.90
21-30 year	19	13.70
>30 year	17	12.20

INFORMATION ABOUT DIABETES MELLITUS

Out of 139 study participants, 110(79.1%) had Type 2 diabetic mellitus. From those who take medication majority 88(64.2%) of study participants had used orally taken medication and the rest 49(35.8%) of study subjects were take inject able medication. All most all 126 (91.97%) of the study subjects were claim that they take their medication properly. Out of 139 study participants, nearly all 136(97.8%) of the study subjects had regular follow up. out of 139 study participants, majority 98(70.5%) of diabetic patients had no positive family history of DM **(Table 2).**

Table 2: Information about diabetes mellitus of diabetic patients in Hawassa University Comprehensive Specialized Hospital, 2017

Variables	Frequency (N=139)		Percent (%)
Take medication	Yes	137	98.6
	No	2	1.4
Type of medication	Orally taken	90	64.7
	Inject able	49	35.3
Have regular follow up	Yes	136	97.8
	No	3	2.2
Type of DM	Type1	29	20.9
	Type2	110	79.1
Take medication properly	Yes	128	92.1
	No	11	7.9
Family history of DM	Yes	41	29.5
	No	98	70.5

Out of 139 study participants of this study, nearly two-third 94(67.6%) of study subjects were aware of diabetic foot ulcer. More than half 90(64.7%) of diabetic patients were knew that diabetic foot ulcer was preventable. From those diabetic patients in this study knowledge about preventive mechanisms, more half 70 (50.4%) of study subjects were aware that observing feet frequently is preventive. Out of 139 study participants, majority 87(62.6%) of study participant knew that washing feet is protective. Of 84 (60.4%) study subjects have got information about wearing comfortable shoes is essential in protecting DFU. Out of study subjects, more than half 90(64.7%) of know using moisturize is preventive.

Regarding knowledge about diabetic foot ulcer care, majority 83(59.7%) of study subjects were knew correct way of hygiene which is using cold water and soap. Overall had 38(27.3%) good knowledge and 101(72.7%) had poor knowledge regarding diabetic foot ulcer. The mean knowledge score is 7.1±4.3 **(Table 3)**.

Table 3: knowledge assessment result of diabetic patients about diabetic foot ulcer in Hawassa University Comprehensive Specialized Hospital, 2017

Variables	Frequency (N=139)		Percent (%)
Know about diabetic foot ulcer	Yes	94	67.6
	No	45	32.4
Know that observing feet frequently is preventive	Yes	70	50.4
	No	69	49.6
Know that Diabetic foot ulcer is preventable	Yes	90	64.7
	no	49	53.3
Know that washing feet daily is preventive	Yes	87	62.6
	No	52	37.4
Know that wearing comfortable shoes is preventive	Yes	84	60.4
	No	55	39.6
Know that checking inside shoes before wearing	Yes	65	46.8
	No	74	53.2
Know that drying feet after washing is preventive	Yes	81	58.3
	No	58	41.7
Know not walking barefoot is preventive	Yes	50	36.0
	No	89	64.0
Know using moisturizer is preventive	Yes	49	35.3
	No	90	64.7
Know using cold water is preventive	Yes	59	42.4
	No	80	57.4
Correct way of hygiene	yes	83	59.7
	No	56	40.3
Ideal way of drying	Yes	63	45.3
	No	76	54.7
Ideal foot wear	Yes	42	30.2
	No	97	69.8
Overall knowledge	Good	38	27.3
	Poor	101	72.7

Regarding practice assessment of diabetic patients about diabetic foot ulcer, out of 139 study participants, almost all 138 (99.3%) of study subjects were wash foot regularly. Out of this diabetic patients, more than half

99(71.2%) of study participants had wash foot using cold water. From this study subjects, nearly three-fourth 95(68.3%) of them were dry foot after washing. out of139 diabetic patients, more than half 74(53.2%) of them were bad practice of diabetic foot ulcer among diabetic patients (**Table 4**).

Table 4: Practice assessment of diabetic patients about diabetic foot ulcer in Hawassa University Comprehensive Specialized Hospital, 2017

Variables		Frequency	%
Inspect feet regularly	yes	58	41.7
	no	81	58.3
Wash foot regularly	yes	138	99.3
	no	1	0.7
Wash foot using cold water	yes	99	71.2
	no	40	28.8
Cut nail straight across & not too short	yes	85	61.2
	no	54	38.8
Check the inner part of shoes before wearing	yes	68	48.9
	no	71	51.1
Don't Walk barefoot frequently	yes	139	100
	no		
Don't Clean nail using sharp	yes	99	71.2
	no	40	28.8
Dry foot after washing	yes	95	68.3
	no	44	31.7
Cut nail	yes	136	97.8
	no	3	2.2
Use moisturizer of foot	yes	66	47.5
	no	73	52.5
Habitually used foot wear	yes	57	41
	No	82	59
Nail cut	Yes	62	44.6
	No	77	55.4
Cutting instrument	Yes	137	98.6
	No	2	1.4
Over all practice	Good practice	65	46.8
	Bad practice	74	53.2

Table 5: Distribution and factors associated with knowledge of diabetic patients about diabetic foot ulcer in Hawassa University Comprehensive Specialized Hospital, Hawassa, 2017

	Over all knowledge			
Variables	**Poor knowledge**	**Good knowledge**	**COR[95% CI]**	**AOR [95% CI]**
Age (year)				
21-40	32[84.2%]	6[15.80%]	1	1
41-60	42[79.20%]	11[20.80%]	0.24**[0.09, 0.68]	1.23[0.37, 4.06]
>=61	27[56.20]	21[43.8%]	0.34*[0.14, 0.81]	3.94**[1.25, 2.38]
Gender				
Male	51[72.90%]	19[27.10%]	1	1
Female	50[72.50%]	19[27.50%]	0.98[0.47, 2.07]	0.99[0.49, 2.20]
Marital status				
Married	88[72.7%]	33[27.3%]	1	1
Single	5[83.3%]	1[16.7%]	0.75[0.21,2.66]	0.73[0.15, 2.34]
Widowed	8[66.7%]	4[33.30%]	0.40[0.03,4.68]	0.43[0.06, 5.78]
Occupations				
House wife	42[77.80%]	12[22.20%]	1	1
Civil servant	24[72.7%]	9[27.3%]	0.57[0.19, 1.66]	0.32[0.12, 1.23]
Merchant	12[70.6%]	5[29.4%]	0.75[0.24, 2.35]	0.55[0.34,3.35]
Farmer	7[63.7%]	4[36.4%]	0.83[0.22, 3.12]	0.75[0.30, 4.13]
Others	16[66.7%]	8[33.3%]	1.14[0.26, 5.09]	2.12[0.39, 5.04]
Religion				
Orthodox	53[72.6%]	20[27.4%]	1	1
Protestant	32[71.1%]	13[28.9%]	0.75[0.20, 2.78]	0.59[0.24, 2.67]
Muslim	8[88.9%]	1[11.1%]	0.81[0.21, 3.17]	0.83[0.31, 3.18]
Others (catholic)	8[66.7%]	4[33.3%]	0.25[0.02, 2.75]	0.45[0.74,2.75]
Education of respondents				
Cannot read and write	23[76.7%]	7[23.3%]	1	1
Primary school	39[66.1%]	20[33.9%]	1.10[0.29, 4.03]	1.19[0.19, 4.56]
Secondary school	21[77.8%]	6[22.2%]	1.85[0.59, 5.70]	1.79[0.49, 5.80]
College and above	18[78.3%]	5[21.7%]	1.03[0.27, 3.94]	1.08[0.27, 3.95]
Would you use moisturizer				
Yes	70[77.8%]	20[22.2%]	1	1
No	31[63.3%]	18[36.7%]	1.53[0.59, 3.96]	2.72**[1.09, 3.75]
Heard about DFU				
Yes	57[60.6%]	37[39.4%]	2.18[0.24, 9.80]	36.99***[4.58, 6.95]
No	44[97.8%]	1[2.2%]	1	1
Duration of DM (year)				
< 10 year	52[77.6%]	15[22.4%]	1	1
10-20 year	26[72.2%]	10[27.8%]	1.33[.53, 3.37]	1.23[0.54, 3.34]
21-30 year	15[78.9%]	4[21.1%]	0.92[0.27, 3.21]	0.76[0.37, 3.25]
>30 year	8[47.1%]	9[52.9%]	3.90*[1.28, 8.60]	3.93[0.28, 8.63]

*p.value <0.05, **p.value <0.001, ***P.value<0.0001, COR=crude Odds ratio, AOR=adjusted Odds ratios

Table 6: Factors associated with practice of diabetic patients about diabetic foot in Hawassa University Comprehensive Specialized Hospital, Hawassa, 2017

	Over all practice			
Variables	**Bad practice**	**Good practice**	**COR[95% CI]**	**AOR [95% CI]**
Age (year)				
21-40	23[60.5%]	15[39.5%]	1	1
41-60	28[52.8%]	25[47.2%]	0.24**[0.09, 0.68]	0.31[0.09, 0.78]
>=61	23[47.9%]	25[52.1%]	0.34*[0.14, 0.81]	0.47[0.14, 0.86]
Gender				
Male	43[61.4%]	27[38.6%]	1	1
Female	31[44.9%]	38[55.1%]	0.98[0.47, 2.07]	0.42**[0.21, 0.86]
Marital status				
Married	66[54.5%]	55[45.5%]	1	1
Single	5[83.3%]	1[16.7%]	0.75[0.21,2.66]	0;49[0.23, 2.64]
Widowed	3[25%]	9[75%]	0.40[0.03,4.68]	0.42[0.05, 4.68]
Occupations				
House wife	25[46.3%]	29[53.7%]	1	1
Civil servant	22[66.7%]	11[33.3%]	0.57[0.19, 1.66]	0.48[0.18, 1.66]
Merchant	7[41.2%]	10[58.8%]	0.75[0.24, 2.35]	0.74[0.24, 2.34]
Farmer	5[45.5%]	6[54.5%]	0.83[0.22, 3.12]	0.82[0.21, 3.13]
Others	15[62.5%]	9[37.5%]	1.14[0.26, 5.09]	1.15[0.27, 5.09]
Religion				
Orthodox	40[54.8%]	33[45.2%]	1	1
Protestant	24[53.3%]	21[46.7%]	0.75[0.20, 2.78]	0.67[0.21, 2.78]
Muslim	2[55.6%]	4[44.4%]	0.81[0.21, 3.17]	0.82[0.20, 3.17]
Others (catholic)	5[41.7%]	7[58.3%]	0.25[0.02, 2.75]	0.25[0.02, 3.75]
Education of respondents				
Cannot read and write	9[30%]	21[70%]	1	1
Primary school	34[57.6%]	25[42.4%]	1.10[0.29, 4.03]	1.11[0.29, 4.04]
Secondary school	16[59.3%]	11[40.7%]	1.85[0.59, 5.70]	1.80[0.59, 5.71]
College and above	15[65.2%]	8[34.8%]	1.03[0.27, 3.94]	1.02[0.26, 3.95]
Would you use moisturizer				
Yes	55[61.1%]	35[38.9%]	1	1
No	19[38.8%]	30[61.2%]	1.53[0.59, 3.96]	0.41***[0.20, 0.85]
Heard about DFU				
Yes	53[56.4%]	41[43.6%]	1	1
No	21[46.7%]	24[53.3%]	2.18[0.24, 9.80]	2.27[0.24, 9.81]
Duration of DM (year)				
< 10 year	37[55.2%]	30[44.8%]	1	1
10-20 year	21[58.3%]	15[41.5%]	1.33[.53, 3.37]	1.31[0.54, 3.37]
21-30 year	6[31.6%]	13[68.4%]	0.92[0.27, 3.21]	0.91[0.27, 3.22]
>30 year	10[58.8%]	7[41.2%]	3.90*[1.28, 8.60]	3.76[0.18, 4.30]

***p.value <0.05, **p.value <0.001, ***P.value<0.0001, COR=crude Odds ratio, AOR=adjusted Odds ratios**

Factors associated with knowledge of diabetic patients about diabetic foot ulcer

From those study participants whose age is greater than or equal to 61 years were 4 times [AOR=3.94, 95% CI: 1.25, 2.38] more likely to have good knowledge about diabetic foot ulcer as compared with those study participants whose age is between 21-40 years. Out of diabetic patients who did not use moisturizers for foot care practices were 2.72 times [AOR=2.72, 95% CI: 1.09, 3.75] more likely to have good knowledge about diabetic foot ulcer as compared with those diabetic patients who use moisturizers for diabetic foot ulcer care practice. From those diabetic patients who heard about diabetic foot ulcer were 37 times [AOR=36.99, 95% CI: 4.59, 6.95] more likely to have good knowledge as compared with those diabetic patients who did not heard about diabetic foot ulcer **(Table 5).**

Factors associated with practice of diabetic patients about diabetic foot ulcer

Those diabetic foot ulcer patients whose gender is female were 58% [AOR=0.42, 95% CI: 0.21, 0.86] more likely to practice diabetic foot ulcer care as compared to those participants whose gender is male. From those diabetic patients who did not use moisturizers for foot care practices were 59% [AOR=0.41, 95% CI: 0.20, 0.85] more likely to practice about diabetic foot ulcer care as compared with those diabetic patients who did not use moisturizers for diabetic foot ulcer care practice**(Table 6).**

4. Discussion

In this study, out of 139 diabetic patients, the majority 38.1% of respondents' ages were between 40 and 60 years category. This finding is consistent with study conducted in Northwest Ethiopia [17]. The possible explanation might be due to the fact that type 1 diabetes mellitus patients are younger and have poly symptoms that insist to seek medical care as compared to type 2 diabetes mellitus patients who are elder and asymptomatic which results poor medical seeking behavior.

In the present study result on knowledge of diabetic foot ulcer care among diabetic patients showed that the mean knowledge score was 7.1± 4.3. This score is slight lower than that of a study done in Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia in which the score was 7.5 ± 2.02 [17]. The deference might be recognized to majority of respondents are from urban residences in which they facilitate familiarity with recent information related to diabetes mellitus including diabetic foot ulcer care as compared rural communities. Again, public mass media are available in urban areas compared with rural communities, which is important for discussion with health care professionals to deliver information related to the diabetes mellitus.

In this study out of 139 diabetic patients of 27.3% had good knowledge and 72.7% had poor knowledge about diabetic foot ulcer care. This result is lower than with the study done in Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia and in Nigeria 56.2% were good knowledge and 43.8% had poor knowledge and that 46% were poor knowledge about diabetic foot ulcer care[17, 22]. This is might be due to the deference in classification system of knowledge score in which >70% of total score is considered as good knowledge which is not functional in this study[21]. In addition to this variation might be due to difference in sample size or due to differences in geographical location of the studies as well as socio-cultural variation of the study participants.

On the other hand, majority 72.7% of diabetic patients had poor knowledge about diabetic foot ulcer care. Which is higher than study conducted in Felege Hiwot Referral Hospital, Bahir Dar, Northwest [17]. This might be due to poor communication between diabetic patients and health care professionals. In order to control the diabetic foot ulcer complications, patient's knowledge regarding diabetic foot ulcer may contribute to prevent it. And also patients have adequate knowledge they will be able to practice to prevent diabetic foot ulcer [22].

In the present study almost half of diabetic patients have good practice of diabetic foot ulcer care which is higher than as compared with study conducted previously [17]. This is the might be due to high practice level had many reasons; such as most of the study participants stated that their feet had problems, so there was necessitate to inspect foot daily[23]. Diabetic patients foot care practices that may prevent diabetic foot ulcer are foot hygiene, toenails care, skin care, inspection of feet and legs and footwear [24].

In this study there were identified significant factors with knowledge of diabetic patients includes: age between >=61years, those diabetic patients did not use moisturizer for diabetic foot ulcer care, heard about diabetic foot ulcer care and gender had better knowledge about diabetic foot ulcer care. Diabetic patients whose gender is male and those did not use moisturizer for diabetic foot ulcer care associated with practices about diabetic foot ulcer care.

In the current study revealed that, heard about diabetic foot ulcer care was significantly associated with knowledge of diabetic patients. The possible explanation might be due to this difference could be due to difference in knowledge related diabetic foot ulcer care practice, knowledge on diabetes mellitus, and also possibly due to difference on health-seeking behavior practice between compared with those did not heard about diabetic foot ulcer.

In the present study showed that, those diabetic patients who did not use moisturizer for diabetic foot ulcer care was significantly associated with practice of diabetic foot ulcer care. This finding is similar with the studies conducted in [12, 25]. Possible explanation might be due to practicing foot ulcer care could reduce the development of diabetic foot ulcer due to the benefits of washing their own feet regularly, drying appropriately after washing, daily evaluation of their foot status, and/or facilitating circulation and early management of any abnormality that may occur on the foot.

Limitation of study: this study was used cross-sectional study design which can't determine **causality** that means temporal sequence between exposure and disease can't be established**.** There might be recall bias or reporting bias regarding the asking some of the contribute factors.

5. Conclusions

Significant proportions of diabetic patients have good knowledge about diabetic foot ulcer care which is lower proportion as compared with previously conducted study [17]. Just 46.8% diabetic patients have good practice of diabetic foot ulcer care which is higher than as compared with study conducted previously [21]. There were identified significant factors for practice of diabetic patients about diabetic foot ulcer care includes: gender and that use moisturizer for diabetic foot ulcer care. There were also identified significant factors for knowledge of diabetic patients about diabetic foot ulcer care includes: age of diabetic patients, those diabetic patients use moisturizer for diabetic foot ulcer care, heard about diabetic foot ulcer care.

6. Recommendation

Heard about diabetic foot ulcer care among diabetic patients should be one of the significant factors. So that; emphasize should be given for diabetic foot ulcer care education among diabetic patients, and policy makers should emphasize a program of developing professional diabetic educators to control the diabetic foot ulcer and minimize its complications.

Emphasis also needs to be given for diabetic patients in the age group between greater than or equal to 61 years. Further, interventional studies were conducted, in order to examine the incidence and risk factors among diabetic patients about diabetic foot ulcer care.

Availability of data and materials

The data that support the findings of this study was available from the corresponding author up on reasonable request in the form of SPSS, Version 20.

Competing interest: the investigator declare that have no competing interests.

Authors' contributions: BJB, took part in planning the study, management of quality of data, analyzes the data and writing the manuscript, participated in designing the study and writing the manuscript. The investigator read and approved the final manuscript.

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