



## Cross-sectional Study

# “Loss of a limb is not loss of a life”. Knowledge and attitude on diabetic foot ulcer care and associated factors among diabetic mellitus patients on chronic care follow-up of southwestern Ethiopian hospitals: A multicenter cross-sectional study

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## ABSTRACT

**Background:** Diabetic foot ulcer (DFU) is a full-thickness wound penetrating through the dermis located below the ankle in a diabetes patient. The incidence of diabetic foot ulcers has increased due to the worldwide prevalence of diabetic mellitus (DM) and the poor knowledge and attitude of diabetic foot self-care. Therefore, the study was aimed to assess the knowledge and attitude on diabetic foot ulcers and associated factors among diabetic mellitus patients of southwestern Ethiopian hospitals.

**Methods:** A multicenter cross-sectional study design was used. All diabetic patients fulfilling the inclusion criteria and treated as outpatient in the study period from August 9, 2021 to September 5, 2021 G was interviewed through a semi-structured questionnaire at Bedele General Hospital and Mettu Karl Comprehensive Specialized Hospital. Data was analyzed using a statistical package for social science (SPSS 23 version).

**Result:** Out of 387 diabetic patients, 234(60.5) were male and 266(68.7%) were married. The mean age of the participants was 41.73(SD ± 15.637) years and the majority 87(22.5) of the patients age were greater than 55 years. A total of 11(28.7%) patients had a diabetes mellitus duration between 5 and 10 years and more than half 213(55%) of the patients had a co-morbidity. Regarding the diabetic foot care, a total of 180(46.5%) and 257 (66.4%) of the patients had good knowledge and attitude, respectively. Educational level(AOR = 2.705(1.380-5.299), P = 0.004) and age[AOR = 1.254(0.768–2.048), P = 0.017] were the predictors of knowledge. Monthly income (AOR = 2.879(1.043–7.944), P = 0.041), educational level (AOR = 2.415(1.121–5.20), P = 0.024), previous information (AOR = 4.022(2.311–7.000), P < 0.001) and previous history of foot ulcers (AOR = 1.976(1.126–3.466), P = 0.018) were factors associated with the attitude of diabetic foot ulcer.

**Conclusion:** More than half of the study participants had poor knowledge while the majority of them had a good attitude. Educational level and age were significantly associated with knowledge. Monthly income, educational level, previous information, and previous history of foot ulcers were predictors of attitude towards diabetic foot care. Therefore, the health care providers should provide diabetic foot care education to reduce further complications of foot ulcers. Besides this, special attention should be given to patients who developed diabetic foot ulcers and have low socio-economic status.

## 1. Background

Diabetes mellitus (DM) is a diverse group of metabolic disorders that is resulted from increased blood glucose levels [1,2]. It is classified as either Type-one and Type two that can happen due to complete or near-total insulin deficiency and insulin resistance or impaired insulin secretion [2].

DM is one of the four priority non-communicable diseases (NCDs) targeted for prevention and control by the World Health Organization [3]. It was estimated that in 2019 there were 500 million people with diabetes worldwide and predicted to be 693 million by 2045 [4]. Type 2 diabetes will be the predominant public health problem in Africa and is expected to be 28 million by 2030 [33] and 41.6 million in 2045 [5]. In Ethiopia, one of the top five African countries regarding the prevalence

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of diabetes in the age range of 18–99 years, there were 2,652,129 cases of diabetes in 2017 [5].

Diabetes is identified as the main cause of premature death and disability [6]. Long-standing hyperglycemia of diabetes is associated with significant long-term vascular and non-vascular complications. The vascular complications of DM are further subdivided into microvascular (retinopathy, neuropathy, nephropathy) and macrovascular complications (CHD, peripheral arterial disease [PAD], cerebrovascular disease) [7].

Diabetic foot ulcer (DFU) is a full-thickness wound penetrating through the dermis (the deep vascular and collagenous inner layer of the skin) located below the ankle in a diabetes patient [8]. Diabetic foot complications are caused by many factors, such as peripheral neuropathy that leads to loss of sensation in the feet and peripheral vascular diseases that decrease blood supply to tissue and may cause infection and gangrene, increasing the risk of amputation [9–11].

Foot ulceration and supervening infection are the major causes of morbidity and mortality in diabetes patients [12]. Diabetic foot complications are familiar in diabetic patients and are measured as one of the most expensive diabetes complications to treat [13]. Different treatment protocols which include applying vascular intervention, anti-infection treatment, surgical operation, and postoperative wound care have been performed to increase the healing rate of the diabetes foot ulcer. Despite these, the reported diabetic foot ulcer healing rates from multiple series were poor [14].

In low and middle-income countries, foot ulcers are one of the most feared and common complications of diabetes. In Ethiopian diabetic feet are the main cause of sepsis, 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 [15].

Amputation of the lower extremities is the commonly occurred outcome for the DFU [16]. Approximately, more than half were progressed to infections that may result in amputations, [17]. Besides, DFU is significantly associated with a substantial reduction in the quality of life [18–20].

Proper patients' awareness about foot care is important defense line in preventing DF problems and amputation [21]. Correct practices of foot health care are essential for reducing the incidence of foot ulcers and complications [22]. It has been shown that 49–85% of all diabetic foot related-problems are preventable if appropriate measures are taken. This can be achieved through a combination of good foot care provided by a multidisciplinary diabetes care team and appropriate education for both people with diabetes and health care professionals [23].

Know days, the incidence of diabetic foot ulcers has increased poor knowledge and attitude of diabetic foot self-care [24–28]. In Ethiopia, patient habits of poor foot-care practice, and the absence of good quality service of DFU may lead to foot infections which result in limb amputation [29].

Prior to delivering diabetes education, it is essential for the health care professional to understand the extent of the patient's knowledge and attitude [30]. There was a scanty of finding on the care of the diabetic foot ulcer in Ethiopia. Therefore, the study was aimed to assess the knowledge and attitude of diabetic self-care and its predictors among diabetic's mellitus patients.

## 2. Patients and methods

### 2.1. Study area, design and period

A hospital-based multicenter cross-sectional study was employed at BGH and MKCSH from August 9, 2021 to September 5, 2021 G.C. BGH is located in Buno Bedele Zone, Bedele town, Southwest Oromia, Ethiopia which is found 486 km away from Finfinne whereas MKCSH is found Mettu town, South West Oromia, Ethiopia which is found at 600 km from Finfinne. Both hospitals have one diabetes mellitus follow-up clinic. The work has been reported in line with the strengthening of

the reporting of cohort studies in surgery (STROCSS) criteria [31].

### 2.2. Study participants and eligibility criteria

All adult diabetes mellitus patients with type one or type two diabetes, who have attended the diabetic follow-up in BGH and MKCSH during the study period and willing to participate in the study were included whereas DM patients who were unable to hear or communicate, patients developed diabetic ketoacidosis, newly diagnosed patients with DM ( $\leq 1$ -month duration) and patients who had amputation of lower legs were excluded from the study.

### 2.3. Study variables

The dependent variables were patients' knowledge, and attitude about diabetic foot ulcer whereas independent variables includes socio-demographic factors like age, sex, marital status, level of the education, average monthly income, occupation, residence, clinical characteristics like type of diabetes, duration of DM, presence of comorbidity, presence of diabetic complications and previous history of information.

### 2.4. Sample size determination and technique

The sample size was determined by using the single population proportion formula based on the previous finding of Dessie Referral Hospital,  $P = 39\%$  OR 0.39 [32]. Accordingly, 367 patients was obtained. Since the total patient who was attending follow up at BGH and MKCSH during the last year was less than 10,000, which was 8423, the correction formula was used as follows;

$$n_f = n/1 + (n/N) \quad n_f = 367/1 + (367/8423) = 351$$

Where;  $n_f$  = final sample size.

$$n = \text{total study population} \\ N = \text{source of population}$$

By adding 10% contingency, the total sample size was,  $351 + (351 \times 0.1) = 387$ .

The sample size (387) was distributed to each hospital by using a proportionate allocation. Accordingly, 289 patients were selected from MKCSH and 98 of them were from BGH. The study subjects were selected by using simple random sampling techniques.

### 2.5. Data collection process and management

The data collection tool was developed after reviewing different literature. The questioners were modified after the pretest was conducted at nearby Didessa hospital. The data was collected using face to face interview method. Two pharmacists and four nurses were involved in the data collection process. Two days of training was given to all data collectors to have a common understanding of the data collection tools and process. Every day after data collection, questionnaires were reviewed and checked for completeness by the principal investigator.

### 2.6. Data processing and analysis

The data were entered into a computer using EPI-info 3.5.4 software. Analysis was done using statistical software for social sciences (SPSS) 24.0. Descriptive data were explained as frequency and percentage. Multivariable logistic regression was used to analyze the variable and the variables with a P-value of less than or equal to 0.05 were considered a statistically significant association.

2.7. Ethics approval and consent-to-participate

Ethical approval was obtained from the Research Ethics Review Committee (RERC) of Mettu University with the reference number MEU/CHS/RERC95/2021. Written informed consent was obtained from the parents of the participants. The study protocol was performed in accordance with the declaration of Helsinki. The study was registered [researchregistry.com](https://www.researchregistry.com) with a unique reference number of “researchregistry7344”.

2.8. Operational definitions

- Good Knowledge: The knowledge Score of  $\geq 75\%$  of maximum score [33].
- Poor Knowledge: The knowledge Score of  $< 75\%$  of maximum score [33].
- Poor attitude: The possible score of  $\leq 2$  points [34].
- Good attitude: The possible score of  $\geq 3$  points [34].

3. Results

3.1. Socio-demographic characteristics of the diabetic patients

Out of 387 diabetic patients, 234(60.5) were male and 266(68.7%) were married. The mean age of the participants was 41.73(SD  $\pm$  15.637) years and the majority of the patients were 87(22.5%) aged greater than 55 years. Moreover, 112(28.9%) patients with DM were at college and above educational level and 221 (57.1%) patients with DM were lived in the urban area. Most patients with DM 103 (26.6%) were farmers and most of them 220(56.8) had a BMI that lies between 18.5 and 24.5 kg/m<sup>2</sup>. Regarding their income levels, a total of patients 162 (41.9%) had reported an average estimated monthly income of 1000–3000 Ethiopian

**Table 1**  
Socio-demographic characteristics of diabetic patient at MKCSH and BGH, 2021.

Variables	Category	Frequency	Percentage
Age	18–25	80	20.7
	26–35	84	21.7
	36–45	75	19.4
	46–55	61	15.8
	>55	87	22.5
Sex	Male	234	60.5
	Female	153	39.5
Marital status	Married	266	68.7
	Single	101	26.1
	Divorced	6	1.6
	Widowed	14	3.6
Education	No formal education	74	19.1
	Elementary	107	27.6
	Secondary	94	24.3
	College and above	112	28.9
Occupation	Farmer	103	26.6
	Merchant	55	14.2
	Private	32	8.3
	Governmental	60	15.5
	Non-governmental	12	3.1
	House wife	45	11.6
	Student	56	14.5
	Daily labour	24	6.20
Residence	Rural	166	42.9
	Urban	221	57.1
Body mass index(kg/m <sup>2</sup> )	<18.5	1	.3
	18.5–24.9	220	56.8
	25–29.9	154	39.8
	$\geq 30$	12	3.1
Monthly income	<1000 ETB	101	26.1
	1000-3000 ETB	162	41.9
	3001-5000 ETB	56	14.5
	>5000 ETB	68	17.6

ETB = Ethiopian birr.

birr (Table 1).

3.2. Clinical characteristics

Out of 387 study participants, 150(38.8%) of patients were diagnosed as type two DM patients and most of them, 239(61.8%) had a DM duration of fewer than 5 years. A total of 159 (41.1%) patients had never heard information about diabetic foot care. Likewise, the majority of the respondents 193 (61.7%) did not have any history of foot problems. Regarding the examination of their feet, a total of 208 (53.7%) patients’ feet were examined by nurses or physicians during their follow-up. A total of 213(53%) of the patients had comorbidity and 134(34.6%) have developed DM complications in which retinopathy has most commonly occurred that accounting for 56(14.5%)(Table 2).

3.3. Knowledge of patients with DM on diabetic foot self-care

Three hundred fifty-seven (92.2%) patients with DM knew the impact of regular taking of medication on the reduction of DM complications. The majority of the patients 216(55.8%) substantiated as the doctors have been alerting them during their regular follow-up to inspect their feet for ulcer as it may not heal quickly while 220(56.8%) patients with DM knew they may get a foot ulcer. A total of 282 (72.9%) patients knew that as all the time their feet should be washed. The temperature of water for washing feet was correctly answered by 106 (27.4%) patients (Table 3). Overall, a total of 180(46.5%) patients had a good knowledge of diabetic foot care (Table 3).

3.4. Attitude of patients with DM on diabetic foot self-care

More than half of the study participants 211(54.5%) had the ability to perform regular exercise and diet modification to prevent further diabetic complications. A total of the 323(83.5%) patients took the responsibility to examine their feet on a daily basis. Nearly half of the study participants had the ability to use special footwear. The majority of the patients 313(80.9) believe they can live a normal life with appropriate measures of diabetes (Table 4). Overall, about two-thirds of the patients had a good attitude towards diabetic foot-care.

**Table 2**  
Clinical characteristics of DM patient at MKCSH and BGH, 2021.

Variable	Category	Frequency	Percent
Types of DM	Type 1	150	38.8
	Type 2	237	61.2
Duration of DM	<5years	239	61.8
	5–10 years	111	28.7
	11–15 years	25	6.5
Comorbidity	>16 years	12	3.1
	Yes	213	55.0
Diabetic complication	No	174	45.0
	Yes	134	34.6
Types of complication	No	253	65.4
	Retinopathy	56	14.5
	Neuropathy	28	7.2
	Coronary heart disease	10	2.6
History of foot problems	Nephropathy	38	9.8
	Peripheral vascular disease	3	0.008
History of foot problems	Yes	130	33.6
	No	257	66.4
Previous information regarding diabetic foot care	Yes	228	58.9
	No	159	41.1
Previous examination of feet by doctor/nurse	Yes	208	53.7
	No	179	46.3
Frequency of blood sugar check-up	Daily	39	10.1
	weekly	85	22.0
	Monthly or longer	263	68.0

**Table 3**  
Knowledge of diabetic foot self-care among DM patients at MKCSH and BGH, 2021.

Variables		Frequency	Percent
DM patients should take medication regularly	Yes	357	92.2
	No	24	6.2
	I don't know	6	1.6
Controlling blood sugar can reduce complications	Yes	318	82.2
	No	35	9.0
	I don't know	34	8.8
DM patients should look after their feet because wounds and infection may not heal quickly	Yes	216	55.8
	No	65	16.8
	I don't know	106	27.4
DM patients should look after their feet because they may get a foot ulcer	Yes	220	56.8
	No	69	17.8
	I don't know	98	25.3
Effect of smoking on DM progression	Yes	219	56.6
	No	78	20.2
	I don't know	90	23.3
Frequency of feet washing	Everyday	282	72.9
	Rarely	83	21.4
	I don't know	22	5.7
Temperature of water for washing feet	Warm water	106	27.4
	Cool water	263	68.0
	I don't know	18	4.7
Frequency of wearing shoes and socks	All times	153	39.5
	Rarely	206	53.2
	I don't know	28	7.2

**Table 4**  
Attitude of diabetic foot self-care among DM patient MKCSH and BGH, 2021.

Variables		Frequency	Percent
Can you perform regular exercise and change your food habits to prevent further diabetic complications?	Yes	211	54.5
	No	176	45.5
Can you take the responsibility of daily examination of your feet and footwear, as well as regular foot care specialist consultation?	Yes	323	83.5
	No	64	16.5
Can you use special footwear advised by the foot care specialist?	Yes	194	50.1
	No	193	49.9
Will you wear footwear indoors as advised by your foot-care specialist?	Yes	239	61.8
	No	148	38.2
Can you be able to live a normal life with appropriate measures for diabetes?	Yes	313	80.9
	No	74	19.1

**3.5. Factors associated with the knowledge of diabetic foot care**

The knowledge of diabetic foot care was significantly associated with the level of the education and age category. For instance, participants with an educational status of elementary were 2.7 times more likely to have good knowledge as compared to those who didn't attend formal education (AOR = 2.705(1.380–5.299), P = 0.004). Similarly, patients whose ages lie 46–55 years were 2 times more likely to have a good knowledge when compared to those whose ages were >55 years (AOR = 1.869(0.949–3.677), P = 0.017)(Table 5).

**3.6. Factors associated with the attitude of the diabetic foot care**

Multivariable logistic regression analysis revealed that the attitude of the diabetes patients regarding diabetic foot self-care was significantly associated with monthly income, educational level, previous information, and previous history of foot ulcers. Patients who have got a

monthly income of 3001–5000 ETB had 3 times more likely to had a good attitude than those who had got >5000 ETB (AOR = 2.879 (1.043–7.944), P = 0.041). Similarly, patients with the educational status of secondary school were 2.4 times more likely to have a good attitude when compared with those who did not have formal education (AOR = 2.415(1.121–5.200), P = 0.024). Similarly, patients that received previous information about diabetic foot care were 4 times more likely to have a good attitude than their counterparts [AOR = 4.022(2.311–7.0), P= <001]. Patients who had the previous history of foot ulcers were 2 times more likely to have a good attitude as compared to their counterparts(1.976(1.126–3.466), P = 0.018) (Table 6).

**4. Discussion**

A diabetic foot ulcer is one of the chronic complications of diabetes patient which lead to disability and death if it is not effectively prevented and controlled. To prevent this, the patient should have good knowledge and attitude on diabetic foot self-care [23].

In our study, a total of 180(46.5) of the patients with DM had good knowledge of diabetic foot self-care. This demonstrated a lower level of knowledge regarding diabetic foot self-care compared to the study done in China (70.38%) [35] and Saudi Arabia (53.6%) [36]. The possible reason might be in both country and there may be enough access to information through health education, print, and electronic media that helps to enhance the public awareness of diabetes and its complications. However, it was higher than the studies done in Pakistan (29.3%) [37]. The difference might be due to the study settings and sample size differences. The level of knowledge was also higher compared to the study done in Hawassa, southwest Ethiopia 38(27.3%) [38]. The difference might be recognized to the majority of respondents were from urban residences in which they facilitate familiarity with recent information related to diabetes mellitus including diabetic foot ulcer care as compared to rural communities. Additionally, 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 diabetes mellitus.

In this study, about two-thirds 254(66.4%) of diabetic patient have a good attitude toward diabetic foot care. This finding was less as compared to the study done in Thailand (75.3%) [39]. The difference might be due to the socio-demographic variation of the study populations. On the contrary, the finding is slightly higher than the study conducted in Lahore (60%) [40].

The level of knowledge on diabetic foot self-care was significantly associated with educational level (AOR = 2.705(1.380–5.299), P = 0.017) and age(AOR = 1.869(0.949–3.677), P = 0.017). This finding was similar to the study conducted in Bahirdar, northwest Ethiopia, north of Iran, Pakistan, and Nepal in which educational status is significantly associated [33,41–43]. The possible explanation for this difference might be due to the knowledge gap between the compared groups as the educational level increases the eagerness to know about one's own health and take prevention method increase. Similarly, patients aged between 36 and 45 had much responsibilities and were working-age group compared to those aged above 55years. Therefore, they seek to know more about the disease and related complications. Monthly income (AOR = 2.879(1.043–7.944), P = 0.041), educational level (2.415(1.121–5.200), P = 0.024) previous information (4.022 (2.311–7.000), P=<000) and previous history of the foot ulcer (1.976 (1.126–3.466), P = 0.018) were factors that significantly associated with the attitude of diabetic foot ulcer. On the contrary, the study done in Riyadh Saudi showed that the frequency of visiting the diabetic clinics was significantly associated with attitude [44]. This finding was consistent with the study conducted in Sudan in which the presence of diabetic foot ulcers was associated with the attitude level of patients [45]. This is because of the patient who had previously been diagnosed with foot problems were alerted to know and take measures to prevent further foot-ulcer. The other possible explanation is; willingness to take

**Table 5**

Multivariable logistic regression analysis of factors associated with the knowledge of diabetic patients about diabetic foot care in MKCSH and BGH, 2021.

Variables	Category	Knowledge		COR(95%CI)	P-value	AOR(95%CI)	P-value
		Good (n = 180)	Poor (n = 207)				
Age(Years)	18–25	37(20.6%)	43(20.8%)	1.570 (0.852–2.894)	0.107	1.869 (0.949–3.677)	0.070
	26–35	40(22.2%)	44(21.2%)	1.486 (0.813–2.718)	0.148	1.473 (0.772–2.813)	0.240
	36–45	31(17.2%)	44(21.2%)	1.918 (1.026–3.587)	0.198	1.881(0.952–3.717)	0.069
	46–55	22(12.2%)	39(19%)	2.396(1.221–4.699)	0.041	2.395 (1.169–4.905)	0.017
	>55	50(27.8%)	37(17.8%)	1		1	
Education	No formal education	23(12.8%)	51(24.6%)	1		1	
	Elementary	44(24.4%)	63(30.4%)	3.301 (1.775–6.140)	0.000	2.705 (1.380–5.299)	0.004
	Secondary	46(25.6%)	48(23.2%)	2.132 (1.243–3.656)	0.006	1.611(.900–2.882)	0.108
	College and above	67(37.2%)	45(21.7%)	1.554 (0.893–2.702)	0.119	1.226(.675–2.227)	0.503
Previous information about diabetic foot care	Yes	127(70.6%)	101(48.8%)	2.515 (1.651–3.830)	0.000	0.374 (0.228–0.613)	0.613
	No	53(29.4%)	106(51.2%)	1		1	
Previous foot examination	Yes	105(58.3%)	103(49.8%)	0.707 (0.473–1.058)	.092	1.254 (0.768–2.048)	0.366
	No	75(41.7%)	104(50.2%)	1		1	
Blood sugar check up	Daily	24(13.3%)	15(5.8%)	.449(.225–.896)	.023	.509(.238–1.092)	0.509
	Weekly	46(25.6%)	39(19%)	.610(.373_997)	.049	.666(.385–1.151)	0.666
	Monthly or longer	110(61.1%)	153(75.%)	1		1	

**Table 6**

Multivariable logistic regression analysis of factors associated with the attitude of a diabetic patient about diabetic foot in MKCSH and BGH, 2021.

Variables	Category	Attitude		COR(95%CI)	P-value	AOR(95%CI)	P-value
		Good (n = 257)	Poor (n = 130)				
Monthly income	<1000 ETB	59(30%)	42(32.3%)	5.339(2.312–12.332)	<001	3.204(1.239–8.287)	0.079
	1000-3000 ETB	99(38.5%)	63(48.5%)	4.773(2.139–10.648)	<001	3.546(1.429–8.798)	0.076
	3001-5000 ETB	39(15.2%)	17(13.1%)	3.269(1.287–8.303)	0.013	2.879(1.043–7.944)	0.041
	>5000 ETB	60(23.3%)	8(6.1%)	1		1	0.063
Education	No formal education	43(16.7%)	31(23.8%)	1		1	0.06
	Elementary	59(30%)	48(37%)	2.949(1.530–5.684)	0.001	1.748(.746–4.096)	0.199
	Secondary	65(25.3%)	29(22.3%)	3.328(1.823–6.077)	<001	2.415(1.121–5.200)	0.024
	College and above	90(35%)	22(16.9%)	1.825(.963–3.459)	0.065	1.340(.626–2.869)	0.452
Residency	Rural	101(39.3%)	65(50%)	1.545(1.010–2.363)	0.045	1.010(.601–1.699)	0.969
	Urban	156(60.7%)	65(50%)	1		1	
Previous information	Yes	182(70.8%)	46(35.4%)	.226(.144–.354)	<001	4.022(2.311–7.0)	<001
	No	75(29.2%)	84(64.6%)	1		1	
History of previous foot ulcer	Yes	99(38.5%)	31(23.8%)	.500(.311–.804)	0.004	1.976(1.126–3.466)	0.018
	No	158(61.5%)	99(76.2%)	1		1	
Previous foot examination by doctor/nurse	Yes	156(60.7%)	52(40%)	.432(.280–.664)	<001	1.014(.582–1.765)	0.962
	No	101(39.3%)	78(60%)	1		1	
Smoking cigarette	Yes	17(6.6%)	4(3.1%)	.448(.148–1.360)	0.157	2.133(.615–7.394)	0.232
	No	240(93.4%)	126(96.9%)	1		1	

responsibility to do advice told by physician depends on income. For instance, a diabetic patient who had a low monthly income can't afford special footwear advised by foot care specialist.

**4.1. Strength and limitation of the study**

As the strength the study was a multicenter and as a limitation, the cause and effect relationship was not obtained due to its retrospective study.

**5. Conclusion**

More than half of the study participants had poor knowledge and about two-thirds of the patients had good a attitude. Educational level and age were significantly associated with knowledge. The attitude of foot care was associated with Monthly income, educational level, previous information, and history of previous foot ulcers. The hospital

should consider establishing a specialized diabetic clinic in which foot care education can easily be integrated into follow-up care to reduce further complications of foot ulcers and special attention should be given for patients who haven't formal education and patients who had diabetic foot ulcers to reduce, delay, or prevent the risk of limb amputation.

**Ethical approval**

Ethical clearance was obtained from the Institutional Review Board (IRB) of Mettu University, college of health science.

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This work was funded by Mettu University. The funding body did not have any role in study design, data collection, data analysis, interpretation of data or in writing the manuscript.

## Author contribution

FB contributes in the preparation of proposal, methodology, and statistical analysis. DB was participated in preparing the first draft of the manuscript. FB was contributed to the editing of the manuscript. All authors checked and confirmed the final version of the manuscript.

## Consent

Not applicable. No individual person's personal details, images or videos are being used in this study.

## Registration of research studies

Name of the registry: RESEARCH REGISTRY, <https://www.researchregistry.com>.

Unique Identifying number or registration ID: researchregistry7344.

Hyperlink to the registration (must be publicly accessible): <https://www.researchregistry.com/register-now#home/registrationdetails/5d70f2520791fb0011b79e9f/>

## Guarantor

Firomsa Bekele.

## Availability of data and materials

The materials used while conducting this study are obtained from the corresponding author on reasonable request.

## Consent for publication

Not applicable. No individual person's personal details, images, or videos are being used in this study.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

## Declaration of competing interest

The authors declared that they have no competing interest.

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## Abbreviations

AOR	Adjusted odds ratio
BGH	Bedele General Hospital
BMI	Body mass index
DFU	Diabetic foot ulcer
DM	Diabetes mellitus
MKCSH	Mettu Karl Comprehensive specialized hospital
NCD	Non-communicable disease
PAD	Peripheral arterial disease
SD	Standard Deviation
SPSS	Statistical package for social sciences

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.103140>.

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