COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTMENT OF NURSING

KNOWLEDGE, ATTITUDE, PRACTICE AND THEIR PREDICTORS TOWARDS PREVENTION OF DIABETIC FOOT ULCER AMONG ADULT DIABETIC PATIENTS ATTENDING AT DIABETIC FOLLOW UP CLINIC AT GURAGE ZONE, SOUTHERN, ETHIOPIA, 2022

BY:

HENOK TEKLE

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A RESEARCH SUBMITTED TO WOLKITE UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTEMENT OF NURSING IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR BACHELOR OF SCIENCE DEGREE IN NURSING

JUNE,2022

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HENOK TEKLE

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ADVISOR:

Mr. TADESSE TSEHAY (BSC, MSC IN ADULT HEALTH NURSING)

Mr. BAYE TSEGAYE. (BSC, MSC IN ADULT HEALTH NURSING)

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Approval sheet

This is certifying that the student research proposal entitled "*Knowledge, Attitudes and Practice towards Prevention of Diabetic Foot Ulcer among Adult Diabetic Patients at Follow up Clinic at selected Hospitals at Gurage Zone in Ethiopia, 2021*". A research proposal submitted in partial requirement for the degree of nursing at Wolkite University, College of Medicine and Health Science, department of Nursing.

The assistance and help received during the course of this work have been duly acknowledged. Therefore, the advisors recommended that it be accepted as fulfilling the requirement.

Advisors

Mr. Tadesse Tsehay (Bsc, Msc in Adult health nursing)

Signature ---------- Date ----------

Mr. Baye Tsegaye. (Bsc, Msc in Adult health nursing)

Signature ---------- Date ----------

Examiners

Mr. Haymanot. A

Signature ---------- Date ----------

Mr. Haile. T

Signature

---------- Date ----------

Contents

Acknowledgment 3
Approval sheet 4
List of tables 8
List figures 9
Abbreviations and Acronyms 11
Abstract 12
1. Introduction 13
1.1 Background 13
1.2 Statement of problem 14
1.3 Significance of the study 16
2. Literature Review 17
2.1 Diabetic Patients' Knowledge towards Prevention of Diabetic Foot Ulcer 17
2.2 Diabetic Patients' Attitude towards prevention of Diabetic Foot Ulcer 18
2.3 Diabetic Patients' Practice towards prevention of Diabetic Foot Ulcer 19
2.4 Socio demographic and clinical characteristics of diabetic patients towards KAP on Prevention of Diabetic Foot Ulcer 19
2.5 Conceptual frame work 20
3. Objectives of the study 21
3.1. General Objective 21
3.2. Specific Objectives 21
4.Methodology 22
4.1 Study area and period 22
4.2 Study design 22
4.3 Population 22
4.3.1Source population 22
4.3.2 Study population 22
4.4 Eligibility criteria 22
4.4.1 Inclusion criteria 22
4.4.2 Exclusion criteria 22
4.5 Sample size determination and sampling procedure 23
4.5.1 Sample size 23

4.5.2 Sampling technique and procedure 23
4.6 Study variable 25
4.6.1 Dependent variable 25
4.6.2 Independent variable 25
4.7. Operational definitions 25
4.8 Data collection instrument and procedure 26
4.8.1 Data collection instrument 26
4.8.2 Data collection procedure 26
4.9 Data Quality Assurance 27
4.10 Data Processing and Analysis 27
4.11 Ethical considerations 27
4.12 Dissemination of the result plan 27
5. Results 27
5.1 Socio-demographic characteristics of participants 27
5.2 Clinical Characteristics of Study Participants 28
5.3 Knowledge on prevention of diabetic foot ulcer 28
5.4 Associated factors of knowledge on prevention of diabetic foot ulcer 28
5.5 Attitude on prevention of diabetic foot ulcer 30
5.6 Associated factors of participant's attitude on prevention of diabetic foot ulcer 30
5.7 Practices of participants on prevention of diabetic foot ulcer 32
5.8 Associated factors of participant's practice on prevention of diabetic foot ulcer 32
..... 34
6. Discussion 34
6.1 Limitation of the study 36
7. Conclusion 36
8. Recommendation 36
9. Reference 37
Annexes: 41
Annex 1: English Version of Information and Consent Form. 41
Annex: III Questionnaire (English Version) 42

List of tables

Table 1 Associated factors of knowledge towards prevention of diabetic foot ulcer at selected hospitals in Gurage Zone, Southern, Ethiopia 2022. 29
Table 2: Associated factors of attitude towards prevention of diabetic foot ulcer using binary logistic regression at Gurage zone hospitals, southern, Ethiopia 2022.....30
Table 3: Associated factors of practice on prevention of diabetic foot ulcer self-care at selected hospitals in Gurage Zone, Southern Ethiopia 2022. 32

List figures

Figure 1 : Conceptual frame work on possible predictors of diabetic foot ulcer.....20
Figure 2 Schematic presentation on selecting study setting and sample on the knowledge attitude, practice and their predictors towards prevention of diabetic foot ulcer in Gurage Zone, Ethiopia.....24
Figure 3Level of knowledge attitude and practice on the prevention of diabetic foot ulcer among diabetic patients at selected hospital in Gurage Zone Southern Ethiopia, 2022. 34

Abbreviations and Acronyms

AOR	Adjusted odd ratio
CI	Confidence Interval
COR	Crudes odds ratio
DFU	Diabetic foot ulcer
DM	Diabetes mellitus
ETB	Ethiopian Birr
KAP	Knowledge attitude and practice
PAD	Peripheral artery disease
SNNPR	Southern Nation's Nationality People Regional State
SPSS	Statistical package for social sciences
WKUSTH	Wolkite university specialized teaching hospital

Abstract

Background: Diabetes mellitus is a chronic and complex metabolic disorder that results into many complications. Diabetic foot ulcer is one of its complication and that affects life quality of diabetic patient. Despite its great negative impact on life quality, only few studies have been done so far to assess its determinants.

Objective: To assess patients' knowledge, attitude, practice on prevention of diabetic foot ulcer and their predictors among adult diabetic patients at selected hospitals in Gurage zone.

Methodology: Institution-based cross-sectional study design was conducted among 380 patients selected by simple random sampling in three selected hospitals from Feb to June 2022. Data was collected using pretested and semi structured self-administered questionnaire. Collected data was entered in EPI and exported to SPSS version 25 for analysis. Descriptive analysis for frequency and percentage, and binary logistic regression for association was done.

Results: Out of the 380 study participants, 374 were completed the study giving the response rate of 97.4%. The mean age of participants is 46.06 (13.5) years. From total, 148 (39.6%) had poor knowledge and 226 (60.4%) of participants had good knowledge towards prevention of diabetic foot ulcer. Nearly three fourth, 283 (78.8%) patients had positive attitude but only 185 (56.4%%) patients had good foot care practice. Socio-demographic variables such as residence, age group, educational status, religion, marital status, and history of diagnosed foot problem are found to be significantly associated with knowledge on prevention of diabetic foot ulcer. Attitude and practice of the patient also significantly associated with the age and educational status

Conclusion

Nearly half of the study participants had good knowledge and good practice. Age, educational status, occupation, residence, marital status and history foot problem are associated factors.

Recommendation: The researches recommends that health care providers and responsible bodies like, health professionals, policy makers should create strategy to give quality health education to enhance the knowledge on prevention of diabetic foot ulcer.

Key words: Knowledge, Attitude, practice. diabetic foot ulcer, Ethiopia

1. Introduction

1.1 Background

Diabetes mellitus could be a unremitting and complex metabolic clutter requiring persistent and legitimate restorative care for support of typical blood glucose level and lessening of complications(1). Ongoing clinical hones for administration, avoidance and instruction of diabetic patients are not sufficient for the control of its intense and long term complications (2). Noteworthy investigate confirmations recommend that a wide extend of mediations are required for the advancement of diabetic outcomes (3). In spite of the fact that a long list of complications influences a diabetic quiet but one deplorable complication is diabetic foot or foot ulcer/lesion (4). Diabetic foot injury has striking affect on socio-economic status and prosperity and of diabetic understanding. It not as it were hampers the quality of life but too has obvious result on the monetary status of a diabetic patient (5).

It happens since of numerous chance variables. The foremost common contributing components in making DFU are peripheral artery disease (PAD) poor metabolic control, foot deformities, older age, peripheral vasculopathy and poor knowledge of diabetics peripheral neuropathy, shoes pressure, poor blood glucose control, cigarette smoking etc and these variables can too play an imperative part in patho-physiology of the disease, Although diabetic foot may be a destroying and extended condition related with diabetes indeed at that point it can be avoided in tall chance patients (6).

The common clinical presentation of DFU includes pain in the foot, absence of sensation, ulceration, loss of joint movements, absence of sensation in the foot, abscess formation and change of colour and temperature when gangrene sets in (7). Ulceration of the calcaneum and bones of the forefoot, particularly the incredible toe and to begin with metatarsal head, are common locales of diabetic ulcer; on the off chance that a foot ulcer goes untreated and does not heal, it may gotten to be infected and appearances of complications extend from basic to profoundly complex, counting appendage removals and life-threatening contaminations (8).

An understanding of the causes of foot diseases in diabetics will empower high-risk patients to be recognized early. Subsequently, Knowledge, attitude and practice (KAP) in respect to infection, medications and life style plays a critical part in accomplishing fitting glycemic control in patients with DM(9).

1.2 Statement of problem

Globally, diabetic foot ulcer could be a major medical, social and financial issue. In most developed nations, the yearly rate of foot ulceration among individuals with diabetes is about 2%. In these nations, diabetes is the foremost common cause of non-traumatic amputation (10).

Diabetic Foot injury may be a destroying condition since it moreover increments the rate inability and even death of diabetic patients, Foot ulcers can lead to recurrent hospital admission, superadded bacterial infections of lesions and even limb amputation in severe cases (11). Diabetic foot is very common and also one of most expensive complication of diabetes(12). Diabetic foot ulcer can effectively be analysed amid take after up visits by cautious feet examination (13). In developing countries like Pakistan, diabetic foot injuries are exceptionally troubling for the diabetics (14). It is not only associated with significant risk of disability, morbidity and mortality but has a great psychological impact on diabetic patients. Study evidences suggest that 15% of diabetic patients can suffer from diabetic foot lesions at some stage of their disease (15). Severity of complication can vary from simple boil to life threatening secondary bacterial infection or even limb amputation(16) .

Diabetic foot ulcer (DFU) is getting to be more than a marker of complication status, having an autonomous affect on lower extremity amputation and mortality risk (17). It is the foremost serious complication of diabetes mellitus attributing to a critical number of morbidity, mortality and decreased quality of life in diabetic patients, and enormous financial misfortune Loss misfortune to the families and the nation (18).

It is the foremost common complication. It is extreme and exceptionally expensive to oversee. Amputation is 10–20 times more common in individuals with diabetes. It is assessed that each 30 seconds, a lower appendage or portion of a lower appendage is lost since of diabetes (19).

Diabetic foot ulcer is preventable with satisfactory understanding information of the disease and consistent examination of the foot (20). Over 40% of individuals with diabetes with foot ulcer needs adequate information and instruction on foot care practices (21). The fast expanding within the rate of foot ulcer requires productive preventive and administration measures within the decrease and care of diabetic foot ulcer.

Therefore, this institutional- based cross- sectional study was conducted to deal with diabetic patient' level of knowledge, attitude, practice and their predictors towards prevention of DFU among adult patients attending at diabetic follow up clinic at Gurage zone.

1.3 Significance of the study

The main purpose of this study is to add understanding and to provide information about prevention of DFU by determining diabetic patients' level of knowledge, attitude, practice and their predictors towards the subject matter among adult diabetic patients attending at diabetic follow up clinic at Gurage zone. Therefore, identifying level of knowledge, attitude, practice and their predictors would help to prevent and manage premature death from DM in general, as well as diabetic foot complications in particular.

This study allows the local health sectors, regional and federal institutions, clinical services, facility managers and governmental and non-governmental organizations to be informed of the patients' level of knowledge, attitude and practice towards the prevention of DFU and to commit to taking action.

In addition, this study helps patients gain more knowledge and understanding in order to prevent diabetic foot ulcers, while it will help us, the researchers, to develop knowledge and skill about research.

We have designed this study to assess the knowledge, attitude, practices and their predictors regarding prevention of diabetic foot ulcer among patients attending at diabetic follow up clinic at Gurage zone. we hope that the information gained on the knowledge and practices regarding foot ulcer prevention can help health care providers to develop targeted self-management education programmes for people with diabetes.

2. Literature Review

2.1 Diabetic Patients' Knowledge towards Prevention of Diabetic Foot Ulcer

An institution-based cross sectional study conducted at the Diabetic Foot Clinic at Roi-Et Hospital, in Thailand, in 2014, with a sample size of 300 respondents reported that the respondents' knowledge level was moderate (66.0%) (22).

According to study done in India in 2015 by using a cross sectional observational study with a sample size of 150 participants showed that 32 % patients had good knowledge about foot care and 27.3 % were lacking the satisfactory knowledge about foot care (24). Another hospital based prospective observational study done in India in 2016 with a sample size of 70 patients showed that majority (58%) of patients had good knowledge while 39% of patients had moderate and 3% had poor knowledge (9).

A cross-sectional observational study done in India in 2019 with a sample size of 135 patient showed only 31.0 % of the individuals with diabetes have knowledge regarding foot care related practices, as advised by their doctors (24). Another also from India revealed that 78% of diabetic patients have average knowledge, 18% have poor knowledge and 4% have good knowledge regarding diabetic foot care (25).

A qualitative exploratory descriptive study done in Tobago, in 2020 using purposeful sampling technique to recruit 20 participants' revealed that the majority of participants had poor knowledge regarding DFU but exhibited awareness about foot care, especially on foot cleaning and inspection, preventing irritation after washing, appropriate footwear, and not walking barefooted (20).

A cross-sectional observational study done in Sudan in 2019 with a sample size of 150 patients. The participants who had good knowledge about diabetic foot self-care were 46.7%, poor knowledge 29.3% and moderate knowledge 24%(26).

In different parts of Ethiopia as reported by different scholars, diabetic patients' knowledge towards prevention of diabetic foot ulcer ranged from 43.8% to 68.3% (25).

An Institution based descriptive cross-sectional study conducted at Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia in 2015 among 313 diabetic patients declare that the mean knowledge score is 7.5 ± 2.02 of which 56.2% and 43.8% had good and poor knowledge of foot care, respectively (25).

According to study done at Dessie Referral Hospital, Northeast Ethiopia in 2021 by using facility-based explanatory sequential mixed method with a sample size of 352 participants showed that 217 (61.3%; 95% CI (57.6–68.3%)) of the patients with DM had good knowledge of diabetic foot self-care (27).

2.2 Diabetic Patients' Attitude towards prevention of Diabetic Foot Ulcer

An institution-based cross sectional study conducted at the Diabetic Foot Clinic at Roi-Et Hospital, in Thailand, in 2014, with a sample size of 300 respondents reported that the respondents' level of attitude is high (75.3%), and their practice was also on high level (50.7%) (22).

A hospital based prospective observational study done in India in 2016 with a sample size of 70 patients showed that 38 (54%) patients having a positive attitude towards disease, while nearly half (46 %) of the patients had a negative attitude which may influence and decrease their quality of life (9).

A descriptive cross-sectional study conducted in the diabetic clinic of tertiary care hospital - King Saud Medical City, Riyadh, Saudi Arabia in 2019 with a sample of 368 shows there were 318 patients (86.4%) who have poor attitude toward diabetic foot and diabetic foot care (28).

A hospital based cross-sectional survey conducted in King Fahd Hospital of the University of Dammam, Saudi Arabia in 2017 with a sample of 229 diabetic patients showed that the majority of participants had good education and favourable attitudes towards diabetic foot care (29).

A hospital based cross-sectional survey conducted in two Family Health Units, in the city of Picos-PI, Brazil, in 2014 with a sample size of 85 diabetic patients showed that most patients (82.4%) would put the foot physical exam into practice (30). Study from India with 100 samples revealed that 89% of diabetic patients have positive attitude and 11% have negative attitude regarding diabetic foot care (31).

A qualitative exploratory descriptive study done in Tobago, in 2020 using purposeful sampling technique to recruit 20 participants' revealed that the participants had good attitudes and practices of foot care despite their poor knowledge of DFU(32).

2.3 Diabetic Patients' Practice towards prevention of Diabetic Foot Ulcer

A hospital based prospective observational study done in India in 2016 with a sample size of 70 patients showed to be a good practice, 42% and 30% related to disease and life style practice respectively were moderate (9).

A descriptive cross-sectional study done in Indonesia in 2019 with a sample size of 546 subjects showed that concerning foot self-care behaviour, the average standard score was 47.4, indicating an overall poor level of foot-care behaviour (33).

A multihospital-based descriptive cross-sectional study done at Volta Region, Ghana, in 2021 among 473 patients showed that 63% of diabetic patients had good knowledge of DFC, while 49% competently practiced it (34). Study from India 86% of diabetic patients have adequate practice and 17% have inadequate practice regarding diabetic foot care (31).

A cross- sectional hospital-based study done at Dessie Referral Hospital, Northeast Ethiopia in 2019 with a sample size of 352 participants showed that one hundred thirty-four (39%; 95% CI: 34.3–45.1%) of patients with DM had a good practice on diabetic foot self-care (27).

2.4 Socio demographic and clinical characteristics of diabetic patients towards KAP on Prevention of Diabetic Foot Ulcer

A cross sectional study conducted at the Diabetic Foot Clinic at Roi-Et Hospital, in Thailand, in 2014, with a sample size of 300 respondents reported that some socio-demographic data, knowledge and attitude are identified as factors associated with the practice of preventive self-care on diabetic foot ulcer in diabetic patients(22)

A descriptive cross sectional study conducted at a diabetic clinic of King Saud Medical City in Riyadh, Saudi Arabia, in 2019, with a sample size 368 diabetic patients showed that being married, having a secondary and university level of education, and being a government employee had significantly better knowledge of diabetic foot compared with their counterparts. In addition, there were no significant differences in the attitude toward diabetic foot and diabetic foot care across age groups. But patients with longer duration of diabetes (>5 years) significantly had better practice of diabetic foot care(23).

2.5 Conceptual frame work

This particular study assessed the knowledge, attitude and practice on prevention of diabetic foot ulcer and determined their predictors.

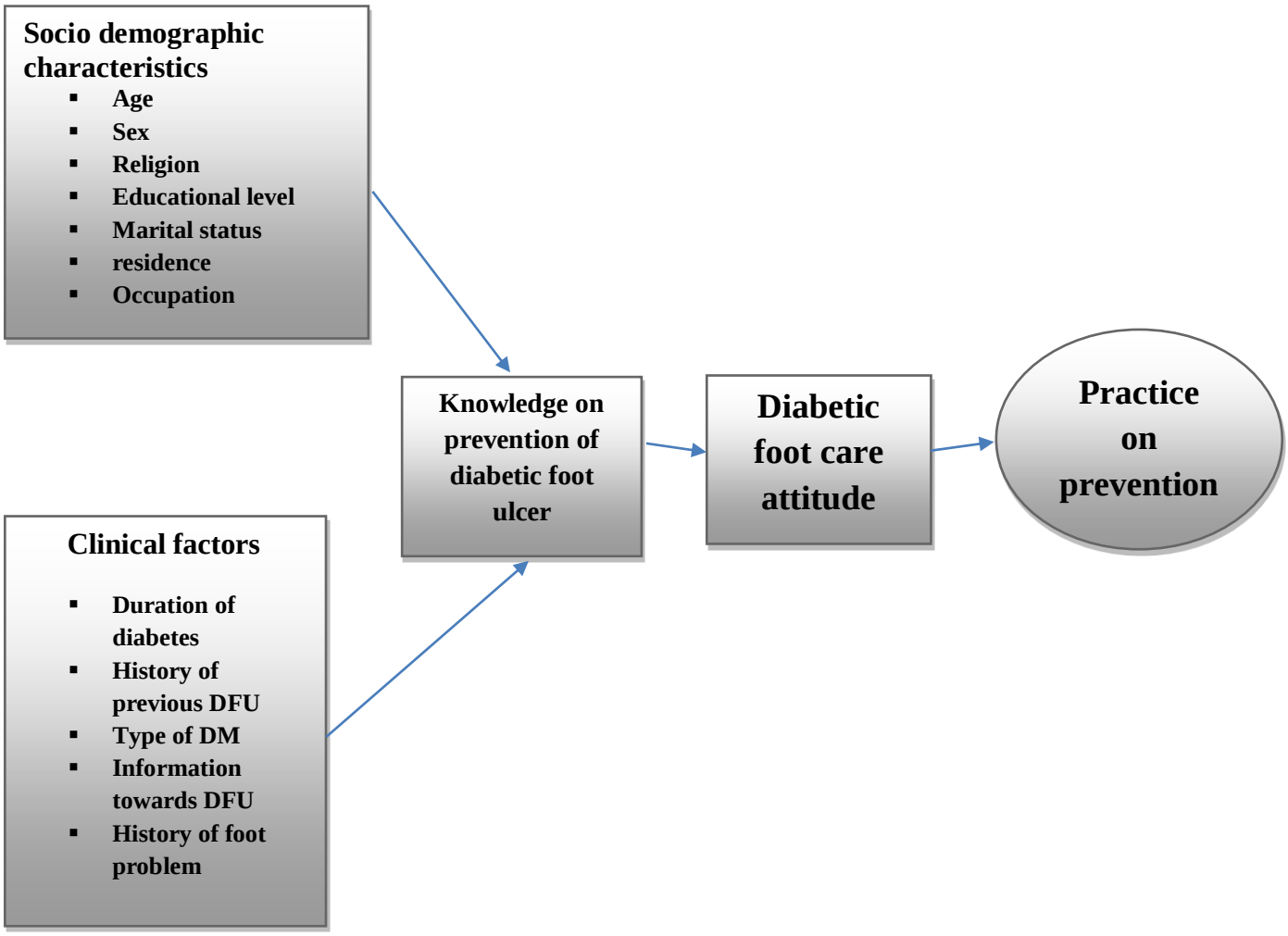

Figure 1 : Conceptual frame work on possible predictors of diabetic foot ulcer

3. Objectives of the study

3.1. General Objective

To assess patients' knowledge, attitudes, practices and their predictors towards prevention of diabetic foot ulcer among adult diabetic patients attending at diabetic follow up clinic at Gurage zone, Southern, Ethiopia, 2022

3.2. Specific Objectives

To determine patients' knowledge towards prevention of diabetic foot ulcer among adult diabetic patients attending at diabetic follow up clinic at Gurage zone, Southern, Ethiopia, 2022

To assess patients' attitudes towards prevention of diabetic foot ulcer among adult diabetic patients attending at diabetic follow up clinic at Gurage zone, Southern, Ethiopia, 2022

To identify patients' practices towards prevention of diabetic foot ulcer among adult diabetic patients attending at follow up clinic at Gurage zone, Southern, Ethiopia, 2022

To assess the predictors of KAP towards prevention of diabetic foot ulcer among adult diabetic patients attending at follow up clinic at Gurage zone, southern, Ethiopia,2022

4.Methodology

4.1 Study area and period

The study was conducted at three selected hospitals in Gurage zone including Wolkite university specialized teaching hospital, Attat primary hospital and Butajira primary hospital. The capital of Gurage zone is Wolkite town which is found in 158km southwest from Addis Ababa, the capital of Ethiopia.

It is a densely populated zone with a total population of 3,567,377 with an area of 5,893.40km2 according to the 2015 census. The zone has one general hospital, seven primary hospitals, 72 health centres, and 412 health posts.

The study was conducted at selected hospitals at Gurage zone from February to june 2022.

4.2 Study design

Institutional based cross-sectional study was conducted in three selected hospitals

4.3 Population

4.3.1Source population

All Adult diabetic patients attending at diabetic follow up clinic at Gurage zone.

4.3.2 Study population

All selected adult diabetic patients who was attending at diabetic follow up clinic in selected hospitals during data collection period.

4.4 Eligibility criteria

4.4.1 Inclusion criteria

All type one and type two diabetic patients above the age of 18 years attending diabetic follow up clinic and who had willing to participate in this study was included.

4.4.2 Exclusion criteria

Diabetic patients whose critically ill patients who are unable to communicate were excluded from the study.

4.5 Sample size determination and sampling procedure

4.5.1 Sample size

The sample size will be calculated by using single population proportion formula with the following assumptions of 95% Confidence Interval (CI) of width, on the value of the proportion of the population at previous study is 66%(35).

n = sample size

p= 66%, the maximum estimated proportion taken for patient who had competent practice from previous study (6)

d =5% (maximum margin of error the researcher is willing to allow)

Z =1.96 (standard normal deviation value corresponding to 95% confidence level)

$$n = \frac{z^2 p(1-p)}{d^2} = \frac{1.96 \times 1.96 \times 0.66(1-0.66)}{0.05^2} = 345$$

Therefore, by adding 10 % for possible non-response rate

(345× 10) / 100 = 34.5 the final sample size was 380.

4.5.2 Sampling technique and procedure

The hospitals were selected by simple random sampling using lottery method those are Wolkite university specialized teaching hospital, Attat hospital, Butajira hospital.

A simple random sampling technique was employed to select the study participants A. To avoid double-counting of cases, the ID of the participants who had undergone the interview was documented each day and any patient coming to the clinic on a specific day was counter checked with the document before conducting the interview.

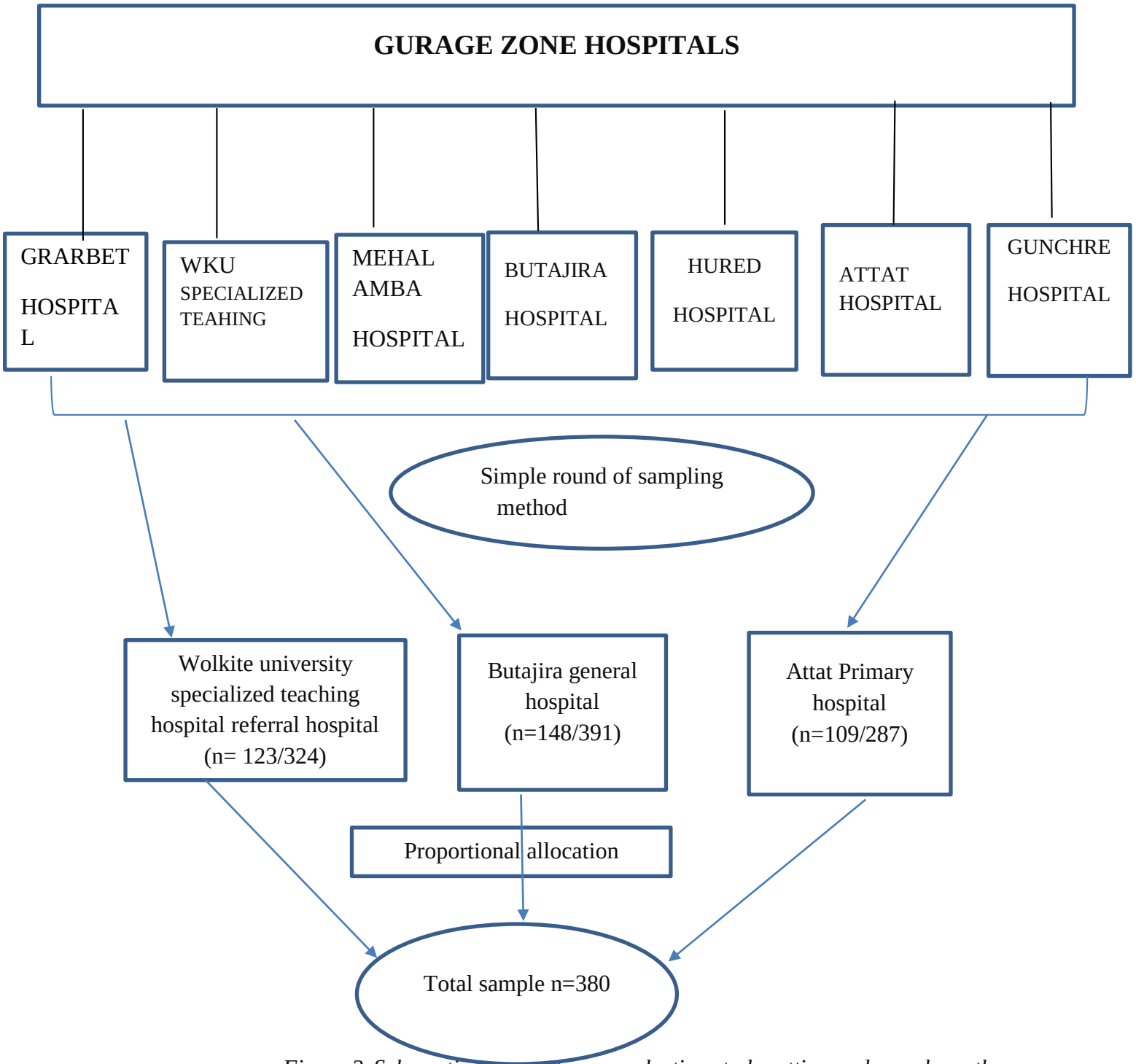

Figure 2 Schematic presentation on selecting study setting and sample on the knowledge attitude, practice and their predictors towards prevention of diabetic foot ulcer in Gurage Zone, Ethiopia..

4.6 Study variable

4.6.1 Dependent variable

In this study the dependent variables Knowledge, attitude and practice to wards preventive measure diabetic foot ulcer.

4.6.2 Independent variable

Age. Sex, ethnicity, Residence, religion, educational level, marital status, occupation, type of DM, information on foot ulcer, duration of diseases, and feet examination by physician.

4.7. Operational definitions

Diabetic foot ulcers: Diabetic foot ulcer is defined as any necrosis, gangrene, or full-thickness skin defect occurring distal to the ankle in diabetic patient (36)

Knowledge level:(37) 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 labelled as have good knowledge of diabetic foot ulcer if the score is greater than or equal to mean and have poor knowledge if the score is less than the mean.

Good knowledge; Patients those who correctly answered greater than or equal to the mean knowledge questions will be said to have a good knowledge level.

Poor knowledge; patients who answered below the mean knowledge questions will be said to have poor knowledge.

Attitude level: (37)Knowledge of patients' relating to diabetic foot ulcer and foot care practice was assessed by using close-ended questions with two options. Patients were labelled as have positive attitude of diabetic foot ulcer if the score is greater than or equal to mean and have negative attitude if the score is less than the mean.

Positive attitude; Patients those who correctly answered greater than or equal to the mean attitude questions will be said to have a positive attitude.

Negative attitude; who answered below the mean attitude questions will be said to have negative attitude.

Practice level: - foot care practice performed by patients to prevent diabetic foot ulcer was assessed using 'yes/no' and other options 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 labelled as to have good practice if the score is greater than or equal to the mean and have poor practice if the score is less than the mean.

Good practice; Patients those who correctly answered greater than or equal to the mean practice questions will be said to have a good practice.

Poor practice; who answered below the mean practice questions will be said to have poor practice (37).

4.8 Data collection instrument and procedure

4.8.1 Data collection instrument

An interview administered structured questionnaire was used to collect data. The structured questionnaire includes five sections; the first section is questions on socio-demographic profile, the second section is clinical characteristics, the third knowledge related to wards prevention of the diabetic foot ulcer, the fourth section is attitude related questions and the fifth section is practices related questions

4.8.2 Data collection procedure

After obtaining ethical clearance, data was collected by face to face interview using a structured interviewer administered questionnaire. The diagnosis of diabetes mellitus was confirmed by checking the medical card of the patient. Participants were interviewed before and /or after getting the medical service. Assessment of participant's level of knowledge, attitude, practice and their predictors towards prevention of diabetic foot ulcer as conducted explanation was given on the purpose of the study and the importance of their involvement, then respondents who volunteer were interviewed face to face using structure questionnaires.

4.9 Data Quality Assurance

Data collectors was given with brief and clear training for a half day. The questionnaire Pre-test was conducted on 5% of the total sample size. The completeness of data was checked each day at the end of data collection.

4.10 Data Processing and Analysis

Data was exported and analysed using SPSS version 25. After data collection, each questionnaire was checked for completeness and code was given before data entry. Data cleaning was done by the software. Frequency, percentage, cross tabulation and descriptive summaries were used to describe the data. The association of dependent and independent variables were assessed by using logistic regression. Those independent variables with p-value < 0.25 with 95% confidence interval in simple binary logistic regression were chosen as candidate for the multivariate binary logistic regression model. Adjusted odd ratio (AOR) with p-value < 0.05 95% CI, were considered to declare the association.

4.11 Ethical considerations

The study was approved by Research and Ethical Committee of Wolkite University College of Medicine and Health Sciences. Following the approval, official letter of co-operation was written to Wolkite University Specialized Teaching Hospital, Attat primary hospital, Butajira hospital by the department of Nursing, College of Medicine and Health Sciences. The oral consent was obtained from each participants, all the research process was explained and the confidentiality of data was strictly followed

4.12 Dissemination of the result plan

The result of the study was submitted to Wolkite University College of Medicine and Health Sciences department of Nursing. The result will be also disseminated to Wolkite Zone health bureau in which the study was done. Also, the findings will be presented in any meetings and seminars. It will be submitted to national and/or international reputable journals for publication.

5. Results

5.1 Socio-demographic characteristics of participants

Out of the 380 study participants, 374 were completed the study giving the response rate of 97.4%. Among the participants, 212 (56.7%) are male and the rest are females. The age of participants ranged from 20 to 88 years, with a mean age (±SD) of 46.06 (13.5). Out of total participants, 166 (44.4%) patients were from rural residence and 208 (55.6%) were from urban.

5.2 Clinical Characteristics of Study Participants

More than half, 237 (63.4%) participant reported of having type II DM, 100 (26.7%) participants did not know the type and the rest were type I DM. Two hundred fifty-four (67.9%) patients had DM for less than 10 years and the rest were for more than 10 years. From the total patients, 113 (30.2%) have the history of foot problem after diagnosis of DM and 205 (54.8%) have had information regarding diabetic foot care. More than half, 232 (62.0%) patients had not examined the foot by a doctor during follow up time.

5.3 Knowledge on prevention of diabetic foot ulcer

The mean knowledge score was 5.05 ± 9.00 with range of 1-10 out of maximum possible score of 10. From total, 148 (39.6%) had poor knowledge and 226 (60.4%) of participants had good knowledge towards prevention of diabetic foot ulcer. The participant's response on 10 knowledge question were described in the table 3.

5.4 Associated factors of knowledge on prevention of diabetic foot ulcer

All socio-demographic factors and clinical history variables were check for the association using binary logistic regression and the variable having p- value less than 0.25 were consider as candidate for multi-variable logistic regression. On the multi-variable analysis, socio-demographic variables such as residence, age group, educational status, religion, marital status, and history of diagnosed foot problem are found to be significantly associated with knowledge on prevention of diabetic foot ulcer. Participants with the age of 30-39.9 years old are 3.37 times more likely to have poor knowledge compared to those with the age of 18 to 29.9 years (AOR; 3.37, 95% CI: 1.19, 9.51). Married participants have lesser odds of exposure to poor knowledge compared to widowed (AOR: 0.97 95% CI: (0.013,0.732) (Table 4).

Table 1 Associated factors of knowledge towards prevention of diabetic foot ulcer at selected hospitals in Gurage Zone, Southern, Ethiopia 2022.

Variables	Knowledge		COR (95% CI)	AOR (95% CI)	P- value
	Poor, n(%)	Good, n (%)			
Sex					
Male	84(56.8)	128(56.6)	1 (ref)	1 (ref)	
Female	64(43.2)	98(43.4)	1.01 (0.66,1.52)	1.37(0.717,2.191)	0.250
Age					
18-29.9	25(16.9)	13(34.2)		1 (ref)	1(ref)
30-39.9	42(28.4)	61(27.0)	4.87(2.19,10.85)	3.37(1.19,9.51)	0.04
40-49.9	28(18.9)	71(31.4)	2.93(1.38,6.24)	7.56(2.39,23.86)	0.012
>=50	53(35.8)	81(35.8)	2.93(1.38,6.24)	3.73(1.12,12.41)	0.034
Marital status					
Married	96(64.9)	151(66.8)			
Unmarried	40(27.0)	52(23.0)	0.24 (0.53,1.09)	0.97 (0.01,0.732)	0.011
Divorced	10(6.8)	10(4.4)	0.20 (0.43,0.93)	0.153(0.02,1.259)	0.130
Widowed	2(1.4)	13(5.8)	0.15 (0.03, 0.86)	0.059 (0.01,0.584)	0.006
Level of education					
No formal education	43(29.2)	48(21.2)	1.15(0.67,1.97	2.52 (1.25,5.09)	0.000
Primary school	58(43.6)	75(33.2)	1.22(0.65,2.28)	2.31 (0.98,5.43)	0.001
Secondary school	30(20.3)	41(18.1)	3.26(1.66,5.42)	11.04 (3.70,32.93)	0.001
College and above	17(39.6)	62(27.4)			
Occupation					
Farmer	21(14.20)	54(13.9)	0.55(0.30,1.02)	1.28(0.11,14.78)	0.362
Merchant	57(38.5)	82(36.3)	0.65(0.31,1.35)	0.49(0.04,5.14)	0.911
Government employed	22(14.9)	37(16.4)	0.20(0.77,0.56)	0.14(0.01,1.638)	0.326
NGO employed	15(10.1)	8(3.5)	0.27(0.92,0.80)	0.06(0.03,0.836)	0.195
Housewife	10(6.8)	7(3.1)	0.63(0.30,1.32)	0.19(0.01,2.478)	0.599
Daily laborer	21(14.2)	34(15.0)	0.77(0.13,4.56)	0.42(0.03, 5.532)	0.748
Student	2(1.4)	4(1.8)			
Residence					
Urban	89(60.1)	119(52.7)	1(ref)	1(ref)	
Rural	59(39.9)	107(47.3)	0.737(0.48,1.12)	1.75 (1.00,3.074)	0.052
Type of diabetes					
Type 1	19(12.8)	18(8.0)	1(ref)	1 (ref)	
Type 2	99(66.9)	138(61.1)	0.40(0.18,0.88)	0.97(0.39,2.417)	0.494
I don't know	30(20.3)	70(31.0)	0.59(0.36,0.98)	0.89(0.30,2.625)	0.786
Duration of diabetes					
<10years	102(68.9)	152(67.3)	1(ref)	1 reference	
>10years	46(31.1)	74(32.7)	1.08(0.69,1.68)	0.98(0.53,1.792)	0.811
Information about DFU					
Yes	80(54.1)	125(55.3)	1(ref)	1 reference	

No	68(45.9)	101(45.2)	0.95(0.62,1.44)	0.98(0.53,1.792)	0.198
History of foot problem					
Yes	58(39.2)	55(24.3)	1(ref)	1 (ref)	
No	90(60.8)	171(75.7)	2.00(1.27,3.13)	2.26(1.20,4.257)	0.008
Feet examined by doctor or nurse					
Yes	53(35.8)	89(39.4)	1 (ref)	1 reference	
No	95(64.2)	137(60.6)	0.20 (0.43,0.93)	0.78(0.42,1.478)	0.103

COR: crude odds ratio, AOR: adjusted odds ratio

5.5 Attitude on prevention of diabetic foot ulcer

Nearly three fourth, 283 (78.8%) patients had positive attitude towards prevention of diabetic foot ulcer and the rest (21.2%) had negative attitude towards prevention of diabetic foot ulcer.

The majority of study participants 222(59.4%) were agreed with that of regular exercise prevents further complication on diabetic patients. Similarly, 217(58.0%) of participants were agreed on dietary modification is important to prevent diabetic foot ulcer. respectively. Likewise, the majority of participants 217(58.0%) were agree onto use special foot wear advised by the foot-care specialist. (Table 5).

5.6 Associated factors of participant's attitude on prevention of diabetic foot ulcer

Analysis of Bi-variable and Multivariable binary logistic regression indicates that age group, marital status, knowledge level and history of feet examination were found to be significantly associated with patient's attitude on prevention of diabetic foot ulcer (p-value ≤ 0.05). Patients who have no history of feet examination by physician had 0.43 times lesser odds of having negative attitude compared to their counter parts (AOR: 0.43; 95% CI: 0.18, 0.99) (Table 6).

Table 2: Associated factors of attitude towards prevention of diabetic foot ulcer using binary logistic regression at Gurage zone hospitals, southern, Ethiopia 2022.

Variables	**Attitude**		**COR (95% CI)**	**AOR (95% CI)**	**p-value**
	negative n(%)	**Positive n (%)**			
Knowledge level					
Poor knowledge	44(57.9)	96(33.9)	0.37(0.22,0.62)	0.371(0.187,0 .736)	0.005
Good knowledge	32(42.1)	187(66.1)			
Sex					

Male	35(46.1)	164(58.0)	1(ref)	1 (ref)	
Female	41(53.9)	119(42.0)	0.61(0.37,1.03)	0.919(0.427,1.980)	0.830
Age					
18-29.9	19(25.0)	13(4.6)	1(ref)	1 (ref)	
30-39.9	16(21.1)	80(28.3)	7.308(3.02,3.01)	12.720(3.264, 49.577)	0.000
40-49.9	19(25.0)	80(28.3)	6.15(2.59,14.61)	8.459(2.082, 34.379)	0.003
≥50	22(28.9)	110(38.9)	7.30(3.15,16.94)	14.048(2.983, 66.157)	0.001
Marital status					
Married	35(46.1)	210(74.2)			
Unmarried	25(32.9)	55(19.4)	0.367(0.203,0.66)	0.563(0.218, 1.455)	0.235
Divorced	11(14.5)	8(2.8)	0.121(0.046,0.32)	0.198(0.059, 0.662)	0.009
Widowed	5(6.6)	10(3.5)	0.333(0.108, 1.03)	0.307(0.074, 1.278)	0.105
Level of education					
No formal education	25(32.9)	64(22.6)	0.178(0.064,0.49)	0.430(0.108, 1.715)	0.232
Primary school	34(44.7)	88(31.1)	0.180(0.067,0.48)	0.616(0.163, 2.327)	0.475
Secondary school	12(15.8)	59(20.8)	0.341(0.114, 1.02)	.0915(0.229, 3.650)	0.900
College and above	5(6.6)	72(25.4)			
Occupation					
Farmer	10(13.2)	62(21.9)	0.33(0.15,0.71)	0.733(0246,2.184)	0.577
Merchant	42(55.3)	87(30.7)	4.43(0.93,21.12)	6.287(0.647,1.040)	0.113
Government employed	2(2.6)	55(19.4)	0.45(0.14,1.43)	0.378(0.73,1.949)	0.245
NGO employed	6(7.9)	17(6.0)	0.29(0.08,0.98)	0.970(0.188,4.999)	0.971
Housewife	10(13.2)	45(15.9)	0.72(0.27,1.89)	0.872(0.230,3.308)	0.840
Daily laborer	6(7.9)	11(3.9)	0.95(0.62,1.44)	0.897(0.306,2.625)	0.999
Student	0(0.0)	6(2.1)			
Residence					
Urban	46(60.5)	149(52.7)	1(ref)	1 reference	
Rural	30(39.5)	134(47.3)	0.725(0.433, 1.21)	0.857(0.435, 1.688)	0.655
Type of diabetes					
Type 1	11(14.5)	24(8.5)	1(ref)	1 (ref)	
Type 2	54(71.1)	172(60.8)	1.460(0.672,3.17)	1.282(0.425, 3.867)	0.659
I don't know	11(14.5)	87(30.7)	3.625(1.402, 9.37)	2.370(0.627, 8.958)	0.203
Duration of diabetes					
<10years	48(63.2)	199(70.3)	1(ref)	1 reference	
>10years	28(36.8)	84(29.7)	0.724(0.425, 1.23)	0.684(0.318, 1.471)	0.331
Information about DFU					
Yes	38(50.0)	161(56.9)	1(ref)	1 reference	
No	38(50.0)	122(43.1)	0.758(0.456, 1.25)	0.803(0.403, 1.600)	0.533

History of foot problem					
Yes	18(23.7)	87(30.7)	1(ref)	1 reference	
No	58(76.3)	196(69.3)	0.699(0.389, 1.25)	0.655(0.292, 1.469)	0.304
Feet examined by doctor or nurse					
Yes	18(23.7)	116(41)	1(ref)	1 reference	
No	58(76.3)	167(59.0)	0.447(0.250,0.79)	0.589(0.266, 0.907)	0.193

DFU: diabetic foot ulcer,

5.7 Practices of participants on prevention of diabetic foot ulcer

Regarding the practice of diabetic foot self-care, 185 (56.4%%) patients had good foot care practice and 143 (43.6%) patients had poor foot care practice. The study revealed that only 33 (8.8%) respondents have checked their shoes before they put on. Among the respondents, 78 (20.9%) patients have never checked their shoes when they take off it.

Of total participants, less than half (41.4%) never used moisturizing cream. The majority of participants, 247 (66.6%) cut toe nails with in every six weeks. Greater than half of the respondents, (59.6%) had no practice of changing socks daily.

5.8 Associated factors of participant's practice on prevention of diabetic foot ulcer

Multi-variable logistic regression analysis showed that socio-demographic variables such as age group, knowledge level(group), marital status and level of education, and participants level of knowledge on prevention of foot ulcer found to be significantly associated with their practice on prevention of diabetic foot ulcer self-care (p *–value* < 0.05).

Table 3: Associated factors of practice on prevention of diabetic foot ulcer self-care at selected hospitals in Gurage Zone, Southern Ethiopia 2022.

Variables	**Practice**		**COR (95% CI)**	**AOR (95% CI)**	**p-value**
	Poor n (%)	**good n (%)**			
Knowledge group					
Poor knowledge	65(45.5)	74(40.0)	0.80(0.514,1.244)	0.55(0.315, 0.978)*	0.042

Good knowledge	78(54.5)	111(60.0)	1 (ref)	1 (ref)	
Attitude group					
Negative attitude	31(23.1)	42(23.5)	0.98 (0.600,1.730)	1.067(0.539,2.115)	0.852
Positive attitude	103(76.9)	137(76.5)	1 (ref)	1(ref)	
Sex					
Male	84(58.7)	102(55.1)	1 (ref)	1 (ref)	
female	59(41.3)	83(44.9)	1.159(0.745, 1.801)	0.799 (0.415,1.536)	0.500
Age					
18-29.9	11(7.7)	27(14.6)			
30-39.9	39(27.3)	52(28.1)	0.543(0.240, 1.227)	0.326(0.103, 1.037)	0.058
40-49.9	39(27.3)	45(24.3)	0.470(0.207, 1.069)	0.176(0.052, 0.600)	0.006
>=50	54(37.8)	61(33.0)	0.460(0.209, 1.015)	0.199(0.054, 0.740)	0.016
Marital status					
Married	94(65.7)	117(63.2)			
Unmarried	36(25.2)	51(27.6)	1.138(0.686, 1.887)	0.679(0.318, 1.447)	0.316
Divorced	11(7.7)	6(3.2)	0.438(0.156, 1.229)	0.277(0.076, 1.016)	0.053
Widowed	2(1.4)	11(5.9)	4.419(0.956, 20.42)	3.669(0.688, 19.571)	0.128
Level of education					
No formal education	33(23.1)	52(28.1)	0.970(0.496, 1.895)	1.555(0.549, 4.402)	0.406
Primary school	54(37.8)	67(36.2)	0.764(0.410, 1.422)	1.242(0.489, 3.154)	0.648
Secondary school	32(22.4)	27(14.6)	0.519(0.252, 1.069)	0.560(0.224, 1.402)	0.215
College and above	24(16.8)	39(21.1)			
Occupation					
Farmer	34(23.8)	28(15.1)	0.549(0.086, 3.519)	0.226(0.023, 2.182)	0.199
Merchant	50(35.0)	75(40.5)	1.000(0.161, 6.200)	0.626(0.070, 5.592)	0.675
Government employed	22(15.4)	28(15.1)	0.848(0.130, 5.529)	0.446(0.047, 4.246)	0.483
NGO employed	8(5.6)	13(7.0)	1.083(0.147, 7.959)	0.740(0.070, 7.792)	0.802
Housewife	20(14.0)	28(15.1)	0.952(.125, 7.275)	0.655(0.064, 6.702)	0.721
Daily laborer	7(4.9)	10(5.4)	0.933(0.143, 6.110)	0.465(0.043, 5.025)	0.528
Student	2(1.4)	3(1.6)			
Residence					
Urban	76(53.1)	108(58.4)	1(ref)	1 (ref)	
Rural	67(46.9)	77(41.6)	1.237(0.797, 1.919)	1.615(0.926, 2.817)	0.091
Type of diabetes					
Type 1	19(13.3)	17(9.2)	1(ref)	1 (Ref)	
Type 2	95(66.4)	123(66.5)	1.447(0.714, 2.934)	1.636(0.662, 4.043)	0.286
I don't know	29(20.3)	45(24.3)	1.734(0.776, 3.874)	2.633(0.915, 7.577)	0.073
Duration of diabetes					
<10years	94(65.7)	126(68.1)	1(ref)	1 reference	
>10years	49(34.3)	59(31.9)	0.898(0.565, 1.428)	1.101(0.609, 1.992)	0.751
Information about DFU					
Yes	72(50.3)	113(61.1)	1 (ref)	1 (ref)	
No	71(49.7)	72(38.9)	0.646(0.416, 1.005)	0.649(0.375, 1.123)	0.122
History of foot problem after diagnosis of DM					
Yes	38(26.6)	62(33.5)	1(ref)	1 (ref)	
No	105(73.4)	123(66.5)	0.718(0.444, 1.161)	0.784(0.413, 1.489)	0.457
Feet examined by doctor or nurse					

Yes	39(27.3)	79(42.7)	1 (ref)	1 (ref)	
No	104(72.7)	106(57.3)	0.503(0.315,0.805)	0.506(0.275, 0.933)	0.036

COR: crude odds ratio, AOR: adjusted odds ratio, DM: diabetes mellitus, * indicates association

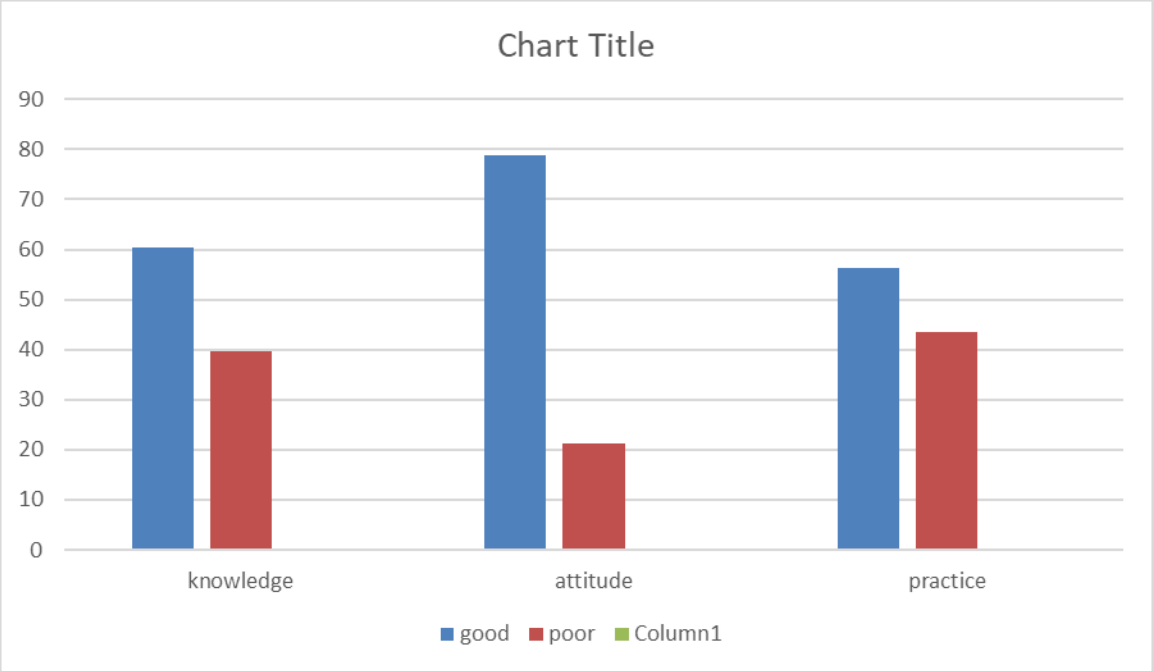

Figure 3Level of knowledge attitude and practice on the prevention of diabetic foot ulcer among diabetic patients at selected hospital in Gurage Zone Southern Ethiopia, 2022.

6. Discussion

This study was conducted to assess knowledge, attitude, practice and their predictors towards prevention of diabetic foot ulcer among adult diabetic patients in gurage zone. The result from the study expends existing reports and could serves foot step for further study studies on related subjects.

The study showed that more than half of participants, 226 (60%; CI (55.3, 65.2%) had good knowledge regarding diabetic foot ulcer. This in line with other study conducted in northeast Ethiopia (61.3%) (38). In contrast, study in India reported greater percentage of good

knowledge (78%) (24). The possible reason of variation in report might be due to difference in socio-demographics of the participants and access to information regarding diabetes and its complications.

Two hundred eight three (78%, 95 % CI: 74.4, 83.0) patients with DM had a positive attitude on diabetic foot care. This is nearly similar with the study done in India and Thailand (22). However, the report is greater in percentage than study conducted in north west Ethiopia (65.2%) (38). The revealed difference of report among the study could be attributed to difference in socio-demographic background, knowledge difference and access to health education regarding the subjects.

Regarding the practice, 185 (56.4%) patients had a good practice on prevention of diabetic foot ulcer self-care and 111 (43.6%) patients had a poor practice. This report is nearly similar to the study done at Bahir Dar (54.6%) (25) and Thailand (50.7%) (22). The report is much better than report from other study (6). This may be attributed to a higher level of diabetic foot education from physicians and difference in socio-demographics' of participants.

The study revealed socio-demographic factors such as age, residence, educational level and religion are significantly associated with participant's knowledge on prevention of diabetic foot ulcer. This result in line with result reported from other study (22). It is obvious that those from urban area and having higher education status could have higher probability to have education related to the subject. They also get access to different mass media than rural and non- educated counter parts.

The research also found that previous history of foot problem or ulceration is significantly associated with knowledge of foot ulcer. This result supported by similar report from other study conducted in Jima, Southeast Ethiopia (18). This might be due to those with longer duration of disease and having foot problem seek and get health care service including health education related to the problem.

The practice of diabetic foot ulcer care was found to be associated with age and level of education. This has been supported by the study conducted in Bangladesh that reported age and level of education was positively associated with diabetic foot ulcer care (39). The possible explanation could be as level of education increases, the knowledge on prevention of diabetic foot ulcer care increases that in turn positively influence the practice.

6.1 Limitation of the study

The cross-sectional study design might have recall bias which makes it unable to establish cause-and-effect relationships. In addition, not including some important variables like co-morbidities, presence of current foot ulcer and family history of DM should be considered as the limitation of the study.

7. Conclusion

Nearly half of the study participants had good knowledge and good practice, and three fourth of participants had positive attitude. Factors such as age, educational status, occupation residence, marital status and history foot problem are found to significantly associated with knowledge of participants. Age, ethnicity and history of foot examination are significantly associated with attitude and age, marital status and level of education are associated with practice.

8. Recommendation

The researches recommends that health care providers and responsible bodies like, health professionals, policy makers should create strategy to give quality health education to enhance the knowledge on prevention of diabetic foot ulcer. We also recommend prospective study on the subject to identify determinants of practice on diabetic foot ulcer self-care.

The physician attending DM patients at follow-up clinic should have update the patient about prevention method of diabetic foot ulcer.

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Annexes:

Annex 1: English Version of Information and Consent Form.

Dear Participant, Good Morning/Afternoon

We are here to collect data for research purposes that will be conducted to complete a research project for Nursing degree in wolkite university, college of medicine and health science, department of Nursing.

The purpose of this study will be to providing good knowledge, attitude and practice toward prevention of diabetic foot ulcer among adult diabetic patient attending at diabetic follow up clinic at gurage zone southern, Ethiopia. you are selected by simple random sampling of participant in the study. we would like to ask you to fill this questionnaire.

The questionnaire takes 20 to 30 minutes of your time. No harm is imposed on you except the time you commit for an interview. Besides, there will be no payment for participation. Participants of the study shall be voluntary; However, your honest answer to this question are important since it provides relevant information on the knowledge, attitude, practice and their predictors towards diabetic foot ulcer adult diabetic patient.

The information provided will be confidential and it will be used only for study purposes. It will not be dis closed to anyone. A code number would be used to identify the participant; therefore, writing your name will not be needed.

So Do you agree to participate in this study?

Respondent agrees to be interviewed	Go to the next part.
Respondent does not agree to be interviewed	Stop interview.

THANK YOU FOR YOUR TIME

Annex: III Questionnaire (English Version)

Knowledge, attitude, practice and their predictor toward prevention of diabetic foot ulcer among adult diabetic patient attending at diabetic follow up clinic at Gurage zone southern, Ethiopia.

Direction for Data Collectors: Put **(√)** mark on the boxes in front of options provided.

1. **Socio-demographic characteristics**

1.1. **Sex** **1**Male ☐ **2** Female ☐

1.2. **Age** _____(in years)

1.3. **Ethnicity** **1**Amhara ☐

2Tigray ☐

3Oromo ☐

4Gurage ☐

5Other(s) _____

1.4. **Marital Status**

1Married ☐ 2Single ☐

3 Divorced ☐ 4 Widowed ☐

1.5. **Religion**

1 Orthodox ☐ 2 Muslim ☐

3 Protestant ☐ 4 Catholic ☐ 5Other (s) _____

1.6. **Educational Status**

1 No education ☐ 2 Primary (Grade 1-8) ☐

3 Secondary (Grade 9-12) ☐ 4 More than secondary ☐

1.7. **Occupational Status**

1 Farmer ☐ 2 Merchant ☐

3 Governmental employee ☐ 4 NGO employee ☐

5 Daily Laborer ☐ 6 House wife ☐

1.8. **Monthly Income (ETB)**

2. OTHER CLINICAL AND RESIDENTIAL CHARACTERISTICS

2.1. Where is your resident? 1 Urban ☐ 2 Rural ☐

2.2. What is your type of diabetes?

1 Type I ☐ 2 Type 2 ☐ 3 don't Know ☐

2.3. How long you have been diagnosed with Diabetes Mellitus?

1 ≤10 years ☐ 2 ≥10year ☐

2.4. Have you ever received any information about Diabetic Foot Care before?

1Yes ☐ 2 No ☐

2.5. Did you have any history of foot problems after diagnoses of DM?

1Yes ☐ 2 No ☐

2.6. Do you know smoking cigarette is a risk factor for foot ulcer?

1Yes ☐ 2 No ☐

2.7. Have you had your feet examined by your doctor or nurse?

1 Yes ☐ 2 No ☐

3. KNOWLEDGE ON PREVENTION OF DIABETIC FOOT CARE

3.1. DM patients should take medication regularly because they liable to get DM complication 1

yes ☐ 2 no ☐

3.2. DM patients should look after their feet because they may not feel a minor injury to their feet

1 yes ☐ 2 no ☐

3.3. DM patients should look after their feet because wounds and infection may not heal quickly

1 yes ☐ 2 no ☐

3.4. DM patients should look after their feet because they may get a foot ulcer

1 yes ☐ 2 no ☐

3.5. DM patients should not smoke because smoking causes poor circulation affecting the feet

1 yes ☐ 2 no ☐

3.6. How often do you think you should inspect your feet?

1 two times a day ☐ 2 once a day ☐

3more than two times ☐ 4 I didn't inspect ☐

3.7. How often do you think your feet should be washed

1 two times a day ☐ 2 once a day ☐

3 more than two times ☐ 4 I didn't wash ☐

3.8. How often do you think you should inspect the inside of your footwear for objects or torn lining

1 two times a day ☐ 2 once a day ☐

3 more than two times ☐ 4 I don't know

3.9 what temperature of water do you think you should wash your feet in

1Warm ☐ 2 cold ☐ 3 hot ☐

3.10 do you know warning signs for which consultation is required

1Yes ☐ 2 no ☐

4. ATTITUDE TOWARD PREVENTION OF DIABETIC FOOT CARE

4.1 Can you perform regular exercise and change your food habits to prevent further diabetic complications?

1 yes ☐ 2 no ☐

4.2 Can you take the responsibility of daily examination of your feet and foot-wear, as well as regular foot-care specialist consultation?

1 yes ☐ 2 no ☐

4.3 Can you use special foot-wear advised by the foot-care specialist?

1 yes ☐ 2 no ☐

4.4 Will you wear footwear indoors as advised by your foot-care specialist?

1 yes ☐ 2 no ☐

5. PRACTICE TOWARDS PREVENTION OF DIABETIC FOOT CARE

5.1 Do you examine (inspect) your feet?

1 More than once a day (☐ 2 Once a day (2) ☐

3 4-6 times a week (1) ☐ 4 Once a week or less (0) ☐

5.2 Do you check your shoes before you put them on?

1 Often (3) ☐ 2 Sometimes (2) ☐

3 Rarely (1) ☐ 4 Never (0) ☐

5.3 Do you check your shoes when you take them off?

1 Often (3) ☐ 2 Sometimes (2 ☐

3 Rarely (1 ☐ 4 Never (0) ☐

5.4 Do you wash your feet?

1 More than once a day (3) ☐ 2 once a day (2) ☐

3 Most days a week (1) ☐ 4 A few days a week (0) ☐

5.5 Do you check your feet are dry after washing?

1 Often (3) ☐ 2 Sometimes (2) ☐

3 Rarely (1) ☐ 4 Never (0) ☐

5.6 Do you dry between your toes?

1 Always (3) ☐ 2 Often (2) ☐

3 Sometimes (1) ☐ 4 Rarely /never (0) ☐

5.7 Do you use moisturizing cream on your feet?

1 Daily (3) ☐ 2 Once a week (2) ☐

3 About once a month (1) ☐ 4 Never (0) ☐

5.8 Do you put moisturizing cream between your toes?

1 Daily (0) ☐ 2 About once a week (☐

3 About once a month (2) ☐ 4 Never (3) ☐

5.9 Are your toenails trimmed?

1 About once a week (3) ☐ 2 About once a mo☐(2)

3 Less than once a month (1) ☐ 4 Never(0) ☐

5.10 Do you wear sandals/slippers?

1 Most of the time (0) ☐ 2 Sometimes (1) ☐

3 Rarely (2) ☐ 4 Never (3) ☐

5.11 Do you wear shoes without socks/stockings/tights?

1 Often (0) ☐ 2 Sometimes (1) ☐

3 Rarely (2) ☐ 4 Never (3) ☐

5.12 Do you change your socks/stockings/tights?

1 More than once a day (3) ☐ 2 Daily (2) ☐ 3

4-6 times a week (1) ☐ 4 Less than 4 times a week (0) ☐

5.13 Do you walk around the house in bare feet?

1 Often (0) ☐ 2 Sometimes (1) ☐

3 Rarely (2) ☐ 4 Never (3) ☐

5.14 Do you walk outside in bare feet?

1 Often (0) ☐ 2 Sometimes (1) ☐

3 Rarely (2) ☐ 4 Never (3) ☐

5.15 Do you put your feet near the fire?

1 Often (0) ☐ 2 Sometimes (1) ☐

3 Rarely (2) ☐ 4 Never (3) ☐

5.16 Do you check the temperature of water before washing your feet?

1 Often (3) ☐ 2 Sometimes (2) ☐

3 Rarely (1) ☐ 4 Never (0) ☐