

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING

**ASSESSMENT OF KNOWLEDGE OF DIABETIC
RETINOPATHY,EYE CHECK-UP PRACTICE AND ASSOCIATED
FACTORS AMONG ADULTS WITH DIABETES MELLITUS ON
FOLLOW UP AT PUBLIC HOSPITALS IN ADDIS ABABA,2023.**

BY:-FEVEN DINSA

**A THESIS SUBMITTED TO GRADUATE STUDIES OF ADDIS
ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT OF
THE REQUIREMENT FOR THE DEGREE MASTER OF SCIENCE
IN ADULT HEALTH NURSING.**

JUNE, 2023

ADDIS ABABA,ETHIOPIA

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING

**ASSESSMENT OF KNOWLEDGE OF DIABETIC
RETINOPATHY,EYE CHECK-UP PRACTICE AND ASSOCIATED
FACTORS AMONG ADULTS WITH DIABETES MELLITUS ON
FOLLOW UP AT PUBLIC HOSPITALS IN ADDIS ABABA,2023.**

BY:-FEVEN DINSA

ADVISORS

DR. FEKADU AGA (RN, ASSOCIATE PROFESSOR)

MR. DEBELA GELA (BSC, MSC, ASSISTANT PROFESSOR)

**A THESIS SUBMITTED TO GRADUATE STUDIES OF ADDIS
ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT OF
THE REQUIREMENT FOR THE DEGREE MASTER OF SCIENCE
IN ADULT HEALTH NURSING.**

JUNE, 2023

ADDIS ABABA, ETHIOPIA

APPROVAL SHEET

APPROVAL BY THE REVIEW BOARD

This thesis by Feven Dinsa (BSc Nurse) is accepted in its present form by the examiners as satisfying thesis requirement for the degree of masters in Adult Health Nursing.

EXAMINER:

EMBET BERHANE(ASS.PROFESSOR) _____

NAME OF EXAMINER	RANK	SIGNATURE	DATE
------------------	------	-----------	------

NAME OF ADVISORS:

DR. FEKADU AGA (RN, ASSOCIATE PROFESSOR) _____

PRIMARY ADVISOR	RANK	SIGNATURE	DATE
-----------------	------	-----------	------

MR.DEBELA GELA (MSC, ASSISTANT PROFESSOR) _____

CO-ADVISOR	RANK	SIGNATURE	DATE
------------	------	-----------	------

DEPARTMENT HEAD:

DR GIRUM SEBSIBE(PHD,ASSOCIATEPROFESSOR) _____

NAME	RANK	SIGNATURE	DATE
------	------	-----------	------

STATEMENT OF DECLARATION

I the under signed, declare that this thesis is my originalwork, done following all ethical guidelines in the in the preparation, planning, data collection, analysis, and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. Every attempt has been made to prevent plagiarism in the preparation of this thesis. I solemnly declare that this thesis has not been submitted to any other organization anywhere for the award of any academic degree, diploma or certificate.

Feven Dinsa

NAME OF STUDENT

SIGNATURE

DATE

NAME OF ADVISORS:

DR. Fekadu Aga (RN, associate professor)

MAIN ADVISOR

RANK

SIGNATURE

DATE

Mr. Debela Gela (msc, assistant professor)

CO-ADVISOR

RANK

SIGNATURE

DATE

ACKNOWLEDGEMENT

First, I would like to express my heartfelt gratitude to my advisors: Dr Fekadu Aga and Mr. Debela Gela for their constructive comments, continuous advice and encouragement throughout the course of this work.

Second my special thanks go to Addis Ababa University, college of health sciences, school of nursing and midwifery for giving me all the necessary supports to conduct this study.

Finally, I want to thank College of Health Science library staffs who helped me by providing necessary reading materials while I need literatures.

ACRONYMS AND ABBREVIATIONS

DM.....	Diabetes mellitus
DR.....	Diabetic retinopathy
ERC.....	Ethical review Committee
IDF.....	International diabetic federation
HRQO.....	Health related quality of life
UEHS.....	Utilization of eye health service

TABLE OF CONTENT

APPROVAL SHEET	I
STATEMENT OF DECLARATION	II
ACKNOWLEDGEMENT	III
ACRONYMS AND ABBREVIATIONS	IV
LIST OF FIGURES	VIII
LIST OF TABLE	IX
ABSTRACT	X
CHAPTER 1: INTRODUCTION	1
1.1. Background of the study	1
1.2. Statement of the problem	3
1.3 .Significance of the study	5
CHAPTER 2: LITERATURE REVIEW	6
2.1. Introduction	6
2.2. Knowledge of diabetic patients regarding diabetic retinopathy	6
2.3. Eye checkup practice of diabetic patients	8
2.4. Factors associated with knowledge of diabetic patients towards of DR	9
2.4.1. Socio demographic and economic factors	9
2.4.2. Clinical factors	10
2.5. Factors associated with Eye checkup practice	11
2.5.1. Socio demographic and economic factors	11
2.5.2. Clinical factors	12
2.5.3. Knowledge of diabetic patients towards diabetic retinopathy	12
CONCEPTUAL FRAMEWORK	13
CHAPTER 3: OBJECTIVES	14
3.1 General objective	14

3.2 Specific objectives	14
CHAPTER 4: METHOD AND MATERIAL	15
4.1. Study area & Study Period	15
4.2. Study design	15
4.3. Population	15
4.3.1. Source Population	15
4.3.2. Study Population	16
4.4. Eligibility criteria	16
4.4.1. Inclusion Criteria	16
4.4.2. Exclusion Criteria	16
4.5. Sample Size Determination and sampling procedure	16
4.5.1 Sample size	16
4.5.2. Sampling procedure	17
4.6. Operation Definition	19
4.7. Study variable	19
4.7.1. Dependent Variable	19
4.7 .2.Independent variable	19
4.8. Data collection procedures (instrument, personnel and data quality control)	19
4.8.1. Instrument and measurement	19
4.8.2. Data collector	20
4.8.3. Data quality control	20
4.9. Data management and analysis procedure	21
4.10. Ethical consideration	21
4.11. Dissemination of the result	22
CHAPTER 5: RESULT	Error! Bookmark not defined.
5.1. Socio-demographic characteristics	Error! Bookmark not defined.
5.2. Clinical profile of study participants	Error! Bookmark not defined.

5.3. Knowledge of diabetic retinopathy among the study participants	Error! Bookmark not defined.
5.4. Response on treatment options of DR	29
5.5. Source of information of the participants	29
5.6. Eye check-up practice of diabetic retinopathy	30
5.7. Reasons identified for not getting eye checkup	Error! Bookmark not defined.
5.8. Factors associated with knowledge of diabetic retinopathy	32
5.9. Factors associated with eye checkup practice	34
CHAPTER 6: DISCUSSION	36
6.1. Strength and limitation	40
CHAPTER 7: CONCLUSION AND RECOMMENDATION	41
7.1. Conclusion	41
REFERENCE	43
ANNEXES	47
Annex I: Subject Information Sheet (English Version)	47
Annex II: Subject information Amharic version	48
Annex III: Consent form (English Version)	49
Annex IV: Consent form (Amharic Version)	50
Annex V: Questionnaire (English version)	51
Annex VII - Questionnaire Amharic version	55

LIST OF FIGURES

Figure 1: conceptual frame work on knowledge of diabetic retinopathy and eye check up practice	13
Figure 2: schematic representation of sampling procedure in selected hospitals in Addis Ababa, Ethiopia, 2023	18
Figure 3:participants response on treatment options of available, among diabetespatients in Addis Ababa, Ethiopia, 2021. (n=421).	29
Figure 4: Source of information regarding diabetes affecting the eye, among diabetes patients in Addis Ababa, Ethiopia, 2021. (n=421).	30

LIST OF TABLE

Table 1: Socio-demographic characteristics of participants in Addis Ababa, Ethiopia, 2023.(n=421).....	24
Table 2: clinical related factors of participants in Addis Ababa, Ethiopia, 2023(n=421).	26
Table 3: knowledge of diabetic retinopathy among the study participants in Addis Ababa, Ethiopia, 2023(n=421).	28
Table 4: Eye check-up practice among the study participants in Addis Ababa, Ethiopia, 2023(n=421).	31
Table 5: Factor associated with knowledge of Diabetic retinopathy	33
Table 6: Eye checkup practice among the study participants in Addis Ababa, Ethiopia2023(n=421).	35

Abstract

Background: Diabetic retinopathy (DR) is the most common complication of diabetes and the leading causes of visual loss among adults. Regular eye examination practice and knowledge of DR plays important role in the prevention and early detection of diabetic retinopathy. However, there is limited data regarding knowledge of diabetic retinopathy and eye check-up practice among diabetes mellitus (DM) patients in Ethiopia. **Objective:** This study aimed to assess knowledge of diabetic retinopathy, eye check-up practice and associated factors among adults with diabetes mellitus on follow up at public hospitals in Addis Ababa, 2023.

Methods: Institution based cross-sectional study was conducted at selected public hospitals in Addis Ababa. A pretested interviewer administered structured questionnaire was used to collect data from a sample of 421 diabetic patients. Bivariate and multivariate logistic regression analysis was used to determine factors associated with eye checkup practice and simple and multiple linear regression analyses was used to identify factors associated with knowledge of diabetic retinopathy. Statistical significance was determined using p -value of < 0.05 and 95% confidence interval.

Result: The mean (SD) knowledge score of diabetic retinopathy was 7.37 ± 3.45 , and 55.3% participants have undergone an eye examination in the last one year at least once. Long duration of diabetes ($\beta=0.157, p=0.001$), older age ($\beta=0.022, P=0.043$) and lower educational status ($B=-0.166, P=0.001$) showed statistically significant association with knowledge of DR. Urban residence (AOR=5.131, 95%CI: 1.804-14.594, $P=0.02$), lower educational status, (AOR =0.230, 95%CI: 0.093 0.572 , $p=0.0020$), < 10 years duration of diabetes (AOR=0.546, 95%CI: 0.323- 0.923, $p=0.024$) and knowledge score of DR (AOR= 1.401, 95%CI 1.271-1.544; $p=0.000$) were significantly associated with eye checkup practice.

Conclusion and recommendation: Majority of the participants answered below the mean of knowledge score of regarding diabetic retinopathy and more than half of the participants undergo an eye examination once in a year. Therefore, effective health education concerning diabetic retinopathy and eye checkup practice via media, regular health education sessions, and posters is important should be given an emphasis .

Keywords: - knowledge, eye checkup practice, diabetic retinopathy, diabetes mellitus

CHAPTER 1: INTRODUCTION

1.1. Background of the study

Diabetes has emerged as one of the most serious and common chronic diseases of our times, causing life threatening, disabling and costly complications, and reducing life expectancy(1). According to the 2021international diabetes federation(IDF) report, over half a billion people are living with diabetes worldwide which accounts for over 10.5% of the world's adult populations, and by 2045 prediction,worldwide DM case will increase from 536.6 to 783.2 million adult people (2).

The most common ocular complication of diabetes is diabetic retinopathy (DR) (3, 4). DR has long been considered a micro vascular complication of diabetes; however, growing evidence suggests that abnormalities in retinal function can be detected in patients without any evidence of micro vascular abnormalities. Therefore the American Diabetes Association recently defined DR as a highly specific neurovascular complication (5).

DR is the leading cause of visual loss among adults with diabetes aged 20–74 years. Nearly all people with type 1 diabetes show signs of retinopathy after 20 years of diabetes. More than half of all people with type 2 diabetes develop some signs of retinopathy after 20 years of diabetes (4, 6, 7).

DR is classified into three stages: non proliferative (background), pre proliferative, and proliferative. The non-proliferative DR is asymptomatic but has changes in micro vascular structure within the retina. In the absence of timely screening and treatment, non-proliferative DR will progress to a more advanced stage known as proliferative retinopathy, which is characterized by abnormal growth of new blood vessel on the retina, new vessel rupture , bleeding and scaring that block the sunlight which ultimately result in visual loss (4, 6).

Since DR is asymptomatic in its early stage, regular eye examination practice plays important role in the prevention and early detection of diabetic retinopathy (8, 9). According to the American Diabetes Association recommendation, adults with type 1 diabetes should have an initial dilated and comprehensive eye examination within 5 years of the onset of diabetes, whereas patients with type 2 diabetes should have an at the time of diabetes diagnosis. The ADA also suggests that eye examination to be done every two years, if there is no sign of

retinopathy identified during one or more annually eye examinations. Diabetic patients should get retinal examination at least once in a year if they have diabetic retinopathy. If the retinopathy advances or threatens vision, more frequent examinations is recommended (5, 6). Along with the regular eye examination, good control of risk factors such as blood glucose level, blood pressure measurement and cholesterol level are very crucial to deter the progression of DR (6).

Therefore, timely screening and treatment is crucial to lessen visual impairment associated with DR. In this regard, awareness and good level of knowledge of DR play a significant role. It helps diabetic patients to have good practice on diabetic self-management, watching potential risk factors and allowing them to develop a positive attitude for an early screening, early detection and timely treatment(10).

1.2. Statement of the problem

Diabetes and its ocular complications are increasing with an alarming rate. Those ocular complications, including DR, are preventable by timely and regular eye examinations (11, 12). Regular eye screening not only ensure early detection and treatment of disease, but also reduce inappropriate referrals to ophthalmologists for non-sight-threatening disease that is more appropriately managed with continued observation in a primary healthcare setting (13). Patients who strictly follow the recommended screening practice will decrease the occurrence of DR by 98% (14).

However, the poor implementation of these preventative measures among diabetes patients contributes to the high prevalence of DR currently seen. The number of adults worldwide with diabetic retinopathy was estimated to be 103.12 million in 2020, with a projected increase to 160.50 million by 2045 (7). Diabetic retinopathy prevalence is 35.9% in Africa and 33.3% in North American and the Caribbean (7). The overall prevalence of DR in Ethiopia is 19.48 % (11).

The increasing prevalence rate of diabetes associated vision-threatening disease has led to a worldwide epidemic with increased disability and healthcare costs (15). DR is the leading cause of blindness in diabetes patients during adult working age. According to The Global Burden of Disease Study, DR was the fifth leading cause of blindness in adults aged 50 and older (16). From 1990 to 2020, the age-standardized global prevalence of blindness due to diabetic increased by 14.9% to 18.5%, however, early detection of this disorder through screening, followed by appropriate treatment, may offer a practical means of preventing blindness. Every year, screening can prevent 260 people from becoming blind (16, 17).

Diabetes patients may have a number of detrimental outcomes as a result of the visual impairment caused by DR. Along with psychological effects including anxiety and depression; it can put a financial pressure on the patient as well as on their families. Since the cost of care for DR varies on the disease's stage, higher expenditures were related with more advanced stages of the condition, which ultimately imposes financial strain on the patient. In addition, diabetic retinopathy can affect the social functioning and emotional wellbeing of the patient (11, 12). Studies also show that patients with severe DR have worse health related quality of life (HRQOL) scores. Ultimately, improving the uptake of eye screening will allow

earlier detection and appropriate management, thus providing opportunity to enhance Patient's clinical and HRQOL outcome (12, 13).

Beside its effect on the individual patient, diabetic retinopathy imposes a significant economic burden on health care system as well as on the society. DR accounted for an estimated \$493 million of the total direct medical costs for visual disorders (12). In Indonesia (2017) the estimated healthcare cost of DR was considerably high that accounts nearly 2% of the national state budget, and projected to increase significantly to more than threefold in 2025 (14). In addition to the direct costs, labor force dropout, absenteeism, and decreased productivity at work all contribute to the indirect economic burden related to DR (12, 15).

Regular check-ups and early treatment have effect on preventing the aforementioned DR consequences. The most important factor in the success of any screening program is community awareness. Diabetic patients' awareness about DM complications, particularly DR, has a significant impact on their behavior (16). Lack of knowledge regarding DR was among the reasons for treatment delay then patients may present with sight-threatening diabetic retinopathy at a tertiary eye-care facility in Central India (17). Patients who have good knowledge about DR, were experiencing regular eye checkup practice (18). Despite the fact that some studies performed in developing country have shown a low level of knowledge towards DR (8, 10, 17).

Urban residence, monthly income, type II diabetes mellitus, duration of diabetes, history of eye disease were factors associated with good knowledge. Similarly, longer duration of diabetes, higher education, good knowledge of DR, family history of DM and history of eye disease were associated with good eye check-up (18, 19).

Good level of knowledge, good eye check-up practice and determining the factors associated with DR are important for the prevention and elimination of modifiable risk factors of DR. However, we had limited data regarding knowledge of diabetic retinopathy and eye check-up practice among DM patients in Ethiopia. Therefore, this study aimed to assess the level of knowledge towards diabetic retinopathy, eye check-up practice and associated factors among adult diabetes mellitus patients on follow up at public hospitals in Addis Ababa, 2023.

1.3 .Significance of the study

The aim of this study is to determine diabetes patient's knowledge about diabetes retinopathy and their eye checkup practice. Developing a more complete understanding of the current level of knowledge about DR and factors affecting their knowledge and practice helps to advance efforts to develop effective strategies for the prevention of this preventable visual impairment tor blindness. Determining the level of knowledge, eye checkup practice and associated factors of DR will provide baseline data for healthcare program planner in order to plan effective prevention and elimination strategies of the modifiable risk factors of DR.

The overall result of the study was used by policy makers as an input in planning DR prevention strategies and improves diabetes patients' eye care seeking behavior The study findings also assist the nurses who are working in diabetic clinics and involved in diabetic teaching programs to modify their teaching practice based on the identified gaps.

More over the result obtained from this study was used by researchers as a stepping stone to advance the study.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

Diabetes patients' knowledge of DR refers to their understanding of the cause, risk factors, diagnostic method; treatment option available and preventive practices of DR. The high level of awareness and knowledge about DR plays a significant role in the overall management of DR and prevention of severe visual impairment (20).

Practice refers to the ways in which patients demonstrate their knowledge and attitude through their actions. The most important and cost-effective component of diabetes care is regular eye checkup practice which help in the prevention, early detection, and timely intervention of diabetes-related visual impairment (21). American Academy of Ophthalmology recommended detailed eye examinations for people with diabetes within five years of diagnosis for type I diabetes and at the time of diagnosis for type II diabetes patients and annually thereafter (22).

The main causes of blindness in diabetic patients are poor diabetes self-management, such as a lack of knowledge (about the course of the disease, risk factors, and treatment options), failure to have an early screening and regular eye check-ups. In developing countries like Ethiopia, where the core of the health system is prevention, thus, it is critical to assess the level of knowledge and practice among the DM population in order to plan intervention strategies (23).

2.2. Knowledge of diabetic patients regarding diabetic retinopathy

According to the study conducted in Switzerland, a significant percentage of participants (96.0%) had knowledge that diabetes could damage the eyes; in fact, all patients with type 1 diabetes and 95.1% of patients with type II diabetes were aware of this risk (24). Regarding preventive measure of DR the same study showed that vast majority of patients knew the benefit of maintaining good glycemic control and having regular eye examination by an ophthalmologist accounting 98.6% and 97.5%, respectively. Furthermore, the same study showed that benefits of maintaining good blood pressure control and good lipid control were, with respectively 91.3% and 85.4% of patients perceiving them as preventive behaviors.

Across-sectional study conducted in Yueqing City, china among the study participants, 61.8% knew that DM can affect the eye (25),and 57.8% of them had obtained instructions for regular eye examinations from physicians those providing routine eye care.

Similarly a study conducted in Syria, 93.8% of the participants were aware that DM could affect the eye (26). However, only 67.3% were aware that it could cause blindness. According to this study, 86.9% of the patients perceived that DM patients should visit an ophthalmologist regularly. A study conducted in Bangladesh shows 63% of the respondents pointed out blindness as a complication of diabetes, diabetic retinopathy (55%) and other eye complications like Cataracts 40% ,Glaucoma 44%, and Double vision 30% (27).

In the study conducted in Jordan, the vast majority of patients enrolled (98.3%) believed that diabetes could affect their eyes However, in regards to patient's awareness of diabetic retinopathy only about half (50.4 %) claimed to be familiar with diabetic retinopathy. Of those patients who had knowledge of diabetic retinopathy, they became familiar with diabetic retinopathy via various methods: media (13.8%), primary care physician or endocrinologist (19.0%), ophthalmologist (8.6%), individual reading education (15.5%), and other (43.1%) (28).

A study conducted in Ogun state of Nigeria shows that knowledge of the time for eye examination was low, 36% of the participants think they only visit an ophthalmologist when they have poor vision. only 16% think that they should see the ophthalmologist at least yearly (29). Similarly the study conducted in Tanzania also shows only 5.8% of the participants knew that they need to be routinely screened for diabetic eye disease annually (30).According to this study majority (91%) did not know the timing and frequency forscreening for diabetic related eye disease.

An institutional based cross-sectional study conducted in the northwest Ethiopia indicates that 52.6% of participants had poor knowledge regarding diabetic retinopathy (19). The respective correct response on risk factors for DR were poorly controlled blood glucose level, long duration of DM, hypertension, high body mass index, smoking and pregnancy which accounts for 42.6%, 36.6%, 26.1%, 21.3%, 12.2%, and 2.2% respectively. According to this study 66.5% participants knew the importance of regular eye checkup and 9.3%mentioned laser treatment as an option for DR treatment. The major sources of information about

diabetic retinopathy for the respondents were medical staffs from diabetic clinic and followed by their relatives or friends. In contrast another study conducted in southern Ethiopia indicates nearly half of participants (51.1%) found their information about DR from media while only 37.5% got it from diabetic care and follow-up service givers (23). In this study 87.4% of participants knew that diabetes could affect the eye and among those 47.3% of them had good knowledge about diabetic retinopathy.

2.3. Eye checkup practice of diabetic patients

According to the study conducted in Switzerland, 70.5% reported having undergone an eye examination by an ophthalmologist during the past 12 months, and 87.0% during the past two years (24). According to this study, a very small proportion (3.7%) of respondents stated never having seen an ophthalmologist to screen for diabetic eye diseases. Furthermore, the proportion of patients visiting an ophthalmologist during the past two years was higher for patients with type I diabetes than for those with type II diabetes (95.5% vs. 85.5%).

According to the study conducted in Turkey from the total 437 patients, 77.3% stated they previously had an eye examination and of those who had eye examination 46.4% received their first eye examination soon after diagnosed with DM (8). In reply to a question on the frequency of the test, 35% indicated to perform it in every 6–12 months. around 37% visited an eye specialist once a year to prevent vision loss and other diabetes associated eye complications according to the study conducted in Bangladesh (27).

The study conducted in central India showed that the reason for poor compliance for undergoing examination by the ophthalmologist in 90.5% of the patient was lack of feeling the need because they had good vision, poor attitude (4.4%), financial problem in (1.9%), long-distance from the hospital (1.9%), and poor family support (1.2%). The same study described that although good practice for DM was present in 40.6% of the patients, good practice for DR was present in only 7.6% of patients (17). Another study in the south Indian state also report similar finding, though 57% of them were observed to have good practice patterns with regard to DM control and treatment, they were very ignorant with respect to eye checkups and follow-ups. Only 148 (9.6%) people had undergone eye checkups for diabetic retinopathy, 1188 (77.2%) participant said they would prefer an eye checkup only if they have an eye problem (31).

A study conducted in Jeddah, Saudi Arabia indicates 35% did not go to their eye checkups, even though 59% thought that DR could lead to blindness (32). A doctor's referral was the most frequent reason reported for undergoing the first eye screening, while a lack of knowledge about DR was the most frequently reported barrier not to undergoing an eye screening earlier. More than 63% of the patients thought that a person with DM should undergo an eye checkup once a year or every 6 months. About 42% responded that glasses may improve eyes that are affected by DM.

Overall, 49.0% of people with diabetes reported having ever had an eye examination since their diabetes diagnosis according to the study conducted in south Africa (33). A study conducted in Ghana shows eye care health service utilization among diabetic patient with in the past year was 21.7% (34).

A cross-sectional study conducted in North West Ethiopia indicates 60.4% had poor eye check-up practice regarding diabetic retinopathy (19). Among those who examined their eyes 65.6% reported that they got dilated fundus examination. Another study conducted in north east Ethiopia reported that 49.5% of the participants had a history of eye examination (35). In this study, the proportion of use of eye care services within the past 1 year among adult patients with diabetes was 31.5%. Among the total study participant, 68.5% of participants did not use an eye care service within the past 1 year. Of those participants, more than three-fourth (76.50%) of participants have not used an eye care service because those participants believed that no need for eye examination since their vision is good.

2.4. Factors associated with knowledge of diabetic patients towards of DR

2.4.1. Socio demographic and economic factors

According to the study conducted in Switzerland, No association was found between patient's knowledge regarding DR and variables such as age, gender and educational status (24). A study conducted in Sri Lanka indicates employment of the participants, level of education and level of income had significant association with knowledge .However, the variables such as, the marital status of the selected patients and the employment of the spouse did not prove to have any significance, with regard to the level of knowledge of the patients (36).

A study conducted in north India showed that awareness of DR was significantly associated with patient gender, and their place of residence (rural/urban; $P = 0.003$) Participants from a rural background ($P = 0.003$) were found to be more aware of DR. However awareness of DR was not significantly associated with the patient's age (37). Similarly another study conducted in south Indian state, shows significant relationship between sex and knowledge towards DR According to this study Female sex ($P < 0.001$) were found to have significantly better knowledge regarding the disease. In addition literate population, those with history of eye consultation were also found to have significantly better knowledge and practice regarding DR (31).

A study conducted in Goa, India revealed that awareness of DR was significantly higher among subjects who completed their college education compared to primary and secondary school level education. Subjects who prefer English as their primary language for communication had significantly higher awareness of DR and better knowledge about DR. Christians reported better knowledge about DR compared to other religion (38).

According to the study conducted in Kenya, higher level of education was significantly associated with higher knowledge on DR (21). The study conducted in debark hospital, Ethiopia indicates that residence and monthly income, were significant associated with knowledge regarding DR. In this study, participants from urban were more likely to have good knowledge compared to those from rural area. Similarly participants who had monthly income of 3501-8000ETB had good knowledge compared to those who had ≤ 500 ETB monthly income. (19). Another study conducted in north west Ethiopia indicates educational and occupational status were found to have been significantly related with the good knowledge of DR (10). Institutional based cross sectional study conducted ,southern Ethiopia, indicates urban residence and high income were significantly associated with knowledge on diabetic retinopathy (23).

2.4.2. Clinical factors

According to the study conducted in Switzerland. the linear regression analyses investigating the determinants of patients' knowledge, only eye examination performed during the past two years ($p = 0.005$) was associated with the knowledge score But no

association found with variables like type of diabetes, duration of diabetes at recruitment, member of the local diabetes association, and presence of diabetic retinopathy (24).

A study conducted in Sri Lanka indicates Utilization of the following sources, namely; television/radio, internet, newspapers/articles/books, communication with other patients and family members and duration of diagnosis of the disease were found to have a significant association with the level of knowledge of the patients (36). A study conducted in north India showed that awareness of DR was significantly associated with duration of diabetes ($P = 0.035$). Those having DM for a longer duration (>5 years; $P = 0.035$) were found to be more aware of DR (37).

Factors such as Longer duration of DM ($P = 0.03$) and presence of systemic complication of diabetes ($P = 0.05$) were associated to excellent grade of knowledge according to the study conducted among diabetic patients at a private hospital of Riyadh, Saudi Arabia. In this study, the presence of systemic complication of DM ($P < 0.01$) is associated with excellent grade of practice also. Additionally those recruited from the eye clinic also had excellent practice pattern ($P = 0.03$) (39).

The study conducted in Ethiopia indicates that, duration of DM from diagnosis and previous eye disease was significant associated with knowledge regarding DR. Those participants having diabetes duration of 6-12 years had good knowledge compared to participants having DM duration of ≤ 2 years. Participants who had previous eye disease also had good knowledge compared to those who hadn't (19).

Institutional based cross sectional study conducted in southern Ethiopia indicates type II diabetes, long duration of diabetes, family history of diabetes and history of eye disease were significantly associated with knowledge on diabetic retinopathy (23).

2.5. Factors associated with Eye checkup practice

2.5.1. Socio demographic and economic factors

A study conducted in Goa indicates no association between eye checkup practice and demographic factors such as age, gender, occupation, locality, and socio economic status (38). The study conducted on eye health service utilization among diabetic patients in Ghana depicts that educational level and marital status were significantly associated with utilization

of eye health service. In this study having secondary and tertiary education levels significantly increases utilization of eye health service (UEHS) by approximately 2 times compared with no formal education. Additionally Age and mode of payment for health care services also had a significant association with eye health service utilization. Patients aged ≤ 29 years were more likely to utilize eye care health services (34).

The study conducted in south Africa indicates that older age (55–64 years and ≥ 65 years, having health insurance, and having had diabetes for 6–10 years were significantly associated with eye care utilization(33). According to the study conducted in Kenya, age and marital status were significantly associated with practices on eye check-up practice (21). However, higher level of education was not significantly associated with improvement in eye checkups by an eye specialist although it was significantly associated with higher knowledge on DR.

2.5.2. Clinical factors

A study conducted in Goa indicates no association between eye checkup practice and duration of diabetes(38). The study conducted on eye health service utilization among diabetic patients in Ghana depicts that type of diabetes; years of diagnosis, and current blood glucose level were significantly associated with utilization of eye health service. In this study utilization of eye health service (UEHS) by people with type 1 diabetes was approximately 6-folds higher compared with type 2 diabetic patients (34). The study conducted in Ethiopia indicates duration of DM, previous eye disease were significantly associated with good eye checkup practice (19).

2.5.3. Knowledge of diabetic patients towards diabetic retinopathy

The cross-sectional study conducted in Bangladesh indicates a significant positive association between the knowledge about ocular complication of DM and the practice score (27). Another study conducted in Goa, India revealed, participants who have good knowledge about DR tend to have good practice pattern (38). The study conducted in north west Ethiopia indicates knowledge of DR were significantly associated with good eye check up practice (19).

CONCEPTUAL FRAMEWORK

After reviewing of various literatures (10, 19, 28, 32-37) conceptual framework was developed by the principal investigator. It shows how the particular variables in the study are potentially related to the knowledge of DR and eye checkup practice, and identify the variables required in the research investigation.

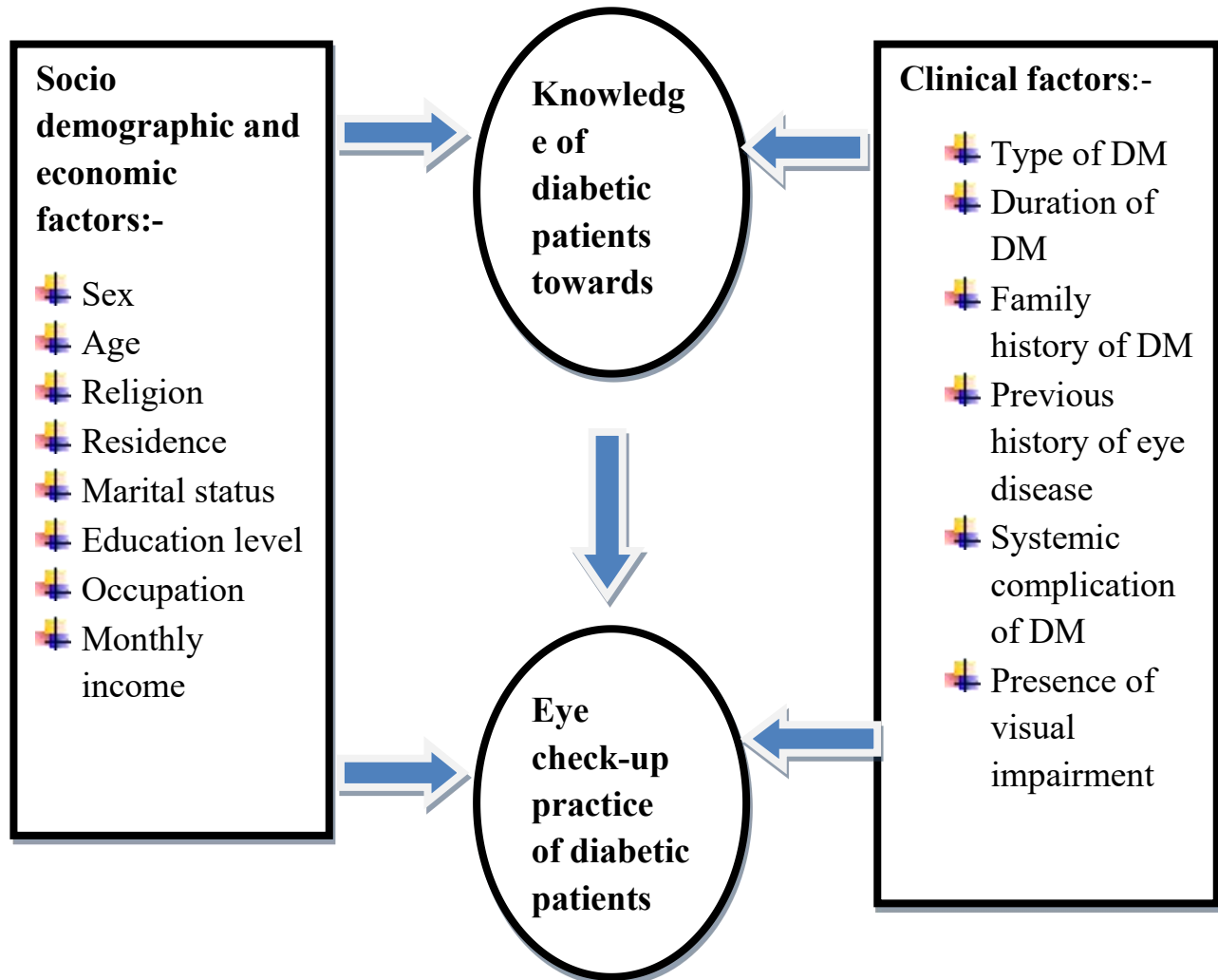


Figure 1: conceptual frame work on knowledge of diabetic retinopathy and eye check up practice

CHAPTER 3: OBJECTIVES

3.1 General objective

- To assess knowledge of diabetic retinopathy, eye check-up practice and associated factors among adults with diabetes mellitus on follow up at public hospitals in Addis Ababa, 2023

3.2 Specific objectives

- To assess knowledge regarding diabetic retinopathy among diabetic patients who have health care follow up at public hospitals in Addis Ababa, 2023.
- Assess the eye checkup practice of diabetic patients among those attend their healthcare at public hospitals in Addis Ababa,2023
- Identify factors associated with knowledge about diabetic retinopathy among diabetic patients and attend healthcare at public hospitals in Addis Ababa, 2023.
- Identify factors associated with eye checkup practice among diabetic patients who attend healthcare at public hospitals in Addis Ababa, 2023.

CHAPTER 4: METHOD AND MATERIAL

4.1. Study area & Study Period

The study was conducted in Addis Ababa, the capital city of Ethiopia and the head quarter of African union and other international organizations. The estimated city population was 6.6 million inhabitants in 2016 (40). In the city there are 13 government hospitals (5 federal, 6 under Addis Ababa health bureau, one Police force and one armed force hospitals). Tikur Ambessa specialized hospital (TASH), St Paul Hospital Millennium Medical college, Yekatit 12, Princess Zewditu memorial hospital and Ras Desta hospital were selected. TASH which is the largest teaching and specialized public hospital, which is administered under Addis Ababa University, College of Health Sciences. The hospital offers diagnosis and treatment for more than 500,000 patients year. The hospital's endocrinology unit conducts three diabetes clinics a week and provides comprehensive diabetes care to more than 1000 diabetic out patients per month. Saint Paul hospital is also a referral teaching hospital, which is under the Federal Ministry of Health (FMOH). It gives service for more than 300,000 patients annually. The hospital has 1200 clinical and non-clinical staff. Yekatit 12 Hospital annually offers the services to 100,000-200,000 patients. Zewditu hospital is the state-owned public hospitals in the capital city of Ethiopia. The hospital provides comprehensive medical services with more than 400 medical staffs. Ras Desta hospital which is one of the state owned public hospitals in the capital city of Ethiopia. The hospital provides a comprehensive medical service with its 550 staff, consisting of 246 medical. The hospital has 168 beds in 5 inpatient wards (37 in gynecological and obstetric, 39 in surgical, 33 in medical, 19 in pediatric and 40 in adult and neonatal intensive care unit [ICU] wards).

The study will be conducted in public hospitals of Addis Ababa, Ethiopia and the data will be collected from Feb 27-Mar 27/2023.

4.2. Study design

Institution based cross sectional study design was applied.

4.3. Population

4.3.1. Source Population

✚ All diabetic patients on follow up at public hospitals of Addis Ababa, Ethiopia.

4.3.2. Study Population

- All diabetic patients who attend at selected public hospitals in Addis Ababa.

4.4. Eligibility criteria

4.4.1. Inclusion Criteria

- All adults with diabetes mellitus aged ≥ 18 years; attending diabetic follow-up clinic at selected hospital was included in the study.
- Patients were willing to give consent and participate.

4.4.2. Exclusion Criteria

- Diabetic patients who are critically ill.
- Diabetic patients with diagnosed mental health problem who is unable to respond to questionnaire.

4.5. Sample Size Determination and sampling procedure

4.5.1 Sample size

Sample size was calculated using single population proportion formula by considering 47.4%(knowledge of DR) and 39.6%(for Eye checkup practice) proportion of good knowledge and good eye checkup practice respectively among diabetic patients taken from a study done in north west Ethiopia at debark hospital, 95% level of confidence,5% margin of error and 10% non-response rate(3). Finally, the largest prevalence is taken for sample size calculation.

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 (0.47)(0.526)}{(0.05)^2}$$

$$n = 383$$

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 (0.396)(0.604)}{(0.05)^2}$$

$$n = 368$$

Then, by adding 10% (38.3) non-response rate, the final sample size is 421.

4.5.2. Sampling procedure

Five public hospitals were selected from 13 hospitals found in Addis Ababa by using lottery methods. Then the number of diabetic patients on follow up in each selected public hospital was collected from the follow up unit of each hospital then calculated by the number of representative samples by using proportion with the total sample size to select the study participants, the total sample size was allocated proportionally based on the number of patients from each selected hospital. Then systemic random sampling was used to select the study respondents from selected governmental hospitals

Kth value = N/nf where: kth= the interval by which respondents was interviewed

N = the expected number of diabetic patients per month

nf = the calculated final sample size

Kth value = N/nf $3468/421= 8$ Hence, using the order of patients' medical records which was registered in follow-up appointment as a sampling frame, individuals were chosen at 8th number intervals until the total sample size was reached and the first participant was chosen by lottery method.

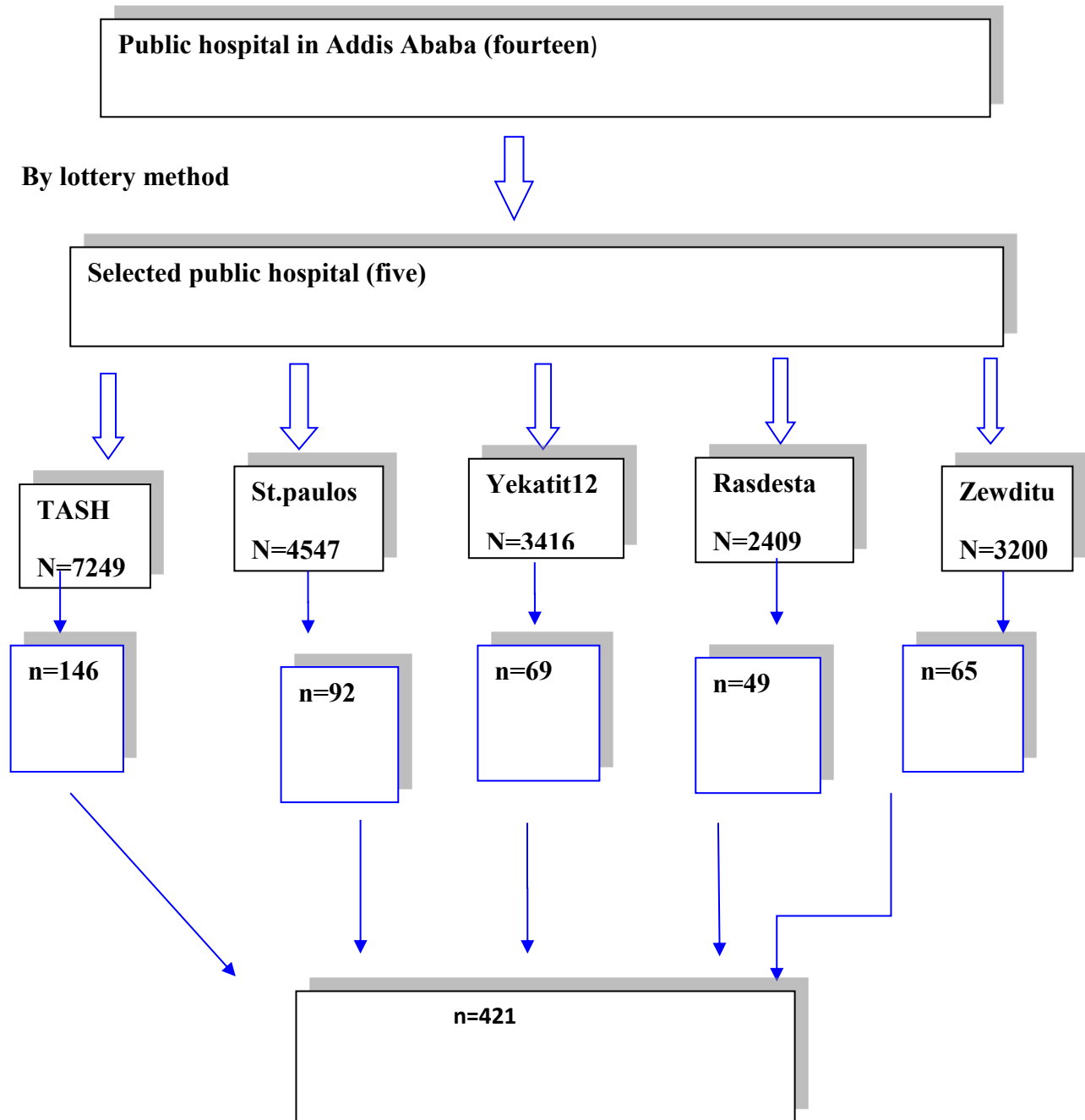


Figure 2: schematic representation of sampling procedure in selected hospitals in Addis Ababa, Ethiopia, 2023

4.6. Operation Definition

Knowledge –Refers respondents understanding DR. The participants understanding were measured by 12 multiple choice items. organized on different dimensions of DR, such as, definition of DR, factors of DR, treatment option of DR, and eye checkup schedule of diabetes, .Each correct answer had a value of 1 and incorrect answer had 0. Knowledge was scored by the proportion of correctly answered items. The total knowledge score range from 0 – 19. Higher score shows better knowledge of diabetes retinopathy.

Eye check practice-Refers to Participants ocular examination within the last 1 year. The participant eye checkup practice was measured by 'yes' or 'No' questions. Participants who answered yes will be given a value of 1 and a value of 0 will be given for participants who answered no.

4.7. Study variable

4.7.1. Dependent Variable

- ✚ Knowledge about diabetic retinopathy
- ✚ Eye checkup practice

4.7 .2.Independent variable

- ✚ Socio demographic and socio economic: sex, age, religion, residence, marital status, education level, occupation, ethnicity, monthly income
- ✚ Clinical factors: type of DM, duration of DM, family history of DM, previous history of eye disease, systemic complication of DM, presence of visual impairment

4.8. Data collection methods(instrument, procedures and data quality control, data management and analysis)

4.8.1. Instrument and measurement

The questionnaire has 34 items and divided in to four parts.

Part I: consists of 8 questions related to socio demographic and economic status of the participant such as age, sex, residence, income, marital status, education, religion, occupation, and ethnicity.

Part II: consists of 7 questions related to clinical profile of the participant such as type of DM, duration of diabetes, history of eye disease, presence of visual impairment, family history, and systemic complication of DM.

Part III: contains 12 items related to knowledge of the participant regarding diabetic retinopathy. This part includes participant knowledge of definition, risk factor, screening of DR and treatment options of DR. and 1 source of information

Part IV: includes 6 questions used to assess eye checkup practice.

4.8.2. Data collection procedure

The data was collected using interviewer administered standardized questionnaire adopted from a previous study (10, 19, 35). The questionnaire was initially prepared in English and then translated to Amharic language, and translated back to English to check for any inconsistencies. The data was collected by three nursing students and supervised by two Bsc nurses. For data collectors relevant training was given by the principal investigator to make them familiar with the data collection tool. Data was collected after obtaining informed consent from the study participants by data collectors. Completeness of questionnaire was regularly checked by supervisors on a daily basis. Each questionnaire filled was again checked for completeness of the information's by the principal investigator and immediate measures were taken to make complete for the incomplete one.

4.8.3. Data quality control

Pre-testing of the questionnaire was carried out on the 5% of sample size in Alert Hospital to ensure for consistency and understandability of the tool before the actual data collection. Based on the result obtained necessary modification was made.

4.9. Data management and analysis procedure

Data entry was done using kobo; the entered data was exported to SPSS version 27 statistical program for analysis. The data was checked and recoded then descriptive statistic using Proportion, central tendencies, and frequency distribution were calculated. To look at the association between each independent variable and dependent linear regression analysis for knowledge of DR and logistics regression for eye checkup was used to control the confounders and identify independently associated factors.

For linear regression Multi-categorical independent variables were dummy coded before running the regression models. The assumptions (normality test, correlation coefficient test, linearity test, outliers, mul-ticollinearity, and homoscedasticity) of the statistical methods for all variables were tested. Additionally, a histogram normal probability plot of the residuals and p-p plots were used to examine the data distribution and the test indicated that the residuals were approximately normally distributed. Multicollinearity was also tested. The Variability inflation factor (VIF) values were below 10, implying there was no multicollinearity among predictor variables. The Simple and multiple linear regression analysis were used to show the association between independent with the dependent variables. Those variables whose p value < 0.25 were entered in to multiple linear regression analysis and variables with p value < 0.05 at 95% confidence interval were presented as they have significant association with the outcome variable. After analysis the results were presented in tables, figures or graphic forms as appropriate. Statistical significance was determined using p-value < 0.05 and 95% CI for knowledge of DR and odds ratio with 95% CI and p-value < 0.05 for eye checkup.

4.10. Ethical consideration

Ethical approval was obtained from the Ethical Review Committee (ERC) of the Department of Nursing on behalf of the IRB of the College of Health Science of Addis Ababa University. A permission letter to carry out the research was written from the college of health sciences school of nursing and midwifery to the respective health offices and study facilities before going for data collection. The objectives and aims of the study were explained in detail for

the study participants in accordance with the Declaration of Helsinki and informed written consent was obtained from each participant before data collection. Participants were informed that their participation was purely voluntary and assured of the confidentiality of all information. Names or any identification was not used when the result is displayed.

4.11. Dissemination of the result

At the end, result of the study was presented and submitted to Addis Ababa University College of Health Sciences School of Nursing and Midwifery. The result will be submitted to reputable peer reviewed journal for publication

CHAPTER 5: RESULT

5.1. Socio-demographic characteristics

Four hundred twenty one diabetic patients who were on follow up at five public hospitals found in Addis Ababa participated in the study. The mean age of the participants was 53.1 ± 14.92 years. Majority of the participants were female 226(53.7%) and urban residents 383 (91%).one hundred twenty six 126(29.9%) had college/university level education. The median family monthly income of the study participants was 4000ETB per month [IQR of 2000-5000ETB). (See table1).

Table 1: Socio-demographic characteristics of participants in Addis Ababa, Ethiopia, 2023.(n=421)

Variable	Frequency	Percent
Age category(year)		
18-35	56	13.3
36-50	125	29.7
51-62	110	26.1
≥63	130	30.9
Sex		
Female	226	53.7
Male	195	46.3
Religion		
Orthodox	269	63.9
Muslim	56	13.3
Protestant	88	20.9
Other	8	1.9
Residence		
Urban	383	91.0
Rural	38	9.0
Marital status		
Single	48	11.4
Married	332	78.9
Divorced	15	3.6
Widowed	26	6.2
Educational level		
No formal education	57	13.5
Primary level	124	29.5
Secondary level	114	27.1
Tertiary	126	29.9
Occupation		
Farmer	10	2.4
Daily laborer	5	1.2
Government employed	75	17.8
House wife	139	33.0
Retired	76	18.1
Merchant	70	16.6
Other	46	10.9
Average monthly income category(ETB)		
≤2000	112	26.6
2001-3577	86	20.4
3578-6500	146	34.7
≥6501	77	18.3

5.2. Clinical profile of study participants

The majority of participants in the study (74.3%) were type II diabetic patients. The median duration of diabetes mellitus from the time of diagnosis was 8years [IQR 4–15). Two hundred twenty nine (54.4%) of study subjects had a history of previous eye disease .53.2% of the study participants reports visual symptoms. (SeeTable 2).

Table 2: clinical related factors of participants in Addis Ababa, Ethiopia, 2023(n=421).

Variable	Frequency	Percent
Duration of diabetes		
<10 years	221	52.5
≥10 years	200	47.5
Type of DM		
Type I	108	25.7
TypeII	313	74.3
Hypertension		
Yes	227	53.9
No	194	46.1
Family history of DM		
Yes	171	40.6
No	250	59.4
Systemic complication of DM		
Kidney complication	30	7.1
Cardiovascular complication	35	8.3
Other complication of DM	3	0.7
I don't know	4	1.0
I don't have any complication	349	82.9
Previous eye disease		
Yes	229	54.4
No	192	45.5
Presence of visual symptoms		
Yes	224	53.2
No	197	46.8

5.3. Knowledge of diabetic retinopathy among the study participants

The mean knowledge score of the participants was 7.37 ± 3.45 . Majority of the study participants (88.8%) knew that diabetes affects the eye and even cause blindness (83.1%). From those patients who knew that diabetes affects the eyes, only 137 (36.63%) were able to correctly name “Diabetic Retinopathy” as the condition specifically related to diabetes. Only 70 (18.72%) described the disease process of Diabetic Retinopathy.

The respective correct response on risk factors for DR for poorly controlled blood glucose level, long duration of DM, hypertension, high body mass index, pregnancy and smoking were 54.01, 48.93, 24.33, 6.42, 5.88, and 5.35 respectively. Three hundred forty three (81.5%) participants knew the importance of regular eye checkup (See Table: 3).

Table 3: knowledge of diabetic retinopathy among the study participants in Addis Ababa, Ethiopia, 2023(n=421).

Characteristics	Frequency	Percent
Does diabetes affect the eye		
Yes	374	88.8
No	21	5
Don't know	26	6.2
Does it cause blindness		
Yes	350	83.1
No	11	2.6
Don't know	12	2.9
What eye condition does diabetes cause		
Diabetic retinopathy	137	36.63
Cataract	18	4.81
Glaucoma	20	5.35
Don't know	199	53.2
What is diabetic retinopathy		
It is the same as cataract	6	1.60
It is high sugar in the eye	17	4.55
Change in the blood vessels of the retina	70	18.72
High blood pressure in the eye	15	4.01
Don't know	266	71.12
What is the risk factor for developing diabetic eye disease		
Poorly controlled blood sugar	202	54.01
Duration of diabetes	183	48.93
Hypertension	91	24.33
High BMI	24	6.42
Pregnancy	22	5.88
Smoking	20	5.35
Don't know	55	14.71
Should a person with diabetes check his/her blood pressure?		
Yes	359	95.99
No	2	0.53
Don't know	13	3.48
Is blood sugar important in preventing blindness from DR		
Yes	279	74.60
No	6	1.60
Don't know	89	23.80
Should a person with DM need eye screening		
Yes	341	91.18
No	8	2.14
Don't know	25	6.68
How soon after diagnosis need eye screening		
Immediately	165	48.39
One year after diagnosis	110	32.26
Five year after diagnosis	10	2.93
Don't know	56	16
Does a patient with DM needs a regular eye check up		

Yes	343	81.5
No	12	3.21
Don't know	19	5.08

5.4. Response on treatment options of DR

On the other hand, 124(33.15) participants mentioned that diabetic retinopathy can be treated .Out of those only 43(34.68%) mentioned laser as a treatment option for DR (see Figure 3)

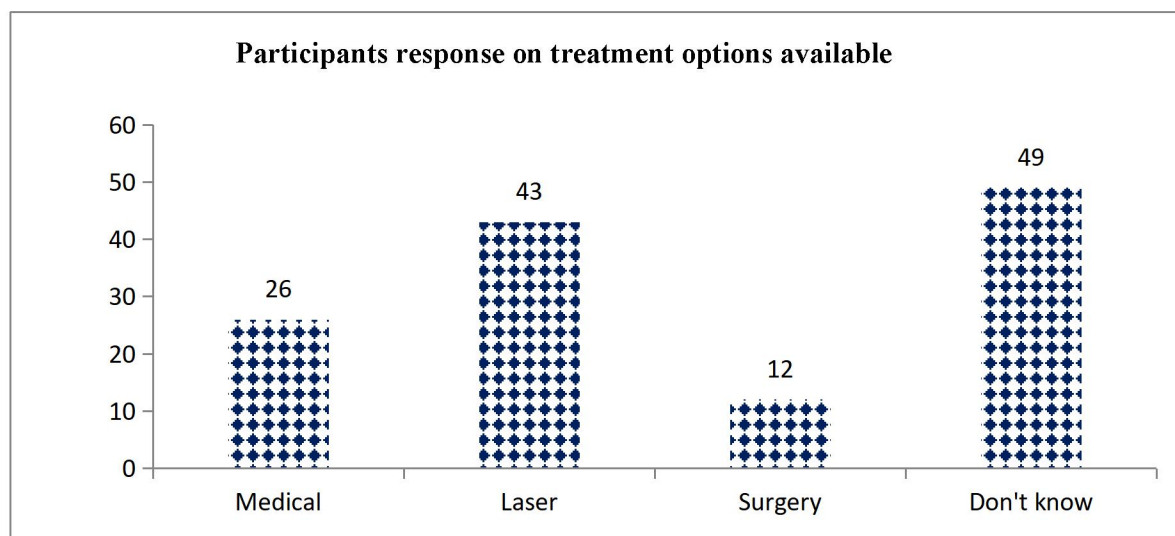


Figure 3: participants response about available treatment options, (n=421).

5.5. Source of information of the participants

The major sources of information concerning the effect of diabetes on the eye were health professionals from diabetic clinic followed by relatives or friends with diabetes. (See figure: 4)

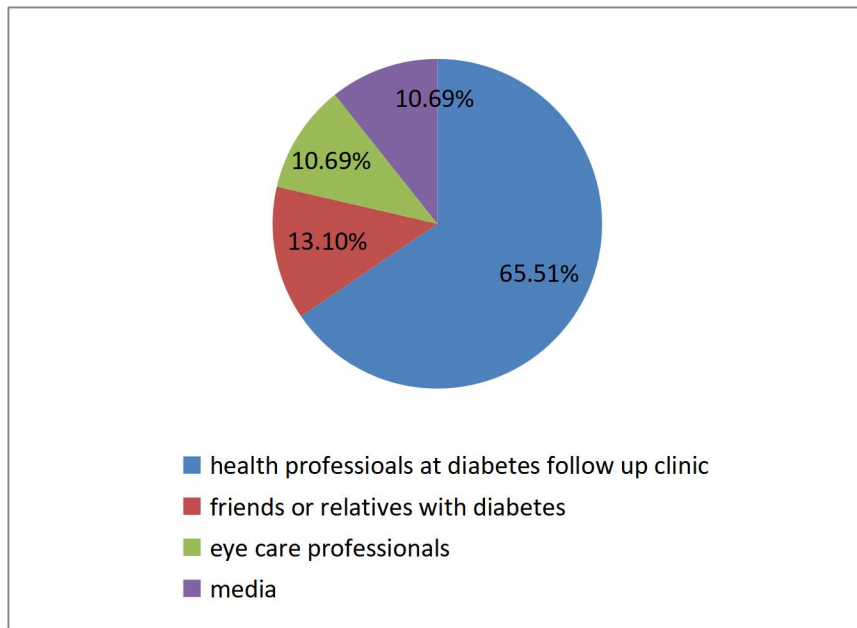


Figure 4: Source of information regarding diabetes complication that is affecting the eye, (n=421).

5.6. Eye check-up practice of diabetic retinopathy

Two hundred thirty three (55.3%) participants have undergone an eye examination in the last one year at least once. Among those who examined their eyes 81.47% reported that they got dilated eye examination. Even after being diagnosed with diabetes, 157 study participants (37.29%) never had their eyes examined. In 48.65% of the study participants, the possible causes stated by the patients were a lack of visual symptoms that led them to believe that examination is unnecessary, 36.69% of the participants felt they needed to be referred by their physicians before getting their examination. (See Table:4)

Table 4: Eye check-up practice among the study participants in Addis Ababa, Ethiopia, 2023(n=421).

Variable	Frequency	Percent
Have you ever been referred to check your eyes		
Yes	333	79.1
No	88	20.9
Have your eyes been examine after the diagnosis of DM		
Yes	264	62.7
No	157	37.29
How many times in the last one year		
None	31	11.74
Once	141	53.4
Twice	69	26.13
Three times or more	23	8.9
What type of eye exam did you get		
Vision	15	5.68
Checking for eye glass	25	9.47
Dilated examination of the eye	215	81.47
Slit lamp/torch	4	1.52
Other	5	1.89
Why didn't you get eye examination?		
Lack of visual symptoms	72	48.65
Not referred by physicians	54	36.49
Financial restriction	4	2.70
Lack of convenient facility	4	2.70
Other	14	9.46

5.7. Factors associated with knowledge of diabetic retinopathy

To identify the significant candidate variable a simple linear regression was run for all variables, and then the variables with p values 0.25 were taken into multiple linear regression analysis. In multiple linear regressions analysis variables with p values 0.05 at 95% confidence interval were considered as having a significant association with the knowledge of diabetic retinopathy.

Simple linear regression identified age, sex, educational status, monthly income, family history of DM, duration of DM, and history of eye disease as a candidate for multiple linear regression at p-value of <0.25 . In multiple linear regression analysis age, educational status and duration of diabetes are identified as factors associated with knowledge of diabetic retinopathy. According to the regression results, having no formal education decreases 0.166 score of the knowledge of DR, by holding the primary, secondary and college/ university level educational status as constant, ($B=-0.166$; 95% CI=-2.672 to -0.663), $P=0.001$). Similarly study participants being a secondary level of education decreases 0.165 score of the knowledge score of DR, when college/ university level education, primary level and no formal education are constant ($B= -0.165$; 95% CI=-2.077 to -0.511), $P=0.001$)

For every one year increase in duration of diabetes, knowledge score of DR increase by 0.157 point score ($\beta=0.157$; 95% CI= -0.120 to 0.193, $P= 0.00$). The other independent variable which was associated with knowledge of DR was age. As age increase by one year, knowledge of DR increase by 0.02 point score (2 %) ($\beta=0.022$; 95% CI=0.001 to 0.043, $P=0.044$).

Table 5: Factor associated with knowledge of Diabetic retinopathy

Variable	Unstan dardiz ed β	Std. Erro r of B	Standa rdized beta	T	P	95%CI for B	Collinearity statistics Tolera nce	VIF
Age								
	0.022	0.011	0.094	2.023	0.044*	(0.001,0.043)	0.769	1.300
Educational status								
No formal education	-1.668	0.511	-0.166	3.264	.001*	(-2.672,-0.663)	0.641	1.559
Primary	-0.677	0.382	-0.090	1.774	0.077	(-1.427,-0.073)	0.648	1.559
Secondary	-1.294	0.398	-0.165	3.247	.001*	(-2.077,-0.511)	0.625	1.599
College/univer sity								
Duration of diabetes								
	0.157	0.018	0.371	8.525	.000**	(0.120 , 0.193)	0.874	1.144

5.9. Factors associated with eye checkup practice

Logistic regression was used to identify factors associated factors eye checkup practice. After being filtered for multi-co-linearity by the variance inflation factor (VIF), which had a mean of 1.036, socio-demographic characteristics such as age, residence, education level, monthly income, as well as clinical variables such as duration of diabetes, family history of diabetes, systemic complication of diabetes, presence of visual symptoms and knowledge of DR were candidates for multivariable analysis at a P-value less than 0.25.

However, in a multivariable analysis, factors such an educational level, residence, duration of diabetes and knowledge of DR were significantly associated with good eye checkup practice at a P-value of <0.05.

The odds of getting eye checkup at least once in a year, among participant who were urban residents were 5 times (AOR = 5.131; 95%CI: 1.804, 14.594) more as compared to participants who were from rural. On the other hand, diabetic patients who had no formal education were 77% less likely to utilize annual eye examination, as compared to those with higher level of education (college and above) (AOR = 0.230; 95% CI: 0.093, 0.572). Similarly, participants with primary level of education were 49.2% less like to have eye exams in the last one year as compared to those who had college or university level education, (AOR=0.508 ;95% CI: 0.263,0.92).

Participants with a diabetes duration of <10 years were 45.4% less likely to have undergone eye check up in the last one year, than participants with a diabetes duration of ≥ 10 years (AOR = 0.546; 95% CI: 0.323 - 0.923). With regard to knowledge of DR, a unit increase of the knowledge score of DR is 1.40 times more increasing the probability of the eye check-up practicing in the last one year (AOR= 1.401,95%CI1.271-1.544;p=0.000).

Table 6: Eye checkup practice among the study participants in Addis Ababa, Ethiopia2023(n=421).

Factors	Eye checkup practice			COR(95% CI)	AOR(95% CI)	P Value
	Undergo eye check at least once in a year	Didn't undergo eye check up in the last one year				
Residence						
Urban	226	157	6.375	5.131(1.804,14.594)	0.002*	
Rural	7	31	1	1		
Education level						
No formal education	18	39	0.178	0..230(0.093,0.572)	0.002	
primary(1-8)	63	61	0.397	0.508(0.263,0.982)	0.044	
Secondary	61	53	0.443	0.602(0.299,1.213)	0.156	
Tertiary(College/University)	91	35	1	1		
Duration of Dm						
<10 years	94	127	0.325	0.546(0.323,0.923)	0.024*	
≥10 years	139	61	1	1		
knowledge of DR			1.457	1.401(1.271 ,1.544)	0.000*	

CHAPTER6: DISCUSSION

Diabetes and its ocular complications are increasing at an alarming rate(11). To tackle the overall burden of DR; prevention is the back bone. In this case knowledge regarding DR and timely and regular eye examination is mandatory(41). Assessment of the current level of patient's knowledge of DR and eye checkup practice of the patient has significant implication for prevention. So, the purpose of this study was to assess knowledge of diabetic retinopathy, eye checkup practice and its associated factor among diabetic patients on follow up in public hospitals, Addis Ababa Ethiopia.

This study reported that the mean knowledge score of DR was 7.37 ± 3.45 . Three hundred seventy four (88.8%) of the study participants knew that diabetes affects the eye ,which is lower than the study conducted in Australia(42), Japan and Switzerland(24) which were reported as 96%, 98% and 97% respectively. This difference might be due to socio economic status .In contrary the result of this study is higher than the study conducted in north west Ethiopia(19) and India(43) which is 72.2% and 74.3% respectively. The study in India was conducted in rural areas, where there may be less access to knowledge, which could account for this discrepancy. The majority of the study participants in north Ethiopia, according to that study, had no formal education, which may have contributed to their lower level of knowledge.

Regarding knowledge on risk factors , poorly controlled blood glucose level was 54.01%, and longer duration of DM was 48.93%, this finding is higher as compared to a study done in India (43) which was reported as 33.7 and 17.9% respectively and in Debark which was 42.6% and 36.6% respectively(19).This could be due to variation in the level of information given by the physicians on the risk factors and their consequences. On the other hand the result of this study regarding risk factors like poorly controlled blood glucose was lower than the result obtained from the study conducted in Iraq (44), where 84 % of the participants mentioned that poorly controlled blood glucose is a risk factor for DR. The cause for the difference could be, the study in Iraq was carried out at a teaching eye hospital, where improved eye care services and health education could be offered to improve knowledge on glucose control and DR prevention.

In this study 343 (81.5%) of the participants realized the importance of regular eye checkup. This finding is higher than study conducted in India(43), Nigeria(45) and southern Ethiopia (23), which was 29.5%, 66.9% and 61.3% respectively. This difference might be due to majority of the participants in the study conducted in southern Ethiopia had no formal education as opposed to the current study where majority has college/ university level education. However, the result of the current study is lower than the study carried out in Switzerland (24) where 97.5 % of the study participants knew the importance of regular examination. This could be due to majority of the study participants have a history of eye disease that led them to frequently visit an ophthalmologist, where they might have been informed importance of regular examinations.

According to this study age, educational status and duration of diabetes are factors associated with the knowledge of DR. In this study ,As age of the participant's increases the knowledge score of DR increase .This positive association between age and knowledge was supported by other studies conducted at Saudi Arabia(46) and Iran (47).This could be mainly due to increased age factor is a predisposition to eye disease including diabetic retinopathy and other eye diseases appeared, so, patients are more likely to visit the health facility that enable them to acquire knowledge related to eye diseases such as DR. however age is not associated with knowledge of DR in some studies (10, 23, 48).

This study also revealed educational status is significantly associated with knowledge of DR. When compared to study participants with college or university degrees, participants with no formal education and those with secondary education had lower knowledge scores of DR .This might be due to educated diabetic patients could read and search more about their health than those who are not educated, besides educated patients has better access to knowledge and a higher capability to understand. Various other literatures support the association of educational status and knowledge of DR (10, 25, 31, 38, 49).

The other factor associate with knowledge of DR was duration of diabetes. As the duration of diabetes increase, the knowledge score of DR increase. This findings correspond with those of multiple relevant studies conducted worldwide;(23, 25, 37, 50) .The possible explanation for this would be that people who have had diabetes for a longer time may be more motivated and have more opportunity to receive education regarding DM and its complication.

however study conducted in Goa(38),south Indian state(31) and north west Ethiopia shows (10).No association between duration of DM and knowledge regarding DR.

This study showed 55.3% participants have undergone an eye examination at least once in the last one year where as 44.7% of the study participants didn't undergo eye check up in the last one year. This finding is in line with the study done in Kenya (51)and Malaysia (54) where the practice of eye examination in the past one year was reported as 50% in both studies. On the other hand, this finding is lower than studies conducted in the USA (72.2%)(52), Canada (72%)(53), and Turkey (77.3%) (8). this discrepancy might be due to variations in socio-demographic and socio-economic characteristics of the study population. The studies done in the USA were done in the diabetic older population Aged between 50 to 80 years. This leads to overestimating the result since ocular diseases are more prone to occur in an old diabetic patient. Besides, 65.9% of study participants in Canada had college and above educational level which could increase the use of eye care service. However the result of this study is higher than reports from studies done in, north west Ethiopia (38),North east Ethiopia (31.5%)(35) ,Ghana(21.7)(34) ,south Africa (49%).This difference might be due to variations in socio-demographic characteristics of the participants. In the study conducted, North West Ethiopia majority of the study participants are rural residents where as in the current study 91% of the study participants are urban residents. This might create a difference in the eye care seeking behavior of the participants. Majority of the study participants in north east Ethiopia had no formal education which is different from the current study where majority of the study participants had college/university education. This might create some difference in the eye care utilization.

The reasons for not getting eye examination were lack of visual symptoms in 48.65% participants and followed by 36.49 % who felt they needed to be referred by their physician before getting their eyes examined. This result is consistent with the finding reported from Nigeria(23).This is explained by poor perception of participants about the need for regular eye examination.

Residence, educational status, duration of DM and knowledge of DR were associated with eye checkup practice in this study. The odds of getting eye check up at least once in a year, among participant who were urban residents were more as compared to participants who

were from rural. This might be because of urban residents have a different access to health care facilities for checkups. Besides the health literacy of urban resident is high when compared to the rural resident which ultimately affects their practice. In addition urban residents are more close to information due to presence of mass media in which they acquire more information.

The other factor that is associated with eye checkup practice is educational status. Diabetic patients who had no formal education were less likely to utilize annual eye examination. Malaysian and South African studies have also demonstrated similar results (48, 54). Higher educational attainment leads to higher health literacy which ultimately enhances healthy practices like having regular eye checkups. In addition educated individuals have better access to different modes of mass communication and are better empowered to understand the need of undertaking eye examinations.

Duration of diabetes is the other factor that is associated with eye checkup practice. Participants with a diabetes duration of <10 years were lower likelihood to have undergone eye check up in the last one year, than participants with a diabetes duration of ≥ 10 years. The study conducted in Bangladesh(55) and India(56) supports this finding. This might be due to as the disease duration increases their knowledge about eye screening might increase due to continued counseling and health education, which ultimately enhance their eye check up practice.

Knowledge of DR is the other factors that are significantly associated with the eye check up practice. Knowledge of DR and eye check up practice has a positive association in this study. This could be because having good knowledge promotes a strong belief in the need for regular eye checkups and as shown in this study, the main reason for poor eye check-up was the incorrect assumption that eye screening is only required if there is a visual symptom.

6.1. Strength and limitation

6.1.1. Strength of the study

- ✚ Participants of the study were drawn from a variety of healthcare facilities. As a result, the findings can be applied broadly.
- ✚ The sample size was large enough to be representative.

6.1.2. Limitation of the study

- ✚ Since the study was limited to government hospitals, the findings may not be generalized to patients on follow-up at private health care institutions.
- ✚ Cross sectional study makes determining causality impossible.
- ✚ Recall bias could be present for some items, such as the history of eye disease, because the subject might forget.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

7.1. Conclusion

Majority of the participants answered below the mean of knowledge score of regarding diabetic retinopathy and more than half of the participants undergo an eye examination once in a year. Lack of visual symptoms followed by waiting for referral to the eye clinic by their physicians was the main reason identified by the participant for not going for eye examinations.

Duration of diabetes, age and educational status of the participants shows statistically significant association with knowledge of diabetic retinopathy similarly residence, educational status, duration of diabetes and knowledge of DR were significant predictors foreye checkup practice.

7.2. Recommendation

For the health system:-

- Since this study identifies health professional as a primary source of information for the patient, ongoing trainings with aim to update them with the most current information about diabetic retinopathy should be provided.
- Frequent eye checkup campaigns should be implemented to encourage and motivate diabetic patients
- To create inter-sectorial link and joint action with Ethiopian broadcasting authority to organize more programs on diabetes and its complications so that, the community can easily reach out.

For health professionals:-

- Health professional should follow effective way of teaching strategies that could address all groups of the patients. Besides, using posters, brochures, and screening camps, may be useful in order to make the education more attractive and understandable.

- According to the finding in this study the reason not to undertake eye exam is waiting their physician to refer them to the ophthalmic clinic. Improving the referral system of the hospitals is mandatory.

 **For researchers:-**

- Further study should be conducted at national level regarding the eye check up practice of the participants
- Further qualitative studies on barriers to undertake eye checkups should be performed,

REFERENCE

1. Heald AH, Stedman M, Davies M, Livingston M, Alshames R, Lunt M, et al. Estimating life years lost to diabetes: outcomes from analysis of National Diabetes Audit and Office of National Statistics data. *Cardiovascular Endocrinology & Metabolism*. 2020;9(4):183.
2. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. *Diabetes research and clinical practice*. 2022;183:109119.
3. Cavan D, Makaroff L, da Rocha Fernandes J, Karuranga S, Sylvanowicz M, Conlon J, et al. Global perspectives on the provision of diabetic retinopathy screening and treatment: survey of health care professionals in 41 countries. *Diabetes research and clinical practice*. 2018;143:170-8.
4. Brunner LS. *Brunner & Suddarth's textbook of medical-surgical nursing*: Lippincott Williams & Wilkins; 2010.
5. Solomon SD, Chew E, Duh EJ, Sobrin L, Sun JK, VanderBeek BL, et al. Diabetic retinopathy: a position statement by the American Diabetes Association. *Diabetes care*. 2017;40(3):412-8.
6. Fong DS, Aiello L, Gardner TW, King GL, Blankenship G, Cavallerano JD, et al. Retinopathy in diabetes. *Diabetes care*. 2004;27(suppl_1):s84-s7.
7. Teo ZL, Tham Y-C, Yu M, Chee ML, Rim TH, Cheung N, et al. Global prevalence of diabetic retinopathy and projection of burden through 2045: systematic review and meta-analysis. *Ophthalmology*. 2021;128(11):1580-91.
8. Çetin EN, Zencir M, Fenkçi S, Akın F, Yıldırım C. Assessment of awareness of diabetic retinopathy and utilization of eye care services among Turkish diabetic patients. *Primary care diabetes*. 2013;7(4):297-302.
9. Stefánsson E, Bek T, Porta M, Larsen N, Kristinsson JK, Agardh E. Screening and prevention of diabetic blindness. *Acta Ophthalmologica Scandinavica*. 2000;78(4):374-85.
10. Mersha GA, Alimaw YA, Woredekal AT, Assaye AK, Zeleke TC. Awareness and knowledge of diabetic retinopathy in diabetic patients at a General Hospital in Northwest Ethiopia. *SAGE Open Med*. 2021;9:20503121211054994.
11. Moshfeghi AA, Lanitis T, Kropat G, Kuznik A, Gibson A, Feng H, et al. Social cost of blindness due to AMD and diabetic retinopathy in the United States in 2020. *Ophthalmic Surgery, Lasers and Imaging Retina*. 2020;51(4):S6-S14.
12. Coney JM. Addressing unmet needs in diabetic retinopathy. *Am J Manag Care*. 2019;25(16 Suppl):S311-6.
13. Sharma S, Oliver-Fernandez A, Liu W, Buchholz P, Walt J. The impact of diabetic retinopathy on health-related quality of life. *Current Opinion in Ophthalmology*. 2005;16(3):155-9.
14. Sasongko MB, Wardhana FS, Febryanto GA, Agni AN, Supanji S, Indrayanti SR, et al. The estimated healthcare cost of diabetic retinopathy in Indonesia and its projection for 2025. *British Journal of Ophthalmology*. 2020;104(4):487-92.
15. Orji A, Rani PK, Narayanan R, Sahoo NK, Das T. The economic burden of diabetic retinopathy care at a tertiary eye care center in South India. *Indian Journal of Ophthalmology*. 2021;69(3):666.
16. Hamzeh A, Almhanni G, Aljaber Y, Alhasan R, Alhasan R, Alsamman MI, et al. Awareness of diabetes and diabetic retinopathy among a group of diabetic patients in main public hospitals in Damascus, Syria during the Syrian crisis. *BMC Health Serv Res*. 2019;19(1):549.
17. Sen A, Pathak P, Shenoy P, Kohli GM, Bhatia P, Shetty S. Knowledge, attitude, and practice patterns and the purported reasons for delayed presentation of patients with sight-threatening diabetic retinopathy at a tertiary eye-care facility in Central India: A questionnaire-based study. *Indian Journal of Ophthalmology*. 2021;69(11):3118.

18. Fekadu SA, Seid MA, Akalu Y, Gela YY, Diress M, Getnet M, et al. Factors associated with diabetic retinopathy screening and regular eye checkup practice among diabetic patients attending Felege Hiwot Specialized Hospital. *Int J Ophthalmol.* 2022;15(11):1829-36.
19. Assem AS, Tegegne MM, Alemu DS, Woredekal AT, Tefera TK. Knowledge about diabetic retinopathy, eye check-up practice and associated factors among adult patients with diabetes mellitus attending at debark hospital, Northwest Ethiopia. *BMC Ophthalmology.* 2020;20(1):453.
20. Umaefulam V, Premkumar K. Diabetic retinopathy awareness and eye care behaviour of indigenous women in Saskatoon, Canada. *Int J Circumpolar Health.* 2021;80(1):1878749.
21. Cheruiyot G. Knowledge, Attitudes And Practices On Diabetic Retinopathy Among Patients Attending The Diabetes Clinic At Kenyatta National Hospital: University of Nairobi; 2013.
22. Flaxel CJ, Adelman RA, Bailey ST, Fawzi A, Lim JI, Vemulakonda GA, et al. Diabetic retinopathy preferred practice pattern®. *Ophthalmology.* 2020;127(1):P66-P145.
23. Gessese KA, Adimassu NF, Mersha GA, Ayele FA. Knowledge on diabetic retinopathy and associated factors among diabetic patients, Southern Ethiopia, 2021. 2022.
24. Konstantinidis L, Carron T, de Ancos E, Chinnet L, Hagon-Traub I, Zuercher E, et al. Awareness and practices regarding eye diseases among patients with diabetes: a cross sectional analysis of the CoDiab-VD cohort. *BMC endocrine disorders.* 2017;17(1):1-11.
25. Duan F, Zheng Y, Zhao Q, Huang Z, Wu Y, Zhou G, et al. Knowledge and practices regarding diabetic retinopathy among diabetic patients registered in a chronic disease management system in eastern China. *PloS one.* 2020;15(8):e0234733.
26. Hamzeh A, Almhanni G, Aljaber Y, Alhasan R, Alhasan R, Alsamman M, et al. Awareness of diabetes and diabetic retinopathy among a group of diabetic patients in main public hospitals in Damascus, Syria during the Syrian crisis. *BMC health services research.* 2019;19(1):1-10.
27. Ahmed KR, Jebunessa F, Hossain S, Chowdhury HA. Ocular knowledge and practice among type 2 diabetic patients in a tertiary care hospital in Bangladesh. *BMC ophthalmology.* 2017;17(1):1-6.
28. El Khatib B, AlHawari H. and Al Bdour MD. Assessment of awareness of diabetic retinopathy among patients with diabetes mellitus attending the endocrine clinic at Jordan University hospital. *Madridge J Ophthalmol.* 2017;2(1):14-8.
29. Bogunjoko T. Knowledge, attitude and practices among medical officers and diabetic patients regarding diabetic retinopathy in Ogun state of Nigeria. *The Journal of Ophthalmology of Eastern, Central and Southern Africa.* 2015;19(1).
30. Mafwir M, Mwakyusa N, Shilio B, Katule J. Health education and awareness about diabetic retinopathy among patients attending diabetic clinics in tertiary and regional hospitals in Tanzania. *The Journal of Ophthalmology of Eastern, Central and Southern Africa.* 2016;20(2).
31. Hussain R, Rajesh B, Giridhar A, Gopalakrishnan M, Sadasivan S, James J, et al. Knowledge and awareness about diabetes mellitus and diabetic retinopathy in suburban population of a South Indian state and its practice among the patients with diabetes mellitus: A population-based study. *Indian journal of ophthalmology.* 2016;64(4):272.
32. Alzahrani SH, Bakarman MA, Alqahtani SM, Alqahtani MS, Butt NS, Salawati EM, et al. Awareness of diabetic retinopathy among people with diabetes in Jeddah, Saudi Arabia. *Therapeutic advances in endocrinology and metabolism.* 2018;9(4):103-12.
33. Akuffo KO, Asare AK, Sewpaul R, Dukhi N, Kumah DB, Agyei-Manu E, et al. Eye care utilization among diabetics in the South African National Health and Nutrition Examination Survey (SANHANES-1): a cross-sectional study. *BMC Research Notes.* 2020;13(1):1-7.
34. Akrofi B, Tetteh J, Amissah-Arthur KN, Buxton EN, Yawson A. Utilization of eye health services and diabetic retinopathy: a cross-sectional study among persons living with diabetes visiting a tertiary eye care facility in Ghana. *BMC Health Services Research.* 2021;21(1):1-11.
35. Ahmed TM, Demilew KZ, Tegegn MT, Hussen MS. Use of Eye Care Service and Associated Factors Among Adult Diabetic Patients Attending at Diabetic Clinics in Two Referral Hospitals, Northeast Ethiopia. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy.* 2021;14:2325.

36. Seneviratne B, Prathapan S. Knowledge on diabetic retinopathy among diabetes mellitus patients attending the Colombo South Teaching Hospital, Sri Lanka. 2016.
37. Singh A, Tripathi A, Kharya P, Agarwal R. Awareness of diabetic retinopathy among diabetes mellitus patients visiting a hospital of North India. *Journal of Family Medicine and Primary Care*. 2022;11(4):1292.
38. Venugopal D, Lal B, Fernandes S, Gavde D. Awareness and knowledge of diabetic retinopathy and associated factors in Goa: A hospital-based cross-sectional study. *Indian journal of ophthalmology*. 2020;68(2):383.
39. Al-Asbali T, Aldawari SA, Alzahim IA, Alalawi H, Khandekar R, Lotfy NM. Knowledge, attitude and practice regarding diabetic retinopathy screening and its management among diabetic patients at a private hospital of Riyadh, Saudi Arabia. *Saudi Journal of Ophthalmology*. 2020;34(2):85.
40. Central Statistical Agency (CSA) [Ethiopia] and ICF. 2016. Ethiopia Demographic and Health Survey 2016. Addis Ababa E, and Rockville, Maryland, USA: CSA and ICF.
41. Coney JM. Addressing unmet needs in diabetic retinopathy. *Am J Manag Care*. 2019;25(16 Suppl):S311-s6.
42. Schmid KL, Schmid LM, Optom CPB. Knowledge of the ocular effects of diabetes among the general population of Australia and the members of Diabetes Australia. *Clinical and Experimental Optometry*. 2003;86(2):91-103.
43. Balasubramaniyan N, Kumar SG, Babu KR, Subitha L. Awareness and practices on eye effects among people with diabetes in rural Tamil Nadu, India. *African health sciences*. 2016;16(1):210-7.
44. Mukhaiseer M. Diabetic Patients Knowledge and Practice Regarding Annual Visual Checking. *AL-Kindy College Medical Journal*. 2020;15:23-7.
45. Bodunde O, O D, Ogunsemi O, Ajibode A, Raimi T. Awareness of Ocular Complications of Diabetes Among Diabetic Patients In A Tertiary Hospital In Western, Nigeria. *IOSR Journal of Dental and Medical Sciences*. 2014;13:09-12.
46. Al Zarea BK. Knowledge, Attitude and Practice of Diabetic Retinopathy amongst the Diabetic Patients of AlJouf and Hail Province of Saudi Arabia. *J Clin Diagn Res*. 2016;10(5):Nc05-8.
47. Niroomand M, Ghasemi SN, Karimi-Sari H, Kazempour-Ardebili S, Amiri P, Khosravi MH. Diabetes knowledge, attitude and practice (KAP) study among Iranian in-patients with type-2 diabetes: A cross-sectional study. *Diabetes Metab Syndr*. 2016;10(1 Suppl 1):S114-9.
48. Addoor KR, Bhandary SV, Khanna R, Rao LG, Lingam KD, Binu V, et al. Assessment of awareness of diabetic retinopathy among the diabetics attending the peripheral diabetic clinics in Melaka, Malaysia. *Med J Malaysia*. 2011;66(1):48-52.
49. Fallatah MO. Knowledge, awareness, and eye care-seeking behavior in diabetic retinopathy: a cross-sectional study in Jeddah, Kingdom of Saudi Arabia. *Ophthalmology and therapy*. 2018;7:377-85.
50. Al-Asbali T, Aldawari SA, Alzahim IA, Alalawi H, Khandekar R, Lotfy NM. Knowledge, attitude and practice regarding diabetic retinopathy screening and its management among diabetic patients at a private hospital of Riyadh, Saudi Arabia. *Saudi J Ophthalmol*. 2020;34(2):85-93.
51. Mwangi M, Gikonyo G, Wanjiru F. Knowledge and Awareness of Diabetic Retinopathy amongst Diabetic Patients in Kenyatta National Hospital, Kenya. *International Journal of Humanities and Social Science*. 2011;1:140-6.
52. Ehrlich JR, Ndukwe T, Solway E, Woodward MA, Singer DC, Newman-Casey PA, et al. Self-reported Eye Care Use Among US Adults Aged 50 to 80 Years. *JAMA Ophthalmol*. 2019;137(9):1061-6.
53. Hwang J, Rudnisky C, Bowen S, Johnson JA. Socioeconomic factors associated with visual impairment and ophthalmic care utilization in patients with type II diabetes. *Canadian Journal of Ophthalmology*. 2015;50(2):119-26.
54. Joubert F. Awareness of diabetic retinopathy among diabetics in the Cape Town Metropole: University of Cape Town; 2014.
55. Fatema K, Hossain S, Natasha K, Chowdhury HA, Akter J, Khan T, et al. Knowledge attitude and practice regarding diabetes mellitus among Nondiabetic and diabetic study participants in Bangladesh. *BMC Public Health*. 2017;17(1):364.

56. Srinivasan NK, John D, Rebekah G, Kujur ES, Paul P, John SS. Diabetes and Diabetic Retinopathy: Knowledge, Attitude, Practice (KAP) among Diabetic Patients in A Tertiary Eye Care Centre. J Clin Diagn Res. 2017;11(7):Nc01-nc7.

ANNEXES

Annex I: Subject Information Sheet (English Version)

Title of the research: Assessment of knowledge of diabetic retinopathy, eye check-up practice and associated factors among adults with diabetes mellitus on follow up at public hospitals in Addis Ababa, 2023.

Principal investigator: Feven Dinsa

I am Feven Dinsa graduate student in Adult Health nursing at Addis Ababa University. The approval to carry out this study was given by Institutional review Board of School of Nursing and Midwifery A.AU

Objective: The objective of this study will be to assess knowledge of diabetic retinopathy, eye check-up practice and associated factors among adults with diabetes mellitus on follow up at public hospitals in Addis Ababa, 2023.

Perceived benefits and risk: The result may benefit clients, researchers, policy makers and other stakeholders as appropriate. Being involved in this study does not induce any risk .

Confidentiality: All personal identifiers and personal information will not be taken hence your responses will be kept confidential. Data will be accessed by the principal investigator and finally will be analyzed anonymously.

Participation and withdrawal: Your participation in this study which will take you about 5-10 minute is fully voluntarily. You will be free to withdraw from the study at any time or not to answer questions if you don't want to answer.

Coordinating organization: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery

Persons to contact: If you have questions/ concerns about this study you can contact;

Principal investigator: FevenDinsa (0935894513, E.mail:fevendinsa@gmail.com)

Advisors: Dr. Fekadu Aga (Email: fiqaaduuagaa@yahoo.com)

Mr. Debela Gela (Email:debegela@gmail.com)

Annex II: Subject information Amharic version ()

:-

() ()

-

.

.

:

() ()

:-

::

::

:

::

-

5-10

::

- .

: (0935894513 fevendinsa@gmail.com)

:- \ (0911033684 Email:fiqaaduuagaa@yahoo.com)

- Email: debegela@gmail.com

Annex III: Consent form (English Version)

Dear participant, you are selected and kindly invited to be one of the study participants in this study. Your truth full answers for all of the questions are very important to determine the knowledge, eye check-up practice and associated factors of diabetic retinopathy among diabetic patients. Your answers will be confidential and secret. It is your right not to participate in the study, stop at any time or skip any question you do not want to answer. We will take a maximum of 15 minutes to complete the questionnaire.

Next, I will read a consent, which assures your interest to participate.

Do I have your permission to continue?

If yes thank you and continue -----

If no, thank you and go to next study subject -----

Data collector

Name ----- signature ----- date -----

Checked by supervisor

Name ----- signature----- date-----

Annex IV: Consent form (Amharic Version)()

(Diabetic
retinopathy)

15

?

3	Do you have Hypertension?	1.yes 3. Don't know	2.No
4	Is there anyone with diabetes in your family?	1. Yes	2. No
5	Which Systemic complications of DM do you have?	Kidney complication Cardiovascular complication Other complication of diabetes I don't know I don't have any complication of DM	
6	Previous history of eye disease in the past	1.yes 3. Don't know	2.No
7	Do you have any problem with vision / Do you have any visual symptoms?	1 .yes	2.No

Part 3: Knowledge of Diabetic retinopathy

Serial No,	Question	Response	
14	Does diabetes affect the eye?	1.Yes 3.Don't know	2.No
15	Can diabetes cause blindness?	1.Yes 3.Don't know	2.No
16	What disorder does diabetes specifically cause in the eyes?	1.Diabetic retinopathy 3. Glaucoma 5. Others.....	2.Cataract 4. Don't know

17	What is diabetic retinopathy?	1. It is the same as cataract. 2. It is high sugars in the eye. 3.It is changes in the blood vessels of the retina due to diabetes 4.It is high pressure in the eye 5.Don't know
18	What are the risk factors for developing diabetic eye disease? (You can choose more than one answer)	1.Poorly controlled blood sugar 2.Duration of diabetes 3.Hypertension 4.High BMI 5.Pregnancy 6.Smoking 7.I don't know
19	Should a person with diabetes check his/her blood pressure?	1.yes 2.No 3.don't know
20	Is blood sugar control important in preventing blindness from diabetic Retinopathy?	1.Yes 2.No 3.Don't know
21	Is diabetic eye disease treatable? (If answered "No" to the above question, please go to question #23)	1.Yes 2.No 3.Don't know
22	What are the treatment options available for diabetic eye disease?(You can choose more than one answer)	1.Medical (Injections inside the eyes) 2.Laser burns inside the eyes 3.Surgery 4.don't know
23	Should a person with diabetes mellitus need eye screening?	1.Yes 2.No (If answered "No" to this question, please go to question #25) 3.Don't know
24	How soon after the diagnosis has been made should that person visit the specialist eye doctor?	1. Immediately after diagnosis of DM 2. One year after diagnosis 3.Five years after diagnosis _____ 4.Other
25	Does a diabetic patient need a regular	1.Yes 2.No

Annex VII - Questionnaire Amharic version(መጠይቅ በ አ ማር ጅ)

-

.		
1		1. 2.
2		-----
3		1. 2. 3. 4.
4		1. 2.
5		1. 2. 3. 4. ()
6		1. ሆ 2. ደ 3. (1-8) 4. (/)
7		1. 2. 3. 4. 5. 6. 7.
8))	-----

2:

1		? -----
---	--	---------

	?	
2	?	1. 1 2. 2 3.
3	?	1. 2. 3.
4	?	1. 2.
5	?	1. 2. 3. 4. 5.
6	?	1. 2. 3.
7	/ ?	1. 2.

3:

()

.		
1	?	1. 2. 3.
2	?(#14 #15	1. 2.

	" "	3.
	27)	
3	?	1. () (Diabetic retinopathy) 2. (Cataract) 3. () 4. 5.
4	() ?	1. 2. 3. 4. 5.
5	() ?()	1. 2. 3. 4. 5. 6. 7.
6		1. 2. 3.
7	() ?	1. 2. 3.
8	() “(”	1. 2. 3.

	23)	
9	() ?()	1. 2. 3. 4.
10	?	1. 2. (” 25)) 3.
11	⊥ ?	1. 2. 3. 4. _____
12	?	1. 2. 3.
13	() ()?)	1. 2. 3. ⊥ 4. (.....) 5. -----

4: ()
⊥ ⊥ /

.		
1	?	1.

		2. 3.
2	⊥ ?	1. 2. (“ ” 31) 3.
3	“ ’ ?	2. 3. 4.
4	⊥ ?	1. ⊥ 2. ⊥ 3. 4. () 5. _____
5	#28 " " ?	1. 2. / 3. 4. 5. _____
6	?	1. , ∩ ? _____ 2. 3.