



COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

DEPARTMENT OF CARDIOVASCULAR NURSING

**KNOWLEDGE OF CARDIOVASCULAR DISEASES RISK
FACTORS ON ITS ASSOCIATED FACTORS AMONG
PATIENTS FOLLOW UP IN DIABETES MELITUES CLINIC
IN ADAMA GENERAL HOSPITAL AND MEDICAL
COLLEGE, ETHIOPIA, 2024**

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Acronym and Abbreviation

CVD	CARDIOVASCULAR DISEASE
DM	DIABETICS MELITES
MRFIT	MULTIPLE RISK FACTORS INTERVENTION TRIAL
IDF	INTERNATIONAL DIABETES FEDERATION
FBG	FASTING BLOOD GLUCOSE

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SUMMARY

Background

The leading cause of death and morbidity worldwide is cardiovascular disease. This is because risk factors for cardiovascular diseases that can be changed are becoming more and more common. Therefore, the study's goal was to determine the knowledge and unhealthy habits of diabetes mellitus patients that lead to cardiovascular diseases.

Objective: - Knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

Method: - An institution based quantitative cross-sectional study design and from February 20/ 2024 to March 20/ 2024 was conducted. The data was entering EpiData 4.2 version, then exported to SPSS version 25 for analysis. The adjustment odds ratio was used to measure the strength of association at 95% CI to assess the existence and strength of association, and if $p < 0.05$, statistical significance was declared. Finally, the outcome was provided in the form of descriptive text, tables and graphs.

Result: -The findings of this study indicated that 56 % of the respondents had good knowledge. Participant's age 50 % less likely from 45 to 64 years old than age ≥ 65 years old (AOR=0.5, 95% CI: (0.26-0.99) and duration of diabetics' mellitus 4 and 5 times more likely from 11 to 20 years and $\geq$ to 21 years than ≤ 10 years (AOR=4.3, 95% CI: (1.71-10.78) and (AOR =5.2, 95 % CI: (1.37-19.63) respectively. From participants occupation employed, house wife, self-employed and daily laborer 3, 7, 2, 1 and 3 times more likely than students (AOR=3.32, 95 % CI: (1.15-9.52), (AOR=7.35, 95 % CI: (2.4-22.4), (AOR=2.9, 95 % CI: (1.11-9.7.62) and (AOR=3.2, 95 % CI: (1.1-9.13) respectively. Family history of cardiovascular disease 38 % less likely than not have (AOR=0.62, 95 % CI: (0.39-0.98), 43 % less likely than not use of chat (AOR=0.57, 95 % CI: (0.35-0.92), drinking alcohol 41% less likely than not drinking (AOR=0.59, 95 % CI: (0.37-0.94) and monthly income from 5251-7800 (AOR=2.046, 95 % CI: (1.04-4.03)

Conclusion and recommendation: - The findings of this study indicated that 56 % of the respondents had good knowledge. participant's age, monthly income, duration of DM, occupational status, drinking alcohol and use chat, types of DM and family history of cardiovascular disease

Key words: - knowledge, risk, cardiovascular, disease, diabetics mellitus, factors

1. INTRODUCTION

1.1. Background

In both developed and developing countries, the prevalence of diabetes mellitus (DM), a group of metabolic diseases characterized by consistently high blood glucose levels, is rapidly increasing. If proper action is not taken, it is estimated that at least 350 million people worldwide will have type 2 diabetes by 2030. (1, 2).

Type 2 diabetes is expected to become the most prevalent public health concern in Africa, affecting 28 million people by 2030 and 41.6 million by 2045. According to an International Diabetes Federation (IDF) report, Ethiopia had 2,652,129 cases of diabetes in 2017, ranking first out of the top five African nations in this category (3, 4).

Furthermore, diabetes mellitus (DM), also known as diabetes, is a serious chronic disease that causes high blood glucose levels in people whose bodies either cannot use the insulin they produce or only produce insufficient amounts of it. A multiorgan disease that impacts numerous organ systems, diabetes mellitus (DM) causes problems like a decline in population health and higher medical expenses (5).

In the next 25 years, the global burden of diabetes is expected to triple due to a combination of factors such as poor diet, sedentary lifestyles, and an aging population. Furthermore, insufficient diabetes education and self-care behaviors lead to poor glycemic control and complications such as diabetic retinopathy, diabetic neuropathy, and diabetic nephropathy (6). Multiple mechanisms, including insulin resistance, inflammation, and endothelial dysfunction, contribute to the increased risk of cardiovascular disease associated with elevated blood sugar levels. Fasting blood sugar has also been connected to a variety of other common underlying metabolic risks, including dyslipidemia, hypertension, and severe obesity. Significant influences on the risk also come from smoking and inactivity (7).

Hospitalization rates for unstable diabetes have been found to be higher in patients with diabetes who have a poor understanding of the disease.⁵ On the other hand, individuals with superior diabetes knowledge and comprehension are able to follow the guidelines for self-management and have demonstrated improved glycemic control as well as improved health outcomes (8).

A person must be aware of and knowledgeable about the nature, consequences, risk factors, management, and chronic complications of the disease in order to provide the best possible care for it. Thus, good diabetic control, which is essential for preventing diabetic complications, is greatly impacted by knowledge about diabetes mellitus (DM) and its chronic complications (9).

Due to diabetes cardiovascular diseases occur and manifested by heart defects, rheumatic heart disease, peripheral arterial disease, coronary heart disease, cerebrovascular disease (stroke), hypertension, deep vein thrombosis, and pulmonary embolism (10).

Patients with diabetes are more affected by the standard cardiovascular risk factors than people without the disease. According to the Multiple Risk Factors Intervention Trial (MRFIT), men with diabetes had a higher risk of dying from CVD than men without the disease if they had any one, two, or all three risk factors (dyslipidemia, cigarette smoking, or hypertension) (11, 12).

Also, patients with diabetes, particularly those with type 2, frequently have hypertension. Depending on the population and how hypertension is defined, the prevalence of the condition varies. According to studies conducted in Addis Ababa and Jimma, approximately one-third of people with diabetes also have hypertension. Type 2 diabetics frequently have dyslipidemias (abnormal lipoprotein levels), but type 1 diabetics do not if their glycemic control is adequate. Additionally, type 2 diabetics are more likely to be obese, which is linked to hypertension and dyslipidemia. Up to 25% of diabetic patients in the West smoke cigarettes (13, 14).

1.2. Statement of the problem

Most DM complications can be avoided by increasing awareness. Educating people about a disease, its treatment, and its complications is the first step in managing it. Additionally, this facilitates efforts at control and prevention. Adherence to treatment also requires knowledge of the disease's nature and complications. However, a lack of awareness regarding diabetes complications leads to high rates of complications (15, 16).

Cardiovascular disease (CVD) is the world's leading cause of death and morbidity. This is due to the increasing prevalence of modifiable risk factors for CVDs. Thus, the purpose of the study was to identify the unhealthy behaviors and knowledge that people with diabetes mellitus have that contribute to CVD (17).

The annual death toll from cardiovascular diseases (CVDs) is approximately 17.9 million. This amounts to 32% of all deaths that occur each year worldwide. More than 75% of these fatalities occur in middle- and low-income nations. If nothing is done, CVDs will cause more than 22.2 million deaths a year by 2030 (18, 19).

Among the modifiable risk factors for CVD are tobacco use, high cholesterol, diabetes, sedentary lifestyle, overweight or obesity, a diet high in fat, and excessive alcohol intake. The 2017 Global Burdens of Disease Report found that smoking and high blood pressure were the main global risk factors for premature death and disability across all age groups (20, 21).

The consequences of behavioral risk factors that lead to cardiovascular disease and its complications can manifest in people as obesity, elevated blood lipids, elevated blood pressure, and elevated blood glucose. Moreover, the underlying causes of CVDs included population aging, poverty, urbanization, globalization, cultural and economic change, and genetic factors (22, 23).

There are many studies conducted in Ethiopia on the complications of diabetes and cardiovascular risk factors. According to a retrospective study conducted at Tikur Anbesa Hospital, among diabetic admissions, CVDs accounted for 16% of deaths, with acute complications and infections accounting for the remaining 18% (24).

DM is a prevalent condition frequently encountered by healthcare professionals. Adults with diabetes mellitus were expected to have a superiority rate of 4% globally in 1995; by 2025, that rate is projected to increase to 5.4%. A silent illness: A lot of people don't realize they have diabetes until they experience potentially fatal complications from one of these conditions. Diabetes and its complications are expected to claim the lives of 4.2 million adults and elderly people in the 20–79 age range in 2019, or one death every eight seconds (25).

Almost half (46.2%) of all diabetes-related deaths worldwide occur in people under 60, including some in the 20–79 age range. Diabetes has a significant financial impact on nations, healthcare systems, and individuals with diabetes and their families must pay for their own medical care (26).

Individuals with diabetes have a 10–20 times higher rate of lower limb amputation than those without the disease. It has been estimated that diabetes causes one lower limb (or portion of a lower limb) to be amputated globally every thirty seconds. The number of foot ulcers and amputations in low- and middle-income countries has surpassed that of high-income countries. Diabetes patients who get foot ulcers must pay fitness fees (27).

Understanding diabetes and its long-term consequences can help with early problem identification and a decrease in the frequency of complications. It has not yet been determined how much information diabetics who visit Adama General Hospital know about the chronic complications of their disease. Performing a baseline knowledge assessment of the intended audience is the first step in creating health education programs (26).

Furthermore, the proper and effective use of scarce resources to treat any health condition depends on this kind of research. Studies pertaining to diabetes patients' awareness of chronic complications have not yet been carried out at Adama General Hospital. Thus, the purpose of this study was to evaluate the diabetic patients at Adama General Hospital in Ethiopia's level of knowledge regarding diabetes mellitus (DM), its chronic complications, and associated factors (9).

And in order to decrease the risk of cardiovascular disease for DM patients in a different set of countries. Therefore, this study aimed to assess knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes

mellitus clinic also, in this study the main concern of this research is therefore to determine the gap to address the knowledge of risk factors in CVDs and the facts of the analysis in the study area. And to identify about knowledge of CVDs and the factors affect that influence them; knowing more will help policymakers, stakeholders, program designers, and health care providers improve the quality of health care. As a result, this study presents data on assessments of knowledge on risk of CVDs signs and associated factors of among DM patients in Adama general hospital, Ethiopia.

1.3. Significance of the study

The significance of the study on knowledge of risk factors of cardiovascular diseases and its associated factors among patient's follow-up in the diabetes mellitus clinic in Adama general hospital in 2024 E.C. can be emphasized in several key areas

For understanding patient awareness, this will reveal how well patients with diabetes understand the risk factors of cardiovascular diseases (CVD), which is crucial as both conditions are closely linked. Assessing this knowledge will help identify whether patients are equipped to manage and reduce their risk of CVD. Promoting preventive health, cardiovascular diseases are a leading cause of death among diabetic patients. By understanding patients' knowledge of risk factors, the study can contribute to efforts aimed at preventing CVD, potentially reducing the burden of heart disease in this vulnerable group.

Informing clinical practice, the results from the study will provide healthcare practitioners in Adama general hospital with evidence on where to focus their educational efforts. This can lead to more effective patient education strategies, encouraging better disease management and adherence to healthy practices, which may lower CVD risk. Reducing CVD-Related Complications for diabetic patients with better knowledge of CVD risk factors are more likely to take action to reduce their risks, such as adopting healthier lifestyles and adhering to prescribed medications. This could result in fewer complications, hospitalizations, and lower mortality rates.

For guiding Policy development, the study findings can assist in developing or refining health policies and clinical guidelines, particularly regarding integrating CVD prevention into routine diabetes care. This could influence future healthcare programs at both local

and national levels. Highlighting associated factors to identifying the factors associated with knowledge gaps as age, education level, or socioeconomic status the study can help healthcare providers develop targeted interventions for those most at risk of poor understanding and the study adds valuable data to the field of public health and cardiovascular care, particularly in Ethiopia. It offers insights into how knowledge of CVD risk factors among diabetic patients influences disease outcomes, helping to guide further research and resource allocation in similar contexts.

Finally, the study's findings will contribute to broader public health efforts aimed at improving cardiovascular health among diabetic patients in the community, which could lead to better quality of life and reduced healthcare costs over time and for improving healthcare delivery, patient outcomes, and public health strategies concerning the prevention and management of cardiovascular diseases among diabetic patients in Adama and similar regions.

2. LITERATURE REVIEW

2.1. Sociodemographic characteristics of diabetics mellites patients

The current study examined 248 patients with type 2 diabetes mellitus, with a 92.9% response rate, according to a scientific journal on poor glycemic control and associated factors among patients with the disease. The mean age of the patients was 59.8 ± 12.1 , with a range of 31 to 93 years. Of the patients, 70.2% (174/248) were female, and 48.4% (120/248) were between the ages of 45 and 60. 248 (88%) of the patients were obese, and more than half of them had finished their postsecondary education (28).

However, a cross-sectional study on cardiovascular disease risk factors among diabetic patients in southwest Ethiopia found that age, gender, type of diabetes, and obesity all had an independent correlation with hypertension. In patients aged 45 years or older, the risk of hypertension was nearly four times higher than in obese patients, three times higher than in type 2 diabetics, and more than twice as high as in these patients. Women were 48% more likely than men to have hypertension. Address, educational attainment, type of diabetes treatment, duration of diabetes, physical activity, smoking, alcohol use, and chatter syndrome did not significantly correlate with hypertension (29, 30).

According to a study conducted on diabetes patients' knowledge of the disease's chronic complications and related factors at the University of Gondar Comprehensive and Specialized Hospital in Gondar, Northwest Ethiopia, out of 320 participants, 52.8% were men, and 44.1% were in the age range of 46 to 65, which comprises the majority of subjects. Regarding religion, most of the participants were Orthodox (69.4%) and married (64.9%). Seventy-seven percent of the participants came from cities. Of the participants, 28.8% were stay-at-home mothers, and 24.1% had finished high school but had not gone to college (31).

Other study also conducted on cardiovascular diseases risk factors among adult diabetic patients in eastern Ethiopia suggest that, the participants in the study included 416 patients in total. There was a mean age of 52 years (SD 14.7), ranging from 18 to 90 years. Type 2 diabetes (69.2%) and female gender composition made up the majority of study

participants (56%). Of the individuals receiving treatment at the time, 58.2% were taking oral anti-diabetic medications. The majority of participants, or 68.5%, had uncontrolled (high) fasting blood glucose levels. The mean fasting blood glucose (FBG) level was 177.7 mg/dl (SD 8.21). Just 11.5% of research participants met the criteria for obesity (BMI 30), with a mean BMI of 24.7 kg (SD 4.79) (32).

2.2. Knowledge of patients towards cardiovascular disease in diabetics

Miletus follow up clinic

Study done in Tanzania on knowledge of cardiovascular risk factors among caretakers of outpatients attending a tertiary cardiovascular center showed that, the participants, 34.4% reported knowing the risk factors for CVD, 41.3% felt they were in good health, and 583 (54.9%) had never had a general health examination. The answers to the 22 questions used to gauge knowledge of CVD risk factors are compiled. The CVD knowledge score ranged from 31.8 to 100%, with a mean of 78.2%. Twelve participants (1.1%) had low knowledge of CVD risk factors, 204 (19.2%) had moderate knowledge, and 847 (79.7%) had good knowledge. About 42.4% of people were not aware that cardiovascular diseases are the world's leading cause of death, and 16.3% thought they were only a problem for the wealthy (33).

A cross-sectional study done on knowledge towards diabetes and its chronic complications and associated factors among diabetes patients in University of Gondar comprehensive and specialized hospital, Gondar, Northwest Ethiopia, the majority of participants (76.6%) are aware that diabetic nephropathy is a complication, while 71.6% are also aware of diabetic neuropathy and 92.5% report diabetic retinopathy as a complication of diabetes 91.3% of participants reported foot ulcers as a complication, and 78.1% of subjects reported heart diseases as a result of diabetes 58.1% of the participants identified hyposexual dysfunction as a chronic diabetes complication, and 87.5% indicated that diabetes can contribute to hypertension. Sixty-six percent of the subjects reported having numbness in their extremities, and ninety-two percent of them thought that routine retinal exams were important (31).

In the same study done in Jima university medical center suggests that, according to 198 (62.3%) of the study participants, eating foods high in fat rather than fruits and vegetables may lead to CVD, followed by a lack of physical activity. Just 152 patients, or 47.8%, were aware that smoking cigarettes was a risk factor for cardiovascular diseases, compared to 196 patients, or 61.6%. Of the study participants, 198 (62.3%) had a good understanding of the risk factors for modifiable CVDs (10).

2.3. Factor that associated towards cardiovascular disease in diabetics Miletus follow up clinic

A cross-sectional survey conducted in Tanzania on knowledge of cardiovascular risk factors among caretakers of outpatients attending a tertiary cardiovascular center show that, women made up the majority (55.7%), with a mean age of 40.5 years. With a body mass index (BMI) of more than two thirds, 18.5% drank alcohol, 3.2% smoked at the time, and 47% did not engage in physical activity. In terms of knowledge of CVD risks, 80.0% had a good score, with a mean of 78.2. 56.7% of people thought that CVDs could be cured, 17.4% thought that they were unpreventable, and 16.3% thought that they were diseases of the affluent. Lack of health insurance, low education, and a negative family history of CVD-related deaths were all found to be independently linked to low CVD knowledge (33).

A survey conducted in west Ethiopia on similar topic showed that, chi-square test results showed that DM complications were significantly associated with patient age ($p = 0.024$), family history of DM ($p = 0.038$), duration of DM ($p = 0.015$), DM regimen ($p = 0.041$), and presence of other chronic diseases ($p = 0.006$). Additionally, the rate of DM complications rose as the patient's age and duration of DM increased, with the prevalence of complications being relatively higher in women (39.4%) than in men (29.7%), although the difference was not significant. Similarly, DM type, specific DM medications, and overall knowledge and attitude scores did not significantly correlate with DM complications (34).

The study conducted on knowledge of risk factors in cardio vascular disease among follow up diabetics mellites clinic was the final regression model included the following variables: age, work status, residence, length of DM, and educational status because they

were significant at 0.25. At a 5% level of significance, age, educational attainment, length of DM therapy, and occupational status all demonstrated a significant correlation with good knowledge. Therefore, compared to those under 25, those in the 26–45 age range were 66.7% less likely to be well-informed about the chronic complications of diabetes. Compared to those who cannot read or write, those who can was 74.7% less likely to be well-informed about the long-term consequences of diabetes (5).

Also, another study conducted in Ethiopia suggest that, from all participants, 38% believe there is no risk of stroke, and 31.9% believe there is a chance of kidney issues. Thirty-two.5% believe that they are at high risk from hyperlipidemia. 28.1% of the participants believe they were at some risk for a cardiac condition, and 27.8% of the participants believe they were at a higher risk of hypertension. 29.7% of participants believe there is no chance of a heart attack. 38.1% of the subjects were afraid that they had a high risk of having a limb amputated, while 40.9% of the subjects felt that they were at a high risk (31).

2.4. Conceptual frame work

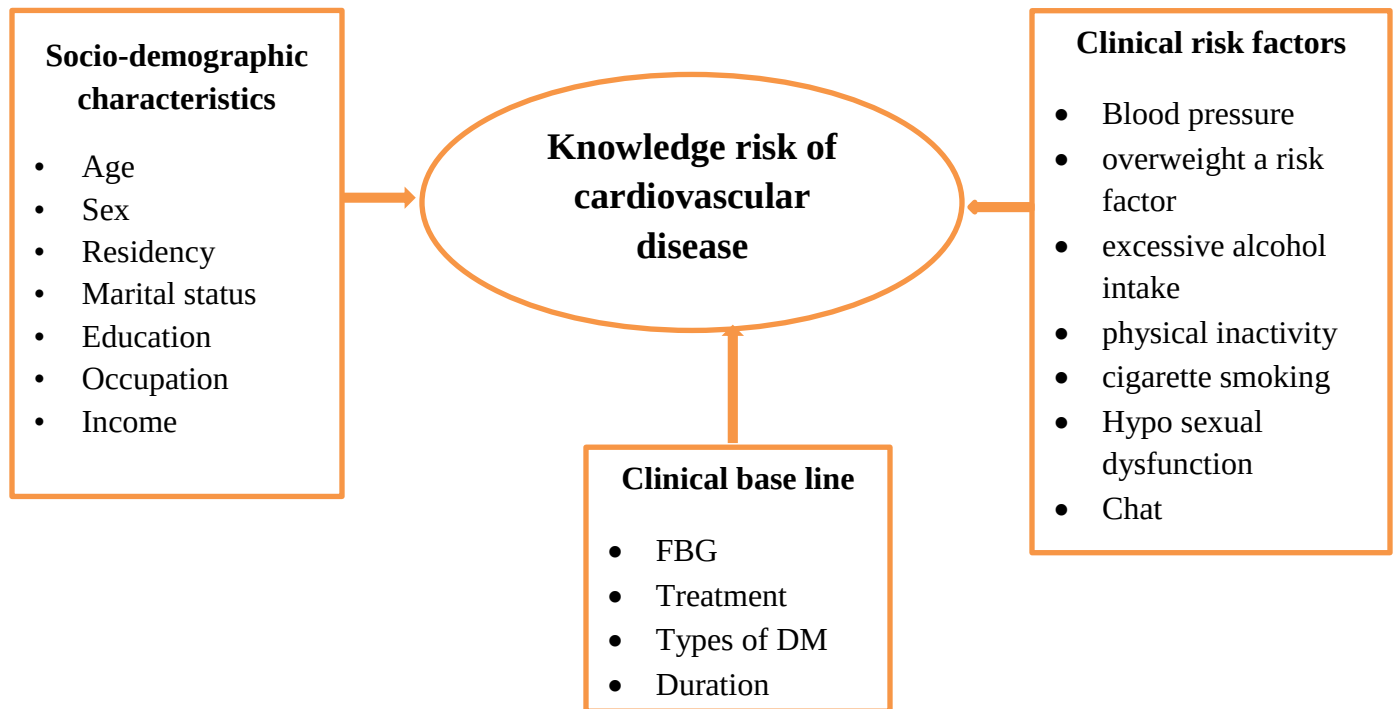


Figure 1 Knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024 (26)

3. Objective

3.1. General objective

Knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

3.2. Specific objective

- ✓ To assess the knowledge of cardiovascular disease among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024
- ✓ To determine the risk factors of cardiovascular disease among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024
- ✓ To determine the factors that affect cardiovascular disease among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

4. Method

4.1. Study Area and period

The study was conducted from February 20/ 2024 to March 20/ 2024 in Adama general hospital, Ethiopia which is found at Oromia region, Ethiopia. The city has coordinates 8°27'N to 8°36'N and 39°12'E to 39°20'E and the city has 6 sub cities (namely Aba-Geda, Boku, Dabe, Bolle, Lugo, and Dembella) and the total area of the cities is 136 square kilometers, administratively divided into 6 sub-cities and 18 districts (in locally word called kebeles) and with a population of almost 374,332 and with 89,127 households. The city far from Addis Ababa which is the capital city of Ethiopia 94.8 km. The city has 2 public hospital and 16 health centers. From the two hospital randomly selected Adama general hospital.

4.2. Study Design:

An institutional based cross-sectional study was conducted.

4.4. Population

4.4.1. Source population

Source population was consisted of all patients in Adama general hospital.

4.4.2. Study participants

All diabetic mellitus patients who had follow up in diabetic mellitus clinic in Adama general hospital.

4.4.3. Eligibility Criteria

4.4.5. Inclusion Criteria: The study included all diabetic mellitus patients who have follow up in Adama general hospital.

4.4.6. Exclusion Criteria: patients who are critical ill and unconscious during the study period.

4.4.7. Sample size determination and sampling technique

4.4.8. Sample size determination

The sample size of the study was determined by using a single population proportion formula to estimate the sample size for determining the level of knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia,

The study population proportion on assessments knowledge of modifiable cardiovascular diseases risk factors and its primary prevention practices among diabetic patients at Jimma university medical Centre, Ethiopia (10).

$$n = \frac{(z_{\alpha/2})^2 \times pq}{d^2}$$

$$(1.96)^2 \times 0.623(1-0.623) / 0.05$$

Were,

n= the desired sample size

q=1-p

p= the proportion take 62.3 %

Z= is the standard normal score set at 1.96 (95% confidence interval)

d= is the margin of error to be tolerated (5%)

The sample size was calculated using the following formula: Sample size =361

With the above inputs the minimum sample size required for this study was 361. By taking 10% for non- response rate the sample size was 397.

For the second objective was used with the following statically function by using Epi InfoTM7 version 7.1 with assumption of type one error of 0.05 and power of 80%, the calculated sample size which is the highest from the single proportion calculations was included in the study.

Table 1 knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

Variable	OR	Power	CI	Sample size	Sample size with 10% non-response rate	Reference
length of DM therapy	0.25	80	95	310	341	(5)
knowledge of CVD risks	2.4	80	95	203	223	(33)

The first objective sample size is highest compared to the second. So, the final sample size is 397

4.4.9. Sampling technique and procedure

There are thirteen public hospitals in Adama city general hospital which was selected purposive method from the city.

The final sample size 397 was obtained and the participants was selected by systematic random sampling. By considering the average three months patients who come for diabetic mellites follow up in the last three months November, December and January 270, 302 and 312 respectively. Based on assessment of Adama general hospital 3 months average diabetic mellites follow up mothers, by systematic random sampling technique (i.e., $Kth = N / \text{sample size} = 884 / 397 \approx 2$ which means $Kth = 2$), thus every 2 the diabetic mellites follow up who was recruit as study units in Adama general hospital until the total sample size for this study was obtained.

4.4.10. Data collection

For data collection, a pre-tested and the data collectors possessed the necessary proficiency with the data collection instrument. The preparation of the data collection tool involved a review of several published articles and the permission of the author was seek via email and telephone contact (27). Data were gathered using self-administered questionnaires guided by interviews and a review of the charts. Interviews were conducted with diabetic patients who were incapable of writing or reading, and interview administered questionnaire was used. The survey questionnaires are taken from different literature produced by different writers for similar purposes; first, the questionnaire was prepared in English language and translated to local language (Oromifa) by language experts. For data collection used the Oromifa version. Data will collect from February 20/2024 to March 20 / 2024; 10 data collectors (eight diploma nurse and two BSc nurse for supervisor out of the Adama general hospital to minimize social desirability bias) was recruited and give training for the data collectors on understanding of questionnaire, the eligible criteria and ethical issues 1 days prior to the real data collection date. With the assistance of the 8-diploma nurse was data collectors and two BSc nurse supervisors, the interview questionnaire was obtained.

After guaranteeing their willingness to participate in the analysis, the tool was distributed among the study population and then collected by the data collectors after completion, in order to determine knowledge risk factors to cardiovascular patients.

4.4.11. Pretest

The self-administrate questionnaire was pre-test by taking 5 percent of the sample size to decide whether the instrument is free of major biases, clearly worded and help to generate the desire data, run two weeks before the main data collection time at Adama general hospital, which is not included in the study, to determine whether the instrument is free of significant biases. After the pretest is performed, correction on the instrument, clarification and ambiguity of terms was rendered accordingly. The pre-test also revealed how much time it takes to handle the entire questionnaire.

4.4.12. Data quality assurance

In order to clarify the purpose of the analysis, the flow tools, the content of tools, to ensure ethical problems during data collection, data collectors were educated on data collection tools and the principal investigator and field supervisor was recheck the completeness and clarity of the questionnaire immediately after the self-administered and collect the questionnaire at the field level and during submission.

4.4.13. Data management and analysis

The completeness of the questionnaire collected was manually reviewed, coded and EpiData enters into version 4.2, and then the Statistical Package for Social Science (SPSS) version 20 was used to enter and analyze the collected data. There is use of descriptive statistics like percentages and frequencies. To find the factors that predict someone's awareness of diabetes and its complications, a binary logistic regression was employed. Descriptive statistics was carried out and summarized. Descriptive statistics including frequencies and percentages are measured to describe the sample population in relation to specific variables. In addition, dependent and independent variables was used to compute cross-tabulation.

Bivariate and multivariate logistic regression analysis was conducted to see the relative influence of the independent variable on the dependent variable.

In order to modify the impact of cofounders on the outcome variable, the variables relevant in bi-variate analysis ($P < 0.2$) was entered into a multivariate logistic regression model. For those variables that display a statistically significant correlation in bivariate analysis, multiple logistic regression analysis can then conduct multiple logistic regression analysis and examine independent predictors by monitoring for potential confounders.

The adjustment odds ratio was used to measure the strength of association at 95% CI to assess the existence and strength of association, and if $p < 0.05$, statistical significance was declared. Finally, the outcome was provided in the form of descriptive text, tables and graphs.

4.5. Study variables

- **Dependent variables:** - knowledge of cardiovascular risk factors
- **Independent variables**

Socio-demographic characteristics: -

- ✓ Sex
- ✓ Age
- ✓ Residence,
- ✓ Marital status
- ✓ Educational level
- ✓ Occupation
- ✓ Monthly income

Knowledge of cardiovascular disease risk factors

- ✓ Blood pressure
- ✓ Overweight a risk factor
- ✓ Excessive alcohol intake
- ✓ Physical inactivity
- ✓ Cigarette smoking
- ✓ Hypo sexual dysfunction

Clinical base characteristics

- ✓ FBG
- ✓ treatment of DM
- ✓ Counseling
- ✓ History of chat use
- ✓ History of alcohol use
- ✓ Types of DM
- ✓ **Duration DM**

4.6. operational definition

Cardiovascular diseases (CVD) are disorders and injuries of the circulatory system, which includes the heart, its blood vessels, and the blood vessels throughout the body and the brain. The term "CVD" is typically used to describe conditions involving constricted or blocked blood vessels(5).

Diabetes complications: Conditions brought on by diabetes, both acute and chronic(5)

Knowledge scoring: Participants who correctly answer a question about cardiovascular complications and general diabetes knowledge receive one point; if they don't, they receive zero points(10).

Knowledge of cardiovascular disease risk factors: -The total number of responses to 18 information objects, with a minimum score of 0 and a maximum score of 18, will calculate. It will classify as "high" or ‘good’ to quantify the information based on the percentage of knowledge of the different characteristic’s obstetrics danger signs-those who know more than 50 percent, and "low" or ‘poor’ those who know less than 50 percent (17)

Good cardiovascular disease Knowledge - Obtained patients who mention 18 or more cardiovascular disease which might be manifested during follow up I diabetics clinic(10)

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Poor cardiovascular disease knowledge: A person who has a knowledge score of risk of CVD below the score of 18 is regarded to have poor cardiovascular disease knowledge (17)

4.7. Ethical consideration

The study was conducted after getting ethical clearance from Addis Ababa university college health science department of nursing and midwifery ethical review board and Adama general hospital and medical college. A letter of permission was secure from administrative of bodies of Addis Ababa university college health science department of nursing and midwifery college health science to communicate with the relevant bodies in the health institution. The respective health facilities and write informed consent from the

study participants are also secured. Moreover, confidentiality was maintained throughout the study

4.8. Dissemination of the result

The study result will be submitted to Addis Ababa university college health science department of nursing and midwifery as a partial fulfillment of the requirements for Master's Degree in cardiovascular. It will also be disseminated to Adama general hospital and to the organization or institution or individuals who have direct or indirect input to the project.

It will also be disseminated for researchers to use as reference for information, for critique and further research or to individuals who have direct or indirect input into the project. It will be made to present local/international journals at various professional conferences and to publish them.

5. Result

5.1. Sociodemographic characteristics the study participants

A total of 369 come to Adama general hospital who have follow up in diabetics patients participated in the survey, with a response rate of 93 %. A large number of the 123 (33.3 %) of the participants were between the ages of 25 to 44 and 54 greater than or equal to 65 years old 102(27.6 %) with a mean age as 47.53 (± 22.037 SD years) and participants marital status majority 191 (51.8 %) of married and 85 (23 %) of the participants widowed. Concerning about residency majority 297 (79.1 %) of the participants from Adama. More than half 223 (60.4 %) of the participants were male. Regarding participants education secondary educated were 176 (47.7 %) while 82 (22.2 %) were college and above. Of the total respondents, about 178 (48.2 %), were self-employed and regarding about participants income majority 148 (40.2 %) of the participants monthly income less than or equal to 5250 ETB with a mean monthly income as 8190.1 (± 7771.85 SD ETB) and the minimum monthly income 700 and the maximum monthly income 92 monthly income 85000 birr. (Table 2)

Table 2 Sociodemographic characteristics of participants knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024 (n=369)

Variable	Category	Frequency	Percentage
Age	≤ 24	64	17.33
	25-44	123	33.3
	45-64	80	21.7
	≥65	102	27.6
Sex	Male	223	60.4
	Female	146	39.6
Residency	Adama	292	79.1
	Out of Adama	77	20.9
Marital status	Single	56	15.2
	Married	191	51.8
	Widowed	85	23
	Divorced	37	10
Level of education	No formal education	35	9.5
	Primary education	76	20.6
	Secondary education	176	47.7
	College and above	82	22.2
Occupational status	Employed	63	17
	House	49	13.3
	Self-employed	178	48.2
	Daily laborer	50	13.6
	Student	29	7.9
Monthly income in ETB	≤5250	148	40.2
	5251-7800	88	23.8
	7801-10900	51	13.8
	≥10901	82	22.2

5.2. Clinical baseline characteristics of diabetic mellitus patients on follow up for knowledge of risk factors about cardiovascular

According to the study about alcohol usage, most 223 (60.4 %) of the participants drink alcohol and 210 (56.9 %) of the participants also not to use chat. More than half 197 (53.4 %) of the participants were type 1 diabetics mellites and duration of diabetics mellites also, most 315 (85.4 %) of the participants less than or equal to 10 years with a mean duration of years was as 6.26 (± 7.47 SD years) and the minimum age 1 and the maximum age 34 years and majority 268 (72.6 %) of the participants of current treatment was insulin. Regarding about fasting blood group, majority 266 (72.1 %) of the participants less than or equal to 125 mg/dl with the mean was as 129.66 (± 65.67 SD mg/dl) and the minimum 56 mg/dl and the maximum 302 mg/dl.

Concerning about family history of cardiovascular disease, more than half 206 (55.8 %) of the participants had family history of cardiovascular disease. (Table 3)

Table 3 clinical baseline characteristics of the participants knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024 (n=369)

Variable	Category	Frequency	Percentage
Do use alcohol	Yes	223	60.4
	No	146	39.6
Do you use chat	Yes	159	43.1
	No	210	56.9
Types diabetes mellites	Type 1	197	53.4
	Type 2	172	46.6
Duration DM	≤ 10	315	85.4
	11-20	18	4.9
	≥ 21	36	9.8
What is your current treatment	Insulin	268	72.6
	Oral	101	27.4
FBG/ (mg/dl)	≤ 125	266	72.1
	> 125	103	27.9
Do you have family history of CVD	Yes	206	55.8
	No	162	44.2
Counseling section	Attend once	184	49.9
	Attend regularly	185	50.1

5.3.knowledge of patients about cardiovascular disease risk factors

Regarding high blood pressure a risk factor for cardiovascular disease, more than half 199(53.9 %) of the participants have knowledge and about the risk factors of overweight for cardiovascular disease also 173 (46.9 %) participants have knowledge. Concerning about excessive alcohol intake a risk factor for cardiovascular 175 (47.4 %) and diabetics mellittins be a risk factors for cardiovascular around 170 (46.1 %) participants have knowledge. Greater number 143 (38.8 %) of the participants physical inactivity a risk factor for cardiovascular disease and cigarette smoking a risk factor for cardiovascular disease 153 (41.5 %) of the participants have knowledge. (Table 4)

Table 4 The participants knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024 (n=369)

Variable	Category	Frequency	Percentage
Is high blood pressure a risk factor for CVD?	Yes	199	53.9
	No	128	34.7
	I don't know	42	11.4
Is overweight a risk factor for CVD	Yes	173	46.9
	No	129	35
	I don't know	67	18.2
Is excessive alcohol intake a risk factor for CVD?	Yes	175	47.4
	No	128	34.7
	I don't know	66	17.9
Does DM be a risk factor for CVD?	Yes	170	46.1
	No	127	34.4
	I don't know	72	19.5
Is physical inactivity a risk factor for CVD?	Yes	143	38.8
	No	135	36.6
	I don't know	91	24.7
Is cigarette smoking a risk factor for CVD?	Yes	153	41.5
	No	133	36
	I don't know	83	22.5
Are consuming foods rich in fats instead of vegetables and fruit a risk factor for CVD?	Yes	155	42
	No	112	30.4
	I don't know	102	27.6
Do you think that DM can bring kidney disease	Yes	163	44.2
	No	125	33.9
	I don't know	81	22
Do you think diabetes can bring Neuropathy	Yes	160	43.4
	No	124	33.6
	I don't know	85	23
Do you think diabetes can bring Retinopathy (blurred vision)	Yes	155	42.0
	No	133	36.0

	I don't know	81	22.0
Is diabetes can bring heart diseases	Yes	148	40.1
	No	133	36
	I don't know	88	23.8
Do you think diabetes can bring Diabetic foot ulcers	Yes	147	39.8
	No	122	33.1
	I don't know	100	27
Do you think diabetes can bring Hypo sexual dysfunction	Yes	152	41.2
	No	126	34.1
	I don't know	91	24.7
Do you think diabetes can bring Hypertension	Yes	163	44.2
	No	120	32.5
	I don't know	86	23.3
Have you ever felt loss of sensation in arms and legs	Yes	130	35.2
	No	132	35.8
	I don't know	107	29
Is diabetics should make regular visits to the eye doctor	Yes	154	41.7
	No	113	30.6
	I don't know	102	27.6
Do you think diabetics should check their renal function (urinalysis)	Yes	155	42.0
	No	121	32.8
	I don't know	93	25.2
Is diabetics patients should not donate blood	Yes	143	38.8
	No	131	35.5
	I don't know	95	25.7

5.4. The overall knowledge of risk factors cardiovascular disease

More than half 206 (56%) with 95 % of the participants had good knowledge but 163 (44 %) of the participants had poor knowledge. (Figure 2)

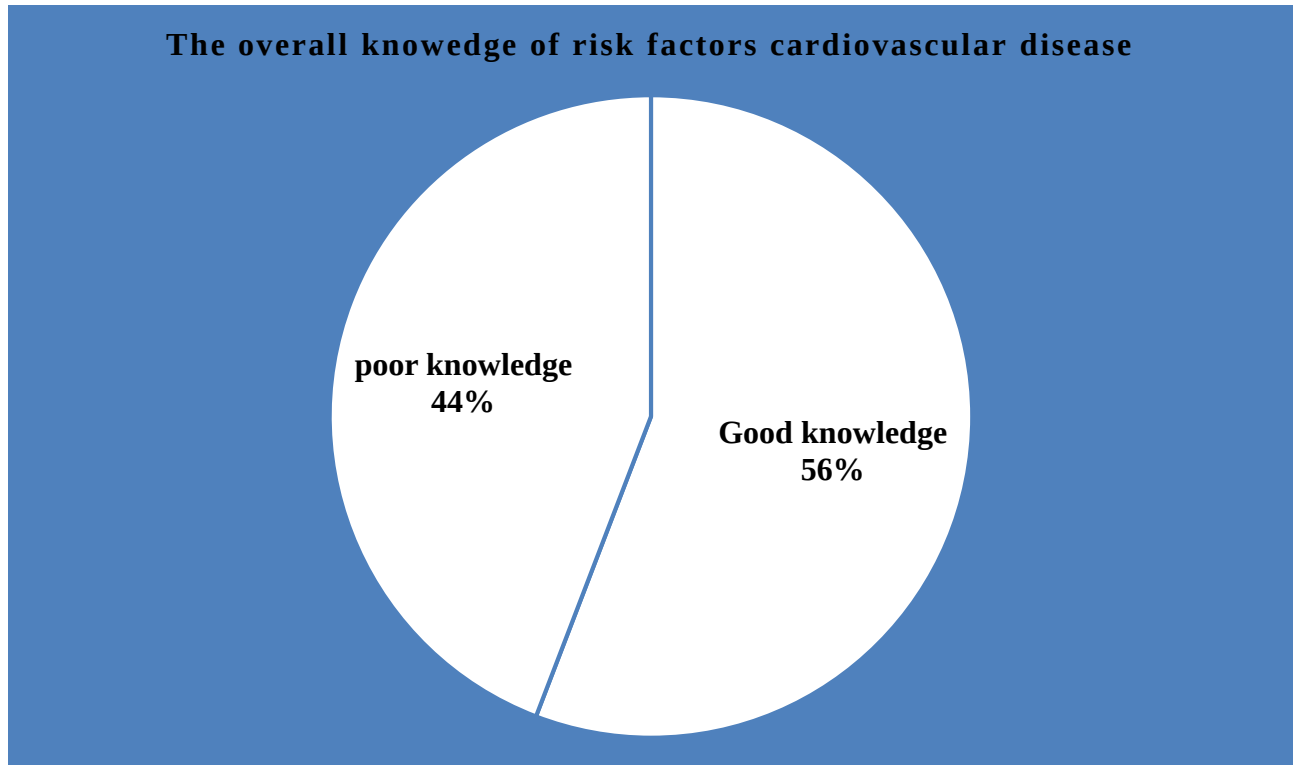


Figure 2 Participants overall knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

5.5. Bivariable and multivariable logistic regression analysis of participants knowledge of risk factors of cardiovascular disease

The logistic regression was done to identify the association between the dependent and independent variable. Binary logistic regression showed that the association of each independent variable with participants knowledge of risk factors of cardiovascular disease. This was the P-value less than 0.2 and then entered to multivariate regression to identify the independent variable prognosticates of the knowledge of risk factors of cardiovascular disease and associated factors. This was P-value less than 0.05. In bivariate logistic regression presented the following variable participant's age, monthly income, duration of DM, occupational status, drinking alcohol and use chat, types of DM and family history of cardiovascular disease.

After multivariable logistics regression the following factors presented to have association with the assessment of patient and associated factors. Those were participant's age from 45 to 54 years old, duration of diabetics melilites from 11 to 20 years and greater than or equal to 21 years old, participants occupation employed, house wife, self-employed and daily laborer, family history of cardiovascular, use of chat, drinking alcohol and monthly income from 5251-7800 ETB.

In multivariate analysis result of the participant's age was significantly associated with knowledge of risk factors of cardiovascular disease. Participants age from 45 to 54 years old were 50 % less likely knowledge of risk factors of cardiovascular disease than those participants greater than 65 years old (AOR=0.5, 95 % CI: (0.26-0.99) (P<0.049).

Duration of diabetics melilites from 11 to 20 and greater or equal to 21 years old were significantly associated. Which were 4.3 times and 5.2 times more likely associated (AOR=4.28, 95% CI: (1.71-10.78) and (AOR =5.2, 95 % CI: (1.37-19.63) duration of DM greater or equal to 21 years old respectively

Occupational status was significantly associated with knowledge of risk factors of cardiovascular disease and associated factors. Occupational status who employed were 3.3 times, house wife 7.4 times, self-employed 3 times, daily laborer 3.2 times more likely to knowledge of risk factors of cardiovascular disease and associated factors than

participants who were students (AOR =3.3, 95 % CI: (1.1-9.5) (P<0.026), (AOR =7.4, 95 % CI: (2.4-22.4) (P<0.000), (AOR =2.9, 95 % CI: (1.1-7.6) (P<0.029), (AOR =2.9, 95 % CI: (1.1-7.6) (P<0.029) (AOR =3.2, 95 % CI: (1.1-9.1) (P<0.032) respectively. (Table 5)

Table 5 Bivariable and multivariable logistic regression analysis of the participants knowledge of cardiovascular disease risk factors and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024 (n=369)

Variables	knowledge of risk factors of cardiovascular disease		COR95% CI	AOR95% CI	p-value
	Good knowledge	Poor knowledge			
Age					
≤24	37	27	0.9(0.49-1.74)	0.8(0.32-1.43)	
25-44	76	47	1.09(0.64-1.87)	0.92(0.48-1.82)	
45-64	32	48	0.45(0.25-0.8) *	0.51(0.26-0.99) **	0.047
≥65	61	41	1	1	
Duration of DM in years					
≤10	184	131	3.2(1.52-6.72) *	4.28(1.7-10.8) **	0.002
11-20	11	7	3.6(1.09-11.67) *	5.2(1.37-19.63) **	0.015
≥21	11	25	1	1	
Income in ETB					
≤5250	73	75	1.89(1.097-3.25) *	0.99(0.52-1.89)	
5251-7800	57	31	1.73(0.9-3.324) *	2.046(1.04-4.03) **	0.038
7801-10900	32	19	1.19(0.69-2.04)	2(0.91-4.4)	
≥10901	44	38	1	1	
Occupational status					
Employed	35	28	2.38(0.953-5.92) *	3.32(1.115-9.51) **	0.026
House wife	33	16	3.92(1.48-10.35) *	7.35(2.4-22.4) **	0.000
Self-employed	97	81	2.28(1.002-5.17) *	2.9(1.11-7.62) **	0.029
Daily laborer	31	19	3.1(1.2-8.1) *	3.2(1.1-9.14) **	0.032
Student	10	19	1	1	
Family history of CVD					
Yes	106	100	1.52(1.002-2.3) *	0.62 (0.4-0.98) **	0.04
No	100	63	1	1	
Types of DM					
Type 1	121	76	1.63(1.08-2.47) *	1.55(0.97-2.48)	
Type 2	85	87	1	1	
Alcohol drinking					
Yes	114	109	0.61(0.4-0.94) *	0.59(0.37-0.94) **	0.027
No	92	54	1	1	
Use chat					
Yes	79	80	0.65(0.43-0.98) *	0.57(0.35-0.91) **	0.018
No	127	83	1	1	

Key * Statistically significant at p-value <0.2, in bivariate, 1= reference of the category

** Statistically significant at p-value <0.05, in multivariate

6. DISCUSSION

The findings of this study underscore a significant gap in knowledge regarding CVD risk factors among diabetes patients in Adama General Hospital and medical college, Oromia region, Ethiopia.

The findings of this study indicated that 56 % of the respondents have good knowledge but 44 % of the participants poor knowledge. This result lower than with the study done in Tanzania on knowledge of cardiovascular risk factors among caretakers of outpatients attending a tertiary cardiovascular center show that 80% good knowledge and also, the study done among diabetes patients in University of Gondar comprehensive and specialized hospital, Gondar, Northwest Ethiopia, the good knowledge was (76.6%) (33). This discrepancy may result from the study's sociodemographic characteristics and study setting.

Regarding about participants age in this study with a mean age as 47.53 (± 22.037 SD years) and the minimum age 12 and the maximum age 92 years. This result lower than the study done on a scientific journal on poor glycemic control and associated factors among patients with type 2 diabetes mellitus states with a mean age of 59.8 ± 12.1 SD of the patients were between the ages of 31 to 92 years old (28). This discrepancy might be result from the study's sociodemographic characteristics and study setting.

Also, the study showed that, the fasting blood glucose mean was as 129.66 (± 65.67 SD mg/dl) and the minimum 56 mg/dl and the maximum 302 mg/dl. This was the mean lower and the standard deviation was higher than the study done in eastern Ethiopia which was the mean fasting blood glucose (FBG) level was 177.7 mg/dl (SD 8.21). Just 11.5% of research participants met the criteria for obesity (BMI 30), with a mean BMI of 24.7 kg (SD 4.79) (32). This could be due to variations in sample size, research setting, research methodology, and sociodemographic area.

Concerning about smoking cigarette in this study 41.5 %. This was lower than the study done in Jima university medical center suggests 47.8%, were aware that smoking cigarettes was a risk factor for cardiovascular diseases (10). This discrepancy may result from the study's sociodemographic characteristics and study setting.

On the other hand, about drinking alcohol more than half (60.4 %) of the participants drink alcohol, this was higher than the study done in Tanzania on knowledge of cardiovascular risk factors among caretakers of outpatients attending a tertiary cardiovascular center which was 18.5% drank alcohol patients with diabetics mellites (33). And lower than the study done in the same Adama general hospital and medical college consumption of alcohol, chat and smoking the results of this study is promising as 93.1%,90.51% and 80.2% patients never smoke, chew chat and take any type of alcohol respectively (35). This could be due to variations in sample size, research setting, research methodology, and sociodemographic area of the participants.

Concerning about monthly income, the study showed that, monthly income 2 times more likely increase the knowledge of risk factors cardiovascular disease from 5251-7800 (AOR=2.046, 95 % CI: (1.04-4.03) than whose monthly income greater than or equal to 10900 ETB this result differ from other study. This result deviates from previous research. This could be due to variations in sample size, research setting, research methodology, and sociodemographic area of the participants.

The occupational status of the respondents had a significant relationship with MA. Respondents who were government-employed were 3.8 times increased odds of having good MA compared to those who were not government-employed. This finding was supported by

The occupational status was significantly associated with knowledge of risk factors of cardiovascular disease and associated factors. Occupational status who employed were 3.3 times, house wife 7.4 times, self-employed 3 times, daily laborer 3.2 times more likely to knowledge of risk factors of cardiovascular disease and associated factors than participants who were students (AOR =3.3, 95 % CI: (1.1-9.5) (P<0.026), (AOR =7.4, 95 % CI: (2.4-22.4) (P<0.000), (AOR =2.9, 95 % CI: (1.1-7.6) (P<0.029), (AOR =2.9, 95 % CI: (1.1-7.6) (P<0.029) (AOR =3.2, 95 % CI: (1.1-9.1) (P<0.032) respectively. Participants who employed in this study lower than in the study done in the same Adama hospital and medical college which is 3.8 times (35). This result deviates from previous research. This could be due to variations in sample size, study time and research methodology.

These findings highlight the urgent need for health policy initiatives to integrate comprehensive CVD risk education into routine diabetes care. Tailored interventions targeting high-risk groups, such as older adults and individuals with specific lifestyle behaviors, are essential. Despite its strengths, such as a robust sample size and focus on a critical population, this study is limited by its reliance on self-reported data and its single-site design, which may limit generalizability. Future research should consider longitudinal designs to explore knowledge trends and the effectiveness of targeted interventions over time.

7. STRENGTH AND LIMITATION OF THE STUDY

7.1.Strength of the study

The questionnaire was pre-tested and required modifications made before the real data collection. The data collectors supervised daily after data collection by the principal investigator and supervisors.

7.2.Limitation of the study

The cross-sectional nature of the data had made it incomprehensible to reach the causal relationship between the diverse independent factors and patients' knowledge of risk factors of cardiovascular disease.

The results of the study may be impacted by social desirability effects, which refer to the respondents' particular.

8. Conclusion and recommendation

8.1. conclusion

This study has demonstrated revealed a low level of knowledge about cardiovascular disease (CVD) risk factors among patients attending the diabetes mellitus clinic at Adama General Hospital, Oromia region, Ethiopia. Key factors associated with this limited knowledge include the participants' age, duration of diabetes mellitus, occupational status, alcohol consumption, and chat use. These findings highlight the urgent need for targeted educational interventions and awareness campaigns to improve patients' understanding of CVD risk factors, which could lead to better prevention and management of cardiovascular complications in the population.

8.2. Recommendation

Based on the finding of this research the following recommendations forwarded by the principal investigator.

For policy makers and ministry of health (MOH)

- Policy development: - developed and implement national guidelines for the integrated management of diabetics and cardiovascular disease risk factors
- Prioritize CVD prevention diabetics care policies
- Training and capacity building
- Public awareness campaigns

Health facilities

- Routine CVD risk screening regularly assess blood pressure lipid profiles and glycemic control during DM clinic
- Patients' education program
- Lifestyle modification support
- Medication management

For health care providers

- Patients-centered education on relationship between diabetics and CVD emphasizing modifiable risk factors

- Comprehensive risk management- assess and address all modifiable CVD risk factors during every clinic visit
- Prescribe evidence-based medication

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8. ANNEXES

Addis Ababa university college of health sciences school of nursing and midwifery post graduate program

8.1. ANNEXES

ANNEX A: INFORMATION SHEET

Introduce: - My name isI was working on data collection for a study led by Azene wondayehu the Knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, to complete part of the study master's degree in cardiovascular. You will select to participate in this study and all necessary information about this study is described below.

Objective: - knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia, 2024

Security: -All information you provide will be kept confidential and cannot be accessed by any third parties. Also, you are not allowed to write your name so that no one can recognize you.

Benefits: -There is no direct benefit to you from this study. However, the indirect benefit of the study to participants and other clients is clear because assessing the aim of this study is knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital.

Risks: the information is collected using structured questionnaire therefore participating in the study will not inflict any harm on you.

Right to refuse: you have the right not to participate in the study as well as to drop it at any time if you feel discomfort with any question.

Contact: -This research project has been reviewed and approved by the Institutional Review Boards of the Addis Ababa university college of health sciences department of

nursing and midwifery. If you have any questions, you can contact any of the following people (Investigators and Advisors) and you can ask them at any time.

Azene Wondayehu Addis Ababa university college of health sciences department of nursing and midwifery post graduate program

Email- **Azenewondayehu21@gmail.com**

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ANNEX B: CONSENT FORM

Dear Participants

As part of the requirement of my Master's in cardiovascular, I am undertaking a study on the aim of this study is knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia. You are invited to participate in this study. Before deciding to participate, it is important that you understand what participation is and the purpose of this study.

The aim of this study will to the aim of this study is to knowledge of risk factors of cardiovascular disease and its associated factors among patients follow up in diabetes mellitus clinic in Adama general hospital, Ethiopia. To achieve this research objective, your goodwill and kind participation are required. Confidentiality is strictly protected and none of your responses are reported privately. Therefore, it is not necessary to write your name or identification number on these questionnaires. You have the right to participate in or decline this study. However, your sincere answers will help us gain valuable information to achieve our research goals. So please take a few minutes to answer the questions.

Part I Socio demographic characteristics

1	Age	Age _____ years
2	Sex	1. Male 2. Female
3	Residency	1. Adama 2. Out of Adama
4	Marital Status	1. Single 2. Married 3. Divorced 4. Widowed
5	Educational level	1. no formal education 2. primary education 3. secondary education 4. college and above
6	Occupational status	1. Employed 2. House wife 3. Self employed 4. Daily laborer 5. student
7	Income in ETB	_____ ETB

Part II Baseline characteristics of diabetic mellitus patients on follow up

1	Do you use alcohol	1. yes 2. no
2	Do you use chat	1. yes 2. no
3	Types of DM	1. Type 1 2. Type 2
4	Duration of DM	years
5	What is your current treatment	1. Insulin 2. Oral
6	FBG (mg/dl)	 (mg/dl)
7	Do you have family history of CVD	1. Yes 2. No
8	Counseling section	1. Attend once 2. Attended regularly

Part III knowledge of patients about cardiovascular disease

1	Is high blood pressure a risk factor for CVD?	1. Yes 2. No 3. I don't know
2	Is overweight a risk factor for CVD?	1. Yes 2. No 3. I don't know
3	Is excessive alcohol intake a risk factor for CVD?	1. Yes 2. No 3. I don't know
4	Does DM be a risk factor for CVD?	1. Yes 2. No 3. I don't know
5	Is physical inactivity a risk factor for CVD?	1. Yes 2. No

		3. I don't know
6	Is cigarette smoking a risk factor for CVD?	1. Yes 2. No 3. I don't know
7	Are consuming foods rich in fats instead of vegetables and fruit a risk factor for CVD?	1. Yes 2. No 3. I don't know
8	Do you think that DM can bring kidney disease	1. Yes 2. No 3. I don't know
9	Do you think diabetes can bring Neuropathy	1. Yes 2. No 3. I don't know
10	Do you think diabetes can bring Retinopathy (blurred vision)	1. Yes 2. No 3. I don't know
11	Is diabetes can bring heart diseases	1. Yes 2. No 3. I don't know
12	Do you think diabetes can bring Diabetic foot ulcers	1. Yes 2. No 3. I don't know
13	Do you think diabetes can bring Hypo sexual dysfunction	1. Yes 2. No 3. I don't know
14	Do you think diabetes can bring Hypertension	1. Yes 2. No 3. I don't know
15	Have you ever felt loss of sensation in arms and legs	1. Yes 2. No 3. I don't know
16	Is diabetics should make regular visits to the eye doctor	1. Yes 2. No 3. I don't know
17	Do you think diabetics should check their renal function (urinalysis)	1. Yes 2. No 3. I don't know
18	Is diabetics patients should not donate blood	1. Yes 2. No 3. I don't know