ADDIS ABABA UNVERSITY COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF EMERGENCY MEDICINE

KNOWLEDGE OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG DIABETES MELLITUS PATIENTS IN TIKUR ANBESSA SPECIALIZED HOSPITAL

BY: FILIPOS ALEMU (BSc)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE DEPARTMENT OF EMERGENCY MEDICINE IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE MASTERS OF EMERGENCY MEDICINE AND CRITICAL CARE NURSING.

JUNE, 2021

ADDIS ABABA, ETHIOPIA

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Approval Sheet

This thesis by Filipos Alemu is accepted in its present form by the board of examiners as satisfying the thesis requirement for the degree master of emergency medicine and critical care nursing.

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Statement of declaration

By my signature below, I declare and affirm that this thesis is my work and has not been submitted to another institution for the award of a degree, diploma, or certificate. All scholarly matter that is included in the thesis has been duly acknowledged.

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ACRONYMS

AAU – Addis Ababa University

AMI – Acute Myocardial Infarction

AOR – Adjusted Odds Ratio

ASCVD – Atherosclerotic Cardiovascular Disease

CI – Confidence Interval

CVD – Cardiovascular Disease

COD – Crude Odds Ratio

DALYS – Disability Adjusted Life Years

DM – Diabetes Mellitus

HDFQ – Heart Disease Fact Questionnaire

HF – Heart Failure

IDF – International Diabetes Federation

IQR – Interquartile Range

NCD – Non-communicable Disease

SD – Standard Deviation

SPSS – Statistical Package for Social Science

TASH – Tikur Anbessa Specialized Hospital

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ABSTRACT

Introduction: *Cardiovascular disease (CVD) is the commonest cause of mortality worldwide, especially in diabetes mellitus patients. Many risk factors contribute to the development of cardiovascular diseases. Adequate knowledge of risk factors for cardiovascular diseases is the first step towards effective preventive strategies to combat the burden of cardiovascular disease.*

Objective: *To assess knowledge of risk factors of cardiovascular disease and associated factors among diabetes mellitus patients in TASH, Addis Ababa Ethiopia, 2020/21*

Method: *Cross-sectional study was conducted on diabetes mellitus patients on follow up at Tikur Anbessa specialized hospital from April 11 to May 16. The study participants were selected using a consecutive sampling method. Data was collected using an interview method and then, data was entered into Epidata (4.6) and analysed using SPSS (26). A score of less than 70% was defined as suboptimal knowledge. Multivariable logistic regression was used to examine the relationship between knowledge of CVD risk factors and predictor variables.*

Result: *A total of 404 patients were enrolled in the study. The mean age was 52.03±14.39 years and more than half 217(53.7%) of patients were females. Roughly half of the participants 196(48.5%) had information about CVD risk factors. About half of patients (52%) had good knowledge of CVD risk factors, whilst 48% demonstrated suboptimal knowledge. Based on multivariable logistic regression analysis higher education, urban residence, being employed and hearing information about CVD risk factors associated with knowledge of CVD risk factors.*

Conclusion: *This study revealed that diabetes mellitus patients in TASH had suboptimal knowledge about CVD risk factors and inadequate education about risk factors of CVD and poor counselling about the lifestyle they lead. In addition to this income level, age, marital status and sex are not associated with knowledge of CVD risk factors, whereas, higher education, being employed, urban residency and having information about CVD risk factors are significantly associated.*

Keywords: *diabetes mellitus, knowledge, cardiovascular disease; risk factors*

Chapter 1

Introduction

1.1 Background

Cardiovascular disease (CVD) is a disease that affects the heart and blood vessels, and include:- hypertension (high blood pressure), coronary heart disease (heart attack), cerebrovascular disease (stroke), peripheral vascular disease, heart failure, cardiomyopathies. (1,2) Risk factors for cardiovascular disease (CVD) are any habits, behaviours, circumstances or conditions that increase an individual's risk of developing cardiovascular disease. Cardiovascular disease risk factors can be divided into two groups, called: modifiable and non-modifiable. Non-modifiable cardiovascular disease risk factors are those that cannot be changed. These include a person's age, ethnicity and family history, and sex. Modifiable cardiovascular disease risk factors are those that can be reduced or controlled with behaviour change or modification, such as; high blood pressure (BP), diabetes, high cholesterol, smoking, high consumption of alcohol, poor diet, obesity or inadequate physical activity. (1, 3, 4)

Cardiovascular diseases (CVDs) are a growing problem with increasing global prevalence and one of the leading causes of mortality worldwide. (5–8) In developing countries, the burden of CVD is high whilst awareness or knowledge of disease and associated risk factors is limited. Moreover, findings show that the prevalence of CVD is increasing and posing a public health challenge in developing countries. (9,10) Cardiovascular disease(CVD) is the number one cause of death among men, and diabetes mellitus(DM) is the main risk factor for CVD in both men and women. The risk of developing CVD has greatly increased in patients with type two diabetes compared with the non-diabetes population. The CVD that might follow diabetes includes angina, myocardial infarction (heart attack), stroke, peripheral artery disease and congestive heart failure. (11, 12) Fifty per cent of the deaths due to CVDs can be prevented by controlling the related risk factors. Individuals must have appropriate and adequate levels of knowledge regarding their risk status to plan appropriate interventions for controlling their risk factors and to stop the occurrence of further complications. Good knowledge about CVD risk factors among individuals will help them to be active in decreasing their risk since the majority of the

risk factors are modifiable. (13–15) And patients' perceptions of their risk for CVDs can significantly influence their decision-making process about self-management. So, these patients with diabetes mellitus are potentially important targets for health promotion about cardiovascular risk factors. (11)

1.2 Statement of the problem

Non-communicable diseases (NCDs) are a major health challenge globally, currently causing more deaths than all other causes combined. About 38 million people died from NCDs in 2012 and by 2030 it is expected to rise to 52 million which means a 5.32% increment. From deaths, due to NCDs almost half of the deaths are as a result of CVD, estimated at an annual 17.3 million deaths, and 10% of the global disease DALY burden. And from these deaths above three-quarters of CVD deaths occur in low- and middle-income countries. Ischemic heart disease and stroke were the leading causes of DALY for population aged 54-74 and above, in 2019. So, CVDs are the number one cause of death globally: more people die annually from CVDs than from any other cause. (2, 16, 17)

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of morbidity and mortality for patients with diabetes mellitus and is the greatest attributer to the direct and indirect costs of diabetes mellitus. (5) People with diabetes are two to three times more prone to have cardiovascular disease than people without diabetes and death in people with diabetes mellitus is most commonly due to cardiovascular problems. (12, 17, 18) Patients with diabetes have 2.5 times increased risk of developing heart failure than non-diabetes mellitus individuals. Diabetes mellitus not only increase the chance of having heart failure(HF) but also affect the outcome, 70% of death in diabetes patients is due to CVD.(20–23)

The global number of individuals with diabetes in 2000 was estimated to be 171 million (2.8% of the world's population), a figure projected to increase in 2030 to 366 million (6.5%), and from these 298 million will live in developing countries so, due to this, this population is at increased risk for developing cardiovascular complications related to diabetes. (24)

The increasing of a cardiovascular problem around the world is due to significant worldwide changes in behaviour and lifestyle, with poor diet, tobacco use, physical

inactivity, excess alcohol consumption, which mainly result from inadequate awareness of their effect on cardiovascular health. (25) Evidence from studies in developed and a developing country shows that respondents' recognition of cardiovascular disease risk factors is inadequate or sub-optimal. (11, 13, 15, 25, 26)

Ethiopia is among the first four countries in sub-Saharan Africa having the highest number of people with diabetes mellitus and hospital admissions due to diabetes mellitus. According to the 2017 estimate by IDF(international diabetes association), Ethiopia has 2.57 million (5.2%) adult people aged 20–79 years with diabetes, making it the largest diabetes population in sub-Saharan Africa. (28)

Even though most of the diabetes patient, from sub-Saharan African, exists in Ethiopia there is limited access to study conducted on the knowledge of these people about risk factors of cardiovascular disease (CVD). The knowledge of heart disease risk factors is essential to make an informed decision that will result in a reduction in the overall cardiovascular risk of an individual. And this study aims to assess knowledge of CVD risk factors among diabetes mellitus patient.

1.3 Significance of the study

Published research that addresses the knowledge of diabetes mellitus patients about cardiovascular disease risk factor is limited in Ethiopia. It is the health care provider's, especial nurses, role to educate diabetes mellitus patients on health behaviours, risks and about their diseases. The findings from the study will benefit patients, health care worker, researchers, policymakers and other stakeholders as outlined below.

- will identify the main problems associated with knowledge of modifiable CVD risk factors among patients with diabetes mellitus at TASH which increase the occurrence of CVD, which helps to address the problem.
- may help health care providers to deliver health care information based on the result finding's recommendations
- may have significant input for managers and policymakers on how to improve CVD risk factors knowledge of the people living with diabetes mellitus and as a whole, for the community in the country.
- also, the study finding may help as secondary data sources for researchers who want to research on the same inquiry.

Chapter 2

Literature review

2.1 Knowledge of cardiovascular disease risk factors

Regarding knowledge of cardiovascular disease risk factors, a global evaluation was done using an online survey on 133 different countries, about 76% from the Europe and western pacific region of IDF, totally of 12,695 respondents completed the questioner the following result was obtained, the majority of the respondents defined increased blood pressure (78%) and overweight or obesity (76%) as CVD risk factors. And 59% of the respondents identified family history as a CVD risk factor. Approximately half (46%) of the respondents classified excessive alcohol consumption as a CVD risk factor. Overall, 9% of the respondents did not know about CVD risk factors. (26) Another study on the same inquiry (a cross-sectional study) conducted on 188 type two diabetes mellitus patients (T2DM) in turkey in 2018 using HDFQ (heart disease fact questionnaire) score, the mean score for HDFQ was 62.81± 17.59 but in the study, they did not describe how much of the participants correctly mentioned the risk factors of CVD.(13)

Another cross-sectional study conducted in the USA revealed that being overweight, not exercising, smoking, and high cholesterol were the most cited responses as risk factors of CVD by the study participants overall. In contrast, 5% or less of the respondents identified a high-fat diet, alcohol consumption, poor nutrition, high triglyceride levels, or ageing as causes of heart disease. Approximately 11% of the participants did not respond or did not know the answers. (29)

Similarly, a cross-sectional study conducted on 1000 Jordanians about their knowledge of cardiovascular disease risk factors shows that; the most commonly identified risk factors are smoking with 75.5%(757), next to it, obesity with (71.2%) and high-fat diet with (62%). Other identified risk factors are lack of exercise 22% (220), hypertension 6.2%(62), diabetes 5.3%(53) and hyperlipidaemia 4.6%(46) and least identified risk factor is old age with 1.5% only 15 participants identifying it as a risk factor for CVD. (30)

A cross-sectional study conducted in Kuwait in 2014 on 808 individuals, responded to nine risk factor questions and their result is; the median (IQR) score for knowledge about the nine CVD risk factors was 7.0 (4.0) [moderate knowledge]: 6.6% did not know any CVD risk factor, whereas 13.2% identified smoking, obesity, unhealthy diet, and physical inactivity, 32.0% identified high cholesterol level, hypertension, and family history, and

48.2% identified stress and diabetes mellitus as risk factors. The commonest risk factors identified by over four-fifths of respondents were smoking, obesity, unhealthy diet and physical inactivity. (14)

Another cross-sectional study conducted in Pakistan in 2004 among 720 acute myocardial infarction (AMI) patients about their knowledge on modifiable risk factors of CVD, four cardiovascular risk factors were studied; fatty food consumption, smoking, obesity and lack of exercise, shows that 3.8% of participants do not know any risk factors, 89(12.4%) know only one risk factor, 302(41.9%) identified two risk factors and 302(41.9%) identified three out of four factors. According to this study, only 42% of the subjects had a good level of knowledge of the risk factors of heart disease. Almost all subjects 693 (96%) were able to identify at least one risk factor. (15)

An institutional-based cross-sectional study done in India in 2009 on 217 individuals about risk factors of coronary atherosclerotic heart disease (CASHD) which is one type of CVD showed that; 41% of the sample surveyed had a good level of knowledge. 68%, 72%, 73% and 57% of the population identified smoking, obesity, hypertension, and high cholesterol correctly, respectively. 30% identified diabetes mellitus as a modifiable risk factor of CASHD. (31) Community based cross-sectional study done in India, shows that above 90% of participants identified smoking, high blood pressure, high cholesterol, and obesity as risk factors of CVD. With 48% of participants scored ≥ 20 from 25 HDFQ.(32)

In one study done in South Africa about the relation between cardiovascular risk factors and knowledge of CVD: the mean score for HDFQ was 15 ± 2.1, with 10 minimum score and 19 maximum scores. (33)

Another cross-sectional study was done in Nigeria in 2015 among university workers, on 206 participants shows; about half of all the participants had a low level of knowledge 49.0% compared to 31.1% with a moderate level of knowledge and 19.9% with a good level of knowledge. (10)

A cross-sectional descriptive study conducted in Zimbabwe in 2015 on 67 women aged 20-70 years with diabetes mellitus to assess knowledge of cardiovascular disease risk factors describes that knowledge of cardiovascular disease risk factors was low (mean score 13.4 out of 24, SD = 5.7, range 0-21). Less than 70% of the participants answered correctly in 5 out of 6 risk factor domains relating to smoking, hypertension, diet, stress and the link between diabetes and cardiovascular disease. (27)

A community-based cross-sectional study conducted in Cameroon in 2016 among randomly selected 1162 adults (>18 years) participants shows that; smoking (82%), unhealthy diet (70.6%), lack of exercise (67.0%), obesity (69.7%), stress (73.1%), high blood pressure (HBP) (73.3%) and diabetes (60.8%) were potential risk factors for CVD but for family history of CVD, where up to 52.4% either were unaware it was a risk factor for CVD or thought it was not related to CVD.(34)

One study conducted in Ethiopia in university students of Gondor in 2018 on 423 students cross-sectional survey; shows that the knowledge score of participants' ranged from 1 to 15 with a mean result of 10.17 (SD ± 2.66). "Regular physical activity will lower a person's chance of getting heart disease" (378, 89.4%), "Smoking is a risk factor for heart disease" (375, 88.7%), and "Eating fatty foods does not affect blood cholesterol levels" (354, 83.7%). (9) another study conducted in eastern Ethiopia on CVD patients in two hospitals shows that the most identified risk factors are smoking 97.6%, followed by being overweight 91.3%, high blood pressure 81.9% and age 79.4%. And about 54% of participants had optimal knowledge scoring ≥ 70% and 46% of participants had suboptimal knowledge, scoring < 70%.(35)

2.2 Factors associated with knowledge of risk factors of CVD

According to a study conducted in Turkey in which regression models were used to evaluate effects of sociodemographic shows that; age is negatively correlated, with (-0.245, $p < 0.001$), in contrast, educational level is positively correlated with CVD risk knowledge (0.283, $p < 0.001$) 24.8%.(13)

Another cross-sectional study conducted in Jordan about knowledge of CVD risk factors show that there is a positive relationship with; high socioeconomic level ($P = 0.001$), held a university degree ($P = 0.002$) and had a positive family history of CVD ($P = 0.004$). (30)

Similarly, a survey done in Kuwait about knowledge of CVD shows that there is a statistically significant association with gender, age, level of education, and family history of CVD ($p < 0.05$), Knowledge about CVD was significantly higher among females compared to males and participants aged 50–59 years were more knowledgeable about CVD compared to other age groups. (14) In contrast to this study, a study conducted in Pakistan on AMI patients there is no significant association between knowledge about CVD risk factors with age and gender, but there is a significant association with education

level; year of education greater than 10 having higher knowledge;(AOR=2.50, CI 95%(1.30, 4.83)). (15)

A cross-sectional study conducted in India about knowledge of modifiable risk factors of CASHD shows that predictors of a good level of knowledge with a statistically significant aOR ($p < 0.05$) were a routine exercise of moderate intensity, aOR 8.41, 95% CI 4.29–16.46 versus infrequent or no exercise. Although statistically insignificant, a trend towards a good knowledge level was associated with higher levels of education. (31)

Another study conduct in Nigeria about knowledge of risk factors of heart disease shows that attending tertiary level education is associated with good knowledge of risk factors of heart disease (OR 3.11, CI 95% 2.06-7.14), age less than 45 years when compared to greater than 45 years associated with good knowledge (OR 1 CI 95%) and family history of CVD is associated with good knowledge (OR 1.76, CI 95% 0.69-8.50). (36)

One study conducted in Cameroon about knowledge of cardiovascular disease risk factor knowledge reveals; that in multivariable logistic regression analysis high level of education [(aOR. = 2.26 (1.69–1.41), $p < 0.0001$], monthly income greater than 100,000FCFA (~USD 200) [aOR. = 1.64 (1.07–2.51), $p = 0.023$], and family history of CVD [aOR. = 1.59 (1.21–2.09), $p = 0.001$] were independently associated with overall good knowledge on CVD. (34) •

Similarly, another cross-sectional study done in Uganda shows that knowledge of CVD is associated with educational level, occupation, religion and information or counselling on a healthy lifestyle. Those who received counselling are more knowledgeable than their counterparts with; APR: 1.37, 95% (1.14 -1.165) And formal employed had good knowledge than others with APR: 1.35 CI 95%(1.18-2.02) p-value < 0.002. (37)

Another cross-sectional study conducted in Ethiopia on CVD patients with multivariate regression analysis shows that knowledge of CVD risk factor is significantly associated with place of residence, level of education and marital status with $p < 0.001$. Urban residents had higher knowledge than rural residents (β =12.84, 95%CI to 18.77) and attending higher education level had good knowledge than those who did not attend formal education. (35)

2.3 Conceptual framework

The conceptual framework of this study developed after reviewing different related literature. (10, 15, 27, 30, 31, 34, 38) This is to show how the particular variables in the study are related to each other.

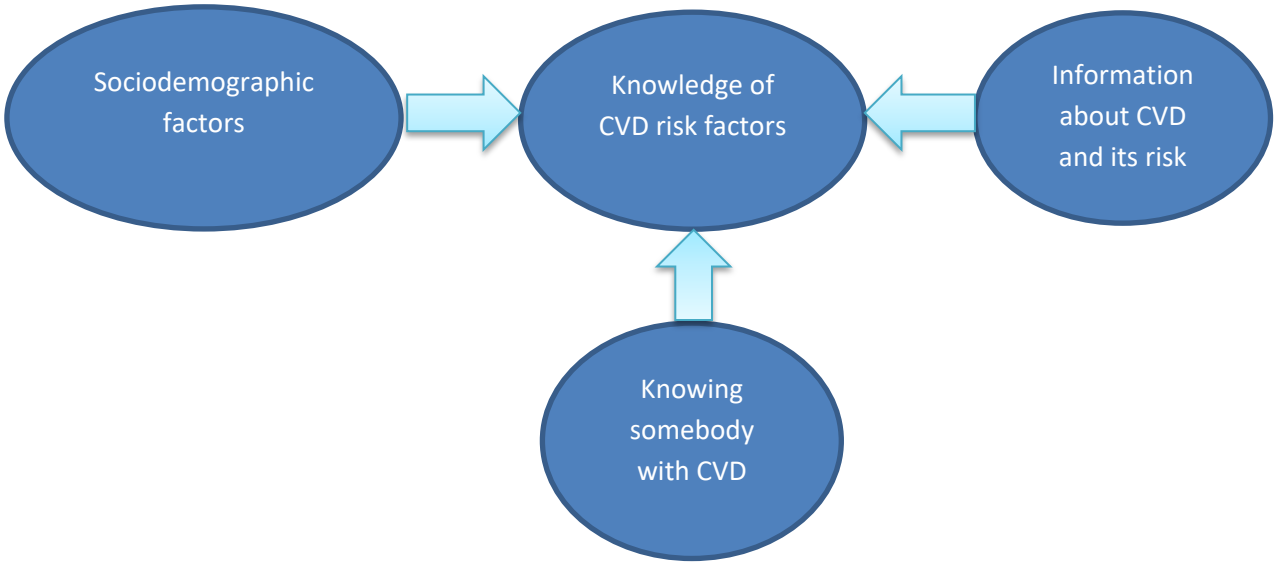

Figure 1: conceptual framework about knowledge of CVD risk factors

Chapter 3

Objectives

3.1 General objective

To assess knowledge of risk factors of cardiovascular disease among diabetes mellitus patients in TASH, Addis Ababa Ethiopia, 2020/21

3.1 Specific objectives

To assess knowledge of diabetes mellitus patients about CVD risk factors

To identify factors affecting knowledge of CVD risk factors

Chapter 4

Methods and materials

4.1 Study area and study period

Study area

The study was conducted at TASH which is located in the capital city of Ethiopia. It is the largest teaching hospital in the country, which provides health care services to over 700,000 patients per year through 77 case teams organized as outpatients (adult and paediatric), emergency (adult and paediatric), in patients (surgery and medical). It contains more than 700 beds and serves as a training and teaching centre for undergraduate, postgraduate and subspecialty programs for health and related professionals, who tackle the health problems of the community and the country at large. Diabetes clinic is one of the various speciality clinics hosted by TASH and it serves diabetes patients that come from all corners of the country through the referral system. (39) In the DM clinic, there are about 6 nurses, residents, specialists and sub-specialists who provide the care for the patients. And the clinic gives its service two days per week to around one hundred two (102) patients visiting the clinic per day.

Study period: the study was conducted from April 11 to May 16, 2021

4.2 Population

4.2.1 Source population

All diabetes mellitus patients who visit TASH DM clinic for follow up

4.2.2 Study population

Patients with type 1 and type 2 diabetes mellitus who visit TASH DM clinic for follow up during the study period.

4.3 Exclusion and inclusion criteria

4.3.1 Inclusion criteria

Diabetes patients with the following characters are included in the study:-

- Diabetes mellitus patients aged 18 years and above who visit TASH outpatient diabetes clinic
- Patients willing to participate in the study

4.3.2 Exclusion criteria

Diabetic patients with the following characteristics are excluded from the study:-

- Those diagnosed with psychiatric disorders
- Patients with gestational diabetes mellitus

4.4 Study design

An institutional-based cross-sectional study design was employed to conduct the study.

4.5 Sample size determination

The required sample size was determined using the single population proportion formula with the assumption of 95% confidence interval, 5% margin of error, and 50% proportion of diabetes mellitus patients who have good knowledge of CVD risk factors.

$$ni = \frac{(Z\alpha/2)^2 p(1-p)}{d2};$$

Where,

p=proportion of diabetes mellitus patients who have good knowledge of CVD risk factors (50%)

d=margin of error=0.05

Zα/2=confidence level required and Zα/2 at 95% CI=1.96

ni = initial sample size = 384

N = total population

So, the total sample size for my study is 423 by adding 10% non-response rate

4.6 Sampling technique

I used the consecutive sampling method, this is because my sample size is large and it is impossible to achieve this sample size with other methods of sampling within a short time, which I have for data collection.

4.7 Study variables

4.7.1 Independent variables

Socio-demographic characteristics:-

- Age,
- Sex,
- Educational status,
- Income level,
- Marital status,
- Occupation.
- Residency
- Information about CVD risk factors
- Family history of CVD
- Having CVD
- Duration of treatment for DM

4.7.2 Dependent variables

Knowledge of risk factors

4.8 Operational definition and definition of terms

Risk factors: - potentially modifiable and non-modifiable conditions which increase the likelihood of having CVD.

Poor knowledge: - identifying < 16 risk factors(9,10,35)

Good or optimal knowledge: - identifying ≥ 16 risk factors(9,10,35)

Score of ≥ 70% categorized as optimal, score < 70% categorized as suboptimal

4.9 Data collection tool and procedure

Data was collected using an interviewer administering a standardized structured questionnaire adapted from previous studies with some modification. (13) The questionnaires' uses a list of 22 CVD risk factors, and then the study participants will select from the option by Yes, No and I don't know mark and each correct answer will have one point. The questioner also contains some questions to assess the sociodemographic characteristic of the patients.

The questionnaire was translated to Amharic by the principal investigator and the interview was conducted by 4 BSc nurses and training was given by the investigator about the content of the questionnaire in detail before data collection. Face to face interview techniques based on inclusion criteria was conducted among patients with diabetes mellitus during the study period.

4.10 Data quality control

Before the data collection period, the questionnaire was pretested on 5% of the sample size on randomly selected individuals on patients with diabetes mellitus who were on follow up at Saint Paul hospital. During the pre-test, the questionnaire was assessed for its understand ability, and sensitivity of the subject matter and cultural acceptability in the area.

During the period of data collection, the principal investigators and supervisor provided on-site close supervision, technical support, and all filled questionnaires were checked daily for completeness, accuracy, clarity, and consistency by the principal investigator.

4.11 Data analysis

After data collection, it was checked for completeness and consistency. Coded data were entered into an EpiData entry version 4.6. After that, it was exported to and analyzed by using SPSS version 26. Descriptive statistics such as per cent, frequency, and mean, used to summarize categorical variables of patients characteristics and knowledge of risk factors of CVD. Bivariable logistic regression analysis was performed and variables with a p-value ≤ 0.25 in this model were included in the multivariable logistic regression model. Adjusted odds ratio with a 95% confidence interval was estimated to identify the significant predictors of good knowledge with a p-value of ≤ 0.05, as a cut point.

4.12 Dissemination

After completion of the study, the finding report was presented at the department of emergency medicine, and the copy was sent to the advisors of the article, and the TASH administrator office. And possibly it will be published in national and international journals.

4.13 Ethical considerations

Before starting data collection, a letter of permission was obtained from the college of health science department of the emergency medicine ethical review committee and was given to the internal medicine department head, and written informed consent was taken from all the study participants during data collection time. The data collectors also explained the objectives, contents, and importance of the study before starting the interview, as well as their right to refuse and withdraw from the data collection procedure or an interview.

Chapter Five

Result

5.1 Sociodemographic characteristics of participants

A total of 404 participants were included in the study giving a response rate of 95.5%. The mean age of respondents was 52.03±14.39. Regarding the sex of participants more than half 217(53.7%) were females. And when we see their marital status; more than four-fifth of participants are ever married 340(84.2%) and about one-sixth are unmarried 64(15.8%). Regarding their residency majority of participants are urban 376 (93.1%) (Table 1)

Table 1: Sociodemographic characteristics of patients with diabetes mellitus who visited the diabetes clinic for follow up, from April 11 to May 16, in TASH, Addis Ababa, Ethiopia 2021, (n= 404)

Variables		Frequency	Knowledge		P –value
			Poor	Good	
Sex	Male	187 (46.3%)	75	112	<.001
	Female	217 (53.7%)	119	98	
Age	18- 40	97 (24.0%)	50	47	.306
	41 – 60	191 (47.3%)	84	107	
	≥ 61	116 (28.7%)	60	56	
Residence	Urban	376 (93.1%)	171	205	<.001
	Rural	28 (6.9%)	23	5	
Marital status	Never married	64 (15.8%)	35	29	.244
	Ever married	340 (84.2%)	159	181	
Duration of treatment for DM	Less than six-year	144 (35.6%)	74	70	.313
	Six years and above	260 (64.4%)	120	140	
Level of education	No formal schooling	80 (19.8%)	63	17	<.001
	High school and less	186 (46.0%)	93	93	
	Diploma and above	138 (34.2%)	38	100	
Occupation	Employed	178 (44.1%)	64	114	<.001
	Retired	79 (19.6%)	28	51	
	Not employed	147 (36.4%)	102	45	
Family history of CVD	Yes	61 (15.1%)	23	38	.080
	No	343 (84.9%)	171	172	

Having CVD	Yes	179 (44.3%)	88	91	.682
	No	225 (55.7%)	106	119	
Monthly income	<5000	343 (84.9%)	181	162	<.001
	5001 – 10,000	51 (12.6%)	11	40	
	>10000	10 (2.5%)	2	8	
Type of DM	Type I	108(26.7%)	55	53	.480
	Type II	294(73.3%)	139	157	

5.2 Source of information about CVD risk factors

Among the respondents who had information about CVD risk factors, 166 (41.1%) are from health care workers, 88 (21.8%) from media (radio, television, and reading), and 29 (7.2%) friends and relatives. And more than half 208(51.5) did not hear any information about CVD risk factors. (Table 2)

Table 2: Study participants' source of information about CVD risk factors mellitus who visited the diabetes clinic for follow up, from April 11 to May 16, in TASH, Addis Ababa, Ethiopia 2021, (n= 404)

Variable		Frequency	Knowledge		p-value
			Poor	Good	
Information about the risk factors of CVD	Yes	196 (48.5%)	65	131	<.001
	No	208 (51.5%)	129	79	
Source of information		Frequency	Percentage		
Health care providers		166	84.6 %		
Friends and relatives		29	14.79 %		
Media		88	44.89 %		

5.3 Knowledge of cardiovascular disease risk factors

The commonest CVD risk factor identified by the participants were "regular physical activity will lower a person's chance of getting heart disease" 366 (90.6 %), followed by smoking, being overweight, diabetes mellitus, and high blood pressure, 359 (88.9 %), 356 (88.1 %),

343 (84.9 %), and 336 (83.2 %), respectively. Among the participants more than half, 53.5% (216) did not know that family history of CVD, as a risk factor. Almost one fifth 63 (18.9%) did not understand that keeping blood pressure under control decreases the risk of developing cardiovascular disease (CVD), 100 (24.8%) were unable to identify eating fatty food affects blood cholesterol level, and 61 (15.1%) did not consider diabetes mellitus as a risk factor for cardiovascular disease (CVD). (Table 3)

Table 3: Responses to the HDFQ among patients attending diabetes mellitus follow up clinic in TASH, Addis Ababa Ethiopia, 2021 (n= 404)

Questions (n = 404)	Correct response	Frequency
People can easily know by themselves when they have heart disease	False	107 (26.5 %)
If you have a family history of heart disease you are at risk for developing heart disease	True	188 (46.5 %)
The older a person is, the greater their risk of having heart disease	True	253 (62.6 %)
Smoking is a risk factor for heart disease	True	359 (88.9 %)
A person who stops smoking will lower their risk of developing heart disease	True	360 (89.1)
High blood pressure is a risk factor for heart disease	True	336 (83.2 %)
Keeping blood pressure under control will reduce a person's risk for developing heart disease	True	331 (81.9 %)
High cholesterol is a risk factor for developing heart disease	True	307 (76.0 %)
Eating fatty foods does not affect blood cholesterol levels	False	304 (75.2 %)
If your 'good' cholesterol (HDL) is high you are at risk for heart disease	False	67 (16.6 %)
If your 'bad' cholesterol (LDL) is high you are at risk for heart disease	True	112 (27.7 %)
Being overweight increases a person's risk for heart disease	True	356 (88.1 %)
Regular physical activity will lower a person's chance of getting heart disease	True	366 (90.6 %)
Only exercising at a gym in an exercise class will help lower a person's chance of developing heart disease	False	289 (71.5 %)
Walking and gardening are considered as an exercise that will help lower a person's chance of developing heart disease	True	299 (74.0 %)
Diabetes is a risk factor for developing heart disease	True	343 (84.9 %)
A person who has diabetes can reduce their risk of developing heart disease if they keep their blood sugar level under control	True	339 (83.9 %)
A person who has diabetes can reduce their risk of developing heart	True	335 (82.9 %)

disease if they keep their blood pressure under control		
A person who has diabetes can reduce their risk of developing heart disease if they keep their weight under control	True	328 (81.2 %)
People with diabetes rarely have high cholesterol	False	165 (40.8)
People with diabetes tend to have low HDL “good” cholesterol	True	81 (20.0 %)
If your blood sugar is high over several months it can cause your cholesterol level to go up and increase your risk of heart disease	True	333 2.4 %)

5.3 Knowledge score of CVD risk factors

Level of DM patient’s knowledge on CVD risk factors measured based on the correct response to twenty-two knowledge questions. The minimum and maximum score of participants was two and twenty-two respectively with a mean score of 14.75. And their knowledge categorized into good and poor using a 15.4(70%) knowledge score as a cut of point. Regarding overall knowledge of risk factors, approximately half of the participants 194 (48.0%) had poor knowledge, giving correct response to < 16 HDFQ; While 210 (52%) of the participants had good knowledge giving correct response to ≥16 HDFQ within 95% CI of (47.3% - 56.7%). (Figure 2)

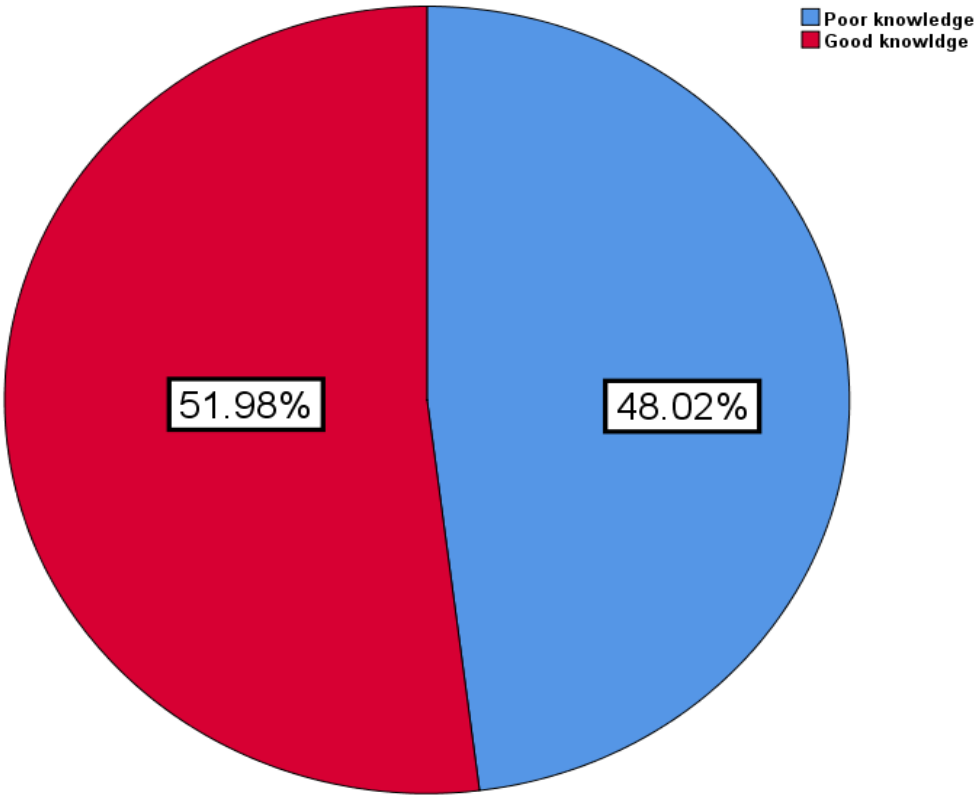

Figure 2: Knowledge of CVD risk factors among patients who visited the DM clinic for follow up from April 11 to May 16, in TASH Addis Ababa, Ethiopia2021 (n=404)

5.4 Factors associated with CVD risk factors

Bivariable logistic regression was performed to select variables for the final model using $p \leq 0.25$. Residence, sex, age, income, CVD history in the family, information about CVD risk factors, educational level, occupation, and marital status included in the final model.

After controlling for the effects of potentially confounding variables using multivariable logistic regression; place of residency, education level, occupation, and information about CVD risk factors remained significantly associated with knowledge of CVD risk factors. Whereas sex, marital status, income level, age group, and family history of CVD are not significantly associated with knowledge of CVD risk factors.

In this study, it was observed that urban residents are three times more likely to have good knowledge when compared to rural residents AOR=3.335, 95%CI (1.134-9.809), p= 0.040. Similarly, those who attended high school and less are two times more likely to have good knowledge versus those who not attended formal education (illiterate), AOR=2.374, 95%

CI(1.192-4.726). And when we compare participants who attended diploma and above with not attended formal education, the former (attended diploma and above) are four times more likely to have good knowledge, AOR=4.016, 95%CI (1.780-9.061). Participants who are employed are more likely to have good knowledge when compared to those not employed, AOR=1.942, 95%CI (1.058-3.566). Finally, participants who heard information about CVD risk factors are two times more likely to have good knowledge than from not heard, AOR=2.492 95%CI (1.573-3.949). (Table 4)

Table 4: Factors associated with good knowledge of CVD risk factors who visited the DM clinic for follow up from April 11 to May 16, in TASH Addis Ababa, Ethiopia2021 (n=404)

Variables	Knowledge of risk factors		COR(95%CI)	AOR(95%CI)	p-value
	Poor	Good			
Sex					
Male	75	112	1.813 (1.22-2.695)	1.076(.664-1.743)	.767
Female	119	98	1	1	
Age group					
18- 40	50	47	1	1	
41 – 60	84	107	1.355(.83-2.212)	.721(.381-1.363)	.314
61 and above	60	56	.993(.579-1.703)	.643(.290-1.427)	.278
Residence					
Urban	171	205	5.515(2.053-14.814)	3.335(1.134-9.809)	.029*
Rural	23	5	1	1	
Marital status					
Never married	35	29	1	1	
Ever married	159	181	1.374(.804-2.349)	1.917(.946-3.884)	.071
Level of education					
No formal schooling	63	17	1	1	
High school and less	93	93	3.706(2.018-6.806)	2.374(1.192-4.726)	.014*
Diploma and above	38	100	9.752(5.076-	4.016(1.780-	.001*

			18.738)	9.061)	
Occupation					
Employed	64	114	4.037(2.535-6.431)	1.942(1.058-3.566)	.032*
Retired	28	51	4.129(2.313-7.368)	1.909(.889-4.097)	.097
Not employed	102	45	1	1	
Family history of CVD					
Yes	23	38	1.643(.939-2.874)	1.112(.588-2.102)	.743
No	171	172	1	1	
Information about the risk factors of CVD					
Yes	65	131	3.291(2.187-4.951)	2.492(1.573-3.949)	.000*
No	129	79	1	1	
Monthly income					
<5000	181	162	1	1	
5001 – 10,000	11	40	4.063(2.017-8.183)	1.340(.586-3.061)	.488
>10000	2	8	4.469(0.935-21.351)	1.927(.368-10.087)	.437

* (statistically significant at p< 0.05 in AOR), COR (crude odds ratio), AOR (adjusted odds ratio)

Chapter Six

6.1 Discussion

Increasing awareness of CVD risk factors is an important way of combating its occurrence. The purpose of this study was to assess knowledge of diabetes mellitus patients about CVD risk factors. And findings from this study suggest that knowledge of DM patients about CVD risk factors is suboptimal. Moreover, about half of patients had no information about CVD risk factors and place of residency, level of education, hearing information about CVD risk factors and being employed are predictors of good knowledge.

Most of the study participants identified smoking 359(88.9%), being overweight 356(88.1%), and high blood pressure 336(83.2%) as risk factors of CVD. This study finding is relatively consistent with a study conducted in northern Ethiopia in which smoking 280(97.6%), being overweight 262(91.3%), and high blood pressure was identified as risk factors of CVD.(35) Similarly to the current study finding, in the study done Kuwait, above 80% of participants identified smoking, overweight, and high blood pressure as risk factors of CVD. (14) In contrast to the above study findings study conducted in Cameroon shows a significant difference, in which about 69.7%, overweight, 67.0% lack of exercise and 73.3% high blood pressure are mentioned as risk factors of CVD. (34) This discrepancy may be due to the sociodemographic difference of the study participants.

Knowledge of CVD risk factors among DM patients was inadequate (not satisfactory) and about half of the patients have suboptimal knowledge, with a mean score of 67.01%, This finding is similar to previous study results reported from South Africa, India, and Ethiopia.(32,33,35) In contrary to this finding study done in Zimbabwe about knowledge of CVD risk factors the mean score is 56.25% which is lower than the current study finding. (27) This gap is may be attributed to sociodemographic difference and the study participants in the previous study were only females.

Education level, residency, occupation, and hearing information about CVD risk factors were associated with good knowledge of CVD risk factors. In line with the finding of the current study, numerous studies (13–15,30,34) have revealed that higher education is associated with good knowledge of CVD risk factors. This may be explained by as educational level increase health information seeking behaver also increase and they can easily apprehend information about CVD. A systematic review done in sub-Saharan Africa shows that there is a significant

association between residence and knowledge of CVD risk factors in which urban residents were more knowledgeable about CVDs risk factors compared to their rural ones. (16) This finding is similar to the current study finding, urban residents are three times more likely to have good knowledge than rural. Thus, high knowledge of CVD risk factors in urban residents could be due to their good access to health information as compared to rural ones, and attainment of higher educational level is high among urban residents, which is the main predictor of good knowledge in the current study and many other studies.

Additionally, the current study shows that those who are employed have higher levels of knowledge regarding CVD risk factors compared to those who are not employed. Similar to this finding study done in Uganda shows that those who formal employed are more knowledgeable than others. (37) This may be due to that employed ones achieve a higher educational level and are more likely to get more health-related information. Plus to this current study shows that participants who heard information about CVD risk factors two times more likely to have good knowledge than not heard, this finding is similar to a study done in Uganda. (37) It is obvious that if someone has information on CVD risk factors, it boosts his/her knowledge and influences his/her behaviour.

6.2 Conclusion

Overall, this study was done on diabetes mellitus patients in follow up in TASH and shows that diabetes mellitus patients had unsatisfactory knowledge about CVD risk factors, with almost half of patients had suboptimal knowledge. Moreover, my study shows that there is inadequate education and counselling of DM patients about CVD risk factors and lifestyle. Higher education, being employed, an urban residence and having information about CVD risk factors are associated with good knowledge. Whereas, marital status, age, sex, and income did not have a significant association with knowledge of CVD risk factors.

6.3 Recommendations

According to my study finding, half of the participants had poor knowledge, the following recommendations are forwarded:

This study shows there is a need for implementing effective primary prevention methods. So due to this, all responsible bodies should act together to achieve this goal: Minster of health, TASH administrations and health workers in the clinic. One way of achieving this is preparing and providing health education about CVD risk factors and deep counselling of patients in the lifestyle they lead. As the whole working to improve the literacy of the population should be considered, because it helps in combating the burden of many chronic diseases, especial CVD.

Plus, since this study is institutional-based, further research should be conducted on population base and on multicentre settings to conclude the result.

6.4 Strength and limitations

Strength

- Data quality control was highly practised throughout the data collection and collected data was entered and analyzed by updated software.

Limitations

- This study may be subject to bias; because the subject may be prone to social desirability bias (may attempt to give the correct response, actually not knowing the correct response).
- Cause and effect relationship can't be established, because the design is cross-sectional.

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Annexe I

Consent form (English version)

Thanks for coming. My name is…….. We are conducting a study on knowledge of risk factors of cardiovascular disease risk factors among patients with diabetes mellitus at TASH. We are interviewing randomly selected participants like you. For this purpose, certain questions that are thought to be important will be asked. You are kindly required to respond to these questions. We want to assure you that your answers will be strictly kept secret. Participation in this survey is voluntary and you have the right to refuse participation at any time or not to respond to questions that you are not willing to answer. However, your honest answers to these questions will help us in identifying important factors to prevent cardiovascular disease occurrence. We would appreciate your help in responding to these questions, and the interview will not take more than 15 minutes.

Are you willing to participate in the study? Yes… No…….

Day/Month/Year of interview (EC): ____/___/2013

Annexe II

Questionnaires (English version)

Part I: socio-demographic characteristics of patients with diabetes mellitus who visit the diabetes clinic for follow up.

Instruction: please encircle the number after the options you choose from the lists.

No	Socio-demographic characteristics	Response classification	Skip
1	Sex	Male……..1 Female …….2	
2	Age (in years completed)	……	
3	What is your place of residence	Urban…….1 Rural ……..2	
4	What is your marital status?	Never married……..1 Ever married…….....2	
5	What is the highest level of education you have completed?	No formal schooling……..1 High school completed and less ……..2 Diploma certificate and above.……3	
6	What is your current occupation?	Employed……...1 Retired……..2 Not employed…….3	
7	For how long you have been on treatment for diabetes?	Less than six years …….1 Six years and above …….....2	
8	Do you have a history of CVD in your family?	Yes ……1 No ……..2	
9	Do you have CVD?	Yes ……1 No ……..2	
10	Have you heard about the risk factors of CVD?	Yes……..1 No……...2	→ 13
11	Who told you about it?	Health care providers……..1 Friends and relatives…….....2 Media …….3	
12	Your monthly income	…….	
13	Type of DM	Type 1…….1 Type 2…….2	

Part II: knowledge of cardiovascular disease risk factors

Instruction: please put the "**X**" mark in the options section for your choice

No	Questions to assess knowledge	Options		
		True	False	IDN
1	People can easily know by themselves when they have heart disease			
2	If you have a family history of heart disease you are at risk for developing heart disease			
3	The older a person is, the greater their risk of having heart disease			
4	Smoking is a risk factor for heart disease			
5	A person who stops smoking will lower their risk of developing heart disease			
6	High blood pressure is a risk factor for heart disease			
7	Keeping blood pressure under control will reduce a person's risk for developing heart disease			
8	High cholesterol is a risk factor for developing heart disease			
9	Eating fatty foods does not affect blood cholesterol levels			
10	If your 'good' cholesterol (HDL) is high you are at risk for heart disease			
11	If your 'bad' cholesterol (LDL) is high you are at risk for heart disease			
12	Being overweight increases a person's risk for heart disease			
13	Regular physical activity will lower a person's chance of getting heart disease			
14	Only exercising at a gym in an exercise class will help lower a person's chance of developing heart disease			
15	Walking and gardening are considered as an exercise that will help to lower a person's chance of developing heart disease			
16	Diabetes is a risk factor for developing heart disease			
17	A person who has diabetes can reduce their risk of developing heart disease if they keep their blood sugar level under control			

18	A person who has diabetes can reduce their risk of developing heart disease if they keep their blood pressure under control			
19	A person who has diabetes can reduce their risk of developing heart disease if they keep their weight under control			
20	People with diabetes rarely have high cholesterol			
21	People with diabetes tend to have low HDL “good” cholesterol			
22	If your blood sugar is high over several months it can cause your cholesterol level to go up and increase your risk of heart disease			

Annex III

የፈቃድ ቅጽ (ስምምነት ፎርም)

ስለመጡ እናመሰግናለን ። ስሜ .... እኛ በ TASH የስኳር ህመምተኞች፣ የልብና ዳምሲሪ በሽታ ሊያመጡ ስላምችሉ ነገሮች ያላቻዉን እዉቀት ጥናት እያደረግን ነው ። እንደ እርስዎ ያሉ በአጋጣሚ የተመረጡ ተሳታፊዎችን ቃለ-መጠይቅ እያደረግን ነው ። ለዚሁ ዓላማ አስፈላጊ ናቸው ተብለው የሚታሰቡ የተወሰኑ ጥያቄዎች ይጠየቃሉ ። ለእነዚህ ጥያቄዎች መልስ እንዲሰጡ በትህትና እንጠይቆታሌ ። የእርስዎ መልሶች በጥብቅ በሚስጥር እንደሚጠበቁ ልናረጋግጥልዎ እንፈልጋለን ። በዚህ የዳሰሳ ጥናት ውስጥ መሳተፍ በፈቃደኝነት የሚገኝ ሲሆን በማንኛውም ጊዜ ተሳትፎን የመከልከል ወይም መልስ ለመስጠት ለማይፈልጉት ጥያቄዎች መልስ ላለመስጠት መብት አለዎት ። ሆኖም ለእነዚህ ጥያቄዎች በሐቀኝነት የሰጡት መልስ የልብና የደም ሥር (cardiovascular) በሽታ መከሰትን ለመከላከል ይረዳናል ። ለእነዚህ ጥያቄዎች መልስ በመስጠት ላደረጉልን እገዛ እናደንቃለን ፣ እና ቃለመጠይቁ ከ 15 ደቂቃ በላይ አይወስድበትም።

በጥናቱ ለመሳተፍ ፈቃደኛ ነዎት? አዎ..... አይ.....

የቃለ መጠይቅ ቀን / ወር / ዓመት (EC) _____ / ___ / 2013

Annexe IV

መጠይቅ በአማርኛ

ክፍል አንድ:- የተጠያቂው የግል መረጃ

መመሪያ: - ከዝርዝሮች ዉስጥ የመራጡትን ቁጥሩ ያክቡ

ተ.ቁ	የተጠያቂው የግል መረጃ	አማራጮች	ዝለል
1	ፆታ	ወንድ……1 ሴት ……2	
2	ዕድሜ (በዓመት)	…….	
3	የመኖሪያ አካባቢ	ከተማ ……1 ገጠር……2	
4	የጋብቻ ሁኔታ	ያላገበ……1 ያገባ …… 2	
5	ያጠናቀቁት ከፍተኛ የትምህርት ደረጃ ምንድነው?	መደበኛ ትምህርት ያልተማረ……1 ሁለተኛ ደረጃ እና ከዚያ ያናሳ ……2 ዲፕሎማ፡እና፡ከዚያ፡በላይ……3	
6	የአሁኑ ሥራዎ ምንድነው?	ሥራ ያለዉ ……1 ጡረታኛ ……2 ሥራ የሌላዉ……3	
7	ለስኳር ህክምና ከጀመሩ ስንት ዓመት ሆኖት	ከስድስት ዓመታ በታች ……1 ስድስት ዓመታ እና በላይ ……2	
8	የልብና የደም ሥር በሽታ ያላበት ሰዉ ከቤታሰቦዎ ዉስጥ አሌ	አዎ……1 አይ……..2	
10	የልብ በሽታ ሊያመጡ ስለምችሉ ነገሮች መረጀ ሰምተዉ ያዉቀሉ	አዎ……1 አይ……..2	→12
11	ከማን ሰሙ	ከበለሙያ……..1 ከጓደኞቹ(ወይም)ከዘመድ……2 ከምድያ……..3	
12	ወርሃዊ ገቢ በእት. ብር	…….	
13	ያላቦት የሱኳር አይናት	Type 1……1 Type 2……2	

ክፍል II: የልብና የደም ሥር (cardiovascular) በሽታ ልያመጡ ስለሚችሉ ነገሮች እዉቀት

መመሪያ፡ እባክዎ ለምርጫዎ በአማራጭ ክፍል ውስጥ "x" ምልክት ያድርጉ

ተ.ቁ	እውቀትን መገምገም ጥያቄዎች	አማራጮች		
		እዉነት	ሐሰት	አለዉቅም
1	ሰዎች የልብ በሽታ በሚኖርበቸው ጊዜ በቀላሉ ሊያውቁ ይችላሉ.			
2	የልብ ህመም ታሪክ በቤተሰብ ካለዎት በልብ በሽታ የመያዝ አደጋ ላይ ነዎት			
3	በዕድሜ መግፋት በልብ በሽታ የመያዝ እድሊን ከፍ ያደርጋል			
4	ማጨስ ለልብ በሽታ ያገልጣል			
5	ማጨስ የሚያቆም ሰው በልብ በሽታ የመያዝ እድሉን ዝቅ ያደርጋል			
6	ከፍተኛ የደም ግፊት ለልብ በሽታ ያገልጣል			
7	ደም ግፊትን መቆጣጠር የአንድን ሰው በልብ በሽታ የመያዝ እድሊን ለመቀነስ ይረዳል			
8	ከፍተኛ ኮሌስትሮል በልብ በሽታ የመያዝ እድሊን ከፍ ያደርጋል			
9	ጮማ መማገብ የደም ኮሌስትሮል መጠንን አይጎዳውም			
10	የእርስዎ “ጥሩ” ኮሌስትሮል (HDL) ከፍ ያለ ከሆነ በልብ በሽታ የመያዝ እድሎ ከፍ ይላሊ			
11	የእርስዎ “መጥፎ” ኮሌስትሮል (LDL) ከፍ ያለ ከሆነ በልብ በሽታ የመያዝ እድሎ ከፍ ይላሊ			
12	ከመጠን በላይ ክብደት የአንድን ሰው በልብ በሽታ የመያዝ እድሊን ከፍ ያደርጋል			
13	መደበኛ የአካል ብቃት እንቅስቃሴ የልብ በሽታ የመያዝ እድልን ዝቅ ያደርጋል			
14	በጂም ውስጥ ብቻ የምደረግ የአካል ብቃት እንቅስቃሴ ነዉ የአንድ ሰው በልብ በሽታ የመያዝ እድልን ለመቀነስ ይምራደዉ			
15	የእግር ጉዞ እና የአትክልት ስፍራ እቅስቀሴ በልብ በሽታ የመያዝ እድሊን ዝቅ ለማድረግ የሚረዳ የአካል ብቃት እንቅስቃሴ ተደርጎ ይወሰዳሉ			
16	የስኳር በሽታ፤ በልብ በሽታ የመያዝ እድሊን ከፍ ያደርጋል			

17	አንድ የስኳር ህመሚተኛ የደም ስኳር መጠኑን መቆጣጠር ከቻለ የልብ በሽታ የመያዝ እድሉን ሊቀንስ ይችላል			
18	አንድ የስኳር ህመሚተኛ ደም ግፊቱን መቆጣጠር ከቻለ የልብ በሽታ የመያዝ እድሉን ሊቀንሰ ይችላል			
19	አንድ የስኳር ህመሚተኛ ክብደቱን መቆጣጠር ከቻለ የልብ ህመም የመያዝ እድሉን ሊቀንስ ይችላል			
20	የስኳር ታመሚዎች ኮሌስትሮላቸዉ ብዙም ከፍ አይልም			
21	የስኳር ታመሚዎች፤ HDL "ጥሩ" ኮሌስትሮላቸዉ ዝቅተኛ ነዉ			
22	የደም ስኳርዎ ለበርካታ ወሮቶች ከፍ ከላ የኮሌስትሮሎዎ ደረጃ እንዲወጣ እና በልብ በሽታ የመያዝ እድልዎ እንዲጨምር ሊያደርግ ይችላል			