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**COLLEGE OF HEALTH SCIENCES**  
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**DIETARY PATTERN OF TYPE 2 DIABETES MELLITUS PATIENTS ON FOLLOW UP  
IN PUBLIC HOSPITALS ADDIS ABABA, ETHIOPIA.**

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APPROVED BY THE BOARD OF EXAMINERS

This thesis, by Tsedey Teklemichael is accepted in its present form by the board of examiners as fulfilling thesis requirement for the degree of master in public health nutrition.

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## **LIST OF ABBREVIATIONS**

AAU	Addis Ababa University
AARHB	Addis Ababa Regional Health Bureau
DALYS	Disability Adjusted Life Years
DDS	Dietary Diversity Score
DM	Diabetes Mellitus
EFCT	Ethiopian Food Composition Table
FBS	Fasting Blood Sugar
FFQ	Food Frequency Questionnaire
GLV	Green Leafy Vegetables
IDF	International Diabetes Federation
NCD	Non Communicable Disease
NIDDM	Non Insulin Dependent Diabetes Mellitus
RDA	Recommended Daily Allowance
TFCT	Tanzania Food Composition Table
T2DM	Type 2 Diabetes Mellitus
UAE	United Arab Emirates
USA	United States of America
USD	Unites States Dollar
USDA	United State Department of Agriculture
WHO	World Health Organization

## **ABSTRACT**

**Background** Controlled diet plays a major role in delaying diseases progression among diabetes patients. Diabetes patients often have difficulty of identifying the recommended type, quality and quantity of diet. Knowledge of a recommended diet for diabetes patients influences patient's food selection and dietary pattern .This study aimed to assess the dietary pattern of type 2 diabetes patients in relation to the recommended dietary guideline and identify the patterns with optimal glycemic control.

**Objective:** To assess the dietary pattern and knowledge of type 2 diabetes mellitus patients on the recommended diet in public hospitals Addis Ababa, Ethiopia.

**Methods:** The study employed Institutional based cross-sectional study design from July 2015 to June 2016. We used a semi quantitative Food Frequency Questionnaire (FFQ) with 67 food items to evaluate the dietary pattern and nutrient intake of type 2 diabetes patients. We identified dietary patterns using factor analysis. The relationship between the dietary patterns and glycemic control was investigated by multivariate regression analysis using STATA version 12.1.

**Result-** A total of 385 patients with diabetes were included in the study. Five dietary patterns were identified. The dietary patterns were; (i) the “cereals, vegetable, legumes and fruits”, (ii) the “cereal, meat, vegetable and wine”, (iii) the “fast food” and (iv) the” vegetable and coffee”, (v) the “sweet and dairy product” dietary pattern. Carbohydrate mean intake was higher than the recommended daily allowance while energy is lower but the intake of total fat, protein, and fiber were within the recommended daily allowance. The “cereals, vegetable legumes and fruits”, and the “cereal, meat, vegetable and wine” dietary patterns were positively associated with good glycemic control. Poor dietary knowledge was found in more than half (55.8%) of the patients.

**Conclusion and recommendation.**-Being a member of diabetes association and those who got more advice from a doctor were more likely to follow healthy dietary pattern. Those who follows varied pattern (vegetable, fruit, legumes & cereal) based had good control of glycemia. More than half of the patients had poor dietary knowledge. Integrating dietary education in the management of diabetes mellitus could lead to better outcome.

**Key words** -Type 2 diabetes, dietary pattern, knowledge, semi quantitative FFQ, Factor analysis

# **1. INTRODUCTION**

## **1.1 Background**

The term diabetes mellitus describes a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbance of carbohydrates, fats and protein metabolism resulting from defects in insulin secretion, insulin action, or both(1). American diabetic association classifies DM in to four which is type 1, type 2, gestational DM and Specific types of diabetes due to other causes(2). Diabetes mellitus may present with characteristic symptoms such as thirst, polyuria, blurring of vision and weight loss. People with diabetes are at increased risk of cardiovascular, peripheral vascular and cerebrovascular diseases(1).

Type 1 indicates the process of beta cell destruction that may ultimately lead to diabetes mellitus in which insulin is required for survival to prevent the development of ketoacidosis, coma and death. Type 2 is the most common type of diabetes is characterized by disorder of insulin action and insulin secretion either of which may be the predominantly features. There are other types of diabetes like gestational hyperglycemias a carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy(3).

There are several important risk factors that may lead to type 2 DM. These includes increasing urbanization, dietary changes, reduced physical activity, obesity, advancing age, family history of diabetes, ethnicity and change in lifestyle pattern(4). Healthy eating with attention to food portions in the diet and weight management combined with physical activity may help to improve glycemic level(5). Nutrition therapy is important in preventing diabetes, managing existing diabetes and preventing or at least slowing the rate of development of diabetes complications(6).

A number of epidemiologic studies and randomized clinical trials supports that type 2 diabetes is largely preventable through diet and life style adjustment. The incidence can be decreased by 58% by following lifestyle modification(7). Diet recommendations for the diabetic populations and individuals is to achieve energy balance and a healthy weight, limit

energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats and towards the elimination of trans fatty acids. It is also recommended that those at risk and with the disease Should Increase consumption of fruits, vegetables, legumes, whole grains and nuts to attain healthy eating goals and Limit the intake of free sugars, limit salt (sodium) consumption from all sources and ensure that salt is iodized. American diabetic association and Canadian diabetic association recommended that recommended daily intake for carbohydrate, fat, protein, Trans fatty acid and fiber should be taken daily in proportion of 50–60%, < 30%, 15–20% of energy, less than 7 %, 25-35g/day respectively (3, 6, 8, 9).

Through all stages of life a balance is needed between the amount of energy that individuals consume and the amount of energy they require. Achieving this balance will help prevent excessive weight gain, reduce the risk of diabetes, the progression of the diseases and other non communicable diseases(10).

## **1.2 Statement of the problem**

Diabetes is a major cause of morbidity and mortality(11) .Globally more than 415 people have diabetes and this number is projected to increase to 642 million worldwide , more than 34 million in Africa by the year 2040. In Ethiopian 1.3 million people have diabetes (12). The prevalence of DM is higher among low and middle income countries contributing for 77% of the total disease burden(4, 13). According to IDF 2015 the prevalence of diabetes mellitus in Ethiopia is 2.9-3.4 % and there are 23,145 diabetes related deaths every year(12).

Dietary management is considered to be one of the cornerstones of diabetes care and following this dietary management can delay the progression of the diseases and improve the health status (14).According to the American Diabetes Association, the diet of each diabetic should serve the following purposes: maintaining blood glycemia as close to normal as possible, obtaining optimal serum lipid levels and supplying adequate caloric intake in order to keep or reach the desired body mass and prevent other NCDs like dyslipidemia hypertension, cardiovascular vascular disease (6).

There are several factors that influence patients' food choice and among these dietary knowledge is believed to be the significant factor that influences dietary behavior(15). The problem, however, is that most diabetic patients have difficulty of identifying the recommended quality and quantity of food that they have to eat in order to control their blood glucose level due to lack of appropriate information(10).

Among the different parameters of good self-care practice one is dietary modification and different studies conducted in Ethiopia showed poor self care practice which in turn indicates poor dietary management. (14, 16-21).Even though there are studies conducted on self care practice there is limited studies conducted particularly focusing on dietary habit and knowledge of diabetic patients regarding the recommended diet despite the fact that it is crucial for optimal self care management and delaying diseases progression.

### **1.3 Significance of the study**

This study will give us clear picture of what diabetic patients dietary pattern looks like and whether they follow the recommended dietary guideline or not as this is the key in the management of diabetes mellitus .It also have role in pointing out the knowledge gap that exists among diabetes patients regarding the recommended dietary practice.

The result from this study will help in developing strategies for intervention targeting the knowledge gap identified so as to improve the dietary pattern thereby improving quality of life. It could also help to see the real practice among diabetic patients so as based on this finding appropriate intervention and strategies can be developed to provide base line data for policy makers, health care providers and concerned bodies for further improvements of nutritional counseling and intervention strategies which will be a great help in reducing progression of the diabetes and related morbidity and mortality.

## **2. LITERATURE REVIEW**

### **2.1 Dietary pattern of type 2 DM patients**

A well balanced nutrition is a core building block for promoting health and preventing disease. Both under- and over nutrition increase the risk of type 2 diabetes and diabetes itself is exacerbated by poor nutrition(10).A major goal for diabetes care is to improve glycemic control by balancing food intake with endogenous and/or exogenous insulin levels (5).

In study done in India where FFQ was used to assess the diet, stated that although 76.66% of the patients were vegetarians the general dietary practice was poor(22) .Another study done in Nigeria on 1720 adults with type 2 DM and hypertension the dietary habit was assessed using Semi quantitative FFQ in this study 51.0 % of the patients reported to consume fried foods and 57% drinks soda drinks and this practice was taken as poor dietary habit only 42.6% of the sample consumed fruit in a regular basis, while fruit consumption  $\geq$  3 times/day was found in 11.1% of the sample population which is inadequately(23). Similar study in Addis Ababa done on dietary practice of type 2 DM patients ;dietary habit was assessed using the modified form of the eight-item Morisky medication adherence scale (MMAS-8) (Morisky and DiMatteo2011) and the study revealed that 51.4% of the patients had poor dietary practice(14).

Another study done in India on 115 patients suffering from type 2 DM Rice and ragi(mashella) formed the staple cereal of most patients while wheat was used by lesser number of subjects. GLV was consumed once a week which is less than the recommended intake .Most vegetables were consumed on weekly basis and fruit was not consumed by 50 % of the patient. It can be said the diet of these patients is not adequate. Diet history was collected using 24 hr recall and food frequencie (24)On a study done in Iran the mean daily consumption of vegetable, fruit, dairy products and meat groups were consistent with the minimum standard daily requirements, but there was lower consumption of cereal food groups in diabetic patients than standard recommended orders. Dietary intake information was collected by FFQs designed to assess average food intake(25). UAE study which was

done on diabetic patients 51% of the patients reported 8% used double cream milk. Forty two percent consume meat without removing the fat and 23% didn't remove skin from chicken before cooking, this shows the poor dietary habit and inadequacy of dietary practice(26).

Cross sectional study done by 24-hour dietary recall in Malaysia on type 2 diabetic patients reported that the energy intakes of both male and female subjects in this study only achieved about 77% and 67% of the Malaysian RDA respectively. The mean carbohydrate, protein and fat intake of this population contributed 56.9%, 14.7% and 28.4% of the total calorie intake respectively. This shows that is consistence with dietary recommendation of Malaysia (27).The above study was similar to the study done in Iran which was done by Semi quantitative FFQ.The intake of saturated fat were high, dietary fiber was low and carbohydrate was in recommended range(28).

In similar study done in Saudi Arabian showed that Protein was 17.3% of total energy, the total fat consumption was 31.2% of total energy intake, and carbohydrate was 56.9% of total energy which is slightly higher than the recommended amount the dietary practice is generally inadequate (29).In contrast a study done in Japanese reported that there were no nutrients that were significantly higher, while nutrients that were significantly lower than recommended were energy, protein, carbohydrates, potassium, calcium, magnesium and phosphorus. The median carbohydrate energy ratio was 55–56 E% in the participants, which was comparatively low, although it was within the range of the dietary goal ( $50 < E\% < 70$ ) (30).

Case control Study done in Nigeria plantain was consumed almost in half of the diabetic subjects that participated in the study mainly as the main starch with vegetables and beans in various cooked forms(31). In Khartoum study less than two thirds (62.7%) of the respondents take starch more than the daily recommended allowance and about (88%) of participants were found to take meat, fish or chicken on a daily basis (32).

In cross sectional study done in Japan on relationship between dietary patterns and risk factors for cardiovascular disease in patients with type 2 diabetes mellitus, six dietary

patterns were identified “Seaweeds, Vegetables, Soy products and Mushrooms” pattern, characterized by high

Consumption of seaweeds, soy products and mushrooms, was associated with lower use of diabetes medication and healthier lifestyles, The “Noodle and Soup” pattern, characterized by (33)aminotransferase, aspartate aminotransferase,  $\gamma$ -glutamyl transpeptidase and triglyceride levels. “Noodle and Soup”, The “Fruit, Dairy products and Sweets” pattern was associated with lower  $\gamma$ -glutamyl transpeptidase levels, blood pressure. In similar study done in Iran Tehran on type 2 DM patients three dietary pattern was identified which was done by FFQ ,this are Vegetable & Poultry, Western and Semi-healthybody mass index were negatively associated with vegetable and poultry dietary pattern. Conversely, total cholesterol and fasting blood glucose were positively associated with western dietary pattern. A dietary pattern labeled as semi-healthy pattern was found to be positively related to HDL-cholesterol associations between semi-healthy pattern, LDL-cholesterol and waist circumference were negative(34) another study done in korea by 24 hr recall these four dietary habit was identified ‘Bread & Meat & Alcohol’, ‘Noodles & Seafood’, ‘Rice & Vegetables’, and ‘Korean Healthy’ patterns .Serum cholesterol levels in the highest quartile of the ‘Bread & Meat & Alcohol’ pattern were significantly higher compared with those in the lowest quartile. In addition, total cholesterol and triglyceride levels in the highest quartile of the ‘Korean Healthy’ pattern were significantly lower(35).

In study done in Japan Tokyo on relationship between dietary patterns and risk factors for cardiovascular disease, in patients with type 2 diabetes mellitus diet was assessed using self administered Diet History Questionnaire (BDHQ) and the study showed that FBS didn’t have any significant association with the 6 dietary pattern found by factor analysis(33) same is true for the study done in Tehran on type 2 DM patients FBS didn’t show any significant association with the three dietary pattern found (34).

## **2.2 Knowledge of type 2 DM patients on the recommended diet**

In a study done in India, Ambo, Jimma, Felege study subjects have poor knowledge about dietary self care management. The above result mentioned in this paragraph in line with similar study done in South Africa which 73.3% of the patients has poor knowledge about healthy diet (16, 17, 36-38).In a study done in Indonesia dietary behaviors among patients

with Type 2 Diabetes Mellitus in Yogyakarta, patients has moderate level of recognizing amount of calorie needs, selecting a healthy diet and managing dietary behaviors (15).

In a cross sectional study done on Nepalese Diabetic patient on Factors associated with non adherence to diet and physical activity among Nepalese type 2 diabetes patients; 49.2 % of the patients have poor knowledge about the recommended diet which in lines with a study done in USA in low socioeconomic participants where 40% of the respondents didn't know what food to eat. In contrast a study done in Sudan majority of the respondents (93.3%) had good knowledge about use of vegetable in a diet. Sources of dietary advice were found to be mainly from doctors and sometimes through social communication with friends and neighbors. Age was found to negatively impact on the respondent's level of knowledge and statistically significant relation was seen between knowledge of type two DM and adherence to the recommended dietary advice (32, 39, 40). In other similar study doctors/family physicians were reported to be the good source of advice regarding diet to 77% of study population (41).

In study done in India 15% of the patients have awareness about the restricted food of diabetes, 26% know the Ghee/Butter/Cream is only restricted, 37% know that Jiggery, honey, jam, sweet food is restricted and 22% suggested that fried food is restricted in DM and in one Bahrain study 76% of the respondents was unable to distinguish clearly between low and high glycemic index food (26, 36).

### **2.3 socio demographic and other factors that affect type 2 DM patients dietary habit**

The total intake of vegetables and fruit in the male group was significantly lower and the intake of white vegetables was lower in the female group. Study done on diabetic patients in Brazil unhealthy food consumption was more common in men while women consume healthy food more frequent (22, 30, 42).

Malaysia and Nepal study showed that the male subjects had sufficient intake of all nutrients while the female subjects did not have sufficient intake of calcium, vitamin A and niacin However in study done on UAE there was no statistically significant difference

between males and females; neither was there a difference in terms of age or level of education (26, 27, 39).

Advancing age is a possible factor that might positively influence the dietary practice. Factors such as age, marital status & level of education had a significant relationship with the dietary practice. In another study done in Nekemete and Harari significant associations between self care practice and educational status, monthly income, occupation, years of suffering from diabetes, knowledge level, attitude level, living condition and age of the respondents was seen (20, 23, 38).

In a study done in the united Arab Emirates it was not clear why patients violates dietary recommendation there is no financial barrier to follow the recommended dietary guideline and it shows poor awareness on the aspects of diet in diabetic patient management (26). However in a study done in Addis Ababa 77% of the patient's think of the high cost of food when it comes to following the recommended diet (14). In similar study done in USA on identification of Barriers to Appropriate Dietary Behavior in Low-Income Patients with Type 2 Diabetes Mellitus 59.57% of the patients say they have difficulty of paying for healthy foods. One study done in Bahrain also shows 31.7 % of the patients have reported the cost of healthy food affects their dietary habit (43).

One study done in Bhutanese people on factors influencing eating behavior of people with type 2 Diabetes, accessibility and choice of food could be one factor prohibiting selection of healthy food among the participants, 75% of the participant didn't consume fruits and vegetables due to transportation and lack of supply, this study in line with the study done in yekatit hospital A.A in which 14.4 % of the study group mentioned non availability of fruits and vegetables and majority of the patients has difficulty of resisting temptation to unhealthy foods (14, 44).

Family and social support are important aspects of adherence to diabetes management. Numerous correlation studies have shown a positive and significant relationship between social support and adherence to diabetes treatment(45). In study done in A.A(Ethiopia), USA, Bahrain over half of the patients had good family support which leads to better long-

term self-management and better health outcomes (14, 43, 45).In contrast in UAE study only 45 % of the patients has family support(26).

Non diabetes health problems, financial problems, emotional difficulties, family stress, and problems from medication side effects were other factor that affects the dietary intake study participants in USA. All these additional problems appear to affect this population and may contribute as barriers to appropriate dietary behavior(40)

### **3 .OBJECTIVE**

#### **3 .1General objective**

To assess the dietary pattern and knowledge of type 2 diabetes mellitus patients on the recommended diet in public hospitals Addis Ababa, Ethiopia

#### **3.2 Specific objective**

- To assess the dietary patterns of type 2 diabetic patients on follow up in public hospitals.
- To assess the knowledge of type 2 DM patients on follow up on the recommended diet in public hospitals.
- To assess the relationships between dietary pattern and glyceimic control among type 2 DM patients on follow up in public hospitals.

## **4 METHOD AND MATERIALS**

### **4.1 study area**

The study was conducted in Addis Ababa, the capital of Ethiopia. The city is further divided into 10 sub cities and 116 district administrations. Addis Ababa covers an area of 530.14 square kilometers with 3,272,237 regional total populations (46).

Addis Ababa regional health bureau (AARHB) is responsible to coordinate the overall health care activities of the city. Under its administration there are 6 hospitals. There are also 10 sub-city health offices, which are directly accountable to their respective sub-city administration. There are also 52 hospitals in the metropolis of which 6 are owned by AARHB, 5 by federal government, 3 by NGO's, 3 by Defense force and police and 35 by the private owners. There are also more than 760 private clinics at different levels. As a result, the potential health service coverage measures geographical accessibility in Addis is about 100%. The total number of diabetic patients in AA is 31,915 according to AARHB report in 2012/13.all the hospitals is giving diabetes mellitus follow up Except 3 hospital(46).

### **4.2 Study design and period**

Cross sectional study was conducted on diabetes patients from a follow up clinic in all governmental hospitals. The study was conducted from July 2015-June 2016.

### **4.3 Population**

#### **4.3.1 Source population**

All type 2 DM patients in Addis Ababa public hospitals presenting to a follow up DM clinics.

#### **4.3.2 Study population**

Randomly selected type 2 DM patients who come for follow up in the study period.

#### **4.3.3 Inclusion criteria**

- All diabetes patients that had at least one follow up prior to data collection time.

#### 4.3.4 Exclusion criteria

- A patient who is critically ill and need immediate treatment was excluded.

#### 4.4 sample size determination

Sample size was calculated using epi info 7 stat calc using single population proportion with the assumption; for the all the three objectives.

- 95% confidence interval
- 5% margin of error(d)
- 51.4 % prevalence (14).
- 5 % non response rate

For the second objective –p was taken 69% from study done in felege hiwot hospital for poor knowledge for advisable dietary intake with desired degree of precision was 5%, 95% confidence interval sample size reached is 328 (16). Since there is no similar study done in the area for third objective p was taken 50%, desired degree of precision was 5%, 95% confidence interval sample size reached is 384. By taking the largest sample size The final sample size for this research was 403.

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

Where

z= the standard score corresponding 95% confidence level

P=proportion of diabetic patients with poor dietary practice (51.4%)

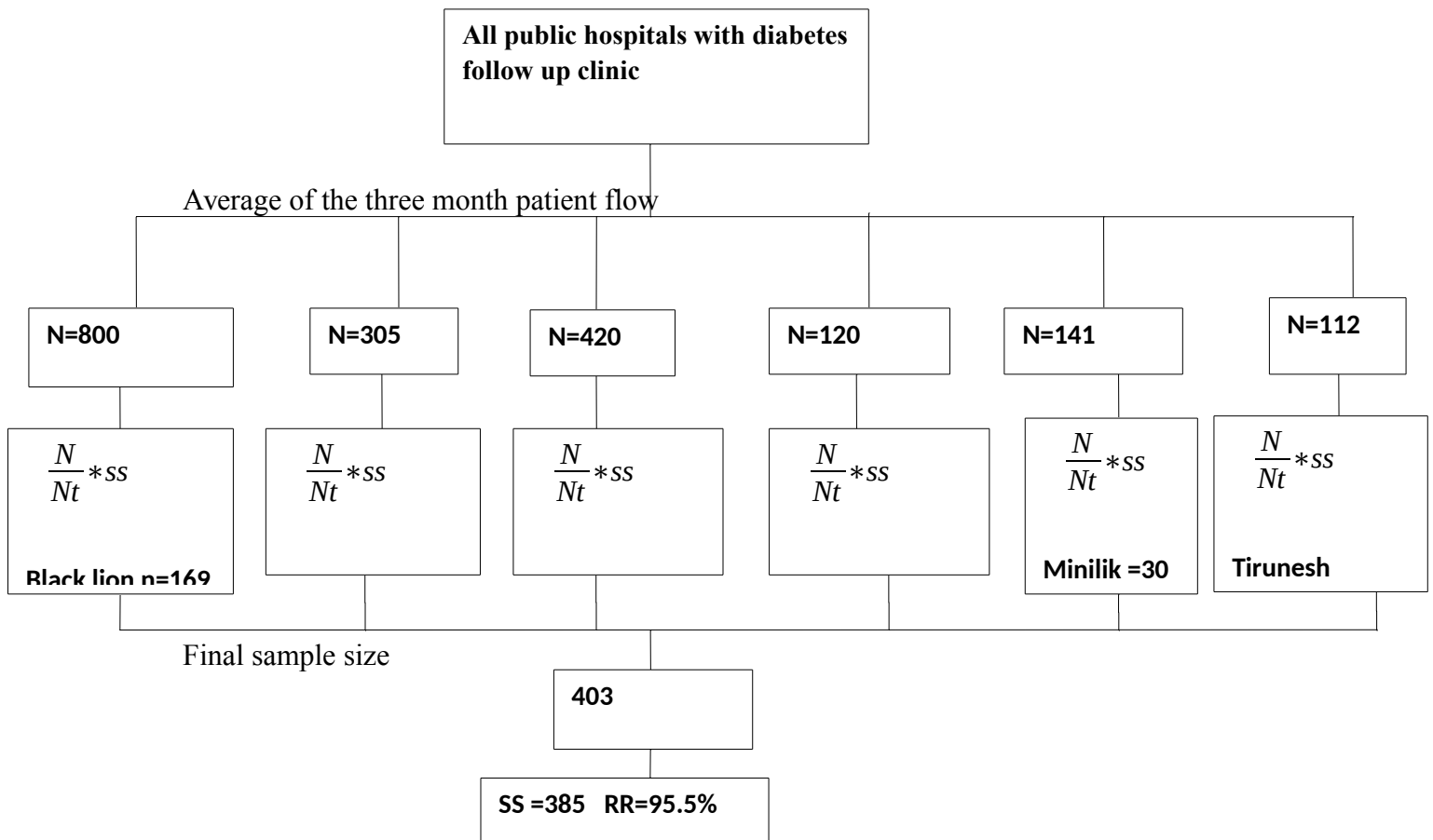
d=margin of sampling error (0.05)

n=number of samples (403)

#### 4.5 Sampling procedure

We obtained the total number of patients three month preceding the data collection from each hospital except one hospital because we couldn't get ethical clearance from the department. Based on this, the sample size of the study was allocated to each hospital proportional to the number of patients in their follow-up clinics. Systematic random sampling technique was used to select study subjects from the selected

facilities based on the patient flow during the study period. The sampling interval was obtained by dividing the sampling proportion in one month (N) to the number of sample (n) at each data collection site. eg ,for black lion  $403/169=4.6 \sim 5$  for all hospitals K was 5.



**Figure 1 schematic presentation of sampling procedures**

#### 4.6 Data collection

Data was collected by 14 trained nurses. The diabetic clinics provide services two days per week. Based on the decision to collect data over the course of one month, the sampling interval was determined by dividing the expected number of diabetic patients

per month into the sample size allocated in each hospital. Thus systematically selected patient coming to the clinic on the day of their appointment day for a follow-up service was interviewed until the total sample size is reached. We developed a questionnaire containing socio demographic, health profile, and dietary data. The first part was demographic information which included age, sex, and marital status, income and level of education. The second part is clinical characteristics includes; duration of disease, treatment modality, co morbidity, family history, physical exercise, and Fasting blood sugar. Third part was about diabetic dietary knowledge of the patient which was adapted from a Development of a general nutrition knowledge questionnaire for adults (47).

**Dietary data:** The questionnaire also included a Semi quantitative FFQ. The list of food items in the FFQ is created from locally consumed foods. We conducted a 24 hr dietary recall on 20 patients which were not included in the study. The aim of the 24 hr dietary recall was to assess the common food types diabetes patients commonly eat. The result helped to complete the list of food in the FFQ the format is adapted from willet FFQ. The FFQ constituted 67 food types divided in to 9 groups including cereal, legumes, roots, sweets, meat, dairy product beverages and fast foods. The food items were taken from EFCT(Ethiopian food composition table )(48, 49).Few food list which was not included in EFCT were borrowed from Tanzania food composition table(50) and USDA composition table(51).

**Portion size estimation:** The portion sizes of the food items consumed by patients were grouped in to three and four. The portion sizes of the food items were captured as follows. All the food list were cooked and prepared for measurement at EPHI (Ethiopian public health institutes) laboratory by the principal investigator ,except commercial an available items such as banana ,orange ,mango ,papaya ,wine ,burger ,pizza, soft drinks ,honey, sugar ,lemon and tuna. Based on the 24 hr dietary recall we identified common utensils used by people living in Addis Ababa the measurements was taken with this utensils purchased from market. The Portion size estimation was done using this utensil like tea spoons, cups, glasses, plates. For each food type measurement was taken to know how much gram one utensils assigned for that specific

food type contains. Different portions were prepared then code was given based on the amount and type of utensils measured. Photograph was taken for each measurement done and album was prepared to help the patients pick easily which utensil with what amount they have used for each food items listed. Foods items were weighed by digital weight scale (EK 01) 3 times and the average was taken for each portion measured.

#### **4.7 Study variables**

##### **4.7.1 Dependent variable**

Dietary pattern

Fasting blood sugar

##### **4.7.2 Independent variable**

- Age, Sex, Religion, Type of work, Income, Educational status
- Knowledge about the recommended diet, Duration of illness, duration of follow up, other co morbidity, attending dietary education, member of diabetic association, Source of information

#### **4.8 Operational and Standard definitions**

**Good Controlled Glycemia** -Fasting blood sugar  $\geq 70$  mg\dl and  $\leq 130$  mg mg\dl

**Poorly controlled Glycemia** -Fasting blood sugar  $> 130$  mg\dl and  $\leq 70$  mg\dl

**Good dietary Knowledge** – Study participants who had scored greater than 12 of the 16 questions asked.

**Intermediate dietary Knowledge** – Study participants who had scored between 8 to 12 questions out of the 16 questions asked.

**Poor dietary Knowledge**-Study participants who had score less than 8 of the 16 knowledge questions asked.

**Younger Age** –those patients whose age is below the mean age (51.2  $\pm$ 12.1).

**Older Age** – Those patients whose age is greater or equal to the mean age( 51.2  $\pm$ 12.1).

**Dietary pattern** –Quantities, proportions, variety or combination of different foods and beverages in diets and the frequency with which they are habitually consumed.

#### **4.9 Data Analysis Procedure**

##### **Descriptive analysis**

The collected data was entered to EPI info 7.1 and then exported to STATA for further analysis. Data was checked for outliers and corrected accordingly.

Descriptive analysis was done using frequency distribution, measure of central tendency to describe socio demographic, health profile and macronutrient intake. Dietary knowledge level was assessed by the 16 questions that should be answered correctly 1 point is given for each answer and bloom's cut off point was used for classification of the knowledge score.

##### **Assessment of dietary pattern**

For assessment of the dietary pattern factor analysis was used to decrease the complexity of the foods. Five dietary patterns were derived from the 67 food item. Eigenvalue >1 were retained with 0.91 % reliability coefficient scale, individual food items with a factor loading of > |0.4| are highlighted as composing factor for simplicity (33). Factor scores were then categorized in to three tertile which was classified as low(T1), intermediate(T2) and high consumer(T3) (52). High consumer of food was taken as reference for comparison. Linear regression was used to assess continuous variable like age, income DM follow up duration, knowledge of DM patients on the recommended diet with dietary habit and logistic regression is done to assess the relation of dietary pattern with categorical variable like medication use, school attendance, marital status, physical activity, Dm association member and advise from doctor .On multivariate analysis the model was adjusted for age and sex. Finally Multivariate logistic regression analysis after adjusted to sex, age, income, educational status, medication use, physical exercise was employed between Fasting blood sugar and the dietary pattern. P value of <0.05 was accepted as significant in all tests.

##### **Nutrient intake analysis**

The food item filled by a code was converted to gram by multiplying the code with the assigned grams for each item by dividing by 7 or 28 days in order to find one day consumption. Nutrient content per 100 gm from each food item was listed and entered

to food processor software version 8.1. Then the converted grams was entered to software to obtain the needed nutrients for each individuals.

#### **4.10 Data quality management**

Before data collection questionnaire was prepared based on the objective of the study and 2 days training was given for data collectors and supervisors on how to carry the interview and how to estimate portion size. Pre testing questionnaire was done in 20 patients which was not included in the study to assess the understandability of the questions. The questionnaire was prepared in English then translated to local language Amharic and back translated to English to check for its consistency.

During data collection the investigator and the supervisors were following closely the data collection process for its completeness. Photograph samples were used in order to decrease recall bias and increase the understandability of the FFQ. Weight scale was calibrated by a known weight object before each food was weighed.

#### **4.11 Ethical consideration**

Ethical clearance was obtained from Addis Ababa University School of public health research ethical committee. Permission to conduct the study was also obtained from the hospitals. Informed Consent was obtained from the participants, after the necessary explanation about the purpose, benefits, risks of the study and also their right on decision of participating in the study all the interviews with subjects was made with strict privacy. Confidentiality was assured. The right of the respondents to refuse answer for few or all of the questions was respected.

#### **4.12 Dissemination of results**

Result will be submitted to Addis Ababa University School of Public Health. Result shall be disseminated for Addis Ababa Health Bureau and Ethiopian diabetic association and shall be presented to different workshops and Publication on peer reviewed journals



## **5 .RESULTS**

### **5.1 Socio demographic characteristics**

A total of 403 diabetic patient who had follow up was approached of which 385 (95.5%) completed the questionnaire. Among the study samples, 174 (45.2 %) were males and 211(54.8) were females. The age range of the patients was from 22 to 83 years with mean age of  $51.2 \pm 12.1$ . Among all the participants 229 (59.5%) were Christians followed by 86(22.3%) Muslims. From the study participants 252 (65.5 %) were married followed by widowed 61(15.8%). One hundred forty three (37.2%) of the participants were Amhara followed by Oromo 83(21.6%). From the study participants 277(71.9%) attended school out of which 79(28.5%) has completed secondary school 66 (23.8%) attended college and above while 108(28.05%) were illiterate. The income of the participants 158 (41.04%) of the subjects lays in (1201-2500) category which is categorized as average income. Around 106(27.53 %) of the subjects are government employees while 67(17.40 %) were merchant and 65(16.88%) are private work employee.

**Table 1 Socio demographic characteristics and health profile of type 2 Diabetes patients who were on follow up in public hospitals Addis Ababa ,Ethiopia (n=385 ),2016.**

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Sex</b>		
Male	174	45.2
Female	211	54.8
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Age category</b>		
<40	68	17.7
40-49	108	28.1
50-59	98	25.5
60-69	81	21.0
>70	30	7.8
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Religion</b>		
Muslim	86	22.3
orthodox	229	59.5
protestant	47	12.2
other	23	5.9
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Marital status</b>		
Married	252	65.4
Single	53	13.8
Widowed	61	5.8
Divorced	19	4.9
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Ethnicity</b>		
Oromo	83	21.6
Tigre	71	18.5
Amhara	143	37.2
Gurage	58	15.1
Other	29	7.6
<b>Total</b>	<b>384</b>	<b>100</b>
<b>Have attended school</b>		
yes	277	71.9
No	108	28.1
<b>Total</b>		
<b>Educational status</b>		
Can read and write	74	26.7
Primary school	58	20.9
Secondary school	79	28.5
college Graduate and above	66	23.8
<b>Total</b>	<b>277</b>	<b>100</b>

<b>Occupation</b>		
Farmer	28	7.3
Government employee	106	27.5
Merchant	67	17.4
Private organization	65	16.9
House wife	85	22.8
Other	34	8.8
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Monthly income</b>		
Very Low	20	5.2
Low	67	17.4
Average	158	22.6
Above Average	50	41.0
High	90	13
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Follow up duration</b>		
1-5	185	48.1
5-10	124	32.2
>10	72	19.7
Median	5 (2,8)	
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Way of treatment modalities *</b>		
Insulin injection	197	51.2
Oral hypoglycemic agent	215	55.9
Controlled Diet	81	21
Both oral hypoglycemic and insulin	38	17.7
Physical Exercise	31	8.1
<b>Total</b>	<b>385</b>	<b>&gt;100</b>
<b>Advice from a doctor about DM patients diet</b>		
No	143	37.1
Yes	242	62.9
<b>Total</b>	<b>385</b>	<b>100</b>
<b>DM association member</b>		
Yes	102	26.5
No	283	73.5
<b>Total</b>	<b>385</b>	<b>100</b>
<b>Fasting blood sugar</b>		
Poorly controlled glycemia	306	79.5
Good controlled glycemia	79	20.5
<b>Total</b>	<b>385</b>	<b>100</b>

\*% more than 100 because some patients used more than one treatment options Income -Very low <445, low 445-1200 ,average 1201-2500, above average 2501-3500, high >3501 (Based on the Ethiopian Civil service monthly salary for civil servants)

## **5.2 Health profile of type 2 DM patients**

About 185 (48.1%) patients were on follow up between 1-5 years and with a median follow up duration of 5 (2,8). One hundred twenty (31.2 %) patients reported that they had family history of DM and 185(48.1%) had co- morbidity. Hypertension was the number one co morbidity disease reported which accounts 121( 31.4%)followed by hyperlipidemia 46 (11.9%).Majority of the subjects 215(55.8%)used oral hypoglycemic agent while 197 (51.2%) used insulin to control blood sugar level and 38(17.7%) used both oral hypoglycemic agent and insulin. Only 81(21.0 %) of the subjects used diet as controlling the blood sugar level. Out of 385 subjects 216 (56.1%) said they have made change of dietary habit when they know they have diabetes.

The patients mentioned doctors, nurses, media as source of information about diabetes diet 311(80.8%) from doctors, 150(39 %) from nurse and 98(25.5%) from media .Two hundreds forty two (62.9%) had advise from the doctor about what they should eat. More than half of the participants 213(55.3%) didn't not do physical exercise at all while 44 (11.4%) exercise 3 times a week for 30 min .One hundred fifty five (40.3%) answered unavailability of healthy food while 122(31.7%) poor dietary knowledge as a barrier for following the recommended diet. Three hundred six (79.5%) of the patients had poor control of glycemia while 79(20.5%) had good control of glycemia.

## **5.3 Dietary knowledge of type 2 DM patients**

With respect to knowledge about the recommended diet most of the patient (55.8%) had poor dietary knowledge. While 171(44.4%) had intermediate dietary knowledge about the recommended diet. The Mean  $\pm$  SD knowledge score was  $7.0 \pm 1.65$ .

The study participants were asked about the life style modification they knew to control glycemia level and Two hundred forty seven (64.2 %) mentioned dietary modification as one of the ways to control blood glucose level and 29(7.5%) didn't know any life style modification.

Two hundred ten (54.6%) patients knew that consumption carbohydrates have immediate effect on blood glucose level while 15(3.9%) didn't know a specific food group that has immediate effect of blood glucose level. Only fifty percent of the participants identified the food types that are sources of carbohydrate.

When the patients asked about which preparation of food decreases or maintain blood sugar level 227 (58.9 %) correctly answered whole grain while 158 (41.0%) of them answered refined grain. When patients asked about which ways is better to eat fruits 95(24.7 %) answered to take as juice while 290(75.3) said eating the whole fruits would help. Three hundred ten (80.5%) didn't think skipping meal time would help controlling blood sugar level while 75(19.5%)thought that skipping meal time will help controlling blood sugar level. Sixty seven percent of the patients who received advice from doctor had intermediate knowledge level while 32% has intermediate knowledge level from those who didn't get advice from doctor.

**Table 2 Dietary knowledge of type 2 DM patients on follow up in public hospitals Addis Ababa, Ethiopia 2016 (n=385)**

Questions	Responses	Yes	%	No	%
Life style modification	Exercise	187	48.6	198	51.4
	Dietary modification	247	64.2	138	35.8
	Weight loss	188	48.8	197	51.2
Raises blood glucose	Carbohydrates	210	54.7	175	45.4
Source of carbohydrate?	Barley ,Ethiopian flat bread, bread, rice ,porridge	193	50.1	192	49.9
Should be eaten to control your blood glucose?	cereal groups mixed with other food groups	206	53.5	179	46.5
	lower sugar level	197	51.2	188	48.8
Lowers your blood level	Whole grains	227	58.9	158	41.1
Helps to achieve good glycemia	fruit daily	131	34.0	254	65.9
	vegetables Daily	280	72.7	105	27.3
	fiber	83	21.6	302	78.4
Raises blood glucose level	Ethiopian flat bread	19	4.9	366	95.1
person with DM eat the most of time	Vegetable and fruit	266	69.1	119	30.9
Preferable way of eating fruit	Not juicing	290	75.3	95	24.7
Plate should vegetable covers?	Half	130	33.8	255	66.2
skipping meal could help control blood sugar level	Yes/No	75	19.5	310	80.5
Knowledge score (mean± SD)	7.0 ± 1.65				

#### **5.4 Macro Nutrient intake of type 2 DM patients**

The response of the patients with regard to dietary practice majority of the patient (89.4%) had a meal frequency of three and more times a day. One hundred twenty eight (33.3%) of the patients consumed vegetables more than 6 times week 3 times in a day while 257 (66.6%) didn't eat that amount. More than half of the participants 230 (59.8) used unsaturated oil for cooking while 189(49.1 %) used saturated fat out of this 37(9.6%) of the participants used both saturated and unsaturated oil. Greater number of patients which is (85.2%) takes fruits as a whole while 57 (14.8%) take fruits juiced.

The mean energy intake was 1669.2±469.3. This is below the recommendation for overall population. When the macronutrient mean intake is seen carbohydrate is 72% (68.3%-75.8%) of the energy consumed, which is more than the recommended daily allowance. Total fat is 15.7 % (±4.38), protein 15.12% (13%-20%) of the total energy consumed and fiber consumption is 32.76 gm\ d (23.3-42.0 gm\ d).

**Table 3 Nutrient intake in % out of total energy on type 2 DM patients on follow up in public hospitals Addis Ababa Ethiopia February, 2016 (n=385)**

Nutrients	Mean daily intake ( % from the total energy)	Recommended daily allowance (RDA)
Energy (kcal)	1669 ±469. 3	2000-2500kcal
Carbohydrate (%)	72 % (68.3%-75.8%)	50-60( % of total energy)
Protein (%)	15.1 % ( 13%-20%)	15-20( % of total energy)
Fat (%)	15.7 ±4.3	<30%( % of total energy)
Fiber (g)	32.8g(23.3-42.0)	25-35 g\day

## 5.5 Dietary pattern Identified

The factor analysis identified five dietary patterns (table 4). Factor 1, characterized by high loading of white Ethiopian flat bread (*nech tefff injera*), pasta, macaroni, stew made from split lentils, stew made from pumpkins, stew made from carrot, stew made from cabbage, stew made from roasted legumes (*shiro*), stew made from roasted legumes and condiments (*mitin shiro*), stew made from split pea (*ater kik*), banana, mango, orange and low loading for red Ethiopian flat bread (*key teff injera*), kale and *mirinda* it was labeled as “cereals, vegetable, legumes and fruits” pattern. Factor 2 had high loading for *chechebsa*, porridge, green beans, mashed meat with butter (*kitfo*), wine, and low loading for pasta, macaroni, shredded flat bread with spice (*firfir*), barley bread, stew made from cabbage, fried egg factor is labeled as “cereal, meat, vegetable, wine”. Factor 3 had high loading for chips and pizza while they had low loading for red Ethiopian flat bread (*key teff injera*), barley bread, boiled cracked wheat mixed with butter (*kinche*), stew made from carrot, stew made from cabbage, mango and lemon and it was labeled as “fast foods”. Factor 4 had high factor loading for sliced tomato and coffee while low factor loading for red Ethiopian flat bread (*key teff injera*), barley bread, boiled cracked wheat mixed with butter (*kinche*), chips, porridge, green beans, stew made from roasted legumes and it is labeled as “vegetable and coffee”. The last factor which is factor 5 gave high loading factor for yoghurt and coca cola and low loading factor for red Ethiopian flat bread key, white Ethiopian flat bread (*nech teff injera*), pasta, stew made from carrot, and stew made from cabbage it was labeled as “sweet and dairy product”.

**Table 4 Food items and factor analysis of type 2 DM patients on follow up in public hospital Addis Ababa 2016 (N=385)**

Food lists	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
White teff injera ( <i>white Ethiopian flat pan cake</i> )	0.4	-	-	-0.20	-0.05
Red teff injera ( <i>red Ethiopian pan cake</i> )	-0.01	-	-0.40	-	-0.03
Pasta	0.64	-0.10	-	-	-0.2

Boiled Grinded wheat mixed with butter ( <i>Kinche</i> )	-	0.43	-	-	-0.14
Macaroni	0.75	-0.06	-	-	-
Rice	0.64	0.4	-	-	-
stew made from lentil split( <i>misr Kik wot</i> )	0.82	-0.11	-	-	-
Stew made from potato( <i>Dinich wot</i> )	0.67	-1.12	-	-	-
Stew made from Carrot (alicha carro)	0.74		-	-	-0.14
Stew made from Cabbage	0.7	-0.017	-	-	-0.03
Stew made from boiled Kale	-0.04		-	-	-
Stew made from boiled roasted legumes( <i>Shiro</i> )	0.8	-0.19	-	-	-
Stew made from roasted legumes and condiments ( <i>Mitin shiro</i> )	0.67		-	-	-
Stew made from split lentils ( <i>Ater kik</i> )	0.67	-0.187	-	-	-
Papaya	-	0.52	-	-	-
Mango	0.8	-	-	-	-
Orange	0.7	-	-	-	-
Soda drink( <i>Mirinda</i> )	-0.01	-	-	-	-
Banana	0.7	-	-	-	-
Coffee	-0.06	-	-	0.4	-
Porridge	-	0.44	-	-0.17	-
Flat bread with butter( <i>Chechebsa</i> )	-	0.43	-	-	-
Green beans( <i>Fosoliya</i> )	-	0.41	-	-	-
Mashed red meat with butter( <i>kitfo</i> )	-	0.42	-	-	-
Wine	-	0.4	-	-	-
barley bread ( <i>Gebs dabo</i> )	-	-0.35	-	-0.01	-
Chips ( <i>fried potato</i> )	-	-	0.42	-	-
Tomato slice	-	-	-	0.45	-
Yoghurt	-	-	-	-	0.52
Soda drinks Coca cola	-	-	-	-	0.45
Pizza	-	-	0.46	-	

Food items with factor loading  $\leq \pm 0.4$  were left dash

## 5.6 Dietary pattern characterized by variables

Table 5 shows characteristics of subjects according to the tertile classification ,factor 1 characterized by selected variables the subjects which consume higher consumption of this group had better nutritional advise from doctor ,higher calorie intake than the low consumer of this group . “Cereal meat, green beans ,wine” based factor the subjects

with a high consumption of this factor is had higher income ,higher number of Dm member association , higher calories intake and less use of diabetes medication and relatively higher knowledge of the recommended diet and currently married than the low consumer of this group. The other factor which is characterized by “fast food “is characterized by younger age group ,smaller diabetes mellitus association member ,less nutritional advise from doctor and higher calorie intake than the low consumer of this pattern . The vegetable and coffee consumer of had attended school more , had taken more advise from a doctor but had lower level of knowledge about the recommended diet relative to the low consumer of this group. The last factor which is the 5<sup>th</sup> is characterized by soda drink and yoghurt were older age, lower dietary knowledge level relative to the low consumer of this group.

**Table 5 Characteristics according to tertiles categories based on dietary pattern on type 2 DM patients who is on follow up in Addis Ababa Ethiopia February 2016(n=385)**

Characteristics	Factor 1(cereal ,vegetables ,legumes, fruit			Factor 2 (cereal ,meat ,vegetable ,wine			Factor 3 (fast foods )		
	T1	T3	Model	T1	T3	Model	T1	T3	Model
Gender (male)	75(58.1)	65(51)	-	68(52.7)	74(57.8)	.04	72(55.8)	69(53.1)	-
Age (years)	51.6±1.1	50.3±1.1	-	52.6±1	50.1±1.2	-.04	53.2±1.0	47.±1.10	-.*
Education (birr)	2379±394	2821.7±198.6	.063	1870.3±115.7	3130±198.2	.14 **	2742±409.6	2375±145.1	-.04
Duration of follow	5.9±.4	6.4±.5	.065	5.8±.4	6.25±.5	.03	6±.4	6.12±.5	.06
Diagnosis (yes)	277(71.9)	100(78.7)	.101	74(57.4)	110(85.9)	.21 ***	88(68)	101(78.9)	.079
Referral (yes)	30(23.3)	38(29.9)	.05	26(20.2)	46(35.9)	.15 **	40(31)	26(20.3)	-.10*
Advice from doctor	58(45%)	91(71.6)	.12 **	62(48.1)	89(69.5)	0.094	73(56)	37(45.7)	.17 **

obesity (yes)	51(41.9)	55(43.3)	.039	49(37.2)	60(46.9)	.094	70(54)	45(35.2)	-.05
Energy (kcal)	1604.9 ±38	1783.3± 44.8	.16**	1610.4± 40.3	1767.3± 42.2	.15*	1640± 40.2	1742± 43.7	.10*
Medication	83(64.3))	64(50.3)	-.0758	83(64.3)	58(45.3)	-.14 **	69(53.5)	71(55.4)	.014
Smoker (yes)	45(34.8)	63(49)	.06	38(29.4)	80(62.8)	.264***	55(42.6)	59(46.5)	.004
Recently married	85(65.9)	80(62)	-.03	80(62)	93(72.6)	.109*	81(62.7)	87(67.9)	.036
Education level	6.9± .13	7.1±.15	.07	6.8±.14	7.3±.13	.14**	6.9± .14	6.9± .15	-.04

Energy: mean ± SD, number of subjects (percentage) after adjustment. \*P < 0.05, \*\*P < 0.01, \*\*\*P < 0.001 Model 1: Trend estimate

Linear trends across tertile is based on linear regression analysis for continuous variables or logistic regression analysis for categorical variable

**6 Characteristics according to tertiles categories based on dietary pattern on type 2 DM patients who is on follow up in hospitals February, 2016(n=385)**

Characteristics	Factor 4(vegetable and coffee)			Factor 5 sweet and diary product		
	T1	T3	Model	T1	T3	Model
male)	69(53.1)	67(52.1)	-	79(61.1)	58(45.1)	-
years)	50.8±1	52.1 ±1	-	49.7± 1.1	53.0± 1.0	-*
e (birr)	2317.5± 184	2732±149	.05	2381.7± 166	2607± 167.3	.012
on of follow	6.1± .5	5.9± .5	-.03	7.05±.6	5.42± .42	-.12
attendance(yes)	81(62.8)	104(81)	.16p*	97(75.1)	85(68.7)	-.03
sociation(yes)	33(25.2)	41(32)	.089	38(29.2)	34(26.6)	-.002
from doctor	68(52.7)	103(80)	.26 ***	80(62.0)	83(64.8)	.037
rbidity (yes)	42(32.2)	61(47.7)	.082	52(40.1)	59(46)	.048
s (kcal)	1666± 41.6	1605± 44.4	-.094	1711.05± 41.4	1686.2± 44.5	.025
edication (yes)	70(54.3)	70(54.6)	0.2	70(54)	69(53.7)	-.045
se (yes)	59(45.7)	70(54.6)	.145	56 (43.4)	61(47.6)	.029
tly married (yes)	73(57.6)	100(78.1)	-.02	91(70.5)	81(63.1)	-.047
y knowledge	7.08± .14	6.73±.2	-.112 *	7.48±.1	6.62± .2	-.15 **

Data are mean ± SD, number of subjects (percentage) after adjustment. \*P < 0.05, \*\*P < 0.01, \*\*\*P < 0.001 Model 1: Trend estimation for linear trends across tertile is based on linear regression analysis for continuous variables or logistic regression analysis for categorical variable. Standard regression coefficient is shown

### **5.7 Multivariate analysis of FBS and dietary pattern**

In this study a multivariate analysis to investigate the relationships between the dietary patterns and patient's glycemic control were used. Dietary pattern 1 and 2 has significant association with controlled fasting blood sugar those who has high consumer of cereal ,vegetables ,legumes and fruit had AOR= 2.87,95% CI(1.30- 6.3) times the odds of controlling the blood sugar relative to the low consumer of this group. Similarly same is true for those with higher consumption of cereal ,meat ,vegetable ,wine had AOR= 2.24,95%CI(1.02- 4.9) times the odds of controlling the blood sugar with respect to those who consumes low amount of this dietary pattern. The remaining 3 factors which are characterized by fast foods, vegetable and coffee and sweet and diary procdunt didn't show any significant association with FBS.

**Table 7 Bivariate and multivariate analysis between good controlled FBS and dietary pattern of DM patients who has follow up at public hospitals Addis Ababa Ethiopia 2016 , (n=385)**

Variable	Frequency	COR (CI=95%)	AOR (CI=95%)
<b>cereal ,vegetables ,legumes &amp;fruit</b>		<b>1</b>	<b>1</b>
Low	129	1.91 (.96 -3.82)	1.52 (.66- 3.46)
Intermediate	129	3.21(.67- 6.27) ***	2.87(1.30- 6.3)**
High	127		
<b>cereal ,meat ,vegetable &amp;wine</b>		<b>1</b>	<b>1</b>
Low	129	1.9 (.94- 4.05)	0.94(.4- 2.2)
Intermediate	128	4.5 (2.2- 8.9) ***	2.24(1.02- 4.9)*
High	128		
<b>Fast foods</b>		<b>1</b>	<b>1</b>
Low	129	.7(.37- 1.32)	0.75(.3-1.5)
Intermediate	128	1.1 (.61-1.98)	0.8(.39- 1.67)
High	128		
<b>vegetable and coffee</b>		<b>1</b>	<b>1</b>
Low	129	.92(.51- 1.65)	0.54(.5- 2)
Intermediate	128	.55 (.29- 1.03)	1.008(.26- 1.13)
High	128		
<b>Sweet and diary product</b>		<b>1</b>	<b>1</b>
Low	129	.53 (.28- 1)	0.7(.35- 1.4)
Intermediate	128	.74(.41-1.33)	0.29(.33- 1.39)
High	128		

**Adjusted to age, sex, income, educational status, DM medication intake and physical exercise \*P < 0.05, \*\*P < 0.01, \*\*\*P < 0.001**

## 6. DISCUSSION

The objective of this study is to assess the dietary pattern and knowledge of type 2 DM patients on the recommended diet those on follow up in Addis Ababa public hospitals. Nutrient intake was calculated by food processor software and knowledge was evaluated by sixteen questions. The overall knowledge the patients were poor. Factor analysis was done and Five dietary patterns were found which characterized by the type of food by which the factor gave high loading factor. Factor 1 cereal ,vegetables ,legumes &fruit based showed positive association with calorie intake and advise from a doctor .Factor 2 is cereal ,meat ,green vegetable and wine had shown positive association with income, educational status, DM association member, physical activity, marital status, knowledge level and negatively associated with medication use. Factor 3 which is fast food based is had less member of DM association, less advise from doctor ,and has more income than lower consumer group .Factor 4 vegetable and coffee pattern has shown positive association with advise from doctor and educational level but factor 5 has only shown positive association with age and negative association with knowledge. Those who consumed high amount of Cereal, vegetables, legumes &fruit based and cereal, meat, vegetable and wine based were positively associated with good control of fasting blood sugar than the low consumer of the patterns. Fat, proteins and fiber intake of the patients were within the recommended range but carbohydrate intake was high meanwhile energy intake was lower than the recommendation.

Poor dietary knowledge about the recommended diet was observed in 55.58% of the patients and no knowledge difference between male and female .This result is inconsistent with the study done in felege hiwot hospital where poor knowledge level was 69 % which in lines with south African study where poor knowledge regarding healthy dietary intake was 73.3 %.Nepalese study on type 2 diabetes patients 49.2 % of the patients had poor knowledge about the recommended diet(39) and study done in USA on low socioeconomic participants where 40% of the respondents didn't know what food to eat(53) .The difference could be explained by the literacy level, training received ,the quality of service received and the information the patients received(54). Eighty one percent of subjects mentioned doctors as source of information about diabetic diet similar figure is found for the study done in Sudanese patients(32).From the patients who had intermediate knowledge level 67% of them had received advise from a doctor while 31% of who scored intermediate didn't receive advise from doctor this might lead us to

say that advice from doctor could have effect on the knowledge of the patients. This finding is supported by a comparative study done in Nigeria on type 2 DM patients mean dietary score increased after receiving dietary advice(55).

In this study carbohydrate was consumed above the recommended daily allowance. Which has similarity with the national consumption survey done in Ethiopian where the carbohydrate intake of the overall population was 73.5% and 68.1% for woman and men respectively which higher than the recommendation(56). The same is true for Saudi Arabian study done among type 2 DM patients .Though they have used 24 hr recall to assess nutrient intake higher consumption of carbohydrate was seen (57).In one Iranian study they used the same dietary assessment but the intake of carbohydrate was low this could be due to cultural difference and the cereal based pattern in our study(28). While study done in Japan and Malaysia the amount of carbohydrate was within the recommended daily allowance this difference could be due to cultural difference between the countries and the different method which is 24 hr recall and self-administered diet history questionnaire they have used respectively (27, 30).In this study the intake of protein, fat and fiber consumption was based on the recommendation. It inline with the food consumption survey done in Ethiopian.(56)

The dietary pattern identified was almost similar with the national food consumption survey done which was cereal groups are most commonly consumed food groups in the country followed by legumes root & tubers respectively. Flesh foods and dietary product consumption was found to be very limited(56) .Which is similar with our study where three out of the five dietary patterns is dominated by cereal intake.

Among the five dietary pattern identified subjects who has higher loading for cereal ,vegetables ,legumes and fruit has more advise from doctors and has higher calories intake compared while, no significant difference in come, DM association and no difference in educational status was seen compared to the lower consumer of this groups. This is similar with Tehran study which they labeled as healthy dietary pattern have higher energy intake and physical activity levels, compared to the lowest quartile(34) .In a Korean study Compared with subjects in the lowest quartile of the 'Korean Healthy' pattern which has similarity with the factor 1 in our study those in the highest quartile were more likely to have a higher level of

education and household income but in our study this difference is not observed this could be the result of the difference in classification of the pattern and socioeconomic status (35).

The subjects who had higher score for the second pattern has higher income, higher school attendance, more diabetic association member and lesser use of DM medication. Similar result is seen in Iranian study shows which they labeled “semi healthy” patients had a higher income and higher family history of diabetes (34).The fast food pattern had higher calorie intake this could be due to high fat and unsaturated fat content of the foods. They also had lesser advice from a doctor and they are less member of DM association than the one who consume lower amount of this group. This shows its helpful to be DM association member and accepting advise from a doctor might guide to following a relatively healthy dietary pattern .It surprising to see that this pattern has no significant association with fasting blood sugar .In contrast Iranian study which labels as western patter which gives high loading factor for foods found in our study stated that they have higher FBG level. Those who has high loading for vegetable and coffee pattern attended school higher and has got more advice from doctors but smaller dietary knowledge level. Those who has co morbidity and follow up duration of the patients hasn't show any association with any of the five dietary pattern identified. The same is true for study done in Tokyo Japan that duration of DM has no association with the six pattern they identified (33).

When we see the association between dietary pattern and glycemc control of the patients. The first dietary habit which is characterized by high consumption of cereal , vegetable, legumes and fruit the higher consumer of this pattern had AOR 2.87(1.30- 6.3) times the odd of controlling the blood sugar than the low consumer .This study shows similar figure with the Iranian study which is low consumption of fruit and higher consumption of starchy, legumes food has higher fasting blood sugar compared with high consumer .This could be due to vegetable and fruits eating individuals tend to have lower blood glucose level (34).The cereal, meat , vegetable and wine group had AOR 2.24(1.02- 4.9) times the odds of controlling blood sugar level than low consumer of this group .In the Japanese study FBS was not affected by any of the 6 dietary pattern found(33).

This study has its own limitation ,first it was cross sectional study which has effect on hindering causal effect .Thus it need to be done by observational or follow up to confirm the result we

found in here with real practice so that it can help to develop strategies for managing diabetes specifically by diet management. Since semi quantitative FFQ was used to assess the dietary intake it is likely to have measurement error such as difficulties in recalling consumed items, under-reporting or over-reporting about some or total number of food items or nutrients and social desirability bias is also one undeniable limitation of this study. The other is we used single measurement of FBS which can only tell us the recent control of blood sugar not the long term ,so it's better to use Hba1c which we couldn't use due to its unavailability in few hospitals. The other is there is no gold standard way to determine the number of factors that needs to be included in factor analysis, we used factor analysis and loading factor 0.4 was taken which is subjective and it can left out the food groups that needs to be included analysis but its reliability was shown in several studies (34),(33, 52, 58). Validation of the semi quantitative food frequency should have been done but it was not done due to time and budget constraints .

The strength of this study is it used a new method of dietary assessment which is Semi quantitative FFQ has been done and colored photographs of standardized portions of commonly consumed food items were prepared. Therefore, the study tools prepared for this study can serve as an input to carry future studies. No study has identified dietary pattern of particularly DM patients so, this will also help as reference for other study and will give picture about diet of DM patient. Unlike to the previous studies all public hospitals in Addis Ababa were included.

## **7. CONCLUSION**

As we see from the study the Knowledge level of the subjects were poor. It was seen that carbohydrate intake is high in the subjects and other nutrients are within recommended range but the overall energy intake is low. Five dietary patterns identified which three of the five is relatively healthier and dominated by cereal. Advice from doctor has shown negative association with non healthy food (fast food) pattern and positive association with the healthier dietary habit (cereal, vegetable, fruit, and legumes) and (vegetable and coffee). High consumer of Cereal, vegetable, fruit and legumes and cereal, meat, vegetable and wine pattern had good control of glycemia than the low consumer of this pattern.

## **8. RECOMMENDATIONS**

- ✓ Diabetic association to give different nutritional education for health professional and to work on awareness creation for the society using different media.
- ✓ An effort should be in place for health facilities to give nutritional health education and counseling for the patients starting from scratch.
- ✓ To engage dietitian in patient management.
- ✓ Assess the dietary habit with a better dietary assessment mechanism and design.
- ✓ The associations between dietary pattern and type 2 DM should be further studied and confirm their benefits for them.
- ✓ Encourage patients to follow vegetable and fruit based diet by optimizing carbohydrate intake.

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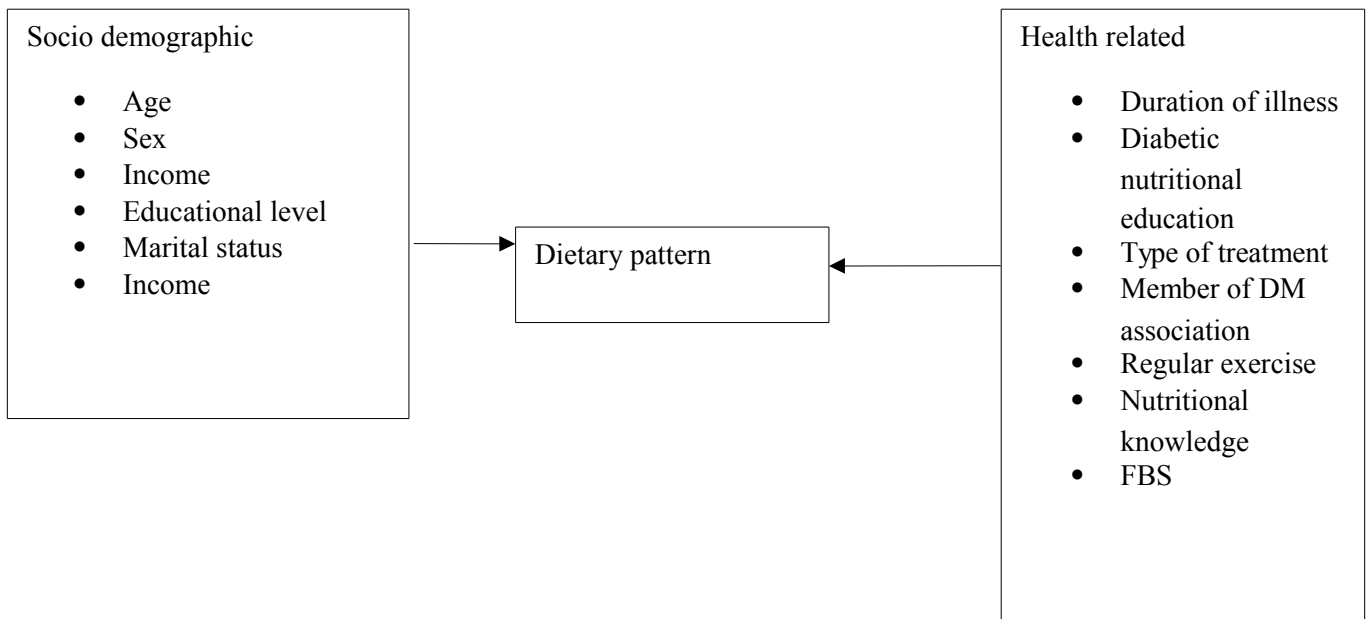
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## 10. ANNEXES

### Annex 1-Conceptual frame work

After reviewing different literatures different factor found to be affecting the dietary habit and knowledge of the patients this are socio demographic, heath related ,other factors like cost availability and family support



Addis Ababa University  
School of public health

Annex-2 Subject Information Sheet

My name is ..... I am here on behalf of Tsedey T/Michael student of Addis Ababa University School of public health. She is doing a research on ‘dietary habit and knowledge among type 2 DM patients. She received permission from Addis Ababa university school of public health and the hospitals.

You are selected by systematic random sampling method to participate in this study because you currently attending diabetic follow up. Your participation is purely based on your willingness .You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you are willing to participate or refuse or decide to withdraw later, you will not be subjected to any ill-treatment.

If you agree to participate in the study, you will be asked to answer some questions about yourself, your dietary habit and knowledge of diet. The interview with you will take about 30 minutes.

The study will help to practice the recommended dietary practice to prevent further complications. It can also provide base line data for policy makers and other researchers for further improvements diabetic nutritional education. The information that you provide will be kept confidential by using only code numbers. Do not give your name. No one will have access to the non-coded data except the principal investigator and the data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study.

Address: Cell phone +251 (0) 911995944 Email tsedeyp5@gmai.com

Questionnaires ID \_\_\_\_\_

Annex 3-Informed Consent Form

Based on the understanding of the information and I given information, are you willing to participate in this study?

A) Yes

B) No

(1) If yes, I will continue a

2) if no I will skip to next participant after writing the reasons of refusal.

**Respondent**

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Interviewer**

Name \_\_\_\_\_ Signature \_\_\_\_\_

Questionnaires number \_\_\_\_\_

Date of interview \_\_\_\_\_ Starting time \_\_\_\_\_ Completed \_\_\_\_\_

Result of interview A) Completed

B) Not completed

C) Partially completed

D) Refused

Checked by Supervisor: Name \_\_\_\_\_ Signature \_\_\_\_\_

Address: Cell phone +251 (0) 911995944

Email: tsedeyp5@gmail.com

Instruction: circle all the possible answers of the respondent from the choice provided.

Annex 4-English version Questionnaires  
**Part 1 -Socio demographic**

On this section of the questionnaire I will ask you few questions about your socioeconomic status and you will choose one or more choices from the answers

No	Questions	Responses	Skip to
101	What is your age	-----year	
102	Sex	Male ..... .....1  Female .....2	
103	What is your religion ?	Muslim..... .....1 Orthodox..... ....2 Protestant ..... .....3 Catholic..... .....4 Others ..... .....5	
104	What is your marital status ?	Married..... 1 Single .....2 Widowed.....3 Divorced..... 4	
105	What is your Ethnicity ?	Oromo .....1 Tigre.....2 Amhara.....3 Guarage.....4 Others (Specify).....5	

106	Have you attended	Yes.....1 → No.....2	go to 107
107	What is your Educational level?	Can you read and write.....1 Primary school .....2 Secondary school.....3 College graduate or above .....4	
109	What is your occupation? (multiple answer is possible)	Farmer .....1 Government employee.....2 Merchant .....3 Private organization employee .....4 Daily laborer .....5 House wife .....6 Other.....7	
110	Monthly income ( if married write the whole family income)	<input type="text"/>	

**Section 2 Health profile questions**

On this section of the questionnaire I will ask you few questions about the health profile and I will ask you to choose one or more answers from the choices

201	How long has it been since you diagnosed with DM?	<input type="text"/>	
202	How long has it been since you started DM follow up?	<input type="text"/>	
203	Do you have other Comorbidity diseases	No.....1 Yes .....2 If yes what type of co morbidity? Hypertension.....1 Hyperlipidemia .....2 CVD.....3	
204	Do you have family history of DM?	Yes.....1 No.....2	
205	How do you control your diabetes	By insulin.....1	

	so far? (multiple answer is possible)	Tablets .....2 By controlling diet .....3 By exercise .....4 Other .....5	
206	Have you made a complete change of your dietary habit when you know you are diabetic?	Yes .....1 No.....2	
207	What is your source of information about diabetic diet? (multiple answer is possible)	Media.....1 Doctors .....2 Nurses .....3 Dietitians .....4 Social medias .....5 Diabetic patients.....6 Non diabetic patients.....7 Neighbors.....8	
208	Does your doctor give you advice about DM patients diet?	Yes .....1 → No.....2	Go to 209
209	What does your doctor recommend that you should be eating more?	To eat whole grain.....1 To eat more vegetable.....2 To eat fruits .....3 Meat and dairy products.....4 Cereals .....5 To avoid sweets.....6	
210	Have you participated in a regular exercise?	Yes, usually (3 times a week for 30 min)...1 Yes, occasionally(less than 3 times a week....2 No, never.....3	
211	Which of the following factor affects your dietary habit although you wanted to follow recommended diet? Circle more than if there is any	Family support.....1 Cost of healthy foods .....2 Availability of fruit and vegetable.....3 Poor dietary knowledge .....4 Got no problem.....5	
212	Are you a member of diabetic associations?	Yes .....1 No .....2	

213	What was the last blood level?	FBS	<input type="text"/>	
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**Section 3 - Diabetic nutritional knowledge questions**

On this section of the questionnaire I will ask you few questions about your nutritional knowledge and I will ask you to choose one or more answers from the choices

301	What do you know regarding life style modification(multiple answer is possible )	Exercise .....1 Dietary modification .....2 Weight loss.....3 I don't know .....4	
302	Which of the food groups raises blood glucose relatively faster?	Carbohydrate .....1 Fiber .....2 Fat.....3 Protein.....4 I don't know .....5	
303	Which of the following should you do to control your blood glucose? (multiple answer is possible)	Eating foods prepared only of barley.....1 To eat from different cereal type with limited amount and mixing with other food groups.....2 To take food small or no sugar.....3 To skip breakfast and dinner .....4	
304	Which food do you think raises your blood level relatively faster?	Whole grain .....1 Refined grains.....2	
305	Which one is source of carbohydrate?	Barley,tef,bread,rice,kocho,sorghum...1 Meat,egg,milk,yoghurt.....2 Kale, Cabbage, Salad.....3 I don 't know .....4	
306	Which food helps to achieve good glycemic control? Read the choices (multiple answer is possible)	Eating fruits daily .....1 Eating vegetables daily .....2 Avoiding cereals .....3	

		Eating fiber.....4 I don't know .....5	
307	Which one of the following raises blood glucose relatively faster?	Butter.....1 Meat .....2 Enjera.....3 Carrot.....4	
308	Which food group should a person with DM eat the most of time ?	Milk, yogurt, cheese.....1 Fats, oils, sweets.....2 Vegetable and fruit.....3 Meat, fish, poultry.....4	
309	Which one is good to control blood glucose on a person with a diabetes ?	Juices .....1 Eating fruits without juicing..... 2	
310	On a person with diabetes what proportion of the plate should be vegetable and fruit?	half or ½.....1 1/3.....2 ¼.....3 I don't know.....4	
311	Do you believe that skipping meal can help you control your blood glucose level	Yes I do believe so.....1 No I don't believe so .....2	

#### Section 4 -Dietary practice questionnaire

On this section of the questionnaire I will ask you few questions about your dietary habit and I will ask you to choose one or more answers from the choices

S.no	Question	Responses	Skip to
401	How many times in a day do you eat?	1 times .....1 2 times.....2 3times .....3 greater than 3times .....4	
402	Do you take your meal with appropriate time ?	Yes .....1 No.....2	

403	Which one do you use for cooking	Saturated fatty acid.....1 Unsaturated fatty acid .....2	
404	Do you drink sweet and soda drinks regularly <sup>a</sup>	Yes .....1 No.....2	
405	Do you take fat of meat regularly <sup>a</sup>	Yes.....1 No .....2	
406	Do you consume fruits $\geq 3$ /a day <sup>b</sup>	Yes.....1 No.....2	
407	Do you eat vegetables $\geq 3$ /a day <sup>b</sup>	Yes.....1 No.....2	
408	How do you usually take fruits	Whole fruit.....1 Juiced .....2	

b $\geq$  6 times/week consumption.

a $\geq$ 2times/weekconsumption.



5	Ambasha		Piece									
6	Nech sinde dabo		Piece									
7	Yeaja atmit											
8	Pasta											
9	Macaronni											
10	Rice											
11	Chechebisa											
12	Nech gebis genifo											
13	Chiko											
	<b>Roots</b>											
14	fried Potato (dinich tibs)											
15	(boiled potato)Dinich kikil											
16	Potato wot Dinich wot											
17	Carrot											
18	Key sir											
	<b>Vegetables</b>											
19	Cabbage Tikil gomen kikil											
20	Kale boiled (tikur gomen)											
21	Lettuce (selata)											

22	Kosta											
23	Tomato raw kurit											
24	Tomato sause											
25	Fosoliya											
26	Pumkin											
	<b>Legumes</b>											
27	Shiro wet											
28	Mitin shiro wet Lentil without chilly											
29	Ashuk											
30	Ater kik wet											
31	Misir kik wot											
32	Peanut butter											
	<b>Fruits</b>											
33	Avocado		In number									
34	Banana		„									
35	Mango		„									
36	Orange		„									
37	Pineapple		„									
38	Papaya											
39	Lemon		„									
	<b>Meat</b>											
40	Kitfo											
41	Siga wet											
42	Ox meat roasted (ye bere tibs)											
43	Raw ox meat											

	(tire siga											
44	Sheep meat roasted (yebeg tibs											
45	Goat tibs											
46	Tuna											
47	Roasted fish											
	<b>Dairy fats and egg</b>											
48	Cow Milk											
49	yoghurt											
50	Cottage cheese (Ayib)											
51	Egg whole boiled		In number									
52	Egg fried		In number									
	<b>Sweets</b>											
53	Honey											
54	Sugar											
55	Jams, marmara											
	<b>Beverage and Fast foods</b>											
56	Mirinda											
57	Coca cola											
58	Sprite											
59	Tea											
60	Coffee											
61	Macchiato											
62	Beer											
63	Tella											

64	Tej											
65	Wine											
66	Pizza		In number									
67	Burger		In number									

አዲስ አበባ ዩኒቨርሲቲ

ህብረተሰብ ጤና ሳይንስ

Annex 5-Amharic version subject information sheet

አዲስ አበባ ዩኒቨርሲቲ ህብረተሰብ ጤና ሳይንስ

የተጠያቂው / መላሾች የመረጃ ቅፅ

እንደምን እደሩ / ዋሉ ። ስሜ ----- ይባላል። ከዚህ የመጣሁት የአዲስ አበባ ዩኒቨርሲቲ ህብረተሰብ ሳይንስ ጤና ህለተኛ ዲግሪ ተማሪ የሆነችውን ጸደይ ተ/ሚካኤልን ወክዬ ነው። ህለተኛ ዲግሪዎን ለመመረቅ በአዲስ አበባ ከተማ በሚገኙ የመንግስት ሆስፒታሎች ላይ የስኳር ህክምና ክትትል በሚያደርጉ ግለሰቦች ላይ ሲሆን ከአዲስ አበባ ዩኒቨርሲቲ እና ከሆስፒታሎቹ ፍቃድ አግኝታ ምርምር ጥናት እየሰራች ነው።

እርስዎ የተመረጡት በዚህ ሆስፒታል የስኳር ህክምና ክትትል በማድረግ ነው። በመሆኑም ህለተኛ የስኳር አይነት ያላቸው ስኳር ህመምተኞች ይሳተፋሉ። የእርስዎ ተሳትፎ ሙሉ በሙሉ የእርስዎ ፈቃደኝነት ላይ የተመሰረተና በጥናቱ መሳተፍ ያለመሳተፍ መብት አልቃም። ለመሳተፍ ፈቃደኛ ከሆኑ በኋላም በፊለጉት ጊዜ ማቋረጥ ወይም ማቆም ይችላሉ። በጥናቱ ባለመሳተፍ የሚደርስበት ምንም አይነት ችግር አይኖርም። በጥናቱ ለመሳተፍ ከተስማሙ ስለ አመጋገብ እና አመጋገብ ላይ ያሉትን እውቀት እስከ 30 ደቂቃ ሊወስድ የሚችሉ የተወሰኑ ጥያቄዎች እንጠይቃለን።

ከጥናቱ ተገቢውን አመጋገብ እንዴት ማሻሻል እንዳለብዎ ይረዳል። ከዚህም በተጨማሪ የጥናቱ ውጤት የስኳር ህመምተኞች አመጋገብ ይበልጥ ለማሻሻል ለተመራማሪዎች በዚህ ዙሪያ ለሚሰሩ አካላት እንደ መነሻ ያገለግላል።

ለማንኛውም አይነት ጥያቄ ዋና አጥኚውን ማነጋገር ይችላሉ። ሞባይል ቁጥር 0911995944

የስምምነት መጠየቂያ/ማረጋገጫ ቅፅ

ከላይ በሰጠሁዎት መረጃ መሰረት በዚህ ጥናት መሳተፍ ፈቃደኛ ነዎት 1) አዎ

የመጠይቁ ቁጥር	_____
የሆስፒታሉ ስም	_____
መጠይቁ የተካሄደበት ቀን	
መጠይቁ የተጀመረበት ሰዓት	
መጠይቁ የተጠናቀቀበት ሰዓት	
ጠያቂ	ስም _____ ፊርማ _____
ተቆጣጣሪ	ስም _____ ፊርማ _____ ቀን _____
የቃለ መጠይቁ ዉጤት	1) ሙሉ በሙሉ የተሞላ 2) በከፊል የተሞላ 3) ምንም ያልተሞላ

(2) አይደለሁም ፍቃደኛ ካልሆኑ (ምክንያቱን ፅፈው ወደ ሚቀጥለው ተሳታፊ አለፍ)

ለማንኛውም አይነት ጥያቄ ዋና አጥኚውን ማነጋገር ይችላሉ። ሞባይል: 0911995944

ትእዛዝ ፤ ተሳታፊዎቹ የሚሰጡትን ማንኛውንም መልስ ከተሰጡት አማራጮች ዉስጥ ለይተዉ አክብብ

ክፍል 1

ከዚህ በመቀጠል ስለ ስጋር ህመም ለንዳንድ ጥያቄዎች ልጠይቅዎ እወዳለዉ ምላሽዎትን ከማነብት ምርጫ ዉስጥ የትኛዉ እንደሆነ ይነግሩኛል

ተ.ቁ	ጥያቄ	ምላሽ	የሚዘለል
101	እድሜዎ ስንት ነዉ	<input type="text"/>	
102	ጾታ ?	ወንድ..... 1 ሴት.....2	
103	የየትኛዉ ሃይማኖት ተከታይ ነዎት?	የሙስሊም.....1 የኦርቶዶክስ.....2 የፕሮቴስታንት.....3 የካቶሊክ.....4 የሌላ .....5	
104	የጋብቻ ሁኔታ ?	ያገባ.....1 ያላገባች.....2 የሞተብት.....3 የፊታ.....4	
105	ብሄርዎት ምንድነዉ?	ኦሮሞ .....1 ትግሬ .....2 አማራ.....3 ጉራጌ.....4 ሌላ.....5	
106	ትምርት ተምረዋል ?	አዎ .....1 አልተማርኩም .....2	ከሆነ ወደ 107
107	የትምህርት ደረጃ	መፃፍና ማንበብ የሚችል .....1 አንደኛ ደረጃ .....2 ሁለተኛ ደረጃ ከዚያ በላይ .....3 ከ ኮሌጅ በላይ.....4	
108	የስራ ሁኔታ(ከአንድ በላይ መልስ መስጠት)	አርሶ አደር/ገበሬ.....1 የመንግስት ሰራተኛ.....2 ነጋዴ .....3 የግሌ ድርጅት ሰራተኛ.....4	

	ይቻላል)	የቀን ሰራተኛ . . . . .5 የቤት እመቤት. . . . .6 ሌላ ካለ ይጥቀሱ. . . . .7	
109	ወርሃዊ ገቢዎ ምን ያህል ነው? (ያገቡ ከሆነ እጠቃላይ የቤተሰብ ገቢ ያላገቡ ከሆነ የግል ገቢዎ ይግለጹ.)	<input type="text"/>	

2. ክፍል ሁለት

ከዚህ በመቀጠል ስለ ጤናዎት ሁኔታ እንዳንድ ጥያቄዎች እጠይቅዎታለዉ ምላሽዎትን ከማንብሎት ምርጫ ዉስጥ ይገልጹልኛል

ተ.ቁ	ጥያቄ	ምላሽ	የሚዘለል
201	የስኳር ህመም ከጀመሮት ምን ያህል ጊዜ ሆኖት?	<input type="text"/>	
202	የስኳር ህመም ከትትል ከጀመሩ ምን ያህል ጊዜ ሆኖት?	<input type="text"/>	
203	ተጓዳኝ (ሌላ ህመም) አለብዎት? ካለ በምርጫ ከተዘረዘሩት መሃል ይምረጡ	የለም ..... .....1 አለ..... .....2 አለ ከሆነ የትኛዉ ህመም አለብዎት? የደም ግፊት..... .....1 የኮሌስትሮል ክፍ ማለት..... 2 የልብ	

		ችግር..... .....3	
204	በዘር (በቤተሰብ) የስኳር ህመም አለ? አለ?	አለ..... .....1 የለም..... .....2	
205	የስኳር ወይን መጠን ለማተካከል በየትኛው መንገድ ይጠቀማሉ? (ከአንድ በላይ ምላሽ መስጠት ይቻላል)	በኢንሱሊን..... .....1 የሚዋጥ መዳኒት..... .....2 የአመጋገብ ስርዓትን በማስተካከል..... ...3 የአካል ብቃት እንቅስቃሴ በማድረግ(ስፖርት)..... .....4 ሌላ..... .....5	
206	የስኳር ህመም ሲጀምሩት አመጋገብዎት ላይ ማስተካከያ አድርገዋል?	አዎ አድርጌያለዉ..... .....1 አላረኩም..... ..... .....2	
207	ስለ ስኳር ህመምተኞች አመጋገብ ከየት ነዉ መረጃ የሰሙት? (ከአንድ በላይ ምላሽ መስጠት ይቻላል)	ከመገናኛ ብዙሃን..... .....1 ሃኪም..... ..... .....2 ነርስ..... ..... .....3 የስነ ምግብ ባለሙያ..... .....4 የማህረሱብ ገጽ.....	

		<p>.....5</p> <p>ሌላ የስኳር ታካሚ.....</p> <p>.....6</p> <p>የስኳር ታካሚ ካልሆነ ሰዉ.</p> <p>.....7</p> <p>ኅረቤት.....</p> <p>.....</p> <p>.....8</p>	
208	ከ ሃኪም ስለ ስኳር ህመምተኛ እመጋገብ ምክር እግኝተዉ ያዉቃሉ)	<p>እዎ ወስጄ</p> <p>አውቃለዉ.....1</p> <p>ወስጄ</p> <p>አላዉቅም.....</p> <p>.....2</p>	ወደ 209
209	በሃኪም ምን እንዲመገቡ ነዉ የተመከሩት? እይነቡባላቸዉ (የመለሱት ብቻ ይከቡብ)	<p>ያልተፈተጉ ምግቦች እንደባሉ.....</p> <p>.....1</p> <p>ቅጠላ ቅጠል</p> <p>እንደባሉ.....</p> <p>.....2</p> <p>ፍራፍሬ</p> <p>እንደባሉ.....</p> <p>.....3</p> <p>ስጋ እና የወተት ተዋለዎቻች</p> <p>እንደቀንስ.....4</p> <p>አህል ዘሮች(ጤፍ</p> <p>ስንዴ.....)እንዳልመገቡ.....5</p> <p>ጣፋጭ ነገር እንዳስወግድ</p> <p>.....6</p>	
210	በመደበኛ የአካል እንቅስቃሴ ተሳትፈዉ ያዉቃሉ?	<p>እዎ ቡብዛት (በሳምንት 3 ቀን ለ 30 ደቂቃ ያህል).....1</p> <p>እዎ እንዳንዴ(በሳምንት ከ 3 ቀን ያነሰ)</p> <p>.....2</p> <p>አላዉቅም.....</p> <p>.....</p> <p>.....3</p>	

211	<p>የሚመከረውን አመጋገብ መመገብ ቢፈልጉም እንዳይመገቡ የሚያረጋግጥ ምክንያት ካለ የትኛው ነው ከአንድ በላይ መምረጥ ይችላሉ ?</p>	<p>የቤተሰብ ድጋፍ ማጣት ..... ...1 የገቢ ማነስ..... .....2 የምግብ አይነቶቹ አለመኖር..... ..3 የግንዛቤ ማነስ..... .....4 ምንም የለም ..... .....5</p>	
212	<p>የስኳር ህመምተኞች ማህበር አባል ነዎት?</p>	<p>አዎ.....1 አደለሁም..... .....2</p>	
213	<p>የመጨረሻው የደም ስኳር መጠን ስንት ነው?</p>	<p>FBS <input type="text"/></p>	

ክፍል ሶስት

ከዚህ በመቀጠል ስለ ስኳር ህመምተኞች የአመጋገብ ሁኔታ በተመለከተ ስላለውት እዉቀት እጠይቃለሁ ምላሽዎን ከማነብሎት ምርጫ ዉስጥ የትኛው እንደሆነ ይነግሩኛል

ተ.ቁ	ጥያቄዎች	መልስ	የሚዘለል ጥያቄ
301	<p>የስኳር ህመምን ለመከላከል የሚጠቅሙ የእኗኗር ዘይቤ ለውጥ የቱን ያውቃሉ? (ከአንድ በላይ አማራጭ መጥቀስ ይችላሉ)</p>	<p>የአካል እንቅስቃሴ..... .....1 የአመጋገብ .....2 ክብደትን መቀነስ.....</p>	<p>ብቃት    ለውጥ</p>

		<p>.....3</p> <p>ምንም <span style="float:right">የማወቀው</span></p> <p>የለም.....</p> <p>.....4</p>	
302	<p>የደምን የስኳር መጠን በአፋጣኝ ክፍ የሚያረገገው የምግብ ክፍል የቱ ነዉ?</p>	<p>ሀይል ሰጪ ምግብ(ካርቦሃይድሬት)</p> <p>.....1</p> <p>ያልተፈተጉ</p> <p>ምግቦች.....</p> <p>.....2</p> <p>ቅባታማ</p> <p>ምግቦች.....</p> <p>.....3</p> <p>ሰውነት ገንቢ ምግብ(ፕሮቲን)</p> <p>.....4</p> <p>ምንም <span style="float:right">የማወቀው</span></p> <p>የለም.....</p> <p>.....5</p>	
303	<p>አንድ የስኳር ህመምተኛ የደሙን መጠንን ለመቆጣጠር የቱን አማራጭ ቢጠቀም ተመራጭ ነዉ?</p> <p>(ከአንድ በላይ አማራጭ መጥቀስ ይችላሉ)</p>	<p>ከገብስ ብቻ የተዘጋጁ ምግቦችን መብላት.....1</p> <p>ከሁሉም የአህል አይነቶች በመጠኑ ከሌሎች የምግብ አይነቶች ጋር አቀላቅሎ መብላት.....2</p> <p>ስኳር የሌላቸውን ወይም መጠነኛ ምግቦች መብላት.....3</p> <p>እራትና ቁርስን መዝለል.....</p> <p>.....4</p>	
304	<p>የትኛው የ አህል አዘገጃጀት የደም መጠንን ለመቀነስ ይረዳል?</p>	<p>የተፈተገ</p> <p>አህል.....</p> <p>.....1</p> <p>ያልተፈተገ</p> <p>አህል.....</p> <p>.....2</p>	
305	<p>የትኛው የምግብ አይነት ሀይል ሰጪ ምግብ ዉስጥ ይመደባል ?</p>	<p>ገብስ፣ጤፍ፣ስንዴ፣ሩዝ፣ቆጮ.....</p> <p>.....1</p>	

		ስጋ፣ ወተት፣ ለርጎ፣ ..... .....2 ሰላጣ ..... ፣ጥቅል ጎመን፣ ቆስጣ ..... .....3 አላዉቅም ..... .....4	
306	የትኛዉ የምግብ አይነት የደም ስኳር መጠንን ለመቆጣጠር ይረዳል? (ከአንድ በላይ አማራጭ መምረጥ ይችላሉ)	ፍራፍሬ ..... በየቀኑ መመገብ ..... .....1 ቅጠላ ቅጠል በየቀኑ መመገብ ..... .....2 የአህል ዘር ማስወገድ ..... .....3 ፍራፍሬን መሉዋቸዉን መመገብ(ሳይጨመቁ) ..... .....4	
307	የትኛዉ የምግብ አይነት በአፋጣኝ የደም መጠንን ከፍ ያረጋል?	ቅቤ ..... .....1 ስጋ ..... .....2 እንጀራ ..... .....3 ካሮት ..... .....4	
308	አንድ የስኳር ህመምተኛ የትኛዉ የምግብ አይነት በብዛት ቢመገብ ይመረጣል ?	ስጋ፣ አሳ፣ ፣ እንቁላል ..... .....1 ወተትና ..... የወተት ተዋእዶ ..... .....2 ቅባት፣ ዘይት፣ ጣፋጭ ..... .....3 ቅጠላ ..... ቅጠልና ፍራፍሬ .....	

		.....4 ዳቦ፣ ሩዝ፣ እንጀራ..... .....5	
309	እንደ የስኳር ህመምተኛ የደም የስኳር መጠንን ለመቆጣጠር ፍራፍሬን በየትኛው መንገድ ቢጠቀም ተመራጭ ነው?	በጭማቂ መልክ መጠጣት..... .....1 ቆራርጦ መመገብ..... .....2	
310	እንደ የስኳር ህመምተኛ ከሚበላው ምግብ ሳህን ላይ ቅጠላ ቅጠልና ፍራፍሬ ምን ያህሉን መያዝ አለበት?	ግማሹን..... .....1 እንደ ሰስተኛውን..... .....2 እንደ አራተኛውን..... .....3 አላወቀውም..... .....4	
311	የምግብ ሰዓትን በመዝለል የደም የስኳር መጠንን ማስተካከል ይቻላል ብለው ያስባሉ?	አዎ አስባለው..... .....1 አላስብም..... .....2	

ክፍል 4- የአመጋገብ ሁኔታን የሚጠይቅ ጥያቄዎች

ከዚህ በመቀጠል ስለ ስኳር ህመምኞች የአመጋገብ ሁኔታ በተመለከተ ጥያቄ አጠይቆታለው ምላሽዎትን ከማነብሎት ምርጫ ውስጥ የትኛው እንደሆነ ይነግሩኛል

ተ. ቁ	ጥያቄ	መልስ	የሚዘለል ጥያቄ
40 1	በቀን ምን ያህል ጊዜ ይመገባሉ?	እንደ ጊዜ.....1 ሁለት ጊዜ.....2 ሶስት ጊዜ.....3 ከሶስት ጊዜ በላይ.....4	
40 2	የምግብ ሰዓትን ጠብቀው ይመገባሉ?	አልመገብም.....1 እመገባለሁ.....2	
40 3	የሚጠቀሙት የዘይት እይነት ምን እይነት	የሚረጋውን ዘይት.....1 የማይረጋውን ፈሳሽ.....2	

	ነዉ? (ከአንድ በላይ መምረጥ ይችላሉ)		
40 4	ለስላላሳና ጣፋጭ በመደበኛነት(በሳምንት ከ 2 በላይ)ይወስዱ?"	አዎ ..... .....1 አልወስድም..... 2	
40 5	በመደበኛነት(በሳምንት ከ 2 በላይ)ቅባት ያለዉ ስጋ ይበላሉ?"	አዎ ..... .....1 አልበላም .....2	
40 5	ፍራፍሬ በመደበኛነት(በሳምንት ከ 6 በላይ)በቀን ደግሞ ≥3 በላይ ይመገባሉ?" <sup>^</sup>	አዎ ..... .....1 አልበላም ..... ...2	
40 8	ቅጠላ ቅጠል በመደበኛነት(በሳምንት ከ 6 በላይ )በ ቀንከ≥3 በላይ ይመገባሉ?" <sup>^</sup>	አዎ ..... .....1 አልበላም .....2	
40 9	ፍራፍሬን በምን መልክ ነዉ የሚወስዱት?	በጭማቂ .....1 ሳይጨመቅ ከነሙሉ .....2	

ክፍል 5፣ የዘወትር እመጋገብ ሁኔታና የምግብ መጠን የሚያሳይ መጠይቅ

ከዚህ በመቀጠል በሚገኘው የምግብ ዝርዝር ከያዘው ሰንጠረዥ ውስጥ በወር ውስጥ የተመገቡትን የምግብ ዕይነት ለትንሽ ደቂቃ አስበው የወሰዱት የምግብ አይነት ካለ በምን ያህል ጊዜ እና መጠን እንደወሰዱ በማሳይቃት የሮቶ መረጃዎች በመታገዝ ይገልጹልኛል

የምግብ አይነት (ከዚህ በታች የተዘረዘሩት ምግቦች በአንድ ወር ውስጥ መመገባቸውን ይጠይቁ)	500A-በባለፈ.ወ. ወር -----ተመገበዉ ያዉቃሉ 1 እዎ 2 እልተመገብኩም	500 B እንዴ ሲመገቡ ምን ያህል-----ይመገቡሉ		በቀን ከ 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በቀን እንዴ	በሳምንት 5-6 ጊዜ (ቁጥሩን ይጻፉ)	በሳምንት 3-4 ቀን (ቁጥሩን ይጻፉ)	በሳምንት 2 ጊዜ	በሳምንት 1 ጊዜ	በወር 2-3 ጊዜ	በወር እንዴ
		የሮቶ ኮድ/በቁርጥ / ብዛት	ድግግሞሽ (ምን ያህል)								
የእህል ዘር											
501 ቀይ ጤፍ እንጀራ		በቁርጥ ብዛት									
502 ነጭ ጤፍ እንጀራ		በቁርጥ ብዛት									
503 እንጀራ ፍርፍር											
504 የገብስ ዳቦ		በቁርጥ ብዛት									
505 አምባሻ		በቁርጥ ብዛት									
506 ነጭ ስንዴ ዳቦ		በቁርጥ ብዛት									
507 የእጃ ቁንጫ											
508 ፓሰታ											
509 ማካሮኒ											

	የምግብ አይነት (ከዚህ በታች የተዘረዘሩት ምግቦች በአንድ ወር ውስጥ መመገባቸውን ይጠይቁ)	በባለፈው ወር -----ተመግ በወ. ያወቃሉ 1 አፆ 2 አልተመገቡበትም	አንዴ ሲመገቡ ምን ያህል----- ይመገባሉ		በቀን ከ 2- 3 ጊዜ (ቁጥሩን ይጻፉ)	በቀን አንዴ	በሳምንት 5- 6 ጊዜ (ቁጥሩን ይጻፉ)	በሳምንት 3- 4 ቀን (ቁጥሩን ይጻፉ)	በሳምንት 2 ጊዜ	በሳምንት ት 1 ጊዜ	በወር 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በ ወር አንዴ
			የፎቶ ኮድ/በቁርጥ / ብዛት	ድግግሞሽ (ምን ያህል)								
510	ሩዝ											
511	ጨጨብሳ											
512	ነጭ ገብስ ገንፎ											
513	ጭኮ											
	ስር ምግቦች											
514	የተጠበሰ ድንች											
515	ድንች ቅቅል		በቁጥር									
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524	ቲሞቲም ስልስ											
525	ፎሰሊያ											

ተ.ቁ	የምግብ እይነት (ከዚህ በታች የተዘረዘሩት ምግቦች በአንድ ወር ውስጥ መመገባቸውን ይጠይቁ)	በባለፈው ወር -----ተመገበው ያዉቃሉ 1 አዎ 2 አልተመገብኩም	አንድ ሲመገቡ ምን ያህል-----ይመገባሉ		በቀን ከ 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በቀን አንድ	በሳምንት 5-6 ጊዜ(ቁጥሩን ይጻፉ)	በሳምንት 3-4 ቀን (ቁጥሩን ይጻፉ)	በሳምንት 2 ጊዜ	በሳምንት 1 ጊዜ	በወር 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በ ወር አንድ
			የፎቶ ኮድ/በቁርጥ /-ባዛት	ድግግሞሽ (ምንያህል)								
526												
527												
528												
529												
530												
531												
532	የለውዝ ቅቢ											
533			በቁጥር									
534			በቁጥር									
535			በቁጥር									
536			በቁጥር									
537			በቁጥር									
538												
539			በቁጥር									

	የምግብ ለይነት (ከዚህ በታች የተዘረዘሩት ምግቦች በአንድ ወር ውስጥ መመገባቸውን ይጠይቁ)	በባለፈው ወር -----ተመገበው ያዉቃሉ 1 አዎ 2 አልተመገብኩም	አንዴ ሲመገቡ ምን ያህል-----ይመገባሉ		በቀን ከ 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በቀን አንዴ	በሳምንት 5-6 ጊዜ(ቁጥሩን ይጻፉ)	በሳምንት 3-4 ቀን (ቁጥሩን ይጻፉ)	በሳምንት 2 ጊዜ	በሳምንት 1 ጊዜ	በወር 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በ
			የፎቶ ኮድ/በቁርጥ /ባዛት	ደግግሞሽ (ምንያህል )								
540												
541												
542												
543												
544												
545												
546	ቱና											
547	አሳ ጥብስ		በቁጥር									
548												
549												
550												
551			በቁጥር									
552			በቁጥር									
553												
554												
555												

	መጠቦች ፈጣን ምግቦች											
	የምግብ እይነት (ከዚህ በታች የተዘረዘሩት ምግቦች በእንደ ወር ውስጥ መመገባቸውን ይጠይቁ)	በባለፈው ወር -----ተመግበው ያዉቃሉ 1 እጾ 2 እልተመገቡበትም ኮዱን ብቻ ዳፍ/ፊ.	እንዴ ሲመገቡ ምን ያህል-----ይመገቡሉ	በቀን ከ 2-3 ጊዜ (ቁጥሩን ይጻፉ)	በቀን እንዴ	በሳምንት 5-6 ጊዜ (ቁጥሩን ይጻፉ)	በሳምንት 3 -4 ቀን (ቁጥሩን ይጻፉ)	በሳምንት 2 ጊዜ	በሳምንት 1 ጊዜ	በወር 2-3 ጊዜ ((ቁጥሩን ይጻፉ)	በ ወር እንዴ	
			የፎቶ ኮድ/በቁርጥ / ብዛት	ድግግሞ ሽ (ምንያህ ል)								
556	ሚረንዳ											
557	ኮካ ኮላ											
558	ስፕራይት											
559												
560												
561	ሚኒያቶ											
562												
563												
564												
565												
566	ፒዛ		በቁርጥ ብዛት									
567	በርገር		በቁርጥ									

Annex 6 Estimated portion size and photograph models

	Food types	Portion 1	Portion 2	Portion 3	Portion 4	Portion 5
	የአህል ዘር					
501	ቀይ ጤፍ እንጀራ	( 1) 97	(2) 168	(3) 251	(4) 311	
502	ነጭ ጤፍ እንጀራ	( 1) 93	(2) 178	( 3) 224	( 4 ) 311	
503	እንጀራ ፍርፍር	( 4) 91	( 5) 113	( 6) 166		
504	የጉበስ ዳቦ	( 1) 89				
505	አምባሻ	( 1) 159				
506	ነጭ ስንዴ ዳቦ	( 1) 89				
507	የአጃ ቁንጫ	( 3) 60	( 4) 107	( 5) 151		
508	ፓስታ	( 4) 183	( 5) 260	( 6) 382		
509	ማካሮኒ	( 4) 227	( 5) 331	( 6) 496		
510	ሩዝ	( 4) 156	( 5) 263	( 6) 423		
511	ጨጨብሳ	( 3) 81	( 4) 115	( 5) 151		
512	ነጭ ጉበስ ገንፎ	( 1) 276	( 2) 426			
513	ጭኮ	( 1) 23	( 2) 70	( 3) 81		
	ስር ምግቦች					
514	የተጠበሰ ድንች	( 1) 109	( 2) 168			
515	ድንች ቅቅል					
516		( 4) 103	( 5) 206	( 6) 309		
517		( 3) 103	( 4) 206	( 5) 309		
518		( 3) 26	( 4) 58	( 5) 81		
519		( 3) 45	( 4) 90	( 5) 135		
520		( 3) 51	( 4) 102	( 5) 153		
521		( 2) 35	( 3) 53	( 4) 66	( 5) 106	
522		( 3) 51	( 4) 102	( 5) 153		
523		( 2) 35	( 3) 53	( 4) 66	( 5) 106	
524	ቲማቲም ስልስ	( 3) 59	( 4) 74	( 5) 134		
525	ፎሶፊያ	( 2) 32	( 3) 49	( 4) 66	( 5) 98	
526		( 4) 103	( 5) 206	( 6) 309		
527		( 4) 56	( 5) 112	( 6) 168		
528		( 4) 56	( 5) 112	( 6) 168		
529		( 1) 117	( 2) 172	( 3) 246		
530		( 4) 62	( 5) 78	( 6) 135		
531		( 4) 60	( 5) 85	( 5) 159		
532	የለጫ ቅቢ	( 0) 7	( 1) 12	( 2) 21		
533		172				
534		154				
535		214				
536		180				
537		( 1) 152	( 2) 261	( 3) 501		

538		( 1) 132	( 2) 241	( 3) 481		
539		57				
540		(2) 20	(3) 59	(4) 78	(5) 118	
541		(4) 52	(5) 104	(6) 156		
542		(3) 30	(4) 49	(5) 76		
544		(3) 30	(4) 49	(5) 76		
545		(3) 30	(4) 49	(5) 76		
546	ቱና	(1) 75				
547	እሳ ጥብስ	406				
548		(1) 105	(2) 218	(3) 127		
549		(1) 198	(2) 225	(3) 295		
550		(3) 28	(4) 57	(5) 108		
551		42				
552		(2) 85	(3) 115	(4) 151		
553		(0) 7	(1) 12	(2) 21		
554		(0) 5	(1) 7	(2) 14		
555		(0) 7	(1) 12	(2) 21		
556	ሚሪንዳ	(1) 205,300	(2) 250	(3) 275	(4) 275	(5) 400
557	ኮከ ኮላ	(1) 205,300	(2) 250	(3) 275	(4) 275	(5) 400
558	ስፕራይት	(1) 205,300	(2) 250	(3) 275	(4) 275	(5) 400
559		(1) 105	(2) 223	(3) 105		
560		(1) 57	(2) 61			
561	ማኪያቶ	(1) 105	(2) 223	(3) 105		
562		(1) 205 , 330	(2) 250	(3) 275	(4) 275	(5) 400
563		(1) 205	(2) 250	(3) 275	(4) 275	(5) 400
564		(1) 205	(2) 250	(3) 275	(4) 275	(5) 400
565		(1) 205	(2) 250	(3) 275	(4) 275	(5) 400
566	ፒዛ	(1) 110	(2) 184	(3) 306	(4) 364	
567	ቦርገር	(½) 176	1( 376)			

የፎቶ ግራፍ ማሳያዎች

በቁጥር የሚገለጹ (በሳጥን ውስጥ ያሉት)

1 ፣ 2 ፣ 4 ፣ 5 ፣ 6 ፣ 15 ፣ 33 ፣ 34 ፣ 35  
 ፣36 ፣ 39፣ 46 ፣47 ፣51 ፣52 ፣ 66 ፣ 67

32 ፣ 53 ፣ 54 ፣ 55

7፣11፣ 17፣ 18፣ 19 ፣20 ፣21 ፣ 22 ፣23 ፣24  
 ፣25 .26፣40 ፣ 41 ፣ 42 ፣44 ፣45፣50



2 1 0



59፣ 61 ፣ 48 5 4 3

3፣ ፣ ፣10 ፣ 16፣ 27፣ 28፣30 ፣31 ፣ 41



6 5 4



1 2 3

8



4



5



6

9



4



5



6

29



1



2



3

13



1



2



3

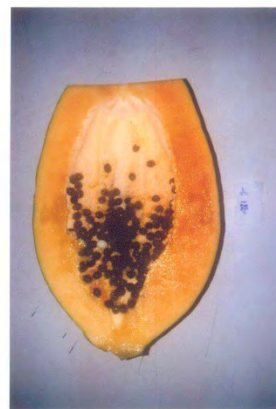
38



1



2



3

49



1

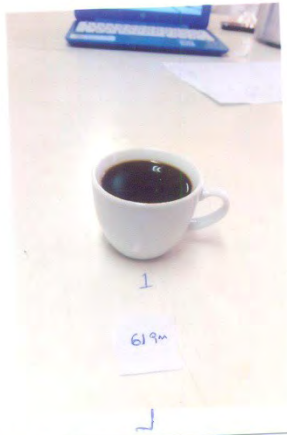


2



3

60



56 57 58 62 63 64 65



12



14



1



2

Annex 7 curriculum vitae

**1. PERSONAL DATA**

- Name:- Tsedey Teklemichael Haile
- Sex:-Female
- Birth place:-Addis Ababa
- Date of birth :-1988
- Nationality :-Ethiopian
- Marital status:-single
- Religion:-Christian
- Language:-oromifa, English, Amharic

**2. EDUCATION**

<b>Year</b>	<b>Grade</b>	<b>school</b>
1994-2001	1-8	Hamle 19 primary school
2002-2003	9-10	Chilalo high school
2004-2005	11-12	Asella preparatory school

University

<b>Institution</b>	<b>Field of study</b>	<b>Year of graduation</b>
Jimma university	Bsc in Public health	2009
Addis Ababa university	Master of public health	Ongoing

**3. WORK EXPERIANCE**

- I worked at Tulu bolo hospital for 3 and half years as maternal and child health team leader and ART focal person. Currently working at bole 17/20 health center.

**TRAINING**

- Has completed training on integrated course of clinical nutrition care for patients with HIV/TB and on infant and child feeding (IYCF) with collaboration of ENGINE and save the children
  - Has successfully completed national comprehensive HIV/AIDS care and ARV therapy adult training
  - Has successfully completed on basic national compressive integrated PMTCT/MNCH
    - DBS
    - Long term family planning
    - Management of SAM
- 4. REEFERENCES**
- Zertihun lemma (medical director of 17/20 health center)  
0911350104
  - Dr. Ephrem Solomon(Medical director of tulubolo hospital)  
0911982522
  - Jimma university registrar  
04711111457
- 5. CONTACT ADDRESS**  
Tsedey Teklemichael Haile  
Mobile number 0911995944, 0922981627  
[Email-tsedey5@yahoo.com](mailto:Email-tsedey5@yahoo.com) and [tsedeyp5@gmail.com](mailto:tsedeyp5@gmail.com)

**Curriculum Vitae: Bilal Shikur**

Last updated: March, 2016

**Personal Information**

First name: Bilal

Middle name: Shikur

Last name: Endris

Age: 29years  
a son

Sex: Male

Marital status: Married and father of

Place of Birth: Addis Ababa, Ethiopia

Date of Birth: 1 October, 1986

Nationality: Ethiopian

Language: Amharic, English and Arabic: Speak, Read and Write

Email: [lebiluka@yahoo.com](mailto:lebiluka@yahoo.com)

Phone number (mobile): +251911-47-53-75

### **Home Address**

KolfeKeranio sub-city, Kebele 08/09

House number 1056, Addis Ababa, Ethiopia

Tel: +251-112-792232

### **Work/office address**

Lideta sub-city, Addis Ababa University, College of Health Sciences, School of Public Health

TikurAnbessa Specialized Referral Hospital, Main building, Second floor, Room number c216

P.O. Box: - 5657

Tel: +251-115-157701

## **I. Academic Qualification**

### **1. Masters of Public Health in Epidemiology (MPH):**

*Period of study:* September 2012- July 2014

*Program:* Masters of Public Health, Epidemiology Specialty

Track

*Institution:* Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

### **2. Degree of Doctor of Medicine (MD):**

*Period of study:* January 2006-September 2011

*Program:* Medicine

*Institution:* Addis Ababa University, School of Medicine, Addis Ababa, Ethiopia

**3. Ethiopian Higher Education Entrance Certificate:**

*Period of study:* September 2003-July 2005  
*Program:* Preparatory Program  
*Institution:* Medhaniyalem , Addis Ababa, Ethiopia

**4. Ethiopian General Secondary Education Certificate:**

*Period of study:* September 2001-July 2003 G.C  
*Program:* High School  
*Institution:* Dilachin, Addis Ababa, Ethiopia

**II. Work Experience**

**1. Assistant Professor of Public Health**

*Duration of employment:* Since July, 2014  
*Institution:* Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

**2. Lecturer**

*Duration of employment:* September, 2011 – June, 2014  
*Institution:* Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

**3. Co-PI** of Addis Ababa Mortality Surveillance Program: June, 2014 -July,2015

**4. PI** of Addis Ababa Mortality Surveillance Program-Since July,2015

**5. Clinical Intern**

*Duration of Employment:* July, 2010 – July, 2011  
*Institution:* TikurAnbessa Specialized Teaching Hospital

**Research experience**

- Assessment of the relationship between malnutrition and malaria among under-five children in Adami Tulu district: A case-control study (**Shikur B**, Deressa W, Lindtjorn B, BMC Public Health. © *Shikur et al.* 2016(16:174)
- Assessment of the magnitude and factors associated with exclusive breast feeding among employed and unemployed mothers: a comparative cross sectional study ( under review, PLOSE ONE )
- Immunization incompleteness rate and associated factors among children aged 12-23 months in Yirgalem town, SNNPR.
- Prevalence and factors associated with work related injuries in Iron and Steel industries Addis Ababa, Ethiopia.

- Prevalence and Risk factors of Diabetes mellitus and impaired glucose level among federal police officers in Addis Ababa, Ethiopia.
- Iron Folic Acid Supplementation for Adolescent Girls: Assessment of Need and Modalities of Implementation in Ethiopia
- Substance use and other predictors of academic outcomes among undergraduate medical students of Addis Ababa University (on going)

### **Teaching**

- Lecture masters of Public Health students of Addis Ababa University, on public health nutrition
- Lecture undergraduate medical students of Addis Ababa University and Myung Sung Medical College (MMC), on public health nutrition

### **Committee Membership and related activities**

- Member of the managing committee of the Butajira Demographic and Health Survey (One of the oldest demographic surveillance sites in Africa)
- Member of Research Ethics Committee (REC) for the department of Reproductive Health and Health Service management
- I was a member and secretary of School of Public Health's Golden Jubilee Core Committee.
- Strategic plan developing committee for College of Health Sciences

### **Merits received**

- AMREF young African research scholarship award winner
- PI in a research award by Addis Ababa University-Medical Education Partnership Initiative (MEPI)
- Ethiopian General Secondary Education Certificate with **4.00 GPA** (9As)
- Ethiopian Higher Education Entrance Certificate with **Distinction**
- Masters in Public Health with very great distinction with **CGPA-3.97 (the top Grade of the year)**
- MPH Research-**Excellent grade**

### **Professional Associations Memberships**

- Ethiopian Medical Association (EMA)
- Ethiopian Public Health Association (EPHA)

- Ethiopian Society of General Medical Practitioners (ESGMP)

### **Consultancy services**

- Maternal and Neonatal Health in Ethiopia Initiative (MaNHEP) a project on Amhara and Oromia regions of Ethiopia; end line survey

### **Trainings taken and Conferences attended**

- Oral presenter on AMREF health Africa international conference at Nairobi, Kenya
- Oral presenter at EMA 51<sup>st</sup> conference
- PMTCT training from AAU & John Hopkins University/TSEHAI project, March, 2011.
- ART & HIV care training from AAU School of Medicine & WHO, August 2011.
- Training on “Understanding and Using the Demographic and Health Surveys”, Measure DHS, August, 2012
- Ethiopian Public Health Association 25<sup>th</sup> Annual Conference, Feb 20 -22, 2014, African Union, Addis Ababa, Ethiopia
- MDR/XDR TB management training from Ethiopian Society of General Medical Practitioners and USAID, September 2010.
- Emergency Medicine training for interns from AAU, September, 2010.
- BPR & Government policy training from Ministry of Health, September, 2011.
- TOT on Application of Behavior Change Communication Strategies for HIV/AIDS, by AAU-MARCH Project, Johns Hopkins University Bloomberg School of Public Health & the US CDC.
- Research Ethics, Addis Ababa University, College of Health Sciences IRB in collaboration with MEPI
- Reproductive Health Commodity Security, Addis Ababa University School of Public Health in collaboration with UNFPA

### **Some of the training topics that I deliver as a trainer**

- 1. Medical ethics**
- 2. Personal development plan**
- 3. Goal setting**
- 4. Time management**
- 5. Team work**
- 6. Communication skill**
- 7. Purpose of life**

### **Skills, interests and hobbies**

- Know how on statistical software packages (SPSS, EPI INFO, WHO-Anthro, ENA-SMART, OPEN EPI, open code, STATA)
- Trainer on life skills
- Team leadership
- Good communication skills
- IT know how
- Public speech
- Training

### **Future Plans and Interests**

- To upgrade my level of education to the next higher level
- To be a distinguished health researcher and academician
- Giving voluntary health services
- To be an expert on my area of study

### **References:**

1. Dr. Wakgari Deressa, Dean of the School of Public Health at Addis Ababa University. ([deressaw@gmail.com](mailto:deressaw@gmail.com))
2. Dr. Ahmed Reja, Chief Executive Director, College of Health Sciences, Addis Ababa University  
([ahmedreja@yahoo.com](mailto:ahmedreja@yahoo.com))