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DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG HIV POSITIVE ADULTS ATTENDING ANTIRETROVIRAL THERAPY CLINIC AT FELEGE HIWOT COMPREHENSIVE REFERRAL HOSPITAL, NORTHWEST, ETHIOPIA.

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BAHIR DAR UNIVERSITY

BAHIR DAR INSTITUTE OF TECHNOLOGY

SCHOOL OF RESEARCH AND POSTGRADUATE STUDIES

FACULTY OF CHEMICAL AND FOOD ENGINEERING

DEPARTMENT OF APPLIED HUMAN NUTRITION

MSC. THESIS ON:

DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG HIV POSITIVE ADULTS ATTENDING ANTIRETROVIRAL THERAPY CLINIC AT FELEGE HIWOT COMPREHENSIVE REFERRAL HOSPITAL, NORTHWEST, ETHIOPIA.

BY:

HIWOT AHMED SAID

JULY, 2020

BAHIR DAR, ETHIOPIA

Bahir Dar University

Bahir Dar Institute of Technology

School of Research and Postgraduate Studies

Faculty of Chemical and Food Engineering

Dietary Diversity and Associated Factors Among HIV Positive Adults Attending Antiretroviral Therapy Clinic at Felege Hiwot Comprehensive Referral Hospital, Northwest, Ethiopia.

By:

Hiwot Ahmed Said

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Applied Human Nutrition.

Principal Advisor: Gebeyehu Tsega (MPH/HSM, Assistant Professor)

July, 2020

Bahir Dar, Ethiopia

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APPROVAL SHEET

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SCHOOL OF RESEARCH AND GRADUATE STUDIES

FACULTY OF CHEMICAL AND FOOD ENGINEERING

Approval of thesis for defense result

I hereby confirm that the changes required by the examiners have been carried out and incorporated in the final thesis.

Name of Student **Hiwot Ahmed Said** **Signature** _____ Date 05/08/2020

As members of the board of examiners, we examined this thesis entitled "Dietary Diversity and Associated Factors among HIV Positive Adults Attending Antiretroviral Therapy Clinic at Felege Hiwot Comprehensive Referral Hospital, Northwest, Ethiopia" by **Hiwot Ahmed Said**. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of Masters of Science in Applied Human Nutrition.

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DECLARATION

This is to certify that the thesis entitled "Dietary Diversity and Associated Factors among HIV Positive Adults Attending Antiretroviral Therapy Clinic at Felege Hiwot Comprehensive Referral Hospital, Northwest, Ethiopia", submitted in partial fulfillment of the requirements for the degree of Master of Science in Applied Human Nutrition under Faculty of Chemical and Food Engineering, Bahir Dar Institute of Technology, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

HIWOT AHMED SAID 05/08/2020

Name of the candidate Signature Date

LIST OF ABBREVIATIONS/ACRONYMS

AIDS	Acquired immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
ART	Anti-retroviral therapy
CI	Confidence Interval
DD	Dietary Diversity
FANTA	Food And Nutrition Techinical Assistance
FAO	Food and Agriculture Organization
FHCRH	Felege Hiwot Comprehensive Referral Hospital
HIV	Human Immune Deficiency Virus
IDDS	Individual Dietary Diversity Score
OR	Odds Ratio
PLWA	People living with HIV/AIDS
SPSS	Statistical Package for the Social Science
WHO	World Health Organization

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ABSTRACT

Background: Dietary diversity is the consumption of variety of food items over a reference time. It is one of the important indicators to assess the nutrient adequacy and diversity of diet. However, little is known about dietary diversity among adult HIV patients in Bahir Dar.

Objective: To assess dietary diversity and associated factors among HIV positive adults attending Antiretroviral Therapy Clinic at Felege Hiwot Comprehensive Referral Hospital, in Northwest Ethiopia.

Method: An institution based cross-sectional study conducted in Felege Hiwot Comprehensive Referral Hospital in 2019. Systematic random sampling technique employed to select 352 study subjects. Data collected using an interviewer administered questionnaire & chart review. SPSS version 26 used for analysis. The data were summarized with descriptive measures, simple and multivariable binary logistic regression used to determine associated factors.

Results: Two hundred nine (59.4%) adults had consumed a diversified diet. The mean individual dietary diversity score was 3.86 ± 1.18. Self-employment status (AOR: 4.60; 95% CI: 1.72-12.27) compared to unemployed, quintiles of wealth index; [the second (AOR: 4.33; 95% CI:1.72-10.89), middle (AOR: 4.40; 95% CI: 1.71-11.31), fourth (AOR: 6.60; 95% CI: 2.36-18.48) and highest quintile (AOR: 9.45: 95% CI: 3.34-26.77)] in reference to lowest quintile, last CD4 count 200-349cells/mm^3 (AOR: 8.08; 95% CI: 2.93-22.23) compared to CD4 count < 200cells/mm^3, taking first line ART regimen drugs (AOR: 4.49 ; 95% CI: 2.19-9.21) relative to second line, subjects who were not taking cotrimoxazole prophylaxis (AOR: 6.36; 95% CI: 2.54-15.88), ever had nutritional counseling at health institution (AOR: 2.36; 95% CI: 1.08-5.16), having no food preference (AOR: 2.42; 95% CI: 1.14-5.13), and a food secure household (AOR: 3.51; 95% CI: (1.85-6.67)] were associated factors of dietary diversity among adults on ART.

Conclusion: This study dietary diversity status is unsatisfactory among adult attending ART clinic. Health institution and health professionals working at ART clinic shall strengthened their efforts to sustain the nutritional counseling service and ART adherence at health institution and encourage the patients to avoid food preference for their meal. It is vital to ensure household food security of adults on ART.

Key Words: Dietary diversity, HIV Positive Adults

INTRODUCTION

1.1. Background

Dietary diversity (DD) is the number of individual food items or food groups consumed over a given reference period of time (Ruel, 2018). To guarantee adequate intake of essential nutrients and promote good heath, dietary diversity is thought to be very important and no single food can contain all nutrients. The more different food types are included in the daily diet, the greater the probability of meeting nutrient requirements (Labadarios et al., 2011). People with low income, usually living in developing countries, are more prevalent to chronic diseases as a result of the malnutrition due to poor dietary diversity (Ruel, 2018). It is eating different food types across and within food groups like vegetables, fruits, grains, and animal source foods (Tesfaw et al., 2018).

Adequate nutrient intake which is necessary for good nutrition has often been associated with food variety and diet quality of individuals. Micronutrient malnutrition is one form of malnutrition affecting lives of millions of people worldwide (Bandoh & Kenu, 2017) (Chagomoka et al., 2016). Micronutrient malnutrition remains a major public health concern in developing countries due to intake of monotonous, predominantly starchy based diets that are lacking in diversity (FAO, 2010) and hence, over 2 billion people are affected worldwide (Chagomoka et al., 2016).

Although Anti-retro viral therapy (ART) medication related side effects like poor appetite, fatigue, and nausea make HIV infected individual hard to eat well, the nutritional needs of people with HIV are greater because the body has to work overtime to deal with a chronic viral infection and to fight against opportunistic infections (Lyon & Nambiar, 2000). For healthy, strong, productive life good nutrition has a paramount importance. It has been indicated that diversified diet as indicator of quality food. The dietary diversity score at the individual level is a proxy indicator of adequate intake of energy and micronutrients (UN, 2008) which implies that increasing the diversity of foods and food groups in the diet helps to ensure adequate intake of essential nutrients, and promotes good health (Kennedy et al., 2009).

1.2. Statement of the problem

HIV is one of the most serious global public health challenges. In 2017, 36.9 million people are living with HIV/AIDS worldwide (1.8 million were children <15 years old). Among these 59% (21.7 million) were accessing antiretroviral therapy (ART) globally. Nutrition care and support is one of the components of comprehensive care for people living with HIV (Weldegebreal et al., 2018) since more than half of people living with HIV are in low- and middle-income countries; 19.6 million (53%) in eastern and southern Africa, 6.1 million (16%) in western and central Africa, 5.2 million (14%) in Asia and the Pacific, and 2.2 million (6%) in Western and Central Europe and North America (McGovern, 2010). In Ethiopia, the prevalence of HIV is 1.15% [1.4% urban and 0.6% rural prevalence] PLWA 737,186. And in Amhara PLWA 210,410 (EPHI, 2017).

Dietary diversity is recommended for healthy life and is an important component of diet quality (Martin-Prevel et al., 2017). Globally, in the last half century the food diversity consumed around the world deteriorated (Khoury et al., 2014) and repetitive/monotonous low-quality diets are custom in resource-limited countries (Mekuria et al., 2017).

Dietary diversity is very important to help people living with HIV/AIDS prevent weight loss or maintain weight, maintain muscle mass, boost immunity and to prevent from viral progression and opportunistic infection (World Bank, 2007).

In Ethiopia, several studies have been carried out focusing on women & children nutrition (Eshete et al., 2018; Temesgen, Negesse, et al., 2018; Temesgen, Yeneabat, et al., 2018; Weldehaweria et al., 2016; Yimer & Tadesse, 2016), yet, dietary diversity in vulnerable groups like people with HIV/AIDS is limited. Besides, to the best of my knowledge (the investigator) little is investigated about dietary diversity of people living with HIV and associated factors in Ethiopia particularly in Amhara region and Bahir Dar City.

Therefore, this study proposed to assess dietary diversity and associated factors among HIV positive adults attending ART clinic at Felege Hiwot Comprehensive Referral hospital, Bahir Dar in Northwest Ethiopia.

1.3. Rationale of the study

Nutrition and HIV have an intricate relationship. HIV is known to lead for an extensive immune suppression, and further deteriorating of nutritional status in an infected individual, which in turn worsens the cripple down of immune and escalate HIV. Hence, a person with poor dietary diversity after acquiring HIV is likely to show rapid progress to AIDS (Duggal et al., 2012). Hence, the importance of nutrition for HIV/AIDS patients is paramount to help them boost their immunity. However, studies that focus particularly on dietary diversity of HIV positive adults on ART are few. Therefore, I have proposed to conduct this research with the addition of variables (i.e., food preference and ART regiment category) which were not covered by previous researchers.

1.4. Objectives

General objective

To assess dietary diversity and associated factors among HIV positive adults attending antiretroviral therapy (ART) clinic at Felege Hiwot Comprehensive Referral hospital, in Northwest Ethiopia.

Specific objectives

- To determine the level of dietary diversity among HIV positive adults attending ART clinic at Felege Hiwot Comprehensive Referral hospital, in Northwest Ethiopia, 2019.

- To identify predictors of dietary diversity among HIV positive adults attending ART clinic at Felege Hiwot Comprehensive Referral hospital, in Northwest Ethiopia, 2019.

1.5. Scope of the study

This research focus on adults who age between 18 to 65 years old and attending at ART clinic. And its scope limited to the assessment of magnitude of dietary diversity and its determinant in Felege Hiwot Comprehensive Referral Hospital ART clinic.

1.6. Significance of the study

This research will give an evidence on dietary diversity and selected factors among HIV positive adults attending Felege Hiwot Comprehensive Referral Hospital (FHCRH) ART clinic. Establishing factors associated with dietary diversity is crucial to identify and define the intervention areas for the target groups, ART attendants, so as to ultimately enhance nutrient intake. Hence, it is a vital input for different stake holders; such as health care professionals working in HIV/AIDS care, health facilities, regional health bureau and nutrition related program designers at different level including ministry of health and researchers who are working so as improve quality of life and better survival in HIV-infected patients.

2. LITERATURE REVIEW

2.1. Magnitude/level of dietary diversity

Regarding magnitude of dietary diversity some institution-based cross-sectional studies in East Africa had shown a wide variation in the level of dietary diversity among adults on ART follow-up. For instance, a cross sectional study on dietary intake and dietary diversity score of adults living with HIV/AIDS in Kenya presented 62.7% of respondents had high dietary diversity and mean dietary diversity score was 4.99 (SD 1.37) (Beatrice et al., 2018).

In Ethiopia, low magnitude in dietary diversity had been shown in Northwest Ethiopia studies, i.e., in Metam hospital study it was 41.2% (Woldemariam et al., 2015) and in Motta Town public health facilities only 29.5% of HIV positive adults consumed diversified diet with the mean ± SD dietary diversity score of 3.2 ± 1.88. Besides starchy staples (96.1%), followed by legumes (81.7%) were largely consumed whereas, organ meats (4.6%) were least consumed food groups by study subjects (Tesfaw et al., 2018). While higher dietary diversity was shown by Fitsum Weldegebreal and his colleagues' study in Eastern Ethiopia at Hiwot Fana and Dilchora Hospitals that indicated 71.3% had consumed high dietary diversity (Weldegebreal et al., 2018).

2.2. Factors associated with dietary diversity

2.2.1. Sociodemographic factors

Concerning socio-demographic factors studies has shown that sex (males had higher DD), household wealth quintile (higher wealth index tends to have high dietary diversity) (Codjoe et al., 2016), household size, and gender affect dietary diversity (Powell et al., 2017). Besides purchase of main source of food was a factor for adults to have low dietary diversity (Beatrice et al., 2018).

Besides, Amare Tariku and his colleagues study revealed being self-employed (having their own work) and daily laborer found to be a significant factors for dietary diversity among adults on ART (Woldemariam et al., 2015).

2.2.2. Behavioral factors

Alcoholism has a considerable effect on appetite, food choices and eating habits. Its' impact range from choice of unhealthy food (fatty foods) which predispose to obesity(Kruger & Kruger, 2015) to inability to appreciate hunger feeling which leads to malnutrition (Friedman et al., 1989). Studies has revealed that smoking (Gregersen et al., 2011) and Khat chewing (Ageely, 2008) reduced appetite which in turn affects dietary intake. Moreover, adults who had media exposure had a better dietary diversity than who did not had (Tesfaw et al., 2018).

2.2.3. Health related factors

Having more than 2 years duration of antiretroviral treatment had associated with high dietary diversity (Weldegebreal et al., 2018). While, adults on ART with shorter duration of anti-retroviral treatment (<18months) and taking Cotrimoxazole prophylaxis found to have a contribution for low dietary diversity (Woldemariam et al., 2015).

2.2.4. Nutritional related factors

Ethiopia has high levels of chronic food insecurity and is further prone to acute food insecurity, primarily during times of drought, environmental degradation, and insufficient access to and availability of food. As a result, the country has one of the world's highest incidences of under nutrition (EFDR MOH, 2008). Food insecurity and poor nutritional status may hasten progression to acquired immuno-deficiency syndrome (AIDS)-related illnesses, undermine adherence and response to antiretroviral therapy, and exacerbate socioeconomic impacts of the virus (Tiyou et al., 2012).

Moreover, HIV infected person may be exposed to malnutrition due to different factors. One of the factors responsible for malnutrition in an HIV-infected person is reduced appetite, which could be due to difficulty in ingesting food as a result of infections like oral thrush or

oesophagitis caused by *Candida,* a common opportunistic infection in HIV-infected people and fever, side effects of medicines, or depression (Duggal et al., 2012). Increased energy needs as a result of virus replication and opportunistic infections, Poor absorption of nutrients that may be the result of recurrent or chronic diarrhea and HIV-caused intestinal cell damage, and changes in the way the body uses the nutrients it receives or has stored are other factors that increase the probability of HIV-infected person to become malnourished (EFDR MOH, 2008).

HIV, immune expression, and nutrition interactions are complex and related to each other and as a result, malnutrition adds fuel to the fire by accelerating the progress of HIV infection to AIDS (Duggal et al., 2012). Hence, it is very crucial to maintain adequate food consumption and nutrient intake levels and meet special nutritional needs in order to cope up with the disease and to achieve the full benefit of ART treatment (Tiyou et al., 2012). Moreover, food insecurity has been reported as the reason for the reduced food supply and intake in adults which there by affects dietary diversity (Coates et al., 2007). And nutrition counselling was a significant factors associated with dietary diversified feeding (Tesfaw et al., 2018).

Conceptual framework of the study

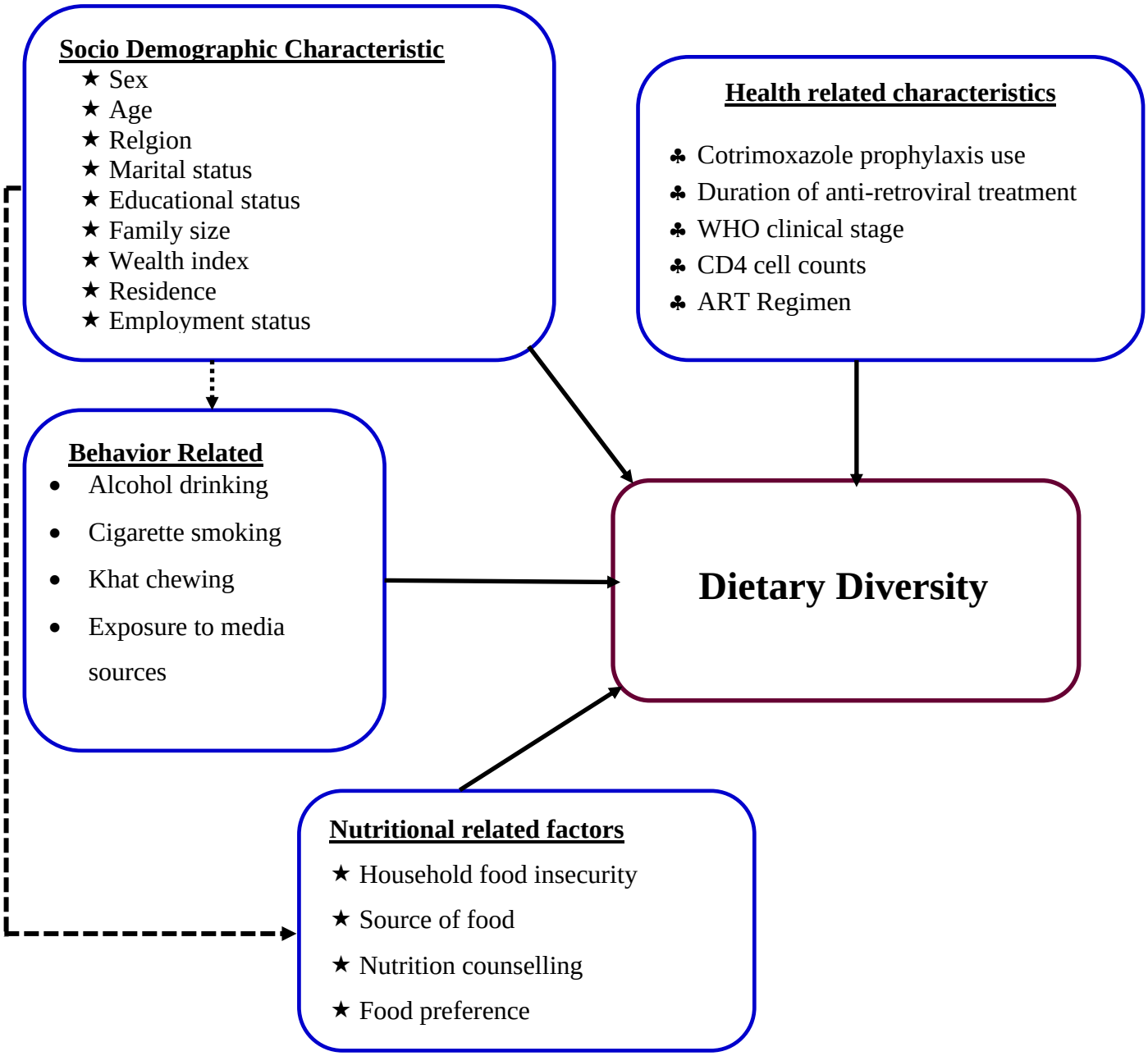

Figure 1. Conceptual Framework Developed based on literature review for Dietary Diversity and Associated Factors among HIV Positive Adults Attending Antiretroviral Therapy Clinics at Felege Hiwot Comprehensive Referral Hospitals, Northwest, Ethiopia

3. METHODOLOGY

3.1. Study area and period

The study was conducted in Felege Hiwot Comprehensive Referral Hospital (FHCRH) ART Clinic which found in Bahir Dar city from October 06/2019 to November 15/ 2019.

Bahir Dar city is the capital city of Amhara National Regional state which is located 565 Km in Northwest of Addis Ababa, Ethiopia.

FHCRH, is a tertiary referral hospital with around 400 beds and 9 operating tables serving over 7 million people from the surrounding area. The hospital provides obstetrics, pediatrics, internal medicine, ophthalmology, general, gynecology, ENT (Ear, Nose and Throat) and orthopedic surgery services. FHCRH ART clinic began to serve since 2002. It has 42 staffs, five out-patient departments and 7,500 HIV/AIDS patients registered for ART clinic service.

3.2. Study design

Institution based cross sectional study was conducted.

3.3.Population

Source population

Source population was all HIV positive adults who are registered for care and support at FHCRH ART clinic.

Study population

All HIV positive adults who were attending ART clinic within the data collection period.

3.4.Sample size determination

Sample size determined using a single population proportion formula with a 95% confidence level, 5% desired level of precision and considering proportion of adult HIV positive individuals attending public health facility in Motta town who consume diversified diet 29.5% (Tesfaw et al., 2018).

$$n = \frac{\left(Z_{\alpha/2}\right)^2 \, p\,(1-p)}{d^2} = \frac{(1.96)^2 * 0.295\ (1-0.295)}{0.05^2} = 319.58 \approx \mathbf{n = 320}$$

Z= the confidence limits of the survey result, P= the proportion of study population

d= the desired precision of the estimate, n= the total sample size.

Considering 10% non-response rate (320+32) the final sample size will be 352**.**

3.5. Sampling technique and procedures

Study participants were selected by systematic random sampling technique at every K^{th} (6^{th}) intervals. Where k is sampling fraction; which is calculated as N/n=2,000/352≈6. The numerator 2,000 was estimated as average number of HIV positive clients attending ART clinic per month (100pts/day*5days/week*4weeks/month). The starting sample selected by lottery method among the first six clients chart. Then the procedure continued (selection of every 6^{th} client as a study subject) until the required sample size obtained. In case of exclusion the next client was taken. Data collected in every working day except Thursday (to avoid Wednesday fasting influence for Orthodox follower) and one study subject recruited only once.

3.6. Inclusion and exclusion criteria

Inclusion criteria

- ✓ HIV positive adults [age 18–65 years old] who were attending ART clinic within the data collection period

Exclusion criteria

HIV positive adults;

- ✓ Previously diagnosed diabetes mellitus, and/or hypertension and/or pregnancy.
- ✓ Those who participated in the special festival or special occasions away from home within the last 24-hours prior to data collection.
- ✓ Adult who took ART less than 3 months before the beginning of data collection.

3.7. Study variables

Dependent variable

- Dietary diversity [Low and high dietary diversity]

Independent variables

- ✓ **Socio-demographic characteristics:**
  - Sex, age, religion, current residence, educational status, marital status , employment status, family size, wealth-index quantile.
- ✓ **Behavioral factors**
  - Alcohol drinking, cigarette smoking, khat chewing, and exposure to media sources
- ✓ **Health related characteristics**
  - Cotrimoxazole prophylaxis use, duration of anti-retroviral treatment, CD4 cell count, ART Regimen category and WHO clinical stage.
- ✓ **Nutritional related factor**
  - Household food insecurity, Source of food, Nutrition counselling, and food preference.

3.8. Operational definitions

Dietary diversity: categorized in two broad categories low dietary diversity and high dietary diversity;

- ✓ **Low dietary diversity**: participants with Individual Dietary Diversity Score (IDDS) below the mean food groups considered as having low dietary diversity (Woldemariam et al., 2015).

- ✓ **High dietary diversity**: Mean individual dietary diversity score used as cut off point and those participants who consumed mean and above food groups within the last 24-hours considered as having high dietary diversity diet (diversified diet) (Woldemariam et al., 2015).

3.9. Data collection and quality assurance

Data collection instrument: Data were collected using a structured interviewer-administered questionnaire with chart review. Standardized individual dietary diversity score tool with 24-hours food recall method used to assess dietary diversity of HIV positive adults.

The questionnaire was adapted from (FANTA/FAO) and by reviewing literatures (Coates et al., 2007; FAO, 2010; Woldemariam et al., 2015). The questionnaire first prepared in English by reviewing literatures and then translated into Amharic then back to English to maintain its consistency, nutrition expert consulted for comment and pretest done.

The questionnaire has seven parts;

- ✓ Part-I: Questions on socio-demographic characteristics.
- ✓ Part-II: Behavioral factors
- ✓ Part III: Health related characteristics
- ✓ Part-IV: Nutritional related characteristics
- ✓ Part-V: Dietary diversity questions
- ✓ Part-VI: Household food insecurity
- ✓ Part-VII: Wealth Index

Data collection personnel: A total of six nurses recruited: five for data collection, one for supervision. They were trained and oriented for one day on the questionnaire and data collection.

Data on health-related characteristics such as duration on ART, Cotrimoxazole prophylaxis, last CD_4 count, WHO clinical stage and opportunistic infections were collected by reviewing patient clinical records & interview.

Measurement of individual dietary diversity score (IDDS): using the standardized IDDS tool, with a 24-hours food recall method (FAO) used to assess individual dietary diversity of study subjects (FAO, 2010; Woldemariam et al., 2015)

For estimation of individual dietary diversity score nine food groups consumed in the study area i.e., starch staples, dark green leafy vegetables, other vitamin-A rich fruits & vegetables,

other fruits & vegetables, meat &/ fish, organ meat, egg, legumes, nuts & seeds and milk & milk products.

Study subject were asked to list all foods he/she consumed at home and outside home in the last 24-hours prior to the data collection date from breakfast to dinner. Food eaten for breakfast 6:00 AM and 10:00 AM (12:00 - 4:00 morning local time) then lunch12:00 PM-4:00 PM (6:00 noon to 10:00 after noon local time) and dinner 8:00 PM-12:00 AM (2:00 evening – 6:00 mid night local time) while snacks considered to be eaten before or after the major meal time. Then food eaten by the respondent classified into nine food groups.

If the respondent consumed food at least once during the last 24-hours within each subgroup 1 point scored and 0 point if they never consumed the food. Food groups an individual has consumed during the preceding 24-hours counted and IDDS calculated as the sum of food groups consumed over 24-hours.

Data quality control: The collected data reviewed and checked for completeness by the data collectors, supervisor and principal investigator. Data collectors given a training and the questionnaire translated and pretested. To assure anonymity, code numbers placed on the completed questionnaires after they return to the investigator.

3.10. Data management and analysis

The data were cleaned and entered in to Epidata manager 4.6, exported and analyzed with SPSS version 26 software. The characteristics of the study subjects described by presenting on tables, means and standard deviations. The categorical variables presented in frequencies and proportions.

To determine the level of individual dietary diversity among HIV positive adults on ART, first individual Dietary Diversity Score (IDDS) calculated as the sum of food groups consumed over 24-hours. Then based on then mean of IDDS level of individual dietary diversity classified into low dietary diversity and high dietary diversity.

Wealth Index: Household's wealth status was assessed collecting data on variables related to ownership of livestock assets, crop produced in the previous year, possession of farm land, valuable domestic assets, living house condition, sanitation facility. For urban and rural

participants, the PCA run separately and finally wealth index score merged to a common variable (wealth index score). Then Wealth index score generated by using principal component analysis and the wealth index score categorized into five distinct wealth quintiles.

Household Food Insecurity Access Scale (HFIAS): Nine occurrence and frequency of occurrence questions/items of FANTA 2007 used to examine household food insecurity scale. The frequency of occurrence item recoded to '0' if the answer for occurrence item is 'No' and if 'Yes' it could be 1, 2, or 3. Thus, households will be grouped based on scores achieved in specific items. Based on the criteria; A food secure household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely. Hence, *food secure households* score item one (601.1) = '0' or '1' and item two (602.1) to nine (609.1) = '0' else recoded in to *Food insecure households* (Coates et al., 2007).

To identify predictors of dietary diversity status, the sum of individual dietary diversity score recoded as low dietary diversity (0) and high dietary diversity (1) by considering mean IDDS as cut off point (3.86 ± 1.18). Then bi-variable binary logistic regression analysis performed between dependent variable (dietary diversity status) and each of the potential factors to select candidate variables for multivariable analysis.

Predictor variables with p-value less than 0.20 in bi-variable binary logistic regression taken in to multivariable binary logistic regression analysis. P-values less than 0.05 considered statistically significant in the multivariable analysis. Predictor variables which had a significant association with dietary diversity status identified using adjusted odds ratio (AOR) with 95% CI and p-value less than 0.05. Hosmer and Lemeshow goodness of fit-test of model computed, p-value (0.21).

3.11. Ethical considerations

Ethical clearance and approval letter to conduct study obtained from Bahir Dar University, Institute of Technology, Faculty of Chemical & Food Engineering, Department of Applied Human Nutrition to Amhara Public Health Institute. Amhara Public Health Institute had written ethical clearance for the conduct to FHCRH. Permission obtained from administrative body of FHCRH hospital. Finally, verbal consent obtained from the subjects included in the study immediately before the interview.

4. RESULTS AND DISCUSSION

4.1. Results

Socio-demographic and behavioral characteristics of study participants

A total of 352 of HIV positive adults (18–65 years old) attending antiretroviral therapy participated which makes 100% response rate. Majority of the participants were male 197 (56%), in the age group 35- 44 years 149 (42.3%), Orthodox religion followers 279 (79.3%), urban dwellers 300 (85.2%), secondary & above highest educational level achieved 202 (57.4%), married 229 (65.1%) and 211 (60.6%) lay in the middle and above quintiles of wealth index. Mean ± standard deviation (SD) age of participants was 36.9 ± 8.2 years old, mean family size was 3.6 ± 1.6. Among the study participants 41 (11.6%) smoke cigarettes, and 25(7.1%) chew khat (**Table 1**).

Table 1. Socio-demographic characteristics of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019. (n=352)

Variables		Frequency	%
Sex	Male	197	56.0
	Female	155	44.0
Age category in years	18 – 24	17	4.8
	25 – 34	119	33.8
	35 – 44	149	42.3
	45 - 54	53	15.1
	55 - 65	14	4
Religion	Orthodox	279	79.3
	Muslim	24	6.8
	Protestant	24	6.8
	Catholic	13	3.7
	Adventist	11	3.1
	Others*	1	0.3
Residence	Urban	300	85.2
	Rural	52	14.8
Highest level of educational achieved	No formal education	89	25.3
	Primary education	61	17.3
	Secondary education & above	202	57.4
Marital status	Married	229	65.1
	Divorced	47	13.4
	Single	35	9.9
	Widowed	41	11.6

* Apostolic

Table 1. Socio-demographic characteristics of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019. (n=352) (*Continued*)

Variables		Frequency	%
Occupation	Farmer	42	11.9
	Government employee	96	27.3
	Housewife	16	4.5
	Self employed	143	40.6
	Daily laborer	38	10.8
	Unemployed	9	2.6
	Student	6	1.7
	Others♣	2	0.6
Family Size	≤4	256	72.7
	≥5	96	27.3
Head of household	Yes	281	79.8
	No	71	20.2
Occupation of house hold ***n=71***	Farmer	18	25.4
	Government employee	17	23.9
	Self employed	25	35.2
	Daily laborer	7	9.9
	Unemployed	2	2.8
	Others♣	2	2.8
Household main source of food	Purchase	307	87.2
	Farm/garden	45	12.8
Quintiles of wealth index	Lowest quintile	74	21.0
	Second quintile	65	18.5
	Middle quintile	72	20.5
	Fourth quintile	75	21.3
	Highest quintile	66	18.8
Smoke cigarettes	No	311	88.4
	Yes	41	11.6
Drink alcohol	No	257	73
	Yes	95	27
Chew Khat	No	327	92.9
	Yes	25	7.1
Follow media (TV/radio/magazine etc.)	No	97	27.6
	Yes	255	72.4

♣ Pension

Health related characteristics

More than two-thirds 239 (67.9%) hand no opportunistic infection in the last one month before date of interview, 162 (46.0%) had treatment stage –I, large proportion 289 (82.1%) were taking first line ART drugs and 177 (50.3%) had CD4 count ≥350cells/mm^3 (**Table 2**).

Table 2. Health related Factors of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352)

Variable		Frequency	%
Diagnosed for opportunistic infection in the last one month	No	239	67.9
	Yes	113	32.1
Type of opportunistic infections ***n=113***	Chronic cough	48	42.5
	Paralysis (any form)	3	2.7
	Tuberculosis	16	14.2
	Oral and/or esophageal thrush	44	38.9
	Others*	2	1.8
WHO clinical stage of disease?	Stage-I (T-1)	162	46.0
	Stage-II (T-2)	125	35.5
	Stage-III	63	17.9
	Stage-IV	2	0.6
Last CD4 cell count (cell/mm^3)	<200	78	22.2
	200 - 349	97	27.6
	≥350	177	50.3
Duration of ART treatment	≤24 months	30	8.5
	25 - 48 months	76	21.6
	≥49 months	246	69.9
ART Regimen category	First Line	289	82.1
	Second Line	63	17.9
Cotrimoxazole prophylaxis	No	295	83.8
	Yes	57	16.2
Any sign of gastro-intestinal up set (diarrhea, nausea or vomiting) within two weeks	No	292	83.0
	Yes	60	17.0
GI upset *(n=60)*	Nausea & vomiting	35	9.9
	Stomach burning sensation	25	7.1

*diarrhea, herpes zoster , T-1: Treatment stage -1, T-2: Treatment stage -2

Nutritional related characteristics

Majority of study participants ever had nutritional counseling at health institution 298 (84.7%) and 292 (83.0%) had no food preference for their meals (**Table 3**).

Table 3. Nutritional related factor of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352)

Variable		Frequency	%
Ever had nutritional counseling at health institution	No	54	15.3
	Yes	298	84.7
Counseling on… *n=298*	Drugs	96	32.2
	Infection/illness	7	2.3
	General feeding	17	5.7
	Drugs, Infection/illness & General feeding	178	59.7
Ever take ready to use therapeutic feeding (RUTF) (plumpy nut) within one month	No	325	92.3
	Yes	27	7.7
Taking RUTF on daily basis *n=27*	No	6	22.2
	Yes	21	77.8
Ever shared RUTF with other family members n=27	No	16	59.3
	Yes	11	40.7
Food preferences	No	292	83.0
	Yes	60	17.0
Any of food did not prefer to eat *(n=60)*	Legumes	21	6.0
	Vegetables	14	4.0
	Meat / Fatty food	16	4.5
	Milk & milk products	9	2.6

Measurements of 24 hours individual dietary diversity

More than half of study subjects 203 (57.7%) ate 3 times a day in the past 24 hours and near a third 115 (32.7%) ate 4 or more times in a day. The average meal frequency was 3.2 ± 0.8 with a minimum of 1x & maximum of 6x a day.

Among nine food groups; starchy staple foods 333(94.5%), other fruits & vegetables 291(82.7%) and legumes, nuts and seeds 228(64.8%) were the most commonly eaten foods while organ meats were the least 28 (8.0%) food types eaten in 24 hours meals. Thirty-six (10.2%) participants mentioned they had eaten something (meal or snack) outside the home the day before interview. The mean individual dietary diversity score was 3.86 ± 1.18 and minimum 1 and maximum 8 type of food eaten. (**Table 4**).

Table 4. The 24 hours dietary diversity of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352)

Food group		Frequency	%
Starchy staple foods	No	19	5.4
	Yes	333	94.6
Dark green leafy vegetables	No	290	82.4
	Yes	62	17.6
Other vitamin A rich fruits and vegetables	No	254	72.2
	Yes	98	27.8
Other fruits & vegetables	No	61	17.3
	Yes	291	82.7
Organ meat liver, kidney, heart or other organ meats	No	324	92.0
	Yes	28	8.0
Meat and fish	No	188	53.4
	Yes	164	46.6
Eggs	No	298	84.7
	Yes	54	15.3
Legumes, nuts and seeds	No	124	35.2
	Yes	228	64.8
Milk and Milk products	No	254	72.2
	Yes	98	27.8

Level of individual dietary diversity

The 24 hours individual dietary diversity score classified based on mean dietary diversity score (3.86 ± 1.18) in two low and high dietary diversity. Two hundred nine (59.4%) study subjects took more than the mean food category (high dietary diversity) (**Figure 2**).

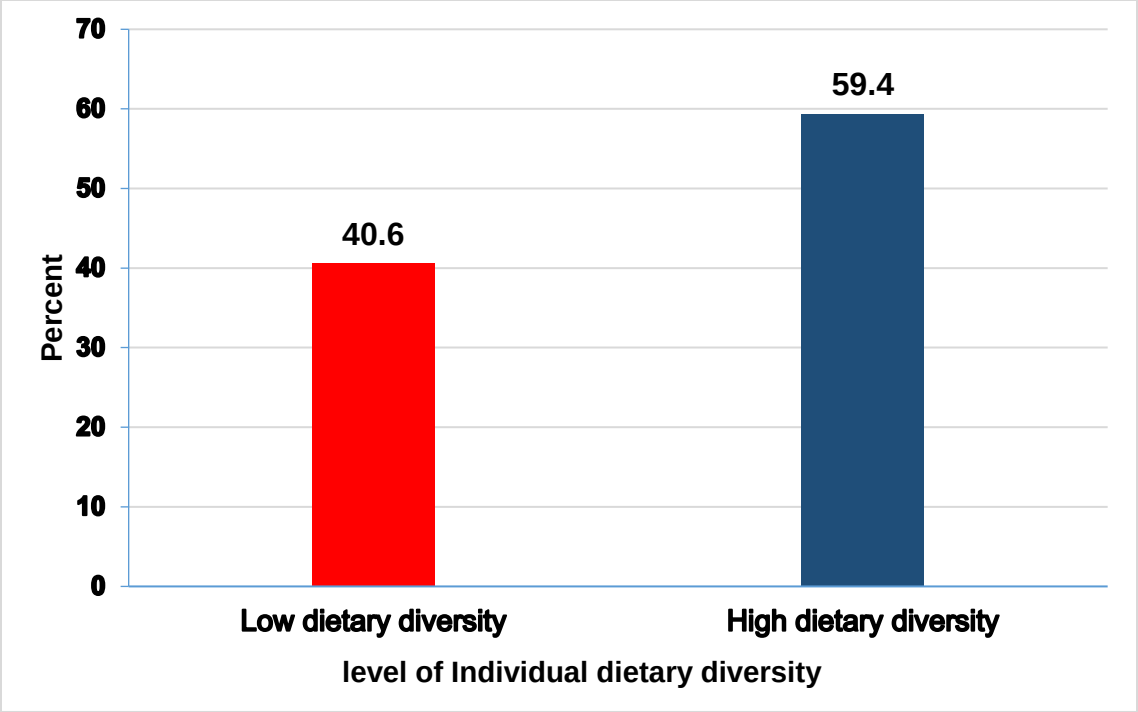

Figure 2 . Level of individual dietary diversity of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352)

Household food insecurity

Adults on ART response for household food insecurity items were computed; the overall magnitude of household food insecurity was 134 (38.1%) and 218 (61.9%) were food secured. One hundred twenty-seven (36.1%) were mildly food insecure household, and 7 (2.0%) moderately food insecure. One hundred thirty-six (38.6%) of participants worried about household would not have enough food. Each of food insecurity items frequency presented on **Table 5**.

Table 5. Household food insecurity of HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352)

Household food insecurity access scale question in the past four weeks….	Occurrence				Frequency of occurrence (if yes for occurrence)					
					Rarely (once or twice in the past four weeks)		Sometimes (three to ten times in the past four weeks)		Often (more than ten times in the past four weeks)	
	Yes		No							
	n	(%)	n	(%)	n	%	n	%	n	%
Worried households about having enough food	136	38.6	216	61.4	69	50.7	58	42.6	9	6.6
Self or household member unable to eat the kinds of foods preferred because of a lack of resources	137	38.9	215	61.1	56	40.9	27	19.7	54	39.42
Self or household member have eaten a limited variety of foods due to a lack of resources	150	42.6	202	57.4	58	38.7	26	17.3	66	44.0
Self or household member have eaten some foods did not want to eat because of a lack of resources to obtain other types of food	147	41.8	205	58.2	63	42.9	44	29.9	40	27.2
Self or household member have eaten a smaller meal than felt needed because there was not enough food	110	31.3	242	68.8	43	39.1	40	36.4	27	24.5
Self or household member have eaten fewer meals in a day because there was not enough food	82	23.3	270	76.7	49	59.8	26	31.7	7	8.5
There was ever no food to eat of any kind in the household because of lack of resources to get food	46	13.1	306	86.9	30	65.2	12	26.1	4	8.7
Self or household member go to sleep at night hungry because there was not enough food	37	10.5	315	89.5	25	67.6	9	24.3	3	8.1
Self or household member go a whole day and night without eating anything because there was not enough food	29	8.2	323	91.8	21	72.4	6	20.7	2	6.9

Factors associated with level of dietary diversity

Candidate variables were fitted into multivariable binary logistic regression model (forward stepwise method); eight variables were found to be predictors of dietary diversity of HIV positive adults attending ART clinic.

Employment status; self-employed individuals had 4.60 more likely to take high diversified diet [AOR = 4.60 (95% CI: (1.72-12.27)] than that of unemployed adults on ART.

Quintiles of wealth index; were another predictor of individual dietary diversity; the second [AOR = 4.33 (95% CI: (1.72 -10.89)], middle [AOR = 4.40 (95% CI: (1.71-11.31)], fourth [AOR = 6.60 (95% CI: (2.36-18.48)] and in a highest quintile [AOR = 9.45 (95% CI: (3.34-26.77)] were more likely to have diversified diet than those individuals in lowest quintile.

Last CD4 count (cell/mm3); subjects with CD4 count 200-349cells/mm^3 were 8.08 more likely to diversify their food [AOR = 8.08 (95% CI: (2.93-22.23)] than those below 200 cells/mm^3.

ART regimen category; Individuals taking first line ART regimen drugs had 4.49 more likely to diversify their food [AOR = 4.49 (95% CI: (2.19-9.21)] than those taking second line ART regimen drugs.

Cotrimoxazole prophylaxis: subjects who were not taking cotrimoxazole prophylaxis were 6.36 more likely to diversify their food [AOR = 6.36 (95% CI: (2.54-15.88)] than those who were taking cotrimoxazole.

Ever had nutritional counseling; subjects who ever had nutritional counseling at health institution were 2.36 more likely to diversify their food [AOR = 2.36 (95% CI: (1.08-5.16)] than their counter parts.

Having no food preferences: adult who had no food preference were 2.42 more likely to diversify their food [AOR = 2.42 (95% CI: (1.14-5.13)] than individuals having food preference to eat.

Household food insecurity; subjects who had food secured household were 3.51 more likely to diversify their food [AOR = 3.51 (95% CI: (1.85-6.67)] than their counter parts. (**Table 6**).

Table 6. Bi-variate & Multivariable binary logistic regression analyses of variables with individual dietary diversity status among HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352).

Variable	Dietary diversity		Crude			P-value	Adjusted			P-value
	High	Low*	OR (95% CI)				OR (95% CI)			
Sex						<0.001				
Male	136	61	2.50	1.62	3.88					
Female	73	82	*Refe*rence							
Age category in years.						0.050				
18 – 24	8	9	*Refe*rence							
25 – 34	60	59	1.14	0.41	3.17					
35 – 44	99	50	2.23	0.81	6.12					
45 – 54	35	18	2.19	0.72	6.63					
55 – 65	7	7	1.13	0.27	4.64					
Religion						0.041				
Christian	190	138	*Refe*rence							
Muslim	19	5	2.76	1.01	7.57					
Residence						0.38				
Urban	181	119	1.30	0.72	2.36					
Rural	28	24	*Refe*rence							
Educational status						<0.001				
No formal education	37	52	*Refe*rence							
Primary education	32	29	1.55	0.81	2.98					
Secondary and above	140	62	3.17	1.89	5.32					
Marital status						0.001				
Married	152	77	*Refe*rence							
Divorced	23	24	0.49	0.26	0.92					
Single	20	15	0.68	0.33	1.39					
Widowed	14	27	0.26	0.13	0.53					
Employment status						0.001				0.001
Self employed	123	62	3.47	1.60	7.51		4.60	1.72	12.27	
Government employee	59	37	2.79	1.23	6.33		1.51	0.51	4.50	
Daily laborer	15	23	1.14	0.44	2.99		0.94	0.27	3.30	
Unemployed	12	21	*Refe*rence				*Refe*rence			
Family Size						0.28				
≤ 4	28	43	*Refe*rence							
≥ 5	181	100	1.26	0.82	1.94					
Head of household						<0.001				
Yes	28	43	2.78	1.63	4.75					
No	181	100	*Refe*rence							
Source of food						0.66				
Purchase	181	126	1.15	0.60	2.18					
Farm	28	17	*Refe*rence							
Quintiles of wealth index						<0.001				<0.001
Lowest quintile	22	52	*Refe*rence				*Refe*rence			
Second quintile	34	31	2.59	1.29	5.20		4.33	1.72	10.89	
Middle quintile	45	27	3.94	1.98	7.85		4.40	1.71	11.31	
Fourth quintile	58	17	8.06	3.87	16.82		6.60	2.36	18.48	
Highest quintile	50	16	7.39	3.48	15.67		9.45	3.34	26.77	
Smoke cigarettes						0.001				
No	169	142	*Refe*rence							
Yes	40	1	33.61	4.56	247.55					

Table 6. Bi-variate & Multivariable binary logistic regression analyses of variables with individual dietary diversity status among HIV positive adults (18–65 years old) attending antiretroviral therapy clinics in Felege Hiwot Comprehensive Referral Hospital, Northwest Ethiopia, 2019 (n=352). *(Continued)*

Variable	Dietary diversity		Crude OR (95% CI)			P-value	Adjusted OR (95% CI)			P-value
	High	Low*								
Drink alcohol						0.010				
No	142	115	*Reference*							
Yes	67	28	1.94	1.17	3.21					
Chew Khat						0.005				
No	185	142	*Reference*							
Yes	24	1	18.42	2.46	137.80					
Follow media (TV/radio/magazine etc.)						0.002				
No	45	52	*Reference*							
Yes	164	91	2.08	1.30	3.35					
WHO clinical stage of disease						0.039				
Stage-I (T-1)	83	79	*Reference*							
Stage-II (T-2)	83	42	1.88	1.16	3.05					
Stage-III	42	21	1.90	1.04	3.50					
Stage-IV	1	1	0.95	0.06	15.48					
Last CD4 count (cell/mm^3)						<0.001				<0.001
<200	38	40	*Reference*				*Reference*			
200 – 349	81	16	5.33	2.66	10.69		8.08	2.93	22.29	
>350	90	87	1.09	0.64	1.86		0.67	0.26	1.71	
Duration of ART in months						0.37				
≤24 months	21	9	1.74	0.77	3.95					
25 - 48 months	47	29	1.21	0.71	2.05					
≥49 months	141	105	*Reference*							
ART Regimen category						<0.001				<0.001
First Line	185	104	2.89	1.65	5.07		4.49	2.19	9.21	
Second Line	24	39	*Reference*				*Reference*			
Cotrimoxazole prophylaxis						<0.001				<0.001
No	190	105	3.62	1.99	6.60		6.36	2.54	15.88	
Yes	19	38	*Reference*				*Reference*			
Ever had nutritional counseling at health institution						0.017				0.032
No	24	30	*Reference*				*Reference*			
Yes	185	113	2.05	1.14	3.68		2.36	1.08	5.16	
Food preferences						0.029				0.022
No	181	111	1.86	1.07	3.26		2.42	1.14	5.13	
Yes	28	32	*Reference*				1.00			
Household food insecurity status						<0.001				<0.001
Food insecure	49	85	*Reference*				*Reference*			
Food secure	160	58	4.79	3.01	7.60		3.51	1.85	6.67	

Forward stepwise elimination binary logistic regression model was run adjusting for the variables significant at p-value < 0.20 in the unadjusted model (Bivariate) which included variables shown in this table.

OR: Odds Ratio, CI: Confidence Interval.

* The reference category is low dietary diversity.

4.2. Discussion

Nearly six in ten (59.4%) study subjects had high dietary diversity (mean IDDS: 3.86 ± 1.18). This was similar with a study done in Kenya (62.7%) (Beatrice et al., 2018). However, higher than a study done in Metema hospital (41.2%) and Motta Town Public Health Facilities (29.5% participants consumed diversified diet with mean IDDS: 3.2 ±1.88) (Tesfaw et al., 2018) and lower than a study done at Hiwot Fana and Dilchora Hospitals (71.3%) (Weldegebreal et al., 2018). This discrepancy might be due to variation in data collection periods i.e., in Motta and Metema the data collection period was April to May which is post-harvest time possibly food access will begin to decrease. While Hiwot Fana & Dilchora Hospitals data collection period was November to February which is harvesting time that will have a better food access. Moreover, geographical location and feeding habit variation between Eastern [Hiwot Fana & Dilchora Hospitals] and northern Ethiopia may be a potential reason for the discrepancy with this study.

The current study showed employment status had a significantly associated factor with dietary diversity. Self-employed adults (having their own work) on ART were more likely to have high dietary diversity than unemployed. This finding is supported by a study done by Amare and his colleagues in Metema hospital (Woldemariam et al., 2015) and Mukabana B. & Masika F. in Uasin Gishu District Hospital in Kenya (Beatrice et al., 2018) .

With regarding to quintiles of wealth index which derived from household assets of study participants, a statistically significant associations were found between quintiles of wealth index and dietary diversity. From second to highest quintile there were an increase in the high dietary diversity compared to the lowest quintile. This would be credited to the fact that household assets have been associated and used as a proxy indicator of the socioeconomic status of a household that links to purchasing capacity of variety of foods and diversify food. This was in line with finding of Metma hospital study (Woldemariam et al., 2015). Besides, wealth also mentioned as a factor for increasing dietary diversity in a study done in Tanzania (Powell et al., 2017) and households in the richest wealth quintile had the highest dietary diversity in Ghana (Codjoe et al., 2016).

Another factor which was found to be associated with dietary diversity was last CD4 cells count. Subjects who had a CD4 cell counts 200-349 cells/mm^3 had a better dietary diversity than those who had a CD4 cell counts less than 200 cells/mm^3. This is due to the fact that poor nutritional status particularly micro nutrients can leads to immunosuppression. This was similar with study done in Uganda which reveals consumption of diversified diet was positively associated with higher CD4 cell counts (Venter et al., 2009).

Moreover, adults who were taking first line ART had four times more likely to diversify their diet compared to those who were on second line ART. The possible reason would be first line ART drugs have less side effects such as lower gastrio-intestinal upset which will have a contribution for better appetite, feeding and dietary diversity (WHO, 2006).

This study showed that adults who were not taking Cotrimoxazole prophylaxis were more likely to have high dietary diversity. The possible reason would be linked to Cotrimoxazole induced nausea and vomiting (Meyer, 1999) which potentially reduce appetite and there by dietary diversity affected. This finding was in line with Metam hospital study which indicated adults on Cotrimoxazole had more likely to have low dietary diversity than the counterpart (Woldemariam et al., 2015).

Besides, adult patients who ever had nutritional counseling at health institution found to have diversified diet than adults who did not get nutritional counseling. The possible reason would be health education/information on nutrition possibly help them to diversify their diet. This is in line with Addisu Tesfaw and his colleague study in Motta (Tesfaw et al., 2018).

Food preference which is one of the new variable add in to this study was a statistically significant predictor of dietary diversity among adult on ART. Adult who had no food preference were two times more likely to diversify compared to those who had food preference for their meal. This would be due to the fact that people who prefer food will eat selectively specific foods which influence food intake and finally ends up with limited food variety and low dietary diversity. This finding also supported by Jamie Hale and Eertmans et.al reviews on food likes and dislikes on human eating behavior which clarifies food preference has a notable contribution for an individual food intake and change of dietary patterns (Hale, 2018) (Eertmans, 2001).

Moreover, household food insecurity found to be a statistically significant determinant of dietary diversity among adults on ART. Adults from food secured household had nearly four times more likely to have high diversified diet than its counterpart. Dietary diversity is an indicator for food security as the inability of households to obtain access to enough food eminently enforce to have monotonous feeding habit which compromise dietary diversity. This was in line to a study done in Jimma, Ethiopia (Tiyou et al., 2012) and in Nepal a study done among lactating mothers (Singh et al., 2020) that showed people with low dietary diversity tend to have food insecurity.

4.3. Limitations and strengths of the study

Limitation of the study: There are limitations that should be considered while using the results of this study. Despite the fact that the study site gives ART service for clients coming from multiple places, still the research conducted at a single site may have a limitation that may attributed to the factor related to institution. Hence, future researches shall consider multiple sites in their study.

Strength of the study: Data collected in non-fasting days so as to avoid the possible effect of fasting on dietary diversity of study participants.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

In summary, this study finding revealed that dietary diversity was unsatisfactory among adult attending Anti-retroviral treatment clinic. Moreover, self-employment status, quintiles of wealth index, last CD4 count, first line ART regimen category, adult not taking cotrimoxazole prophylaxis, having nutritional counseling in health institution, absence of food preferences, household food insecurity were found to be a statistically significant factors for individual dietary diversity of adult taking ART.

5.2. Recommendations

★ Ministry of health, regional health bureau and health professionals working in ART clinic shall work to sustain patient's treatment on first line ART regimen category through strictly adhere to the ART guideline, strong counseling and regular support of people on ART to avoid defaulting or dropout from treatment and drug resistance.

★ Felege-Hiwot Comprehensive Referral hospital and health professionals working at ART clinic shall strengthened their efforts to sustain the nutritional counseling service at the ART clinic through regular updating of the staff working there, adhere the appropriate counseling approach considering the background and situation of adults on ART and using different modalities like experience sharing among people on ART, preparing model sites or simulation areas and educate them through that.

★ Health professionals working at ART clinic shall encourage the patients to avoid food preference for their meals unless it is a cultural/religious taboo.

★ Governmental or NGO aid organization shall ensure household food security of adults on ART through providing food item supports or creating jobs to jobless adults on ART.

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ANNEXES

Annex I: English Version Questionnaire

Questionnaire ID Code ☐☐☐

Bahir Dar University

Institute of Technology

Faculty of Chemical & Food Engineering

Department of Applied Human Nutrition

Consent form

Greetings Dear Sir/Madam! I am _____. I am going to have an interview with you for a research study. First of all, let me describe what it is.

This is a study being carried out to assess the dietary diversity and associated factors among HIV positive adults attending ART clinic at Felege Hiwot Comprehensive Referral hospital, in Northwest Ethiopia. This study is conducted in partial fulfillment of the requirements for Master's Degree in Applied Human Nutrition in Bahir Dar University.

Your participation is totally with your voluntariness and you can stop your participation in the study at any time.

There is no risk associated with participating in this study and no direct benefits. However, it is hoped that your participation in this study will help us to gain a better understanding of your dietary diversity and some potential reasons for it.

Be assured that the **information you provide** would be used for research purposes only and would be treated as **confidential**.

Are you willing to participate? A. Yes B. No

If yes continue, if no thank him/her and go to the next respondent.

Principal Investigator

Hiwot Ahmed

Tel: 0918-15-48-46

Email: hiwotahmed@gmail.com

Thank You!

Part I: Socio-demographic characteristics of adult HIV positive individuals attending ART at FHCRH

Instruction: *Please circle the option mentioned &/or fill in the blank space that best describe the respondent.*

No.	Questions	Coding categories	Skip
101.	Sex	[1] Male [2]Female	
102.	How old are you? (in years)	_____ years	
103.	Religion	[1] Orthodox [2] Muslim [3] Protestant [4] Catholic [5] Adventist [6] Other Specify) _____	
104.	Please describe your current residence?	[1] Urban [2] Rural	
105.	What is the highest level of education you have attained?	[1] Cannot Read and Write [2] Can Read and Write only [3] Primary education [4] Secondary education [5] Certificate and above	
106.	What is your marital Status?	[1] Single [2] Married [3] Divorced [4] Widowed	
107.	Occupation	[1] Farmer [2] Government employee [3] Housewife [4] Self employed [5] Daily laborer [6] Unemployed [7] Student [8] Other(Specify)_____	
108.	How many people are living in your household (Family size)?	_____	
109.	Monthly family income	_____Ethiopian Birr	
110.	Are you the head of your household?	[1] Yes [0] No	If Yes Skip to Q112
111.	If the answer is no for Q110, what is the occupation of the head of the household?	[1] Farmer [2] Government employee [3] Housewife [4] Self employed [5] Daily laborer [6] Unemployed [7] Student [8] Other(Specify)_____	
112.	What is the main source of food for your household?	[1] Purchase [2] Farm/garden [3] Relatives &/ or friends [4] Welfare/NGO support [5] Other (Specify)_____	

Part-II: Behavioral factors

S.No.	Questions	Coding categories	Skip
201.	Do you smoke cigarettes?	[1] Yes [0] No	
202.	Do you drink alcohol?	[1] Yes [0] No	
203.	Do you chew Khat?	[1] Yes [0] No	
204.	Do you follow media (TV/radio/magazine etc.)?	[1] Yes [0] No	

Part-III: Health related Factors (to be checked from client chart + Ask)

Instruction: Please circle the option mentioned &/or fill in the blank space that best describe the respondent. NB: 301- 307 based on the respondent chart data review. 308-310 Ask the respondent

S.No.	Questions	Coding categories	Skip
301.	Does the client have any diagnosed opportunistic infection?	[1] Yes [0] No	If no skip to Question #303
302.	Which opportunistic infections does the client have within one month?	[1] Chronic cough [2] Paralysis(any form) [3] Tuberculosis [4] Oral and/or esophageal thrush [5] No OI [6] Other (specify)_____	
303.	What is the current clinical stage WHO staging of disease?	[1] Stage –I [2] Stage –II [3] Stage –III [4] Stage -IV	
304.	What was the client's last CD4 cell count?	_____Cells/mm^3	
305.	Does the client is on ART?	[1] Yes [0] No	If no skip to #308
306.	Duration of ART treatment (in months)	…….	
307.	ART Regimen	[1] AZT-3TC-NVP [2] AZT-3TC-EFV [3] TDF-3TC-NVP [4] TDF-3TC-EFV [5] Other/second line	
308.	Does the client is on Cotrimoxazole prophylaxis?	[1] Yes [0] No	
309.	Does the client has any sign of gastro-intestinal up set (diarrhea, nausea or vomiting) within two weeks	[1] Yes [0] No	If no skip to que#401
310.	If your answer is yes for Q 309, please specify which Gastro-intestinal upset the client is experiencing?	…….	

Part-IV: Nutritional related factor

S.No.	Questions	Coding categories	Skip
401.	Have you ever had nutritional counseling at health institution?	[1] Yes [0] No	If no skip to que#403
402.	**If** yes for Q401, what was the nutritional counseling about?	[1] Drugs [2] Infection/illness [3] General feeding [4] Others (Specify)……..	
403.	Have you taken ready to use therapeutic feeding (RUTF) (plumpy nut) within one month?	[1] Yes [0] No	If no skip to que #405
404.	If yes for Q403, are you taking on daily basis?	[1] Yes [0] No	
405.	Have you ever shared with other family members?	[1] Yes [0] No	
406.	Do you have food preferences?	[1] Yes [0] No	
407.	If, yes for Q406, please list any food that you do not eat?_____		

***ART**: antiretroviral therapy*

Part-V: Dietary Diversity Questionnaire

Instruction: - Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning.

Table 1. 24 hour dietary recall tool

Write down all food and drinks mentioned by the respondent. When the respondent has finished, probe for meals and snacks not mentioned.

Breakfast 6:00AM-10:00AM	Snack	Lunch 12:00PM-4:00PM	Snack	Dinner 8:00PM-6:00AM	Snack

Table 2. 24 hour dietary recall-Dietary diversity score tool

When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed.

Read the list of foods, mark one in the box if the food in question was eaten and mark a zero in the box if the food was not eaten.

Question no.	Food group	Examples	[1] YES	[0] NO
501.	**Starchy Staples Foods** ***(combination of Cereals and White roots and tubers)***	Corn/maize, rice, wheat, sorghum, millet, potato or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + *insert local foods e.g. porridge or pastes or other locally available grains*	[1] YES	[0] NO
502.	**Dark Green Leafy Vegetables**	dark green/leafy vegetables, including wild ones + *locally available vitamin-A rich leaves such as amaranth, cassava leaves, kale, spinach etc* *Broccoli, cabbage, Lettuce.*	[1] YES	[0] NO
503.	**Other vitamin A rich fruits and vegetables**	Pumpkin, carrots, ripe mangoes ripe papaya *other locally available vitamin-A rich vegetables & fruits*	[1] YES	[0] NO
504.	**Other Fruits & Vegetables**	Other vegetables (e.g. tomato, onion, eggplant), including wild vegetables + other fruits, including wild fruits	[1] YES	[0] NO
505.	**Organ Meat**	Liver, kidney, heart or other organ meats	[1] YES	[0] NO
506.	**Meat and fish**	Beef, lamb, goat, chicken, or other birds (guinea hen)	[1] YES	[0] NO
507.	**Eggs**	Chicken, guinea hen or any other egg	[1] YES	[0] NO
508.	**Legumes, Nuts and Seeds**	beans, peas, lentils, nuts, seeds or foods made from these	[1] YES	[0] NO
509.	**Milk and Milk Products**	milk, cheese, yogurt or other milk products	[1] YES	[0] NO

510. Did you eat anything (meal or snack) outside the home yesterday? [1] YES [0] NO

Part VI. Household Food Insecurity Measurement Tool

S.NO	QUESTION	RESPONSE OPTIONS
601.	In the past four weeks, did you **worry** that your household would not have enough food?	0 = No (skip to Q702) 1=Yes
601.1	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3=Often (more than ten times in the past four weeks)
602.	In the past four weeks, were you or any household member not able to eat the kinds of foods you **preferred** because of a lack of resources?	0 = No (skip to Q703) 1=Yes
602.1	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3=Often (more than ten times in the past four weeks)
603.	In the past four weeks, did you or any household member have to **eat a limited variety of foods** due to a lack of resources?	0 = No (skip to Q704) 1 = Yes
603.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
604.	In the past four weeks, did you or any household member have to **eat some foods that you really did not want to eat** because of a lack of resources to obtain other types of food?	0 = No (skip to Q705) 1 = Yes
604.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
605.	In the past four weeks, did you or any household member have to eat a **smaller meal** than you felt you needed because there was not enough food?	0 = No (skip to Q706) 1 = Yes
605.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
606.	In the past four weeks, did you or any other household member have to eat **fewer meals in a day** because there was not enough food?	0 = No (skip to Q707) 1 = Yes
606.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

S.NO	QUESTION	RESPONSE OPTIONS
607.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q708) 1 = Yes
607.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
608.	In the past four weeks, did you or any household member go **to sleep at night hungry** because there was **not enough food**?	0 = No (skip to Q709) 1 = Yes
608.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
609.	In the past four weeks, did you or any household member go a **whole day and night without eating anything** because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes
609.1	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

Part VII: Household Income and wealth index questions

700	Ask the household if they have any of the following livestock assets	Do you have these animals?		How many of these animals do this household currently own?
	1. Plough oxen	[1] Yes	0 [No]	
	2. Fattened ox	[1] Yes	0 [No]	
	3. Cows	[1] Yes	0 [No]	
	4. Heifer	[1] Yes	0 [No]	
	5. Bull	[1] Yes	0 [No]	
	6. Calf	[1] Yes	0 [No]	
	7. Goats	[1] Yes	0 [No]	
	8. Sheep	[1] Yes	0 [No]	
	9. Donkey	[1] Yes	0 [No]	
	10. Mule	[1] Yes	0 [No]	
	11. Horse	[1] Yes	0 [No]	
	12. Chicken	[1] Yes	0 [No]	
	13. Beehive	[1] Yes	0 [No]	
	14. Others specify)			
701	Ask the household if they have any of the following crop productions produced in the previous last year			If yes how much the amount in quintals
1	Teff	[1] Yes	0 [No]	

2	Barley	[1] Yes	0 [No]	
3	Wheat	[1] Yes	0 [No]	
4	Maize	[1] Yes	0 [No]	
5	Sorghum	[1] Yes	0 [No]	
6	Oats	[1] Yes	0 [No]	
7	Bean	[1] Yes	0 [No]	
8	Pea	[1] Yes	0 [No]	
9	Chickpea	[1] Yes	0 [No]	
10	Lentil	[1] Yes	0 [No]	
11	Soya bean	[1] Yes	0 [No]	
12	Gibto	[1] Yes	0 [No]	
13	Groundnuts	[1] Yes	0 [No]	
14	Carrot	[1] Yes	0 [No]	
15	Red onion	[1] Yes	0 [No]	
16	White onion	[1] Yes	0 [No]	
17	Potatoes	[1] Yes	0 [No]	
18	Head Cabbage	[1] Yes	0 [No]	
19	Tomatoes	[1] Yes	0 [No]	
20	Avocado	[1] Yes	0 [No]	
21	Lemon	[1] Yes	0 [No]	
22	Zeytun	[1] Yes	0 [No]	
23	Mango	[1] Yes	0 [No]	
24	Orange	[1] Yes	0 [No]	
25	Papaya	[1] Yes	0 [No]	
26	Peper corn	[1] Yes	0 [No]	
27	Geisho	[1] Yes	0 [No]	
28	Sugar cane	[1] Yes	0 [No]	
29	Coffee	[1] Yes	0 [No]	
30	Khat	[1] Yes	0 [No]	
31	Others			
702	Does your household have?			How much the number?
1	Functioning radio/tape	[1] Yes	0 [No]	
2	Modern beds	[1] Yes	0 [No]	
3	Cotton/sponge/spring mattress?	[1] Yes	0 [No]	
4	Mobile/cell-phone/wireless	[1] Yes	0 [No]	
5	Water pump	[1] Yes	0 [No]	
6	Modern stoves	[1] Yes	0 [No]	
7	Other (specify)			
703	What kind of latrine does your family have?	1. None		
		2. VIP		
		3. Traditional latrine		
		4.Flash (water)		
		3. Other (specify)		
704	What is the type of roof of the house?	1. Corrugated sheet		
		2. Thatch roof		
		3. Other		

705	How many rooms are used by this household for sleeping only?	Number of rooms_____		
706	Do you have kitchen	[1] Yes	0 [No]	
707	Do you have separate rooms for cattle?	[1] Yes	0 [No]	
708	What is the wall of your residence house made of?	1. Wooden structure		
		2. Mud		
		3. Other(specify)__		
709	Does any member of this household own any agricultural land?	Yes[1]	No[0]	
710	What is the total farm size holding of the house hold in hectares	Size in hectares		
711	Does your house hold have…?			
1.	Electricity?	Yes[1]	No[0]	
2.	A television?	Yes[1]	No[0]	
3.	A Satellite Dish			
4.	A non-mobile telephone?	Yes[1]	No[0]	
5.	A computer?	Yes[1]	No[0]	
6.	A refrigerator?	Yes[1]	No[0]	
7.	A table?	Yes[1]	No[0]	
8.	A chair?	Yes[1]	No[0]	
9.	An electric mitad?	Yes[1]	No[0]	
10.	A kerosene lamp/pressure lamp?	Yes[1]	No[0]	
712	Does any member of this household own:			
1.	A watch?	Yes[1]	No[0]	
2.	A bicycle?	Yes[1]	No[0]	
3.	A motorcycle or motor scooter?	Yes[1]	No[0]	
4.	An animal-drawn cart?	Yes[1]	No[0]	
5.	A car or truck?	Yes[1]	No[0]	
6.	A boat with a motor?	Yes[1]	No[0]	
7.	A bagag?	Yes[1]	No[0]	
713	Does any member of this household have a bank or microfinance account?	Yes[1]	No[0]	

I have finished my questions.

Thank you for your participation and time!

Annex II : Amharic Version Questionnaire

በአማርኛ ቋንቋ የተዘጋጀ መጠይቅ

የመጠይቅ መለያ ቁጥር | | |

የባሕር ዳር ዩኒቨርስቲ

የቴክኖሎጂ ተቋም

የኬሚካል እና የምግብ ኢንጂነሪንግ ፋኩሊቲ

የአፕላይድ ሰብአዊ ሥነ-ምግብ ት/ት ክፍል

የስምምነት/ፈቃደኝነት ቅጽ

ሰላም ጤና ይስጥልኝ እኔ _____ ነኝ፡፡ ለምርምር ጥናት የሚውል ቃለ-መጠይቅ ላደርግልዎት ነው፡ ፡በቅድሚያ ምንነቱን ልግለፅልዎት፡፡

ይህ በሰሜን ምዕራብ ኢትዮጵያ በፈለገ-ሕይወት አጠቃላይሪፈራል ሆስፒታል የፀረ-ኤችአይቪ መድሐኒት (ኤ.አር.ቲ) ክሊኒክ ክትትል በማድረግ ላይ ካሉ ተገልጋዮች ጋር የአመጋገብ ስብጥርና ተያያዥነት ያላቸውን ጉዳዮችን ለመዳሰስ የሚደረግ ጥናትነው፡፡ ይህ ጥናት ሲከናወን በባህርዳርዩኒቨርስቲ በአፕላይድ ሰብአዊ ሥነ-ምግብ የ2ኛ ዲግሪ በከፊል እንዲያሟላ ያደርጋል::

የእርስዎ ተሳትፎ ሙሉ በሙሉ በፈቃደኝነትዎ ላይ የተመሰረተ እና ካልተስማማዎ ተሳትፎዎን በማንኛውም ጊዜ ሊያቆሙ ይችላሉ፡፡

በዚህ ጥናት ውስጥ በመሳተፍዎ የሚደርስብዎት ጉዳትም ሆነ ምንም ቀጥተኛ ጥቅም የለም፤ ሆኖም ግን በዚህ ጥናት ውስጥ ያለዎት ተሳትፎ ስለአመጋገብዎ ስብጥር እና አንዳንድ ምክንያቶች የተሻለ ግንዛቤ እንዲኖረን ይረዳናል፡፡

የሚሰጧቸው መረጃዎች ለምርምር ዓላማ ጥቅም ብቻ እንደሚውሉ እና በሚስጥርነት የተጠበቀ መሆኑንና ስምዎ በጭራሽ የማይጠቀስ መሆኑን አረጋግጥልዎታለሁ፡፡

ለመሳተፍ ፈቃደኛ ነዎት ? ሀ . አዎ ለ. የለም
አዎ ከሆነ አመስግነው ወደ መጠይቁ ይቀጥሉ፡፡
ፈቃደኛ ካልሆኑ አመሰግነው ወደ ተከታዩ ተሳታፊ ይቀጥሉ፡፡

የጥናቱ ባለቤት
ሲ/ር ሕይወት አህመድ
ስልክ: +251-9-18-15-48-46
ኢ-ሜይል: hiwotahmed@gmail.com

አመሰግናለሁ!!

ክፍል 1፡- የግለሰቡ መረጃ

መመሪያ፡- እባክዎ የጥናት ተሳታፊውን/ዋን የሚገልፀውን አማራጭ ክብቡ እና / ወይም ባዶ ቦታን ይሙሉ።

ተ.ቁ.	ጥያቄ	(መለያ ቁጥር/Code/ እና ምላሽ)			እለፍ
101.	ፆታ	[1] ወንድ [2] ሴት			
102.	እድሜዎ ስንት ነው? (በዓመታት)	_____አመት			
103.	የሚከተሉት ሀይማኖት ምንድን ነዉ?	[1] ኦርቶዶክስ [2] እስልምና [3] ፕሮቴስታንት [4] ካቶሊክ [5] አድቬንቲስት [6] ሌላ ካለ ይጠቀስ _____			
104.	እባክዎን አሁን ያለውን የመኖሪያ ቦታዎ ይግለጹ?	[1] ከተማ [2] ገጠር			
105.	የትምህርት ደረጃዎት?	[1] ማንበብናመፃፍ የማይችል [2] ማንበብና መፃፍ ብቻ የሚችል [3] የመጀመሪያ ደረጃ ትምህርት [4] የሁለተኛደረጃትምህርት [5] የምስክር ወረቀት እና ከዚያ በላይ			
106.	የጋብቻ ሁኔታዎ ምንድን ነው?	[1] ያገባ/ች [2] የፈታ/ች [3] ያላገባ/ች [4] ባል/ሚስት የሞተባት/የሞተችበት			
107.	ስራዎ ምንድን ነው? (ይህም ማለት በአብዛኛው የሚሰሩትን የስራ ዓይነት ለማለትነው)	[1] ገበሬ	[2] የመንግስት ሰራተኛ	[3] የቤት እመቤት	
		[4] የግልስራ (የራስ)	[5] የጉልበት ስራ	[6] ስራ ፈላጊ	
		[7] ሌላ ካለ ይገለጽ_____			
108.	በቤትዎ ውስጥ ምን ያህል ሰዎች ይኖራሉ (የቤተሰብብዛት)?	_____ሰው/ሰዎች			
109.	ወርሃዊ የቤተሰቡ ገቢ	_____ብር			
110.	የቤትዎ አባወራ/እማወራ ነዎት?	[1] አዎ [0] አይ			መልሱ አዎ ከሆነ ወደ ጥያቄ ቁ 112 ይለፉ
111.	ለጥያቄ ቁ.110 መልሱ አይ ከሆነ የቤትዎ አባወራ/እማወራ ሥራ ምንድን ነው?	[1] ገበሬ	[2] የመንግስትሰራተኛ	[3] የቤት እመቤት	
		[4] የግልስራ (የራስ)	[5] የጉልበትስራ	[6] ስራፈላጊ	
		[7] ሌላ ካለ ይገለጽ_____			
112.	ለቤተሰብዎ ዋና ምግብ የምግብ ምንጭ ምንድነው?	[1] ግዢ (የገበያ / የግዢ ሱቅ) [2] የእርሻ / አትክልት [3] ዘመድእና /ወይምጓደኞች [4] የበጎ አድራጎት / መንግስታዊ ያልሆነ ድርጅት [5] ሌላ (ዝርዝር ግለጹ)_____			

ክፍል-2፡ ተጓዳኝ ባህርይ

ተ.ቁ.	ጥያቄ	(መለያ ቁጥር/Code/ እና ምላሽ)
201.	ሲጋራ ያጨሳሉ?	[1] አዎ [0] አይ
202.	አልኮል ይጠጣሉ?	[1] አዎ [0] አይ
203.	ጫት ይቅማሉ?	[1] አዎ [0] አይ
204.	መገናኛ ብዙኃን (ቲቪ / ሬዲዮ / መጽሔት ወዘተ) ይከታተላሉ?	[1] አዎ [0] አይ

ክፍል-3፡ ከጤና ጋር ተዛማጅነት ያላቸው ባህሪያት

መመሪያ፡- እባክዎ የጥናትተሳታፊውን/ዋን የሚገልፀውን አማራጭ ያክብቡ እና / ወይም ባዶ ቦታን ይሙሉ።ከጥያቄ ቁጥር 301- 307 ከቻርት ይመልከቱ።ከጥያቄ ቁጥር 308-310 ተሳታፊውን ይጠይቁ።

ተ.ቁ.	ጥያቄ	(መለያ ቁጥር/Code/ እና ምላሽ)	እለፍ
301.	ደንበኛው የተጓዳኝ በሽታዎች(Opportunistic infection)ታመው ያውቃሉ ወይ?	[1] አዎ [0] አይ	መልሱ አይ ከሆነ ወደ ጥያቄ ቁ. 303 ይለፉ
302.	ደንበኛው በአንድ ወር ጊዜ ውስጥ የተጓዳኝ በሽታ/ዎች(Opportunistic infection)ታመው ከሆነ የትኛው/የትኞቹ ታመመ?	[1] Chronic cough [2] Paralysis(any form) [3] Tuberculosis [4] Oral and/or esophageal thrush [5] No OI [6] Other (specify)_____	
303.	አሁን ያለው የዓለም የጤና ድርጅት የበሽታው ደረጃ ሚያንፀባርቀው የትኛው ነው? (WHO clinical staging)	[1] ደረጃ-I [2] ደረጃ-II [3] ደረጃ -III [4] ደረጃ -IV	
304.	የመጨረሻው CD4 መጠን (Last CD_4 count in Cell/mm^3)	_____mg/dl	
305.	ፀረ-ኤች.አይ.ቪ (ART) ጀምረዋል?	[1] አዎ [0] አይ	መልሱ አልጀመሩም ከሆነ ወደ ጥያቄ ቁ308 ይለፉ
306.	ፀረ-ኤች.አይ.ቪ ከጀመሩ ምን ያህል ጊዜ ሆነ?(በወር)	_____ ወር/ራት (ይጠይቁ + ከቻርት ይመልከቱ)	
307.	ፀረ-ኤች.አይ.ቪ መድሐኒት ምድብ (ART Regimen)	[1] AZT-3TC-NVP [2] AZT-3TC-EFV [3] TDF-3TC-NVP [4] TDF-3TC-EFV [5] Other/second line	
308.	ደንበኛው በ Cotrimoxazole ፕሮፊሊያክሲስ ላይ ናቸው?	[1] አዎ [0] አይ	
309.	ደንበኛው ባለፉት ሁለት ሳምንታት ጊዜ ውስጥ የጨጓራ/አንጀት መቆጣት ምልክት (gastro-intestinal up set (ተቅማጥ, ማቅለሽለሽ ወይም ማስታወክ) ምልክት ነበራቸው?	[1] አዎ [0] አይ	አይ ከሆነ ወደ ጥያቄ ቁ401 ይለፉ
310.	አዎ ከሆነ እባክዎ ደንበኛው ያጋጠማቸውን የጨጓራ/አንጀት መቆጣት ምልክት (gastro-intestinal up set) ይግለጹ?	_____	

ክፍል 4:- ከአመጋገብ ጋር የተዛመዱ ባህርያት መጠይቅ

ተ.ቁ.	ጥያቄ	(መለያ ቁጥር/Code/ እና ምላሽ)	እለፍ
401.	በጤና ተቋም ውስጥ የአመጋገብ ምክር አገልግሎት አግኝተው ያውቃል?	[1] አዎ	አይ ከሆነ ወደ ጥያቄ ቁ403 ይለፉ
402.	ለጥያቄ ቁ.401 አዎ ከሆነ ምክር አገልግሎቱ ስለየትኛው ነበር?	[1] መድኃኒቶች [2] ኢንፊክሽን / ህመም [3] አጠቃላይ አመጋገብ [4] ሌሎች (ዝርዝር ይግለጹ)	
403.	ተጨማሪ ምግብ [RUTF] ይጠቀማሉ	[1] አዎ [0] አይ	አይ ከሆነ ወደ ጥያቄ ቁ406 ይለፉ
404.	ተጨማሪ ምግብ [RUTF] በየእለቱ ይጠቀማል	[1] አዎ [0] አይ	
405.	ተጨማሪ ምግብዎን ለሌሎችያጋራሉ	[1] አዎ [0] አይ	
406.	የምግብ ምርጫዎች አለዎት?	[1] አዎ [0] አይ	አይ ከሆነ ወደ ጥያቄ ቁ408 ይለፉ
407.	አዎ ከሆነ እባክዎን እርስዎ የማይበሉትን ምግብ ይዘርዝሩ? _____		

RUTF: ready-to-use therapeutic food.

ክፍል 5:- ከግለሰቡ የአመጋገብ ስብጥር ጋር የተዛመዱ ባህርያት መጠይቅ

<u>መመሪያ:- የጥናቱ ተሳታፊ ቤት ውስጥ ወይም ከቤታቸው ውጭ ትናንትና ቀን እና ማታ የተመገቧቸውን ምግቦችን (ምግቦች፤ ተጨማሪ እና መክሰስ) እንዲሁም የጠጡትን ከጠዋት ጀምረው በዝርዝር እንዲነግሩዎት ይጠይቁ።</u>

<u>ሠንጠረዥ 1፡ የ24 ሰዓታት የአመጋገብ ስብጥር መመዝገቢያ</u>

እባክዎን ትናንትና (ባለፉት 24 ስአታትውስጥ) ቀን እና ማታ ቤት ውስጥ ወይም ከቤትዎ ውጭ የተመገቧቸውን ምግቦችና የጠጡትን ይጥቀሱልኝ

መጀመሪያ በጠዋት የበሉ፤የጠጡትን በመጥቀስ ይጀምሩ።

የጥናቱ ተሳታፊ የጠቀሱትን ሁሉን ምግብ እና መጠጥ በክፍት ቦታው ላይ ይጻፉ። የተለያዩ ምግቦች ቅይጥ ሲጠቅሱ፤ የተቀየጠውን/የተደባለቀውን በአይነት/በዝርዝር እንዲነገሩዎት ይጠይቁ። የጥናቱ ተሳታፊው ዘርዝረው ሲያጠናቅቁ መክሰስ/ተጨማሪና ያለተጠቀሱትን ይጠይቁ።

ቁርስ ከጧቱ 12፡00-4፡00 ሰአት	Snack (ተጨማሪ በቁርስና ምሳ መካከል)	ምሳ ከቀኑ 6፡00-10፡00 ሰአት	መክሰስ	እራት ከምሽቱ 2፡00-6፡00	Snack (ተጨማሪ ከእራት በኃላ)

ሠንጠረዥ-2፡ የ24 ሰዓታት የአመጋገብ ስብጥር መለኪያ

የጥናቱ ተሳታፊ አስታውሰው ሲጠናቀቁ፤ከላይ በተጠቀሰው መረጃ መሰረት የምግብ መደቡን ይሙሉ፡፤ ካልተጠቀሱ የምግብ መደቦች የተዘረዘሩትን የምግብ አይነት ምላሽ ሰጪውን ተመግበው ከሆነ ይጠቁ፡፡
ከዚህ ስር የተዘረዘሩትን የምግብ መደቦች ምላሽ ሰጪውን በልተው ከሆነ "1" ቁጥርን ያክብቡ ካልበሉት ደግሞ "0"ን ያክብቡ

ተ.ቁ	የምግብ መደብ	የምግብ አይነት	አዎ [1]	የለም [0]
501.	አዝርዕት እና ማንኛውም ከአዝርዕት የተጋጀ ምግብ ወይም ድንች እና ነጭ የሥራ ስር ምግብ	በቆሎ፤ሩዝ፤ስንዴ፤ማሽላ፤ዳጉሳ፤ ድንች፤ስኳር ድንች፤ ወይም ሌላ የጥራጥሬ ውጤት ከጤፍ፤ከማሽላ ከዳጉሳ፤ ከበቆሎ፤ከሩዝ የተዘጋጀ ምግብ ለምሳሌ እንጀራ፤ዳቦ፤ ቂጣ፤ገንፎ፣ ብስኩት ወዘተ.	አዎ [1]	የለም [0]
502.	ጠቆር ያሉ አረንጓዴ ቅጠላቅጠሎች	የሀበሻ ጎመን፣ቆስጣ፣ ብሮኮሊ፣ ጥቅል ጎመን፣ሰላጣ፤ ስፒናች	አዎ [1]	የለም [0]
503.	ቫይታሚን ኤ ያላቸው ቅጠላቅጠሎችና ፍራፍሬዎች	ዱባ፣ካሮት፣የበሰለ ማንጎ፣የበሰለ ፓፓያ፣ባለቀይ ቀለም ጣፋጭ ቃሪያ	አዎ [1]	የለም [0]
504.	ሌሎች ፍራፍሬና ቅጠላ ቅጠሎች	ቲማቲም፣ሽንኩርት፣የዱርቅጠላቅጠሎች እና ፍራፍሬዎች	አዎ [1]	የለም [0]
505.	Organ meat (የክፍለ-አካል ሥጋ)	ዱለት(ጨጓራ)፤ የጉበት፤ኩላሊት፤ልብ ወይም ሌሎች የሰውነት ክፍል	አዎ [1]	የለም [0]
506.	ሥጋ እና/ ዓሣ	የከብት፤የበግ፤የፍየል፤የዶሮ፤ቆቅ፤ገርግራ ወይም ሌሎች፡፡ ትኩስ ወይም ደረቅ ዓሣ	አዎ [1]	የለም [0]
507.	እቁላል	የዶሮ፤የቆቅ፤የገርግራ	አዎ [1]	የለም [0]
508.	ጥራጥሬ፣ለውዝ	ባቄላ፤አተር፤ምስር፤ለውዝ፤አኩሪ-አተር ወይም ከነዚህ የተዘጋጀ ምግብ	አዎ [1]	የለም [0]
509.	ወተት እና የወተት ውጤቶች	ወተት፤አይብ፤እርጎ እና ሌሎች የወተት ተዋፅኦዎች	አዎ [1]	የለም [0]
510.	ትላንትና ከቤት ውጭ ማንኛውንም ነገር (ምግብ ወይም ተጨማሪ/መክሰስ) በልተዋል?		አዎ [1]	[0] የለም

ክፍል 6. የቤተሰብ ምግብ ዋስትናን በተመለከተ

ተ.ቁ	ጥያቄ	ምላሽ
601.	ባለፉት አራት ሳምንታት ለቤተሰቦቸዎ **በቂ ምግብ ባለመኖሩ ተጨንቀው** ነበር፤	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. ይለፉ 602)
601.1	መልስዎ አዎ ከሆነ ለስንት ጊዜ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
602.	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባላት በገንዘብ እጥረት ምክንያት **የመረጡትን ምግብ መመገብ አልቻሉም** ነበር	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. ይለፉ 603)
602.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
603.	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብ አባልዎት በሀብት እጥረት ምክንያት **በየአይነቱ ምግብ** ለመመገብ የአቅርቦት እጥረት ነበር?	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. 604 ይለፉ)
603.1	መልስዎ አዎ ከሆነ ለስንት ጊዜ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
604.	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብ አባልዎት በገንዘብ እጥረት ምክንያት **ለመመገብ ያልፈለጉትን** የምግብ አይነት ተመግበው ነበር?	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. 605 ይለፉ)
604.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
605.	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብ አባልዎት በገንዘብ እጥረት በቂ ምግብ ባለመኖሩ ምክንያት በ**መጠንያነስ** ምግብ ተመግባችሁ ነበር?	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. 606 ይለፉ)
605.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ተከሰተ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
606.	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብ አባልዎት በቂ **ምግብ ባለመኖሩ** ምክንያት **የተዘለለ (ቁርስ፤ምሳ፤መክሰስ እና እራት)** ነበር?	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ. 707 ይለፉ)
606.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ተከሰተ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
607.	ባለፉት አራት ሳምንታት በሀብት እጥረት ምክንያት **የሚበላ ምግብ ያልነበረበት/የጠፋበት/ ጊዜ** ነበር ወይ?	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ.608 ይለፉ)
607.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜተከሰተ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
608.	ባለፉት አራት ሳምንታት በምግብ እጥረት ምክንያት **ሳይበላ እንደራበው** የተኛ ሰውነበር	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ወደ ጥያቄ ቁ.609 ይለፉ)
608.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ተከሰተ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ
609.	ባለፉት አራት ሳምንታት ጊዜ ውስጥ እርስዎ ወይም የቤተሰብ አባልዎት በቂ ምግብ ባለመኖሩ ምክንያት **ሙሉቀን እና ሌሊት ሳትበሉ አሳልፋችኋል**።	[1] አዎ [0] የለም (ምላሹ የለም ከሆነ ጥያቄው ተጠናቋል)
609.1	መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ተከሰተ	1. ባለፉት አራት ሳምንታት ውስጥ ለአንዴ ወይም ለሁለት ጊዜ 2. ባላፉትአራት ሳምንታት ውስጥ 3 ወይም 10 ጊዜ 3. ባለፉት አራት ሳምንታት ውስጥ ከ10 ጊዜ በላይ

ክፍል 7፡- የቤተሰብ ገቢና የሃብት ሁኔታን በተመለከተ

700	ቤተሰቡ ከዚህ በታች የተጠቀሱት የእንስሳት ሃብት መኖርና አለመኖሩን ይጠይቁ?	መኖርና አለመኖሩን?		አሁን ላይ ያላቸውን በቁጥር ይጠይቁና ይሙሉ?
1	የእርሻ በሬ	[1] አዎ	[0] የለም	
2	ለስጋ የደለበ በሬ	[1] አዎ	[0] የለም	
3	ላም	[1] አዎ	[0] የለም	
4	ጊደር	[1] አዎ	[0] የለም	
5	አዉራ/ኮርማ	[1] አዎ	[0] የለም	
6	ጥጃ	[1] አዎ	[0] የለም	
7	ፍየል	[1] አዎ	[0] የለም	
8	በግ	[1] አዎ	[0] የለም	
9	አህያ	[1] አዎ	[0] የለም	
10	በቅሎ	[1] አዎ	[0] የለም	
11	ፈረስ	[1] አዎ	[0] የለም	
12	ደሮ	[1] አዎ	[0] የለም	
13	ንብ ያለዉ ቀፎ	[1] አዎ	[0] የለም	
14	ሌላ ካለ ይጠቀስ			
701	ቤተሰቡ ከዚህ በታች የተጠቀሱትን የእርሻና የንሮ ምርት ባለፈው ዓመት ማምረትና አለማምረታቸውን ይጠይቁ			ባለፈው ዓመት ያመረቱትን መጠን በኩንታል ይጠይቁና ይሙሉ?
1	ጤፍ	[1] አዎ	[0] የለም	
2	ገብስ	[1] አዎ	[0] የለም	
3	ስንዴ	[1] አዎ	[0] የለም	
4	በቆሎ	[1] አዎ	[0] የለም	
5	ማሽላ	[1] አዎ	[0] የለም	
6	አጃ	[1] አዎ	[0] የለም	
7	ባቄላ	[1] አዎ	[0] የለም	
8	አተር	[1] አዎ	[0] የለም	
9	ሽንብራ	[1] አዎ	[0] የለም	
10	ምስር	[1] አዎ	[0] የለም	
11	አኩሪአተር	[1] አዎ	[0] የለም	
12	ግብጦ	[1] አዎ	[0] የለም	
13	ኦቾሎኒ	[1] አዎ	[0] የለም	
14	ካሮት	[1] አዎ	[0] የለም	
15	ቀይ ሽንኩርት	[1] አዎ	[0] የለም	
16	ነጭ ሽንኩርት	[1] አዎ	[0] የለም	
17	ድንች	[1] አዎ	[0] የለም	
18	ጎመን	[1] አዎ	[0] የለም	
19	ቲማቲም	[1] አዎ	[0] የለም	
20	አቮካዶ	[1] አዎ	[0] የለም	
21	ሎሚ	[1] አዎ	[0] የለም	
22	ዘይቱን	[1] አዎ	[0] የለም	
23	ማንጎ	[1] አዎ	[0] የለም	
24	ብርቱካን	[1] አዎ	[0] የለም	
25	ፓፓያ	[1] አዎ	[0] የለም	
26	በርበሬ	[1] አዎ	[0] የለም	
27	ጌሾ	[1] አዎ	[0] የለም	
28	ሸንኮር አገዳ	[1] አዎ	[0] የለም	
29	ቡና	[1] አዎ	[0] የለም	
30	ጫት	[1] አዎ	[0] የለም	
31	ሌሎች ካሉ ይጠቀሱ			

702	በቤትዎ ውስጥ እነዚህ አሉ ወይስ የለም			
1	የሚሰራ ሬዲዮ ወይም ቴፕ	[1] አዎ	[0] የለም	
2	ዘመናዊ አልጋ	[1] አዎ	[0] የለም	
3	የጥጥ/ስፖንጅ/ስፕሪንግ ፍራሽ	[1] አዎ	[0] የለም	
4	የሞባይል ስልክ	[1] አዎ	[0] የለም	
5	የውሃ ጀኔሬተር	[1] አዎ	[0] የለም	
6	ዘመናዊ ስቶብ	[1] አዎ	[0] የለም	
7	ሌላ ከለ ይጠቀስ			
703	ቤተሰብዎ/ቤትዎ ያለዎት መጸዳጃ ቤት ምን አይነት ነው?	1. የለንም		
		2. የተሻሻለ		
		3. የተለመዶ		
		4. በውሃ የሚሰራ		
		3.ሌላ ካለ ይጠቀስ		
704	የቤትዎ ጣራው የተሰራው ከምንድን ነው?	1. ከቆርቆሮ		
		2. ከሳር		
		3. ሌላ ከሆነ ይጠቀስ_____		
705	ለቤተሰብዎ ምኝታ አገልግሎት የሚሆን ስንት ክፍል አለዎት	[1] አዎ	[0] የለም	
706	የምግብ ማብሰያ ቤት አለዎት	[1] አዎ	[0] የለም	
707	ለእንስሳቱ መኖሪያ የሚሆን የተለየ ቤት አለዎት?	[1] አዎ	[0] የለም	
708	የመኖሪያ ቤቱ ግድግዳ የተሰራው ከምንድን ነው?	1. ከእንጨት		
		2. ከጭቃና ድንጋይ		
		3. ሌላ ከሆነ ይጠቀስ		
709	ከቤተሰብ አባላትዎ የእርሻ መሬት ያለው አለ?	[1] አዎ	[0] የለም	
710	ጠቅላላ የእርሻ ቦታዎት በሄክታር ምን ያህል ነው?	መጠን በሄክታር _____		
ተ.ቁ.	የሀብት አመላካች	መኖርና አለመኖሩን?		
711	በቤትዎ ውስጥ ..... አለ?			
1.	ኤሌክትሪክ	[1] አዎ	[0] አይ	
2.	ቴሌቪዥን	[1] አዎ	[0] አይ	
3.	ሳተላይት ዲሽ	[1] አዎ	[0] አይ	
4.	የቤት ስልክ	[1] አዎ	[0] አይ	
5.	ኮምፒውተር	[1] አዎ	[0] አይ	
6.	ማቀዝቀዣ	[1] አዎ	[0] አይ	
7.	ጠረጴዛ	[1] አዎ	[0] አይ	
8.	ወንበር	[1] አዎ	[0] አይ	
9.	ኤልክትሪክ ምጣድ	[1] አዎ	[0] አይ	
10.	ማሾ (በኬሮሲን የሚሰራ መብራት) Kerosene/pressure lamp	[1] አዎ	[0] አይ	
712	ከቤተሰብ አባላትዎ____ያለው አለ?			
1.	ሰዓት	[1] አዎ	[0] አይ	
2.	ብስክሌት?	[1] አዎ	[0] አይ	
3.	ሞተር ሳይክል/ስኩቲ ሞተር?	[1] አዎ	[0] አይ	
4.	በጋማ ከብት የሚጎተት ጋሪ?	[1] አዎ	[0] አይ	
5.	መኪና	[1] አዎ	[0] አይ	
6.	ባለ ሞተር ጀልባ	[1] አዎ	[0] አይ	
7.	ሻንጣ	[1] አዎ	[0] አይ	
713	ከቤተሰብ አባላትዎ የባንክ ወይም ማይክሮ ፋይናንስ ሒሳብ ደብተር (አካውንት) ያለው አለ?	[1] አዎ	[0] አይ	

ጥያቄዎቼን ጨርሻለሁ:: ስለተሳትፉዎና እና ጊዜዎን ስለሰጡኝ አመሰግናለሁ::

ቃለ መጠይቁን ያደረገው ስም_____

ፊርማ_____

Annex III: Principal component Analysis (PCA) SPSS Output

***Select Urban case**

```
USE ALL.
COMPUTE filter_$=(q104=1).
VARIABLE LABELS filter_$ 'q104=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
```

*** PCA only on for Urban cases Final**

```
FACTOR
  /VARIABLES q7022 q7023
    q7026 q703recod  q705recod q706
    q7113 q7114  q7118 q7119
    q71111 q7121 q713
  /MISSING LISTWISE
  /ANALYSIS q7022 q7023
    q7026 q703recod  q705recod q706
    q7113 q7114  q7118 q7119
    q71111 q7121 q713
  /PRINT UNIVARIATE INITIAL CORRELATION KMO AIC EXTRACTION ROTATION FSCORE
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA FACTORS ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
 /SAVE REG(ALL)
 /METHOD=CORRELATION.
```

Factor Analysis

Descriptive Statistics

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Q7022 Modern beds	.86	.344	300
Q7023 Cotton/sponge/spring mattress?	.89	.313	300
Q7026 Modern stoves	.53	.500	300
standard toilet for house hold [VIP or flush water]	.63	.483	300
Bed rooms used by household	.43	.496	300
Q706 Do you have kitchen	.58	.495	300
Q7113 A television?	.83	.373	300
Q7114 A Satellite Dish	.76	.426	300
Q7118 A table?	.89	.318	300
Q7119 A chair?	.90	.301	300
Q71111 An electric mitad?	.40	.491	300
Q7121 A watch?	.30	.460	300
Q713 Does any member of this household have a bank or microfinance account?	.78	.417	300

Correlation Matrix

		Q7022 Modern beds	Q7023 Cotton/sponge/spring mattress?	Q7026 Modern stoves	standard toilet for house hold [VIP or flush water]	Bed rooms used by household	Q706 Do you have kitchen	Q7113 A television?	Q7114 A Satellite Dish	Q7118 A table?	Q7119 A chair?	Q711111 An electric mitad?	Q7121 A watch?	Q713 Does any member of this household have a bank or microfinance account?
Correlation	Q7022 Modern beds	1.000	.729	.400	.261	.230	.248	.577	.463	.317	.256	.285	.051	.369
	Q7023 Cotton/sponge/spring mattress?	.729	1.000	.307	.241	.178	.195	.529	.431	.278	.273	.265	.047	.272
	Q7026 Modern stoves	.400	.307	1.000	.248	.277	.309	.454	.352	.272	.240	.624	.045	.373
	standard toilet for house hold [VIP or flush water]	.261	.241	.248	1.000	.023	-.022	.272	.195	.361	.369	.282	-.025	.422
	Bed rooms used by household	.230	.178	.277	.023	1.000	.586	.211	.250	.228	.224	.261	.242	.146
	Q706 Do you have kitchen	.248	.195	.309	-.022	.586	1.000	.178	.237	.204	.142	.300	.301	.108
	Q7113 A television?	.577	.529	.454	.272	.211	.178	1.000	.803	.433	.358	.329	.159	.340
	Q7114 A Satellite Dish	.463	.431	.352	.195	.250	.237	.803	1.000	.395	.337	.375	.180	.285
	Q7118 A table?	.317	.278	.272	.361	.228	.204	.433	.395	1.000	.827	.228	.122	.490
	Q7119 A chair?	.256	.273	.240	.369	.224	.142	.358	.337	.827	1.000	.249	.172	.488

	Q71111 An electric mitad?	.285	.265	.624	.282	.261	.300	.329	.375	.228	.249	1.000	.024	.274
	Q7121 A watch?	.051	.047	.045	-.025	.242	.301	.159	.180	.122	.172	.024	1.000	.023
	Q713 Does any member of this household have a bank or microfinance account?	.369	.272	.373	.422	.146	.108	.340	.285	.490	.488	.274	.023	1.000

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.763
Bartlett's Test of Sphericity	Approx. Chi-Square	1782.639
	df	78
	Sig.	.000

Anti-image Matrices

		Q7022 Modern beds	Q7023 Cotton/sponge/spring mattress?	Q7026 Modern stoves	standard toilet for house hold [VIP or flush water]	Bed rooms used by household	Q706 Do you have kitchen	Q7113 A television?	Q7114 A Satellite Dish	Q7118 A table?	Q7119 A chair?	Q71111 An electric mitad?	Q7121 A watch?	Q713 Does any member of this household have a bank or microfinance account?
Anti-image Covariance	Q7022 Modern beds	.383	-.246	-.043	-.019	-.022	-.037	-.054	.003	-.020	.036	.021	.023	-.079
	Q7023 Cotton/sponge/spring mattress?	-.246	.438	.029	-.022	.012	-.020	-.046	.001	.032	-.046	-.026	.026	.031
	Q7026 Modern stoves	-.043	.029	.482	.012	-.026	-.057	-.099	.071	-.003	.016	-.265	.023	-.097
	standard toilet for house hold [VIP or flush water]	-.019	-.022	.012	.725	.031	.067	-.032	.040	-.029	-.033	-.108	.018	-.152
	Bed rooms used by household	-.022	.012	-.026	.031	.622	-.286	.003	-.019	.011	-.042	-.016	-.045	-.001
	Q706 Do you have kitchen	-.037	-.020	-.057	.067	-.286	.561	.049	-.029	-.062	.054	-.064	-.162	.018

	Q7113 A television?	-.054	-.046	-.099	-.032	.003	.049	.260	-.204	-.033	.013	.055	-.041	.010
	Q7114 A Satellite Dish	.003	.001	.071	.040	-.019	-.029	-.204	.320	-.011	-.003	-.100	-.023	-.009
	Q7118 A table?	-.020	.032	-.003	-.029	.011	-.062	-.033	-.011	.276	-.210	.037	.050	-.040
	Q7119 A chair?	.036	-.046	.016	-.033	-.042	.054	.013	-.003	-.210	.282	-.040	-.081	-.065
	Q71111 An electric mitad?	.021	-.026	-.265	-.108	-.016	-.064	.055	-.100	.037	-.040	.530	.057	.016
	Q7121 A watch?	.023	.026	.023	.018	-.045	-.162	-.041	-.023	.050	-.081	.057	.842	.029
	Q713 Does any member of this household have a bank or microfinance account?	-.079	.031	-.097	-.152	-.001	.018	.010	-.009	-.040	-.065	.016	.029	.612
Anti-image Correlation	Q7022 Modern beds	.799[a]	-.600	-.099	-.035	-.044	-.080	-.173	.010	-.063	.109	.047	.040	-.164
	Q7023 Cotton/sponge/ spring mattress?	-.600	.783[a]	.063	-.040	.022	-.040	-.136	.004	.092	-.132	-.054	.042	.061
	Q7026 Modern stoves	-.099	.063	.767[a]	.020	-.048	-.109	-.280	.182	-.009	.043	-.524	.036	-.179
	standard toilet for house hold [VIP or flush water]	-.035	-.040	.020	.872[a]	.047	.105	-.075	.083	-.065	-.074	-.174	.023	-.228

Bed rooms used by household	-.044	.022	-.048	.047	.769[a]	-.484	.008	-.042	.027	-.101	-.028	-.063	-.001
Q706 Do you have kitchen	-.080	-.040	-.109	.105	-.484	.688[a]	.129	-.068	-.158	.135	-.118	-.235	.030
Q7113 A television?	-.173	-.136	-.280	-.075	.008	.129	.758[a]	-.707	-.122	.049	.148	-.087	.024
Q7114 A Satellite Dish	.010	.004	.182	.083	-.042	-.068	-.707	.752[a]	-.038	-.008	-.243	-.044	-.020
Q7118 A table?	-.063	.092	-.009	-.065	.027	-.158	-.122	-.038	.734[a]	-.753	.096	.105	-.098
Q7119 A chair?	.109	-.132	.043	-.074	-.101	.135	.049	-.008	-.753	.704[a]	-.104	-.167	-.156
Q71111 An electric mitad?	.047	-.054	-.524	-.174	-.028	-.118	.148	-.243	.096	-.104	.737[a]	.086	.027
Q7121 A watch?	.040	.042	.036	.023	-.063	-.235	-.087	-.044	.105	-.167	.086	.681[a]	.040
Q713 Does any member of this household have a bank or microfinance account?	-.164	.061	-.179	-.228	-.001	.030	.024	-.020	-.098	-.156	.027	.040	.896[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

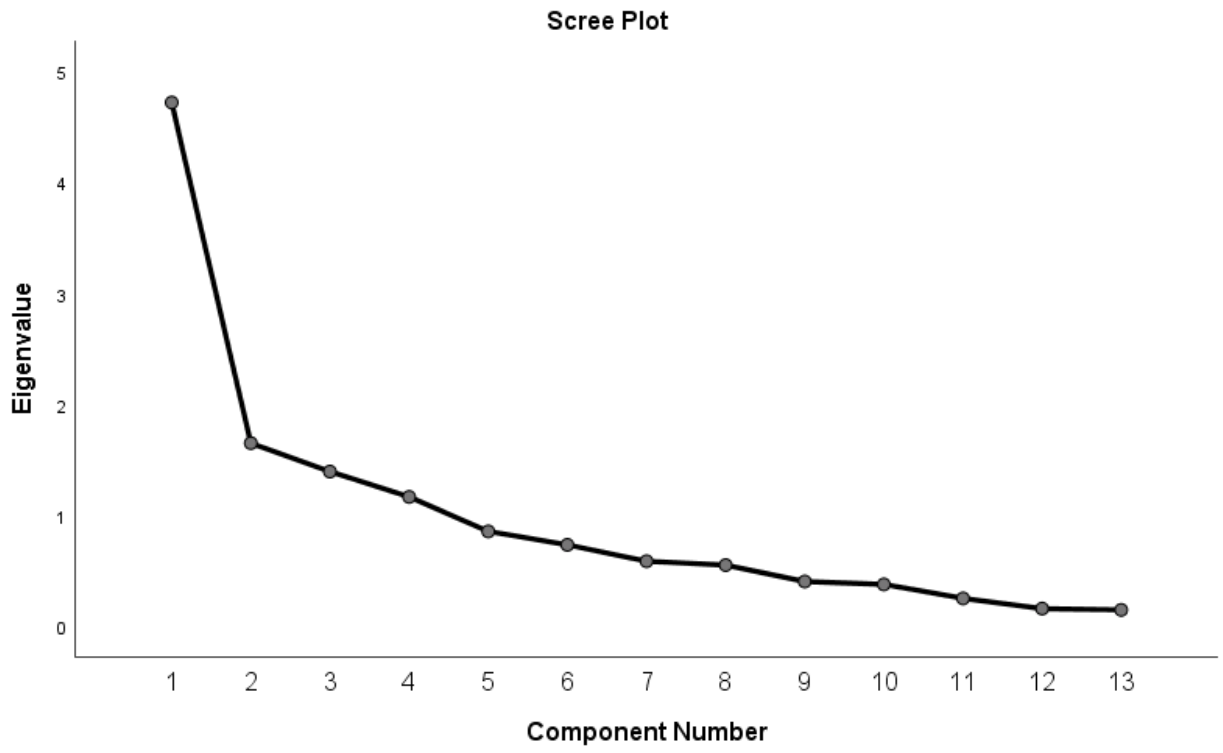
	Initial	Extraction
Q7022 Modern beds	1.000	.711
Q7023 Cotton/sponge/spring mattress?	1.000	.677
Q7026 Modern stoves	1.000	.726
standard toilet for house hold [VIP or flush water]	1.000	.522
Bed rooms used by household	1.000	.654
Q706 Do you have kitchen	1.000	.725
Q7113 A television?	1.000	.770
Q7114 A Satellite Dish	1.000	.656
Q7118 A table?	1.000	.818
Q7119 A chair?	1.000	.835
Q71111 An electric mitad?	1.000	.724
Q7121 A watch?	1.000	.541
Q713 Does any member of this household have a bank or microfinance account?	1.000	.575

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.722	36.322	36.322	4.722	36.322	36.322	2.799	21.534	21.534
2	1.651	12.697	49.019	1.651	12.697	49.019	2.501	19.242	40.776
3	1.394	10.726	59.745	1.394	10.726	59.745	1.857	14.283	55.059
4	1.167	8.974	68.719	1.167	8.974	68.719	1.776	13.659	68.719
5	.855	6.578	75.297						
6	.734	5.649	80.946						
7	.586	4.507	85.453						
8	.552	4.246	89.699						
9	.403	3.100	92.799						
10	.378	2.905	95.704						
11	.252	1.936	97.640						
12	.159	1.222	98.861						
13	.148	1.139	100.000						

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component			
	1	2	3	4
Q7113 A television?	.775		-.293	-.286
Q7114 A Satellite Dish	.721		-.222	-.284
Q7022 Modern beds	.707		-.421	-.184
Q7118 A table?	.687	-.301	.487	-.137
Q7119 A chair?	.650	-.322	.544	-.116
Q7023 Cotton/sponge/spring mattress?	.648		-.437	-.255
Q7026 Modern stoves	.647	.141	-.174	.508
Q713 Does any member of this household have a bank or microfinance account?	.612	-.359	.204	.175
Q706 Do you have kitchen	.430	.695	.215	.107
Bed rooms used by household	.446	.610	.276	
standard toilet for house hold [VIP or flush water]	.473	-.479		.243
Q7121 A watch?	.214	.441	.374	-.401
Q71111 An electric mitad?	.584	.149	-.124	.588

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Rotated Component Matrix[a]

		Component			
		1	2	3	4
Q7113	A television?	.818	.264	.123	.127
Q7023	Cotton/sponge/spring mattress?	.804	.105		.135
Q7022	Modern beds	.802	.133		.221
Q7114	A Satellite Dish	.739	.223	.220	.106
Q7119	A chair?	.159	.876	.207	
Q7118	A table?	.228	.849	.212	
Q713	Does any member of this household have a bank or microfinance account?	.202	.666		.299
standard toilet for house hold [VIP or flush water]		.141	.590	-.244	.307
Q706	Do you have kitchen	.110		.777	.329
Bed rooms used by household				.745	.290
Q7121	A watch?	.107	.102	.665	-.277
Q71111	An electric mitad?	.190	.165	.140	.801
Q7026	Modern stoves	.297	.173	.142	.766

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 6 iterations.

Component Transformation Matrix

Component	1	2	3	4
1	.661	.556	.300	.406
2	.004	-.559	.814	.158
3	-.593	.615	.469	-.224
4	-.460	.000	-.166	.872

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Component Score Coefficient Matrix

		Component			
		1	2	3	4
Q7022	Modern beds	.351	-.103	-.070	-.009
Q7023	Cotton/sponge/spring mattress?	.377	-.108	-.082	-.067
Q7026	Modern stoves	-.036	-.048	-.020	.477
standard toilet for house hold [VIP or flush water]		-.072	.261	-.209	.161
Bed rooms used by household		-.087	-.032	.410	.116
Q706	Do you have kitchen	-.072	-.090	.427	.149
Q7113	A television?	.346	-.030	-.021	-.102
Q7114	A Satellite Dish	.307	-.038	.049	-.108
Q7118	A table?	-.057	.398	.078	-.150
Q7119	A chair?	-.095	.425	.082	-.149
Q71111	An electric mitad?	-.097	-.037	-.015	.524
Q7121	A watch?	.031	.041	.414	-.299
Q713	Does any member of this household have a bank or microfinance account?	-.071	.283	-.094	.116

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Component Score Covariance Matrix

Component	1	2	3	4
1	1.000	.000	.000	.000
2	.000	1.000	.000	.000
3	.000	.000	1.000	.000
4	.000	.000	.000	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

***Select Rural case**

```
USE ALL.
COMPUTE filter_$=(q104=2).
VARIABLE LABELS filter_$ 'q104=2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
****Final PCA for rural cases

FACTOR
     /VARIABLES   q7001  q7014 q7015
       q7021  q7022  q7023 q707 q705recod  q706
  /MISSING LISTWISE
  /ANALYSIS q7001  q7014  q7015
       q7021  q7022   q7023    q707 q705recod  q706
    /PRINT UNIVARIATE INITIAL CORRELATION KMO AIC EXTRACTION ROTATION FSCORE
    /FORMAT SORT BLANK(.10)
    /PLOT EIGEN
    /CRITERIA FACTORS ITERATE(25)
    /EXTRACTION PC
    /CRITERIA ITERATE(25)
    /ROTATION VARIMAX
    /SAVE REG(ALL)
    /METHOD=CORRELATION.
```

Factor Analysis

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Q7001 Plough oxen	.73	.448	52
Q7014 Maize	.77	.425	52
Q7015 Sorghum	.62	.491	52
Q7021 Functioning radio/tape	.27	.448	52
Q7022 Modern beds	.37	.486	52
Q7023 Cotton/sponge/spring mattress?	.44	.502	52
Q707 Do you have separate rooms for cattle?	.27	.448	52
Bed rooms used by household	.35	.480	52
Q706 Do you have kitchen	.38	.491	52

Correlation Matrix

		Q7001 Plough oxen	Q7014 Maize	Q7015 Sorghum	Q7021 Functioning radio/tape	Q7022 Modern beds	Q7023 Cotton/sponge/spring mattress?	Q707 Do you have separate rooms for cattle?	Bed rooms used by household	Q706 Do you have kitchen
Correlation	Q7001 Plough oxen	1.000	.491	.590	-.023	-.080	-.245	.271	-.196	-.144
	Q7014 Maize	.491	1.000	.599	-.285	-.343	-.339	-.182	-.273	-.036
	Q7015 Sorghum	.590	.599	1.000	-.411	-.385	-.569	-.322	-.588	-.431
	Q7021 Functioning radio/tape	-.023	-.285	-.411	1.000	.530	.594	.511	.652	.500
	Q7022 Modern beds	-.080	-.343	-.385	.530	1.000	.852	.530	.707	.714
	Q7023 Cotton/sponge/spring mattress?	-.245	-.339	-.569	.594	.852	1.000	.507	.817	.808
	Q707 Do you have separate rooms for cattle?	.271	-.182	-.322	.511	.530	.507	1.000	.561	.411
	Bed rooms used by household	-.196	-.273	-.588	.652	.707	.817	.561	1.000	.671
	Q706 Do you have kitchen	-.144	-.036	-.431	.500	.714	.808	.411	.671	1.000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.777
Bartlett's Test of Sphericity	Approx. Chi-Square	329.223
	df	36
	Sig.	.000

Anti-image Matrices

		Q7001 Plough oxen	Q7014 Maize	Q7015 Sorghum	Q7021 Functioning radio/tape	Q7022 Modern beds	Q7023 Cotton/sponge/spring mattress?	Q707 Do you have separate rooms for cattle?	Bed rooms used by household	Q706 Do you have kitchen
Anti-image Covariance	Q7001 Plough oxen	.362	-.108	-.138	-.071	-.034	.023	-.218	.027	.026
	Q7014 Maize	-.108	.367	-.137	.092	.110	.019	.039	-.077	-.158
	Q7015 Sorghum	-.138	-.137	.281	-.003	-.077	.016	.100	.068	.062
	Q7021 Functioning radio/tape	-.071	.092	-.003	.504	.027	-.012	-.043	-.112	-.048
	Q7022 Modern beds	-.034	.110	-.077	.027	.205	-.080	-.034	-.029	-.059
	Q7023 Cotton/sponge/spring mattress?	.023	.019	.016	-.012	-.080	.127	-.003	-.062	-.076
	Q707 Do you have separate rooms for cattle?	-.218	.039	.100	-.043	-.034	-.003	.421	-.062	.003
	Bed rooms used by household	.027	-.077	.068	-.112	-.029	-.062	-.062	.243	.026
	Q706 Do you have kitchen	.026	-.158	.062	-.048	-.059	-.076	.003	.026	.247
Anti-image Correlation	Q7001 Plough oxen	.546[a]	-.297	-.431	-.167	-.126	.106	-.558	.092	.088

	Q7014 Maize	-.297	.550[a]	-.426	.215	.400	.090	.099	-.259	-.524
	Q7015 Sorghum	-.431	-.426	.743[a]	-.009	-.321	.082	.290	.262	.234
	Q7021 Functioning radio/tape	-.167	.215	-.009	.896[a]	.085	-.047	-.093	-.319	-.136
	Q7022 Modern beds	-.126	.400	-.321	.085	.803[a]	-.496	-.116	-.131	-.262
	Q7023 Cotton/sponge/spring mattress?	.106	.090	.082	-.047	-.496	.844[a]	-.014	-.352	-.431
	Q707 Do you have separate rooms for cattle?	-.558	.099	.290	-.093	-.116	-.014	.762[a]	-.195	.009
	Bed rooms used by household	.092	-.259	.262	-.319	-.131	-.352	-.195	.866[a]	.106
	Q706 Do you have kitchen	.088	-.524	.234	-.136	-.262	-.431	.009	.106	.783[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

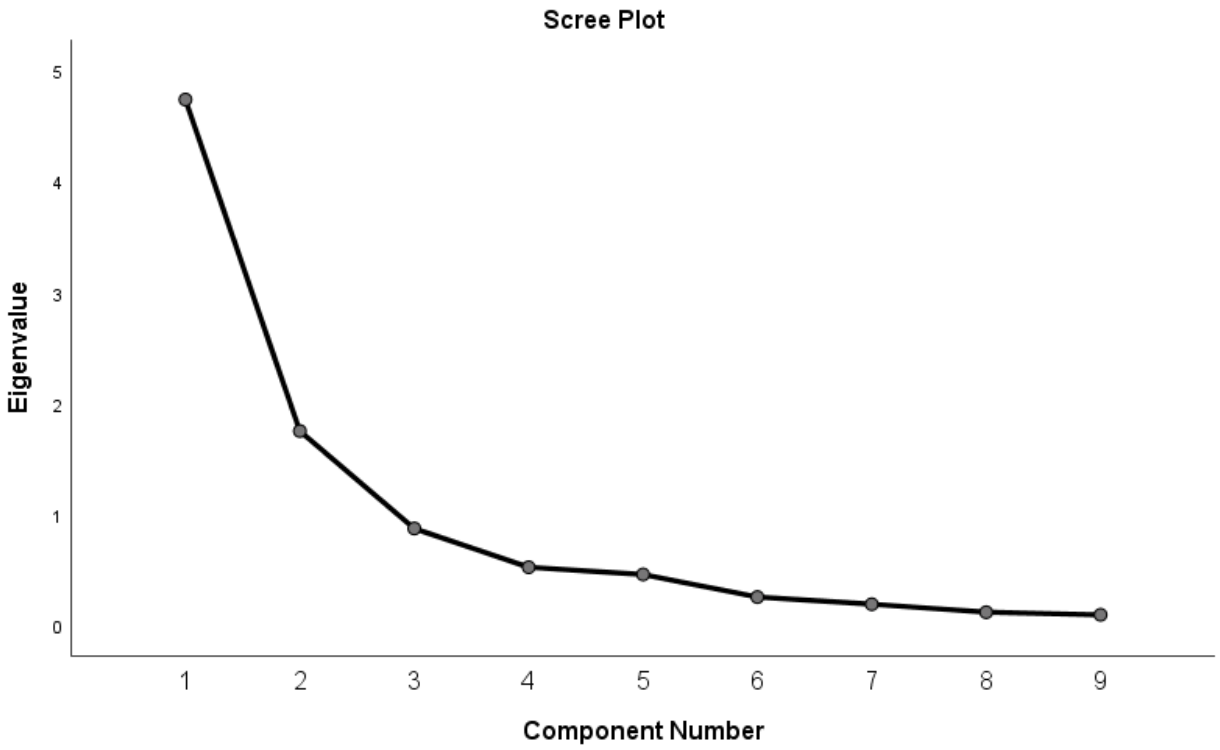
	Initial	Extraction
Q7001 Plough oxen	1.000	.827
Q7014 Maize	1.000	.620
Q7015 Sorghum	1.000	.782
Q7021 Functioning radio/tape	1.000	.569
Q7022 Modern beds	1.000	.754
Q7023 Cotton/sponge/spring mattress?	1.000	.869
Q707 Do you have separate rooms for cattle?	1.000	.597
Bed rooms used by household	1.000	.800
Q706 Do you have kitchen	1.000	.672

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.739	52.653	52.653	4.739	52.653	52.653	4.225	46.941	46.941
2	1.751	19.455	72.107	1.751	19.455	72.107	2.265	25.166	72.107
3	.872	9.692	81.800						
4	.523	5.813	87.612						
5	.458	5.093	92.705						
6	.254	2.828	95.533						
7	.190	2.113	97.646						
8	.118	1.312	98.958						
9	.094	1.042	100.000						

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component	
	1	2
Q7023 Cotton/sponge/spring mattress?	.930	
Bed rooms used by household	.889	.101
Q7022 Modern beds	.846	.195
Q706 Do you have kitchen	.787	.228
Q7021 Functioning radio/tape	.731	.189
Q7015 Sorghum	-.715	.520
Q707 Do you have separate rooms for cattle?	.629	.449
Q7001 Plough oxen	-.290	.862
Q7014 Maize	-.473	.629

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Rotated Component Matrix[a]

	Component	
	1	2
Q7023 Cotton/sponge/spring mattress?	.875	-.322
Q7022 Modern beds	.851	-.173
Bed rooms used by household	.850	-.277
Q706 Do you have kitchen	.811	-.119
Q707 Do you have separate rooms for cattle?	.759	.147
Q7021 Functioning radio/tape	.743	-.131
Q7001 Plough oxen		.904
Q7015 Sorghum	-.435	.770
Q7014 Maize	-.170	.769

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 3 iterations.

Component Transformation Matrix

Component	1	2
1	.910	-.415
2	.415	.910

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Component Score Coefficient Matrix

		Component	
		1	2
Q7001	Plough oxen	.149	.473
Q7014	Maize	.058	.368
Q7015	Sorghum	-.014	.333
Q7021	Functioning radio/tape	.185	.034
Q7022	Modern beds	.209	.027
Q7023	Cotton/sponge/spring mattress?	.195	-.045
Q707	Do you have separate rooms for cattle?	.227	.178
Bed rooms used by household		.195	-.025
Q706	Do you have kitchen	.205	.050

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Component Score Covariance Matrix

Component	1	2
1	1.000	.000
2	.000	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

*Merge FAC1_1 and FACT2_1 in to a new variable common_wisur [common wealth index score]

* Then using Transform➔Rank Cases create a quintile [five categories] of wealth index and label 1= Lowest quintile, 2=Second quintile, 3=Middle quintile, 4=Fourth quintile and 5= Highest quintile.