DETERMINANTS OF DIETARY DIVERSITY PRACTICES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT St. PAUL HOSPITAL MILLENNIUM MEDICAL COLLEGE, ETHIOPIA

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A RESEARCH THESIS SUBMMITED TO THE CENTER FOR FOOD SECURITY STUDIES COLLEGE OF DEVELOPMENTAL STUDIES ADDIS ABABA UNIVERSITY, IN FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER DEGREE IN DEVELOPMENTAL AND FOOD SECURITY

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BY

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JUNE, 2022

Declaration

I honestly declare that this thesis title “Determinants of dietary diversity practices among pregnant women attending ANC in SPHMMC" has been carried out by me under the guidance and supervision of doctor Abebe Haile (PhD). My thesis is original and has not been submitted for the award of any degree and other university or organization.

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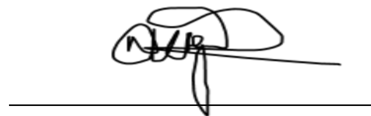
Professor Nigatu Regasa		08/07/2022

Approval sheet

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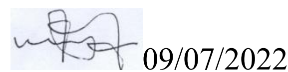
As supervisors/co-advisers of the thesis, we certify that we have read and evaluated the thesis proposal prepared by Medhin Belay Tesfay Entitled 'Determinants of dietary diversity practice among pregnant women attending antenatal clinic at St. Paul Hospital Millennium Medical College, Ethiopia' and recommend for Open Defense as fulfilling the requirement for the degree of Master of Science Degree in Food Security and Development Studies.

Dr. Abebe Haile (PhD)  09/07/2022

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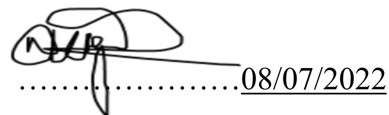
……………………………………..…  …………………08/07/2022

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Final approval and acceptance of this thesis is contingent upon the candidate's submission of the final copy of the thesis, incorporating all the comments by Examining Board, to the Council of Graduate Studies (CGS) through the Centre Academic Committee (CAC) of the Centre.

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Contents

Declaration I
Approval sheet II
Abbreviation and Acronyms VI
Abstract VII
1. Introduction 1
1.1. Background of the study 1
1.2. Statement of the Problem 2
2. Objective 3
2.1. General objective 3
2.2. Specific objective of the study 3
2.3. Research Questions 3
2.4. Significance of the study 4
2.5. Scope of the Study 4
3.1. Literature Review 5
3.1.1. Dietary Diversity 5
3.2. Empirical literature review 6
3.2.1 Nutritional Status 6
3.3 conceptual frame work 9
4. Methodology of the study 10
4.1. Description of Study Area 10
4.2. Study Design and Period 11
4.3. Population 11
4.3.1. Study Population 11
4.4. Inclusion & exclusion criteria 11
4.4.1. Inclusion Criteria 11
4.4.2. Exclusion Criteria 11
4.5. Sample size determination 12
4.6. Sampling technique & sampling procedure 13
4.6.1. Data collection instrument 13
4.6.2. Data quality control 14
4.7. Data Sources 15
4.8. Variables specifications 15
4.8.1. Dependent variable 15
4.8.2. Independent variable 15
4.9. Statistical Data analysis 15

4.10. Ethical Considerations 16
4.11 Operational Definitions 17
6. Discussion 26
7. Conclusion and recommendation 28
8. Bibliography 29
9. Appendices 32
ANNEX 1: English version informed consent form 32
ANNEXE: I. English Version Questionnaire 33
SECTION-1: Socio-economic and Demographic Characteristics 33
SECTION: 2. Pregnancy and Health Related Maternal Factors 34
SECTION: 3. Nutrition related and Dietary Intake Factors 35
3.1 Food Frequency Questionnaire 35
Section 4: Household Food Insecurity Access Scale (HFIAS) Questionnaires 37
ANNEX 2: Amharic Version Questionnaire 42
Annex 3: statistical analysis 48
Ouriginal 59

List of Tables

Table 1. Socio - demographic and economic profile of the study participants 19
Table 2. Obstetrics and nutritional related profile of the study 20
Table 3. Bi-variate analysis using chi-square to identify candidate variables 23
Table 4. Multivariate analysis table of study participants 25
Table 5. English Version Questionnaire 35
Table 6. Household Food Insecurity Access Scale (HFIAS) questionnaires 40
Table 7. Amharic Version Questionnaire 44

List of Figures

Fig. 1. Conceptual framework 9
Fig. 2. St. Paul hospital millennium medical college l0
Fig. 3. Prevalence of adequate dietary diversity among pregnant women attending ANC 22

Abbreviation and Acronyms

ANC=Anti Natal Care

AOR = Adjusted Odd Ratio

BMI =Body Mass Index

DDS=Dietary Diversity Score

DHS = Demographic Health Survey

EDHS = Ethiopian Demographic Health Survey

EPHI=Ethiopian Public Health Institute

FAO =Food and Agricultural Organization

FDRE =Federal Democratic Republic of Ethiopia

GIS=Geographic Information System

GNR=Global Nutritional Report

HHFIAS=Household Food Insecurity Assess Scale

NCHS=Nigeria community health survey

PME = Protein Energy Malnutrition

SD= Standard Deviation

SPHMMC= Saint Paul Hospital Millennium Medical College

USA =United States of America

WDDS = Women Dietary Diversity Score

WFP =World Food Program

WHO = World Health Organization

Abstract

Background: Pregnant women have been deemed vulnerable to malnutrition due to their higher nutrient demands; therefore, dietary diversification has gotten a lot of attention. As a result, a wide variety of foods must be included in their diet to ensure that their nutritional intake is appropriate. There has been no research on dietary variety in the study area.

Objective: To identify determinants of dietary diversity practice among pregnant women attending antenatal clinic at St. Paul Hospital Millennium Medical College, Ethiopia

Methods: A cross-sectional study will be conducted among 316 pregnant women in Ethiopia's St. Paul Hospital Millennium Medical College. A systematic sampling method was used. The data was collected using an interviewer-administered, structured, and modified questionnaire. Epi Data version 3.1 was used to enter the data, while SPSS version 21 was used to analyze it. The study subjects' Socio-demographic, obstetric, and nutrition-related variables were described using descriptive statistics such as frequencies and percentages. To find related factors, multivariate logistic regression was used. With a 95 percent confidence interval, statistical significance was assessed at P- value of < 0.05.

Results: The study revealed that, 68.04% of the study participants had adequate dietary diversity. The result showed that women's husband attended primary **(AOR: 9.8; 95% CI: 6.5, 13.4),** secondary **(AOR: 10.2; 95% CI: 7.5, 15.2),** college and above **(AOR: 12.3; 95% CI: 9.4, 16.2**) compared to non-educated one results a higher odd of adequate dietary diversity. Women receiving nutritional related health information **(AOR: 2.44; 95% CI: 1.31, 4.53),** food secure household **(AOR: 2.68; 95% CI: 1.58, 6.28),** women having greater or equal to 5 meals per day had a higher odd of adequate dietary diversity.

Conclusion and recommendation: According to the findings, total consumption of acceptable dietary diversity is low in the research area. Increased meal frequency, nutritional advice, educated husbands, and secure households all contribute to pregnant women's adequate intake of a diverse diet. Dietary counseling during pregnancy has been highlighted as a way to enhance pregnant women's nutritional practices.

Key words: Dietary diversity, food security, pregnant, SPHMMC, HFIAS

1. Introduction

1.1. Background of the study

Dietary diversity has continued to receive a global attention among pregnant women as they have been considered susceptible to malnutrition because of their increased nutrient demands. Thus, a variety of foodstuffs in their diet are necessary for ensuring the appropriateness of their nutrient consumption (Delil et al. 2021).

In Sub-Saharan Africa, the prevalence of nutritional insufficiency among pregnant women remains high. Despite the fact that dietary diversity is essential for the health of the mother and the fetus in Ethiopia, 22 percent of women are thin and 8% are obese due to insufficient dietary intake, limited diet diversity (vegetables and fruits), and changing lifestyles, 22 percent of Ethiopian women are thin and 8% are obese (Desta et al. 2019). Pregnancy is a critical period in the life-cycle during which additional nutrients are required to meet the metabolic and physiological demands as well as the increased requirements of the growing fetus (Aliwo et al. 2019)

Due to the increased micro-nutrient, energy, and macro-nutrient requirements to support the mother's health, good fetal growth, and the accumulation of stores for nursing, diet becomes even more crucial during pregnancy. Nutritional support for the fetus throughout pregnancy promotes appropriate intrauterine growth and a normal birth weight, which can have long-term developmental consequences(Shrestha et al. 2021)

The amount of various food categories consumed by each woman over a specified reference period is known as the women's dietary diversity score (WDDS). It is a qualitative measure of food consumption that is used as a proxy for individual micro-nutrient adequacy. It counts meals ingested outside of the home in a certain reference period, in the recent 24 hours, unlike the household dietary diversity score (HDDS). The most important factor in preventing micro-nutrient insufficiency is dietary diversification. It reflects the idea that expanding the variety of foods and food types in one's diet helps to ensure optimal nutrient intake and, as a result, promotes good health(Yeneabat et al. 2019).

1.2. Statement of the Problem

Dietary diversity is a criterion for nutritional sufficiency. In the impoverished world, where meals are primarily starchy staples with few animal products, seasonal fruits and vegetables, a lack of diverse diets is a serious problem. A woman's nutritional state during pregnancy is critical since a poor diet has a severe impact on the mother's, fetus's, and newborn's health. Despite evidence that maternal nutrition has substantial direct and/or indirect repercussions for all other age cohorts, there is a paucity of understanding in the domain of dietary diversity and factors affecting it among pregnant women(Kemunto, 2013)

Adequate nutritional intake during pregnancy is a critical aspect that can influence the outcome of the baby's delivery. Dietary diversity scores have been found to be reliable proxy indicators of dietary energy availability at the household level as well as micro-nutrient sufficiency in individuals' meals (Mahama, 2012).

Under nutrition is a major public health concern in many developing nations, owing to rising population sizes, socioeconomic inequality, and a lack of health-care coverage. It's uncertain how much maternal diet promotes fetal growth via influencing placental functional development. Poor maternal nutrition is a key cause of fetal growth problems, which increases newborn morbidity and mortality, as well as the risk of developing a variety of adult-onset disorders (Sohlstrom A, 2001).

Ethiopia is one of the countries having a high rate of malnutrition among mothers and children. Despite the fact that maternal malnutrition has decreased over the last 16 years, from 30% in 2000 to 22% in 2016, Ethiopia remains one of the countries with a significant burden of maternal malnutrition (Dadi, Demelash, and Id 2019).

Complications of pregnancy are a leading source of maternal morbidity and mortality around the world. Diversified food consumption is necessary for the production of hormones during pregnancy, and it also lowers the risk of difficulties. Many academics in Ethiopia have looked into the proportion of pregnant women who have dietary diversity and the factors that influence it. Those studies, on the other hand, are inconsistent and fragmentary(Gedef et al. 2021).

2. Objective

2.1. General objective

The main objective of this study is to assess the determinants of dietary diversity practices among pregnant women attending ANC in SPHMMC, Ethiopia, 2022.

2.2. Specific objective of the study

- Examine the dietary diversity practices of the pregnant women of the study area
- Find the relationship between the dietary diversity practices of the pregnant women and Socio-economic characteristics of the study population of the study area.
- Assess the food security status of household and the pregnant women using HFIAS of the study area
- Assess participants demographic characteristics and their dietary diversity practices

2.3. Research Questions

Having the above problem in mind, this study is designed to assess the determinants of dietary diversity practices among pregnant women attending ANC care in SPHMMC; accordingly, the study tries to answer the following basic questions:

- ✓ What are the main determinants of dietary diversity practices of the pregnant women in SPHMMC ANC visitors?
- ✓ How to analyze the relationship of dietary diversity practices of pregnant women and their Socio-demographic aspects?
- ✓ Which one is the most important socioeconomic factors which is impact for determinants of dietary diversity?
- ✓ How to know food security status of households with pregnant women in one's household using HFIAS?

2.4. Significance of the study

This research aimed to persuade residents in the study area to improve their dietary diversity practices and serve as a useful tool to plan improved nutrition and health conditions for the pregnant women. It can give information of dietary diversity practices of the pregnant women for the government and other local and non-governmental groups. Serve as a tool to reflect dietary diversity practices, socioeconomic and demographic characteristics of the respondents, and the health of pregnant women. Because pregnant women are at risk of malnutrition during their pregnancy, raising awareness about the factors that influence dietary diversity is beneficial to all Ethiopian women.

2.5. Scope of the Study

The emphasis of this study is on the dietary diversification practices of pregnant women in SPHMMC who were receiving ANC clinical care, as well as the study area and time restriction. SPHMMC has maternal and child care center and also ANC service. The main focus of the study was on dietary diversity practices among pregnant women who attended ANC during the study period.

3. Review of Related Literature

3.1. Dietary Diversity Practices Related Theoretical Literature Review

3.1.1. Dietary Diversity

Because different foods and food groups are good suppliers of different macro- and micro-nutrients, a varied diet is the best way to assure nutrient sufficiency. Dietary diversity is supported in all national food-based dietary guidelines and is included in evidence-based healthy diet patterns such as the Mediterranean diet and the "DASH" diet (Dietary Approaches to Stop Hypertension). Fruits, vegetables, legumes, nuts, and whole grains are all part of a balanced diet, according to the World Health Organization (WHO) (FANTA, 2016)

Individual eating patterns develop over time, impacted by a variety of social and economic factors that interact in a complicated way to shape them. Income, food prices (which affect the availability and affordability of nutritious foods), personal tastes and beliefs, cultural traditions, and geographical and environmental considerations are all elements to consider (including climate change). As a result, creating a healthy food environment – including food systems that encourage a diversified, balanced, and nutritious diet – necessitates the participation of a variety of sectors and stakeholders, including government, as well as the public and private sectors (WHO, 2020)

In conclusion, pregnant and lactating women's diets were found to be lacking in variety, with the majority of women eating the same meals, primarily starchy carbohydrates. Similarly, a large majority of women consume unhealthy diets high in saturated fats and oils. Animal-source meals, particularly fish and organ meat, are rarely consumed(Bitew and Worku 2021).

For health and Socio-cultural reasons, women adhere to various food taboos and customs. Scientific studies did not support ideas about the harmful consequences of certain foods. In pregnancy and early childhood, food taboos and behaviors continue to contribute to poor nutrition. While food taboos and customs can expose women to poor nutrition, some food taboos can also shield women from bad eating habits(Ramulondi, de Wet, and Ntuli 2021).

When generating the household dietary diversity score (HDDS), however, the expanded set should be combined back into the original 12 food groups so that the total HDDS is based on the

same 12 food groups. While the individual dietary diversity scores (IDDS) is used as a proxy measure of the nutritional quality of an individual's diet, the HDDS is used as a proxy measure of the Socio-economic level of the household (Bilinsky and Swindale 2006).

Household food access is defined as the ability to obtain sufficient quality and quantity of food to meet the nutritional needs of all household members in order to live healthy lives. Given the wide range of activities that Cooperating Sponsors (CSs) undertake to improve household food access, as well as the significant challenges that most CSs face in measuring household food access for reporting purposes, consensus on appropriate household food access impact indicators is required. (Swindale Anne, 2006).

Pregnant women in low- and middle-income nations are more vulnerable to micro-nutrient deficiencies because their diets are monotonous, primarily cereal-based, and generally include little nutrient-dense animal source food, vegetables, and fruits. In underdeveloped nations, it is believed that two-thirds of pregnant women suffer from nutritional anemia. (Shrestha et al. 2021).

3.2. Empirical literature review

3.2.1 Nutritional Status

Maternal malnutrition is still a major public health issue. There are significant regional and intra-country differences in the prevalence of underweight, anemia, and micro-nutrient deficiencies around the world. Access to health services, water and sanitation, women's status, and food insecurity, as well as the underlying social, economic, and political backdrop, are all factors driving these discrepancies. Preconception to pregnancy, women's health, nutrition, and well-being are crucial for a healthy pregnancy and long-term consequences for both the mother and the child. (Ramakrishnan, 2020).

We synthesize the evidence foundation for nutrition treatments before and during pregnancy in this review, which will aid in the development of programs aimed at women's nutrition. Preconception feeding trials are increasingly showing that it has an impact on offspring size at delivery. Low preconception weight and preconception anemia are linked to a higher risk of low birth weight and newborns that are tiny for gestational age. There are various evidence-based

treatments for enhancing birth outcomes during pregnancy, including balanced-energy protein supplements, several micro-nutrient supplements, and small-quantity lipid nutrient supplements. However, there are a number of major study gaps and priority areas for improving women's nutrition before and throughout pregnancy. Prioritizing preconception nutrition and access to health and family planning resources requires more improvement. To better understand the long-term impact of preconception and prenatal therapies, particularly on child development, more research is needed. Additionally, while maternal nutrition interventions have a strong evidence base, the next frontier demands a greater focus on implementation science and equity to reduce global maternal under nutrition inequities (M.F, 2020).

The results of the study on understanding of food nutrition during pregnancy are still inconclusive. The study found that pregnant mothers' overall understanding of nutrition during pregnancy was low, particularly their knowledge of sources of critical micro-nutrients (iron and vitamin A) and a balanced or diverse diet. As a result, the behaviors connected to proper and varied diet during pregnancy were also discovered to be inadequate. Nonetheless, there was evidence of a hopeful and positive attitude toward food diversification and nutritional care practices. This suggests that, even with small but targeted awareness raising initiatives and economic empowerment of women to assure access to key food items, there is a conducive and great potential to ensure maternal dietary diversity and optimal nutritional habits throughout pregnancy(Zerfu and Biadgilign 2018).

Poor maternal nutrition before and during pregnancy has been linked to a variety of negative pregnancy outcomes, including intrauterine growth restriction, which increases the risk of newborn mortality, low birth weight (LBW), preterm birth (PTB), and stunting. As a result, optimizing one's eating pattern and nutritional status both before and throughout pregnancy can help to prevent anemia, intrauterine growth restriction, and the short- and long-term consequences that come with it. This corresponded to the present focus on the first 1000 days of life as a window of opportunity for promoting healthy infant development. Maternal micro-nutrient malnutrition is a widespread nutrition challenge faced by women living in resource-poor settings, the consequences of which affect not only the health and survival of women, but also that of their children, notably through intrauterine growth retardation (Gedef et al. 2021).

Appropriate dietary practices in pregnancy are critical to meet the increased metabolic and physiological demands; however, information about dietary practices among pregnant women, particularly rural residents, is limited (Fite et al. 2022).

Individual micro-nutrient consumption can be a valuable indicator for determining the need for, or impact of, nutrient-specific treatments like fortification and supplementation, which may be beneficial in certain locales or with specific demographic subgroups like pregnant and lactating women. Furthermore, if data on micronutrient intake for all members of a household is available, this indicator could give information on the dynamics of intra-household food distribution (J. and Friedman 2021).

Unhealthy food habits and nutrition-related practices, which are often based on a lack of information, traditions, and taboos, or a lack of understanding of the link between diet and health, can have a negative impact on nutritional status (Fite et al. 2022).

For health and sociocultural reasons, women adhere to various food taboos and customs. Scientific studies did not support ideas about the harmful consequences of certain foods. In pregnancy and early childhood, food taboos and behaviors continue to contribute to poor nutrition. While food taboos and customs can expose women to poor nutrition, some food taboos can also shield women from bad eating habits (Ramulondi et al. 2021).

3.3 conceptual frame work

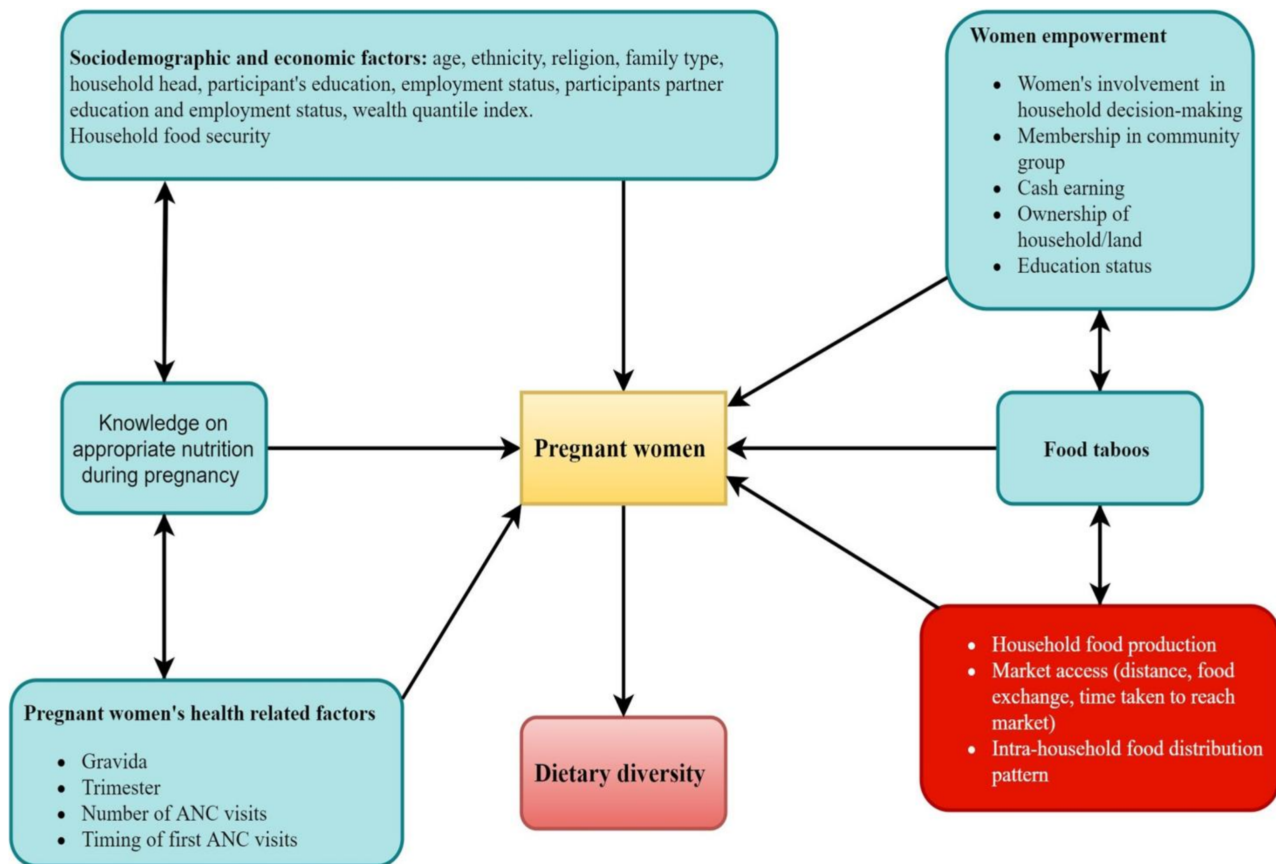

Figure 1; Conceptual framework of determinants of dietary diversity practices among pregnant women.

Source; https://doi.org/10.1371/journal.pone.0247085.g002

4. Methodology of the study

4.1. Description of Study Area

SPHMMC gives preventive, curative and rehabilitative clinical services structured in multipurpose terms in outpatient, inpatient, emergency and critical care, maternal, child health and obstetrics, and the operation theatre. The hospital was chosen due to its highest patient and client attendance. It is the biggest hospital in Addis Ababa, capital city of Ethiopia. It aimed to serve the poor. And a medical college was formed in 2007, currently known as St. Paul Hospital Millennium Medical College.

Currently it's the biggest hospital in Ethiopia and in the city center of Addis Ababa. Located in

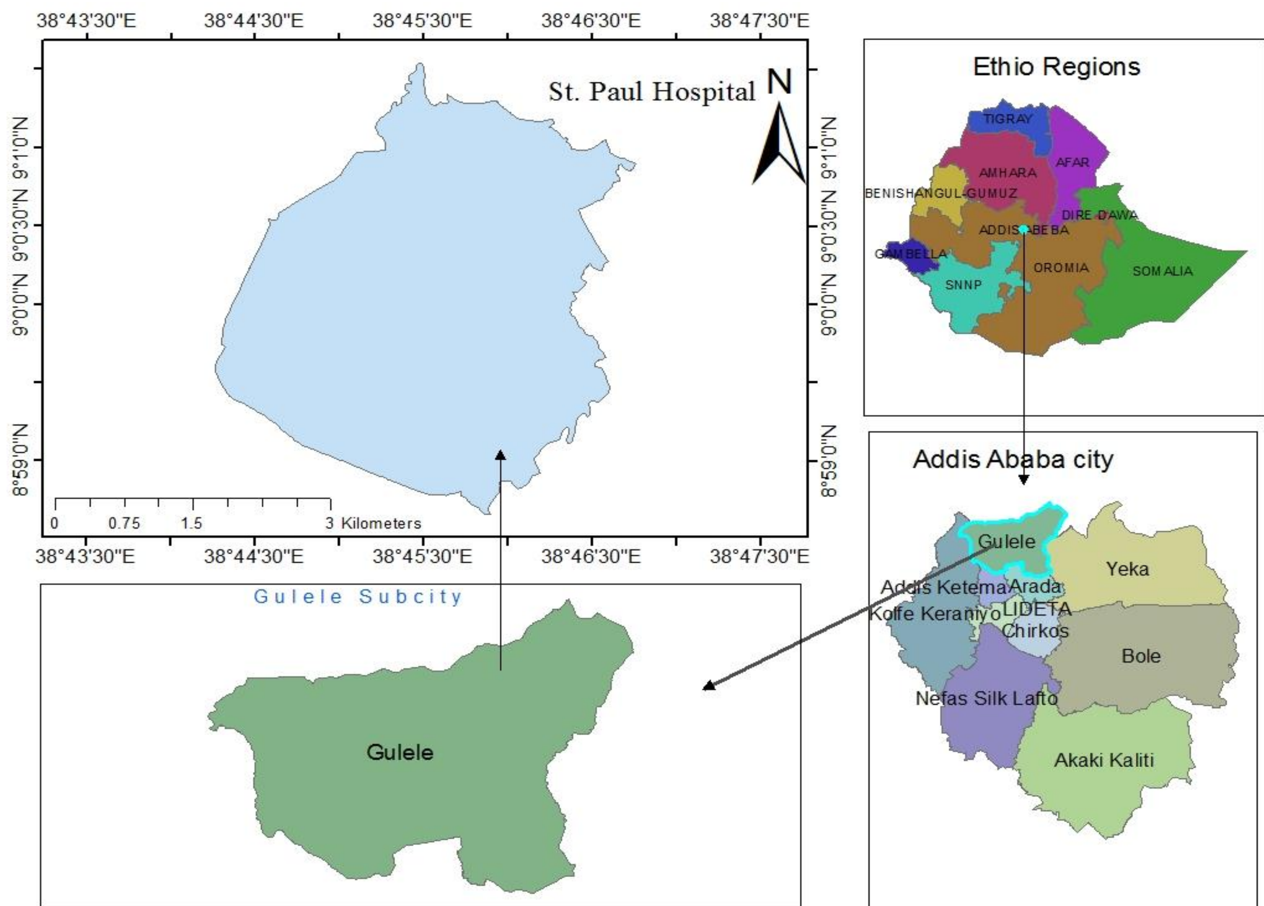

Figure 2; St. Paul hospital millennium medical college location

Source; from GIS 10.5 version and Google earth satellite view of the study area

4.2. Study Design and Period

A hospital-based cross-sectional study was carried out from May 1 to June 30, 2022 among pregnant women attending the ANC clinic at SPHMMC.

4.3. Population

All pregnant women visiting ANC in SPHMMC during the study period

4.3.1. Study Population

The study population was all pregnant women attending ANC in SPHMMC present in the study area at the time of data collection

4.4. Inclusion & exclusion criteria

4.4.1. Inclusion Criteria

All pregnant women attending ANC in SPHMMC during the study period

4.4.2. Exclusion Criteria

Pregnant women who are critically ill or with other chronic illnesses and unable to communicate

4.5. Sample size determination

The sample size was determined using the Cochran's formula for the unknown source of population size, since there is no worked research of determinants of dietary diversity in the selected study area. By assuming to work with a 95% confidence level, a standard deviation of 0.5, and a confidence interval (margin of error) of ± 5%, then by substituting the values in the formula: Using Cochran's formula, for averagely visiting ANC in SPHMMC per month is 1000 pregnant women, then by modifying the Cochran's sample size determination

= ((1.96)2 x .5(.5)) / (.05)2

= (3.8416 x .25) / .0025

=0.9604 /0.0025

=384.16 ~ 385

Then substituting the above values

= 385 / (1 + (385 / 1000))

= 278 plus 10% non-response rate

= 316 was my study population

4.6. Sampling technique & sampling procedure

A systematic random sampling technique was used to recruit the study participants. Since sampling interval is computed to be three, every third interval is used to enroll the participants.

4.6.1. Data collection instrument

The questionnaire was first prepared in English, translated into Amharic, and then translated back to English to ensure the consistency. Data was collected in Amharic (which is the local language). Data was collected through a Kobo tool box software used in face-to-face interviews. Dietary intake information was measured by asking participants to list all food items they consumed in the last 24 hours preceding the survey day. Six data collectors Midwives (3) & BSc nurses (3) all with a bachelor's degree were recruited for the data collection and supervision. The data collectors and supervisors were given training on the content of the tool, the purpose of the study, and how to collect the data. The questionnaire was adapted from dietary diversity guidelines (FAO, 2016).

4.6.2. Data quality control

After reviewing the literature, the questionnaire was prepared first in English and then translated to the local language Amharic (since it's a local language). Data collectors were trained to check the completeness of each questionnaire whether every question has been completely answered and the advisor was rechecked for the completeness of the questionnaire immediately after submission. Data was collected by skilled health professionals with BSc graduated for exact data and checked for completeness and consistence daily supervised and to avoid over repetition of data.

4.7. Data Sources

The data was collected from eligible respondents during the data collection period. To collect the data, Kobo tool box software loaded smart phones was administered for the data collectors, and then they were collected the necessary data from the respondents.

4.8. Variables specifications

The determinants of dietary diversity practices among pregnant women were described in the following function which shows the direction of the relationship of the independent variables with the dependent variables which was determinants of dietary diversity practices of pregnant women attending ANC, f(x)=f(family size -ve, type of income sources +ve, gravida +ve, number of ANC visit +ve, Education status +ve, Knowledge of appropriate nutrition during pregnancy +ve, employment status +ve and dietary diversity +ve). The actual relationship of these independent variables with the dependent variables (determinants of the dietary diversity practices) was assessed by the study.

4.8.1. Dependent variable

Dietary diversity practices among pregnant women

4.8.2. Independent variable

Socio-demographic variable, religion, marital status, family size and income status, number of children,

4.9. Statistical Data analysis

Data was analyzed using SPSS Software (version 20). Descriptive statistics such as frequency, and proportions was calculated to summarize the data. Multivariate logistic regression analyses were conducted to identify determinants of diversity dietary practice. The degree of association between explanatory variables, and outcome was evaluated using odds ratio with 95% confidence intervals.

4.10. Ethical Considerations

Human participants were used in the investigation. After receiving ethical approval from the College of Development Studies' Institutional Review Board, an official letter was sent to the SPHMMC administrative office to begin the study, data collecting began after permission, and a cooperation letter was written to the ANC clinic ward. The study's objective, protocol, and duration, as well as the study's potential hazards and benefits, were all properly presented to the participants in the local language. Respondents were assured of their privacy and told that the information they supplied would be used solely for research purposes. Respondent names were not included on the questionnaires, only their identifying numbers, ensuring confidentiality.

4.11 Operational Definitions

Dietary diversity A total of ten food categories were used in this study, with participants who consumed five and more food groups being classified as having an appropriate dietary variety practice and those who ingested less than five food groups being classified as having an inadequate dietary diversity practice (FAO, 2016).

Dietary diversity scores in the study were created by summing up the number of food groups consumed over a 72-hour periods by an individual.

Food security: Food security, as defined by the United Nations' Committee on World Food Security, means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.

HFIAS: house hold food insecurity access scale, women's household food security status was classified based on responses to the nine severity items in the HFIAS and coded "0" for "No" and "1" for "Yes." The procedure for scoring was used as follows: "0" was attributed if the event described by the question never occurred, "1" if it occurred during the previous 30 days. With regard to the occurrence, "1" was attributed if the events rarely occur, "2" sometimes and "3" often. Therefore, responses on the nine HFIAS questions were summed to create household food security score, with a minimum of "0" and a maximum score of "27." According to the score, the higher the score, the more the women is vulnerable to food insecurity. The lower the score, the lesser the food insecurity a women experienced. Therefore, HFIAS score of 0–1 is categorized as food secure, 2 and above were considered as food insecure (Coates, Swindale, and Bilinsky 2007).

5. Results

5.1 Descriptive characteristics of the study participants

A total of 316 pregnant women were included and analyzed and gave a response rate of 100%. About, 68 % of the women had the age of greater than 25 years. Concerning occupation of the mother and husband, 24.1% and 35.4% of them were government employee. (Table 1)

Table 1: Socio - demographic and economic profile of the study participants in St. Paul Hospital Millennium Medical College, 2022

Variables	Category	Frequency	Percent
Age in years	≤ 25	101	32.0
	>25	215	68.0
Ethnicity	Addis Ababa Region	176	55.7
	Amhara	21	6.6
	Gurage	27	8.5
	Oromia /Tigray	92	29.1
Religion	Orthodox	144	45.6
	Muslim	98	31.0
	protestant/catholic	74	23.4
Mother occupation	House wife	95	30.1
	Merchant	40	12.7
	Government employee	76	24.1
	Daily laborer	105	33.2
Husband occupation	Government employee	112	35.4
	Merchant	81	25.6
	Daily laborer	123	38.9
Husband education	No formal education	15	4.7
	Primary	29	9.2
	Secondary	150	47.5

	College and above	122	38.6
Mother's education	No formal education	9	2.8
	Primary	57	18.0
	secondary	152	48.1
	College and above	98	31.0
Marital status	Married	289	91.5
	Separated/divorced	27	8.5
Income	<1000 Birr	50	15.8
	1000-2000 Birr	37	11.7
	≥ 2000 Birr	229	72.5
Family size	<4	200	63.3
	≥ 4	116	36.7

5.2 Obstetrics and nutritional related profile of the study participants

In this study, 90.2% of pregnant women were 20 years and greater during the first marriage. Three or more ANC visits were experienced by 78.2% of the study participants. Health information related to nutrition was received by 44.9% of the samples. About, 91.8 % of the sample had food secure households. (Table 2)

Table 2: Obstetrics and nutritional related profile of the study participants in St. Paul Hospital Millennium Medical College, 2022

Variables	Category	Frequency	Percent
Age at first marriage	<20 years	31	9.8
	≥ 20 years	285	90.2
Age at first birth	<20 years	34	10.8
	≥ 20 years	282	89.2
Number of ANC visit	1-2	69	21.8
	3 or more	247	78.2
Gestational age in Weeks	<37	306	96.8

	≥ 37	10	3.2
Gravidity	1	83	26.3
	≥ 2	233	73.7
Abortion experience	No	245	77.5
	yes	71	22.5
Experienced still birth	no	298	94.3
	yes	18	5.7
Received nutritional counseling	yes	142	44.9
	no	174	55.1
Frequency of meal	< 4	237	75.0
	≥ 5	79	25.0
Food security status	secure	290	91.8
	not secure	26	8.2

5.3 Prevalence of adequate dietary diversity among pregnant women

The study revealed that, 68.04% of the study participants had adequate dietary diversity. (Fig 3)

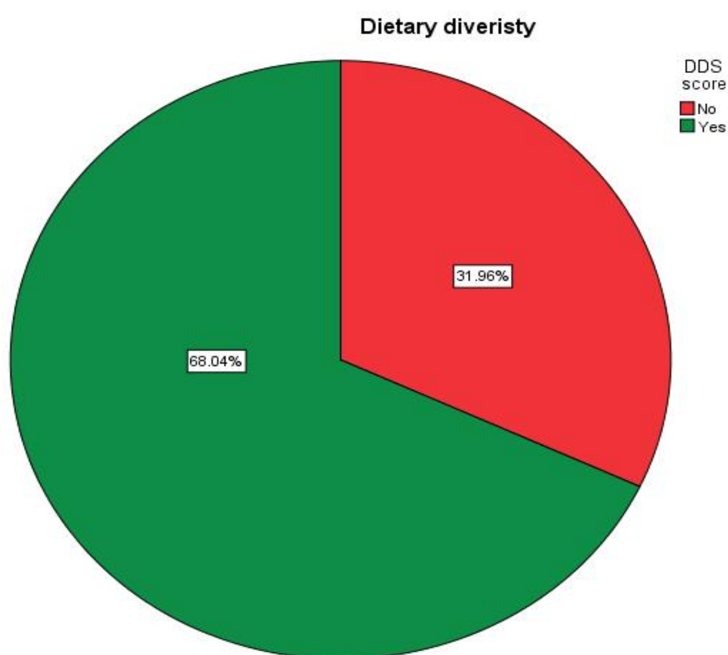

Figure 3: Prevalence of adequate dietary diversity among pregnant women attending ANC St. Paul Hospital Millennium Medical College, 2022

5.4 Determinants of dietary diversity among pregnant women

In the bi-variate analysis using a Chi-square test showed that, variables such as husband education, mother's education, husband occupation, history of still birth, receiving nutritional counseling, ethnicity, age at first marriage, age at first birth, meal frequency, and food security were a potential candidate for multivariate model since they have a p-value of <0.25. (Table 3)

Table 3: Bi-variate analysis using chi-square to identify candidate variables which affect dietary diversity practice among pregnant women attending antenatal clinic at St. Paul Hospital Millennium Medical College, Ethiopia, 2022

Variables	Category	DDS score		Total	Chi-square P-value
		Inadequate	Adequate		
Age of the mother in years	≤ 25	32	69	101	0.94
	>25	69	146	215	
Husband education	No formal education	12	3	15	0.000*
	Primary	4	25	29	
	secondary	54	96	150	
	college	31	91	122	
Mother's education	No formal education	4	5	9	0.224*
	Primary	23	34	57	
	secondary	49	103	152	
	college	25	73	98	
Mother's occupation	House wife	30	65	95	0.613
	Merchant	14	26	40	
	Government employee	20	56	76	
	daily laborer	37	68	105	
Husband occupation	Government employee	36	76	112	0.204*
	Merchant	20	61	81	

	Daily laborer	45	78	123	
History of abortion	No	77	168	245	0.706
	yes	24	47	71	
History of stillbirth	no	98	200	298	0.152*
	yes	3	15	18	
Receiving nutritional counseling	yes	28	114	142	0.000*
	no	73	101	174	
Marital status	married	90	199	289	0.306
	Separated/divorced	11	16	27	
Religion	Orthodox	51	93	144	0.34
	Muslim	31	67	98	
	Protestant/catholic	19	55	74	
Ethnicity	Addis Ababa region	61	115	176	0.065*
	Amhara	9	12	21	
	Gurage	3	24	27	
	Oromia /Tigray	28	64	92	
Income	<1000	16	34	50	0.48
	1000-2000	15	22	37	
	≥2000	70	159	229	
Family size	<4	61	139	200	0.46
	≥ 4	40	76	116	
Age at first marriage	<20 years	7	24	31	0.238*
	≥ 20 years	94	191	285	
Age at first birth	<20 years	15	19	34	0.108*
	≥ 20 years	86	196	282	
Number of ANC visit	1-2	22	47	69	0.98
	3	79	168	247	
Gestational age	<37	97	209	306	0.58
	≥ 37	4	6	10	
Gravidity	1	29	54	83	0.498

	≥2	72	161	233	
Meal frequency per day	4	50	187	237	0.000*
	≥ 5	51	28	79	
Food security	secure	85	205	290	0.000*
	not secure	16	10	26	

*P-value < 0.25 were used to select candidates for multi-variable model

5.5 multi-variable analysis to identify factors for adequate dietary diversity among pregnant women

Data was entered and analyzed using SPSS Software (version 20). Descriptive statistics, frequency, and proportions was calculated to summarize the data. Logistic regression analyses were conducted to identify determinants of diversity dietary practice. The degree of association between explanatory variables, and outcome was evaluated using odds ratio with 95% confidence intervals. Multicollinearity was assessed and the VIF results were less than 10. The model fitness indicated that the model was fitted having a p-value of 0.321.

Variables which had p-value of < 0.25 in bi-variate analysis were entered into multivariate model using binary logistic regression.

The result showed that women's husband attended primary **(AOR: 9.8; 95% CI: 6.5, 13.4),** secondary **(AOR: 10.2; 95% CI: 7.5, 15.2),** college and above **(AOR: 12.3; 95% CI: 9.4, 16.2**) compared to non-educated one results a higher odd of adequate dietary diversity. Women receiving nutritional related health information **(AOR: 2.44; 95% CI: 1.31, 4.53),** food secure household **(AOR: 2.68; 95% CI: 1.58, 6.28),** women having greater or equal to 5 meals per day had a higher odd of adequate dietary diversity. **(Table 3)**

Table 4: Multivariate logistic regression to identify determinants of dietary diversity practice among pregnant women attending antenatal clinic at St. Paul Hospital Millennium Medical College, Ethiopia, 2022

Variables	Category	AOR (95% CI)	P-value
Husband occupation	Government employee	0.58(0.22,1.55)	0.281
	Merchant	1.38(0.56,3.40)	0.484
	Daily laborer	1	
Mother occupation	House wife	0.96(0.42,2.19)	0.932
	Merchant	0.76(0.24,2.45)	0.655
	Government employee	1.12(0.36,3.43)	0.841
	Daily laborer	1	
Nutrition counseling	Yes	2.44(1.31,4.53)	0.005
	No	1	
Age at first marriage	<20 years	1.75(0.62,4.95)	0.288
	≥ 20 years	1	
Age at first birth	<20 years	0.59(0.16,1.2)	0.62
	≥ 20 years	1	
Mother's education	No formal education	1	
	Primary	0.42(0.07,2.63)	0.359
	secondary	0.67(0.11,3.97)	0.662
	College and above	0.98(0.13,7.30)	0.986
Husband's education	No formal education	1	
	Primary	9.8(6.5,13.4)	0.000*
	secondary	10.2(7.5,15.2)	0.005*
	College and above	12.3(9.4,16.2)	0.000*
Experience still birth	Yes	0.35(0.075,1.61)	0.179
	No	1	
Ethnicity	Addis Ababa region	1	0.035

	Amhara	1.29(0.32, 5.16)	0.719
	Gurage	0.82(0.58,2.56)	0.07
	Oromia /Tigray	1.94(0.96,3.88)	0.062
Food security	Secure	2.68(1.58,6.28)	0.003*
	Not secure	1	
Meal frequency per day	<4 times	1	0.000*
	≥ 5 times	4.6(2.10,10.34)	

AOR: Adjusted Odds Ratio; P-value < 0.005 (Statistically significant association)

6. Discussion

The high prevalence of adequate dietary diversity among pregnant women in St. Paul's Hospital, Addis Ababa was higher than studies conducted in Ethiopia; for instance 15.6% in Gurage (Gudeta et al. 2022), 25.4% in Shashemane town (Desta et al. 2019), 47% from East Gojjam Zone (Yeneabat et al. 2019), 43% from Dire Dawa (Shenka A, Damena M, Abdo M et al. 2018), bale zone(Hailu and Woldemichael 2019). Variances in socio-demographic variables, geographic differences, or the season in which the survey was done could all contribute to the observed discrepancy in prevalence. The observed disparities could potentially be due to the differences in the dietary diversity rating techniques used. Furthermore, the current research was carried out solely in an urban setting.

Nutritional advice offered to pregnant women during ANC visits was also linked to a diverse diet. In comparison to those who did not receive nutrition-related education, women who received it were less likely to have a diet with insufficient variety. Malawi had reported similar findings as well(Katenga-Kaunda et al. 2021), and from systematic review and meta-analysis done in Ethiopia (Azene et al. 2021). Dietary practice improves with increased nutritional understanding, which encourages dietary diversity. Women might have a better understanding of the benefits of eating a diverse diet during pregnancy for their own babies' health if they had more information and knowledge about nutritional variety. Mothers are traditionally very concerned about the well-being of their children, which leads them to eat a variety of foods.

Food security results in increasing adequate dietary diversity. This finding was in line with the result in Malawi and Ethiopia revealed pregnant women who have secured food were more likely to have a higher dietary diversity score than those who have unsecured food(Jemal and Awol 2019; Kang et al. 2019). This could be linked to respondents' better attitudes and economic status making it easier to obtain appropriate food. Previous research has found that those with a lack of food and a poor socioeconomic standing are less likely to eat a variety of foods (fruits, vegetables, and milk products) (Tarasuk, McIntyre, and Li 2007).

Women whose spouses had a primary, high school, or higher education level had more suitable eating practices, according to the current study, which is similar with previous Wachamo study, Ethiopian(Delil et al. 2021), and Ambo district, Ethiopia(Mideksa and Dida 2018). This could be because literate spouses are more aware of the need of eating a healthy diet while pregnant, and they are more likely to encourage their women to follow healthy eating habits. In comparison to

individuals who do not receive nutritional assistance, pregnant women who receive dietary advice are anticipated to follow a more varied diet.

During pregnancy, women's meal frequency per day was strongly associated with increased dietary diversification. A study conducted in Ethiopia's East Gojjam zone backs up this finding (Yeneabat et al. 2019). Thus, could be a reliable means for pregnant women to get adequate nutrients sourced from different food groups that they consume as the practice of changing food item.

7. Conclusion and recommendation

The study revealed that the overall consumption of adequate dietary diversity was found to be 68.04% which was good and out of hundred 31.96 % were inadequate dietary diversity practices founded, therefore we need to keep maintain and keep this condition up. Increasing meal frequency, receiving nutritional counseling, having educated husbands, and secured households leads to adequate intake of diversified diet among pregnant women. Providing dietary counseling during pregnancy has been identified as an opportunity to improve nutritional practice for pregnant women. Healthcare workers can provide sustained counseling on the advantage of meal frequency and demonstration of food preparation to help pregnant women consume more diversified food groups available in their home. Program practitioners and policy makers may consider strategies to enhance food security during and after pregnancy when designing nutrition programs aiming to increase the dietary diversity of this population.

Limitations and strengths of the study

Limitation of the study; the time limitation and insufficient data resources of the study in the selected area, pandemic situation of the time, rules and regulation of policies, wworked solely in urban, only visitor pregnant and respondent's bias.

Strength of the study; was cost effectiveness, general, reliable and it was versatile information gained from the study participants and data collectors.

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9. Appendices

ANNEX 1: English version informed consent form

Dear participant, this is research title named as Determinants of Dietary Diversity Practices which is aimed to conduct among pregnant woman in SPHMMC. It is intended to solve community nutritional problem toward food security through assessing of HHFIAS of dietary diversity practices and other nutritional statues measurement. After careful assessment, health education is concerning about the problems of determinants of dietary diversity and the related problems of pregnant women malnutrition and how to solve the issues. This research is also essential to initiate local and international NGO 's and other concerned bodies to make related policies based on the new findings & SPHMMC, to directly focus on that problem through focusing on identified problem. Hence, you are due to respond our questionnaire & stay patiently while we do, if there is possible physical contact and physical measurement throughout our study. If you find difficult to choose to participate, will never denied to not to participate. If this is so, please telling us prior to start!

Thank you for your purposive participation and listening!

Are you willing to participate?

1. Yes = continue
2. No = thank you

Participant 's Signature _________Date ____/___/____

Data collector 's name _______________ Signature _________Date ____/___/____

Advisor 's name _______________Signature __________Date____/____/___

ANNEXE: I. English Version Questionnaire

Participant Identification: Kebele; _______________ Sub city; _______________. Woreda; __________ Code number_____________.
Date of interview (dd/mm/yyyy); ____||____|____|

SECTION-1: Socio-economic and Demographic Characteristics

S.no	Questions	Coding categories
101	How old are you? Age in years?	______________year
102	What is your current marital status?	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated 6. Other (specify)________
103	Ethnicity	1. Oromia 2. Addis Ababa region 3. Afar 4. Amhara 5. Gurage 6. Others (specify)_________
104	What is your Religion?	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. Others (specify)__________
105	Educational level of mother?	1. Can't read & write 2. Grade 1-4 3. Grade 5-8 4. Grade 9-10 5. Grade 11-12 6. College/university
106	Education status of partner	1. Can't read & write 2. Grade 1-4 3. Grade 5-8 4. Grade 9-10 5. Grade 11-12 6. College/university
107	Occupation of mother	1. House wife 2. Merchant 3. Daily worker 4. Government employee 5. Other specify__________
108	Occupation of partner	1. Government employee 2. Farmer 3. Merchant 4. Daily worker 5. Other specify____________
109	Number of people live in your household?	________________.
110	Household monthly income (Provide all sources of income)	|___|___|___|___|___|___| (write one digit in each parenthesis)

SECTION: 2. Pregnancy and Health Related Maternal Factors

S. No	Questions	Coding categories
111	Age at marriage?	___________year
112	Age at first birth?	___________year
113	Total number of pregnancies including the current one?	_____. if Primigravida → 120
114	How many of the pregnancies were given still birth?	____________.
115	Do you have an experience of abortion?	1. Yes 2. No
116	If yes question 115, how many times?	____________.
117	How many months are there b/n the previous and the current pregnancy?	____________.
118	If she is not Primigravida, history of ANC at previous pregnancy?	1. Yes 2. No
119	If she is not Primigravida, place of delivery for previous pregnancy?	1. Home 2. Health facility
120	Last normal menstrual period of the women, gestational age in week?	___________weeks.
121	How many times did you visit antenatal care service with this pregnancy?	____________.
122	Have you ever taken Health education about Nutrition during pregnancy?	1. Yes 2. No
123	If yes question 122, what kinds of information did you get?	1. Iron source food 2. Additional meals 3. Healthy diets
124	Do you have eat fruit or vegetables garden in your home?	1. Yes 2. No

SECTION: 3. Nutrition related and Dietary Intake Factors

3.1 Food Frequency Questionnaire

S. No	Question	Possible alternatives	Remark
125	How many meals per day do you eat on current pregnancy?	1. Once 2. 2 times 3. 3times 4. 4 times 5. ≥ 5 times 6. I don't know	
126	Do you take milk & milk product?	1. Yes 2. No	2 → 128
127	What types of dairy, milk and milk products do you take?	1. Whole milk 2. Cheese 3. Powdered milk 4. Yogurt 5. Butter milk 6. Low fat milk 7.Butter	
128	Do you eat egg?	1. Yes 2. No	2 → 130
129	What types of egg do you eat?	Hen, duck or any other egg	
130	Do you eat cereals& ready-to-eat?	1. Yes 2. No	2 → 133
131	Do you eat white tubers & roots?	1. Yes 2. No	
132	What types of Cereals, white tubers and roots or Starchy staples do you eat?	A. Cereals and grains including ready-to-eat; 1. Wheat (such as whole meal/white bread) 2. Barley 3. Oats/aja 4. Rice 5. Maize 6. Spaghetti/pasta 7. Macaroni 8. Sorghum 9. Teff 10. Other (millet, sago, semolina, triticale) B. White tubers and roots; potatoes, yams, cassava (White), godere, boyna or other foods made from roots	
133	Do you eat Dark Green Leafy Vegetables?	1. Yes 2. No	2 → 135
134	What types of Dark Green Leafy Vegetables do you eat?	1. Kale 2. Swiss chard 3. Endive 4. Lettuce 5. Pumpkin leaves 6. Spinach 7. Cassava leaves 8. Mustard greens 9. Broccoli 10.	

		Others________.	
135	Do you eat ripe mangoes, papaya, bananas and peaches (dried, raw)?	1. Yes 2. No	2 → 137
136	What types of other Vitamin A rich Fruits, Tubers and Vegetables do you eat?	Mango, papaya (Ripe, fresh and dried), pumpkin, carrots, sweet potatoes, red sweet pepper, red palm fruit/pulp, passion fruit, melon, deep yellow or orange-fleshed bananas, peaches (dried, raw)	
137	Do you eat other fruits and vegetables?	1. Other fruits; 1. Yes 2. No 2. Other vegetables; 1. Yes 2. No	2 → 139
138	What types of other fruits and Vegetables do you eat?	1. Fruits items; avocado, apple, mandarin orange, Dates, white/cream-fleshed bananas, strawberry, Grapes, Pears, not ripe mango or papaya, orange, lemon, pineapple, cherries, olive, peach, guava, citron, cassimere, Wild fruits 2. Vegetables items; Beet root, common cabbage, onion, green beans, Cucumber, tomatoes, peas (fresh), green pepper, cauliflower, garlic, mushroom, chilies, green maize, leek, beets, ginger, wild vegetables.	
139	Do you eat meat, poultry and fish?	1. Yes 2. No	2 → 141
140	What types of organ meat, meat and poultry, and fish/seafood do you eat?	1. Liver, kidney, heart or all other organ meats like tripe 2. Lamb, mutton, beef, veal, goat 3. Poultry (e.g. chicken, guinea fowl) 4. Fresh or dried fish, seafood	
141	Do you take Nuts and seeds?	1. Yes 2. No	2 → 143
142	What types of Nuts and seeds do you eat?	1. Almond 2. Sunflower 3. Linseed 4. Melon seeds 5. Sesame 6. Fetto (ፌጦ) 7. Other specify________.	
143	Do you take Pulses or legumes?	1. Yes 2. No	

144	What types of pulses or legumes do you eat?	1. Peas 2. Chickpeas 3. Horse bean 4. Lentils 5. Vetch 6. Haricot beans 7. Kidney bean 8. Niger seed 9. Fenugreek 10. Other specify______	
145.	Women dietary diversity practice (based on above food group taken)	________________________food groups	

Section 4: Household Food Insecurity Access Scale (HFIAS) Questionnaires

No.	Questions	Response options	code
1.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	….|___|
1a.	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)	….|___|
2.	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 Q3) 1=Yes	….|___|
2a.	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)	….|___|
3.	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 Q4) 1 = Yes	….|___|
3a.	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)	….|___|
4.	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 Q5) 1 = Yes	….|___|
4a.	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)	
5.	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 Q6) 1 = Yes	….|___|
5a.	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)	….|___|
6.	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 Q7) 1 = Yes	….|___|
6a.	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)	….|___|
7.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of	0 = No (skip to Q8) 1 = Yes	….|___|

	resources to get food?		
7a.	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)	….|___|
8.	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 Q9) 1 = Yes	….|___|
8a.	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)	….|___|
9.	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	….|___|
9a.	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)	

ANNEX 2: Amharic Version Questionnaire

ክፍል ሁለት፤ የአማርኛ መጠይቅ ወረቀት

ተ.ቁ	ጥያቄ	ኮድ	ማስታወሻ
101.	እድሜሽን ስንት ነው	----------------- ዓመት	
102.	የትዳር ሁኔታ ----------	1. ያላገባች 2. ያገባች 3.የፈታች 4. ሴተኛ አዳሪ 5. በስራ ምክንያት ተለያይተው የሚኖሩ 6. ሌላ ይጠቀስ -------	
103.	ብሄር	1. ኦሮሞ ፣ 2. አማራ 3. ትግራይ 4. አዲስ አበባ 5.ጉራጌ 6. ሌላ ይጠቀስ...	
104.	ሀይማኖት	1. ሙስሊም 2. ፕሮቴስታንት 3. ካቶሊክ 4. ኦርቶዶክስ 5. ሌላ ይጠቀስ	
105.	የትምህርት ሁኔታ	1. መፃፍ እና ማንበብ የማትችል 2. 1-4 ክፍል 3. 5-8 ክፍል 4. 9-10 ክፍል 5. 11-12 ክፍል 6. ኮሌጅ/ዩኒቨርስቲ	
106.	የትዳር ኣጋር የትምህርት ሁኔታ	1. መፃፍ እና ማንበብ የማይችል 2. 1-4 ክፍል 3. 5-8 ክፍል 4. 9-10 ክፍል 5. 11-12 ክፍል 6. ኮሌጅ/ዩኒቨርስቲ	
107.	የእናት የስራ ሁኔታ	1. የቤት እመቤት 2. ነጋዴ 3. የቀን ሰራተኛ 4. የመንግስት ሰራተኛ 5.ሌላ ይጠቀስ	
108.	የትዳር ኣጋር የስራ ሁኔታ	1. የመንግስት ሰራተኛ 2. ነጋዴ 3. ገበሬ 4. የቀን ሰራተኛ 5. ሌላ ይጠቀስ	
109.	የቤተሰብ ብዛት	---------	
110.	የቤተሰብ የገቢ መጠን	......፣ |–|–|–|–|–|–|–|– (አንድ ድጅት በክፍት ቦታው ላይ ይሙሉ)	

ክፍል ለ፤ እርግዝናና ከጤና ጉዳይ ጋር የተያያዙ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	ኮድ	ማስታሻ
111.	የጋብቻ እድሜ	--------አመት	
112.	የመጀመርያ ወሊድ እድሜሽን	--------አመት	
113.	የአሁኑ እና ጠቅላላ እርግዝናዎች	-------------	የመጀመርያ እርግዝና ከሆነ → 120
114.	ሞቶ የተወለደ ካጋጠመሽ፣ ስንቴ ኢጋጥሞሻል	-----------	
115.	ውርጃ (አቦርሽን) አድርገሽ ታውቂያለሽ ወይ	1. አዎ 2. አይደለም	
116.	ለጥያቄ 15፣ አዎ ከሆነ መልስሽ፣ ስንት ግዜ	---------	
117.	የወራት ብዛት ካሁኑና የበፊት እርግዝናሽ መሃል		
118.	የመጀመርያ እርግዝናሽ ካልሆነ፣ቅድመ ወሊድ ክትትል ነበረሽ	1. አዎ 2. የለኝም	
119.	የመጀመርያ ልጅሽን የወለወድሽው የት ቦታ ነበር፣	1. በቤት 2. ጤና ጣብያ/ሆስፒታል	
120.	የመጨረሻ የወር አበባሽን የፅንሽን ቀን/ሳምንታት	-------- ሳምንታት	
121.	በአሁኑ እርግዝናሽ ስንቴ የወሊድ ቅድመ ክትትል መጥተሽል/ታይተሽል	----------	
122.	የጤና ትምህርት ስለ ተመጣጠነ ምግብ በእርግዝናሽ ወቅት ግንዛቤ አግኝተሽ ነበር ወይ፣	1. አዎ 2. አላም	
123.	ጥያቄ 22፣ መልስ አዎ ከሆነ ፣ ያገኘሽው መረጃ ምን ነበር	1. የመኣድን ንጥረ ነገር 2. ተጨማሪ ምግብ መውሰድ 3. ጤናማ የአመጋገብ ስርአት	
124.	በቤታችሁ የጓሮ አትክልት አለ	1. አዎ 2. የለም	

ክፍል 3. ምግብ እና የምግብ ነክ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	ኮድ	ማስታወሻ
125.	በዚህ እርግዝናሽ ወቅት በቀን ስንቴ ነው ምግብ የምትመገቢው	1. አንድ 2. 2 ጊዜ 3. 3 ጊዜ 4. 4 ጊዜ 5.ከ 5 ጊዜ በላይ	

126.	ወተት እና የወተት ተዋጾች ትወስጂያለሽ	1. አዎ 2. አልወስድም ፣	(2) ከሆነ →128
127.	የትኛው ወተት እና የወተት ተዋጾች ትወስጂያለሽ	1. ወተት 2. አይብ 3. የወተት ዱቄት 4. እርጎ 5. የቅቤ ወተት 6. ቅቤ 7.ሌላ ..	
128.	እንቁላል ትመገቢያለሽ	1. አዎ 2. አልመገብም	(2) ከሆነ →130
129	የትኛው የእንቁላል አይነት ትመገቢያለሽ	የደሮ፣ ዥግራ፣ ሌላ	
130.	የጥራጥሬ እህል ምግቦች ትመገቢያለሽ ወይ	1. አዎ 2. አልመገብም	2 ከሆነ →133
131.	የስራስር እና የአገዳ ምግቦች ታዝወትረያለሽ ወይ	1. አዎ 2. አልመገብም	
132.	የምትመገቢው የጥራጥሬ፣ የፍራፍሬ እና የነጭ ስራስር የምትመገቢያቸው አይነቶች	ሀ. ጥራጥሬ፣ ፍራፍሬ፣ 1. ስንዴ (ነጭ. ቀይ) 2. ገብስ 3. ሩዝ 4. በቆሎ 5. ፓስታ ረ. ማካሮኒ 6. አጃ 7. ማሽላ 8.ጤፍ 9. ሌላ --- ለ. የነጭ ስራስር፣ አገዳ እህሎች 1. ድንች ፣ ስኳር ድንች፣ ካሳቫ ፣	
133.	ቅጠላ ቅጠል የምግብ አይነቶች ትመገቢያለሽ ወይ	1. አዎ 2. አልመገብም፣	2 ከሆነ →135
134.	የትኛው ቅጠላ ቅጠል የምግብ አይነቶች ትመገቢያለሽ	1. ቃርያ 2. ፎሶልያ 3. ሳላጣ 4. ቆስጣ 5. ጥቅል ጎመን 6. ዱባ 7. ቀይ ስር 8. ነጭ ጎመን 9. ሌላ	
135.	የበሰሉ ማንጎ፣ ፓፓያ፣ ሙዝ ትጠቀምያለሽ ወይ	1. አዎ 2.አልመገብም፣	2 ከሆነ →137
136.	የትኛው የስራስር፣የፍራፍሬ፣የነጭ ስራስር እና በቫይታሚን የበለጸጉ ምግቦች ትመገቢያለሽ	ማንጎ፣ ፓፓያ፣ ሀብሀብ፣ ስኳር ድንች፣ ካሮት፣ ሎሚ፣ ብርትኳን፣ ማንድሪን	
137.	ሌላ ፍራፍሬ፣ ወይ አትክልት የምትመገቢው	ሀ. ሌላ ፍራፍሬዎች 1. አዎ 2. አይደለም. ለ. ሌላ አትክልቶች 1. አዎ 2. አይደለም፣	2 ከሆነ →139
138.	ሌላ ምን አይነት የፍራፍሬ እና የአትክልት ትመገቢያለሽ	ሀ. ፍራፍሬ. 1. አቮካዶ፣ፖም፣መንደሪን፣ብርትኳን፤ሙዝ፣ እንጆሪ፣ሎሚ፣ አናናስ፣ ካዝሚር፣ዘይቱኒ፣ ሌላ የበረሃ ፍራፍሬዎች ለ. አትክልቶች 1. ቀይስር፣ ጥቅል ጎመን፣ቀይ ሽንኩርት፣ ነጭ ሽንኩርት፣ ባቄላ፣ አተር፣ ቃርያ፣ ቲማቲም፣	

		ካኩዩምበር፣ ሽንብራ፣የአበባ ጎመን፣ ችሊስ፣ ዝንጅብል፣ዝኩኒ፣ ብሮክሊ፣ ባሮ ሽንኩርት፣ ባርቦሮኒ፣ፐርስሊ፣ስፒናች፣ መሽሩም	
139.	ስጋ፣ የደሮ ስጋ እና አሳ ምግቦች ትመገብያለሽ ወይ	1. አዎ 2. አልመገብም፣	2→141
140.	የምታዝወትሪው የስጋ አይነት	1.ጉበት፣ ኩላሊት፣ ልብ፣ 2. ላት፣ የበሬ ስጋ፣ የበግ፣ የፍየል .... 3. የደሮ ስጋ፣ደሮ ዎጥ፣ዥግራ ፣ ቆቅ 4. ፍረሽ እና ደረቅ አሳ፣ የባህር ምግቦች	
141.	ለውዝ እና የቅባት እህሎች ትመገብያለሽ ወይ	1.አዎ 2. አልመገብም	2→143
142.	የትኛው አይነት የለውዝ እና የቅባት እህሎች ትመገብያለሽ	1.አልሞንድ 2. ሱፍ 3. ተልባ 3. ሰሊጥ 4.የሀብሀብ ፍሬ 5. ኑግ 6. ፈጦ 7. ሌላ ...	
143.	የባቄላ ዘር እና የአተር እህሎች ትመገብያለሽ	1.አዎ 2. አልመገብም	
144.	የትኛው አይነት የባቄላ ዘር እና የአተር እህሎች ትመገብያለሽ	1.አዳጉራ 2. ሽምብራ 3. በሎቄ 4. የምስር ክክ 5. አኩሪ አተር 6. የሀበሻ ጎመን 7. ሌላ	
145.	የእናቶች የተመጣጠነ ምግብ የመመገብ ልምድ (ከላይ በተጠቀሰው እናቶች የተመገቧቸው የምግብ አይነቶች ምድብ መሰረት)	---------------------------- የምግብ አይነት	

2. የምግብ ዋስትና ጥያቄዎች

1. በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ በቂ ምግብ የለንም ብላችሁ ተጨንቃችሁ ታውቃላችሁ ወይ?

0 = የለም ከሆነ ወደ 2ኛ ጥያቄ

1 = አዎ

1 ሀ፣ በቤታችሁ ስንቴ ተከስቷል?

1. = አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)
2. = በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3. = በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2. በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ ምግብ ወይ ብር በማጣት የመረጥችሁትን ምግብ ሳትበሉ ቀርታችሁ ታውቃላችሁ ?

0 = የለም ከሆነ ወደ 2ኛ ጥያቄ

1 = አዎ

2ሀ = በቤታችሁ ስንቴ ተከስቷል?

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3. በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ ትንሽ የምግብ አይነቶች ብቻ በልታችሁ ታውቃላችሁ ?

0 = የለም ከሆነ ወደ 4ኛ ጥያቄ

1 = አዎ

3ሀ፣ = በቤታችሁ ስንቴ ተከስቷል?

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

4. በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይም የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ በፍጹም መብላት የማትፈልጊው ወይም መብላት የማትፈልጉትን ምግብ በልታችሁ ታውቃላችሁ?

0 = የለም ከሆነ ወደ 5ኛ ጥያቄ

1 = አዎ

4ሀ፣ **= በቤታችሁ ስንቴ ተከስቷል?**

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

5. **በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ ትንሽ ምግብ ወይም ትንሽ የምግብ መጠን ብቻ ሳትጠግቡ በልታችሁ ታውቃላችሁ ?**

0 = የለም ከሆነ ወደ 6 ኛ ጥያቄ

1 = አዎ

5ሀ፣ = **በቤታችሁ ስንቴ ተከስቷል?**

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

6. **በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ በቀን ትንሽ ምግብ ወይም 1 ምግብ በቀን ብቻ በልታችሁ ታውቃላችሁ ?**

0 = የለም ከሆነ ወደ 7 ኛ ጥያቄ

1 = አዎ

6ሀ፣ = **በቤታችሁ ስንቴ ተከስቷል?**

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

7. **በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ በቀን እሚበላ ምግብ ምንም ሳይኖር ወይም ሳትበሉ ውላችሁ ታውቃላችሁ ?**

0 = የለም ከሆነ ወደ 8 ኛ ጥያቄ

1 = አዎ

8ሀ. = **በቤታችሁ ስንቴ ተከስቷል?**

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

8. **በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ እሚበላ ምግብ ምንም ሳይኖር ቀርቶ ማታ ተርባችሁ ተኝታችሁ ታውቃላችሁ ?**

0 = የለም ከሆነ ወደ 8 ኛ ጥያቄ

1 = አዎ

8ሀ፣ = **በቤታችሁ ስንቴ ተከስቷል?**

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

9. **በቤታችሁ ባለፉት 4 ሳምንታት ውስጥ ወይም በ 1 ወር ውስጥ፣ አንቺ ወይ የቤተሰቦቻችሁ አባላት፤ምግብ ወይ ብር በማጣት፣ ቀን ሙሉ ወይም ሌሊት ሙሉ እሚበላ ምግብ ምንም ሳይኖር ወይም ሳትበሉ ውላችሁ ወይም አድራችሁ ታውቃላችሁ ?**

0 = የለም የለም ከሆነ ጥያቄው አልቋል

1 = አዎ

9ሀ፣ = በቤታችሁ ስንቴ ተከስቷል?

1= አልፎ አልፎ (አንዴ ወይም ሁለቴ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

2= በተወሰነ ግዚያት (3 እስከ 10 ጊዜ ተከስቷል ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

3= በብዛት (ከ 10 ጊዜ በላይ ባለፉት 4 ሳመንታት፣ በ አንድ ወር ውስጥ)

Annex 3: statistical analysis

age category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<=25	101	32.0	32.0	32.0
	>25	215	68.0	68.0	100.0
	Total	316	100.0	100.0	

Abortion experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	77.5	77.5	77.5
	yes	71	22.5	22.5	100.0
	Total	316	100.0	100.0	

Health information taken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	142	44.9	44.9	44.9
	no	174	55.1	55.1	100.0
	Total	316	100.0	100.0	

marital category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	married	289	91.5	91.5	91.5
	separated/divorced	27	8.5	8.5	100.0
	Total	316	100.0	100.0	

income category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1000	50	15.8	15.8	15.8
	1000-2000	37	11.7	11.7	27.5
	>-2000	229	72.5	72.5	100.0
	Total	316	100.0	100.0	

Family size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<4	200	63.3	63.3	63.3
	>=4	116	36.7	36.7	100.0
	Total	316	100.0	100.0	

age at first marriage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20 years	31	9.8	9.8	9.8
	>=20 years	285	90.2	90.2	100.0
	Total	316	100.0	100.0	

age at first birth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20 years	34	10.8	10.8	10.8

	>=20 years	282	89.2	89.2	100.0
	Total	316	100.0	100.0	

ANC visit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2	69	21.8	21.8	21.8
	3.00	247	78.2	78.2	100.0
	Total	316	100.0	100.0	

religion category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	orthodox	144	45.6	45.6	45.6
	muslim	98	31.0	31.0	76.6
	protestant/catholic	74	23.4	23.4	100.0
	Total	316	100.0	100.0	

education of the mother

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No formal education	9	2.8	2.8	2.8

	Primary	57	18.0	18.0	20.9
	secondary	152	48.1	48.1	69.0
	college	98	31.0	31.0	100.0
	Total	316	100.0	100.0	

education of husband

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No formal education	15	4.7	4.7	4.7
	Primary	29	9.2	9.2	13.9
	secondary	150	47.5	47.5	61.4
	college	122	38.6	38.6	100.0
	Total	316	100.0	100.0	

gestational age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<37	306	96.8	96.8	96.8
	>= 37	10	3.2	3.2	100.0
	Total	316	100.0	100.0	

gravidity category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	83	26.3	26.3	26.3

	>=2	233	73.7	73.7	100.0
	Total	316	100.0	100.0	

food security final

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	secure	290	91.8	91.8	91.8
	not secure	26	8.2	8.2	100.0
	Total	316	100.0	100.0	

still birth

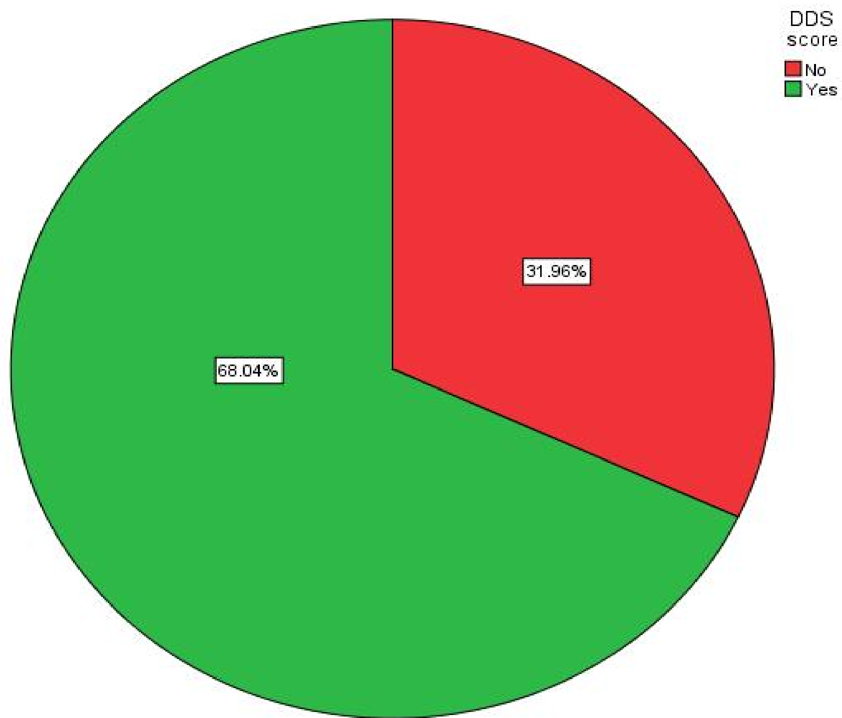
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	298	94.3	94.3	94.3
	yes	18	5.7	5.7	100.0
	Total	316	100.0	100.0	

Ethiniccity final

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	176	55.7	55.7	55.7
	2.00	21	6.6	6.6	62.3
	3.00	27	8.5	8.5	70.9
	4.00	92	29.1	29.1	100.0
	Total	316	100.0	100.0	

Frequencey of meal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<=4	237	75.0	75.0	75.0
	>=5	79	25.0	25.0	100.0
	Total	316	100.0	100.0	



Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.

Step 1	Step	145.976	20	.000
	Block	145.976	20	.000
	Model	145.976	20	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	250.024[a]	.370	.518

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	9.260	8	.321

Contingency Table for Hosmer and Lemeshow Test

		DDS score = No		DDS score = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	26	29.037	5	1.963	31
	2	27	22.888	5	9.112	32
	3	16	15.859	17	17.141	33
	4	12	11.353	20	20.647	32

	5	10	8.806	22	23.194	32
	6	5	6.980	27	25.020	32
	7	4	4.285	28	27.715	32
	8	1	1.213	34	33.787	35
	9	0	.487	31	30.513	31
	10	0	.093	26	25.907	26

Classification Table[a]

	Observed		Predicted		
			DDS score		Percentage Correct
			No	Yes	
Step 1	DDS score	No	64	37	63.4
		Yes	17	198	92.1
	Overall Percentage				82.9

a. The cut value is .500

Variables in the Equation

		Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
						Lower	Upper
Step 1[a]	HusbandOccupation	1.970	2	.373			
	HusbandOccupation(1)	1.195	1	.281	.58	.22	1.55
	HusbandOccupation(2)	.021	1	.484	1.38	.56	3.40
	Motheroccupation	2.972	3	.396			
	Motheroccupation(1)	.030	1	.932	.96	.420	2.19
	Motheroccupation(2)	1.724	1	.655	.76	.24	2.45
	Motheroccupation(3)	.931	1	.841	1.12	.36	3.43
	Healthinformationtaken(1)	27.924	1	.005	2.44	1.31	4.53
	agemarcat(1)	.008	1	.288	1.75	.62	4.95
	Agefbirth(1)	.138	1	.62	.59	.16	1.2
	edmother	2.754	3	.431			
	edmother(1)	.698	1	.359	.42	.007	2.63
	edmother(2)	.178	1	.662	.666	.100	3.97
	edmother(3)	.105	1	.986	.98	.13	7.30
	educhusband	10.777	3	.013			
	educhusband(1)	9.489	1	.000	9.8	6.5	13.4
	educhusband(2)	2.860	1	.005	10.2	7.5	15.2
	educhusband(3)	4.067	1	.000	12.3	9.4	16.2
	SB(1)	2.748	1	.179	.35	.0075	1.61
	ethincityfinal	2.868	3	.412			
	ethincityfinal(1)	.007	1	.719	1.29	0.32	5.16
	ethincityfinal(2)	1.952	1	.07	.82	.58	2.56

ethincityfinal(3)	1.150	1	.062	1.94	.96	3.88
MDP(1)	41.864	1	.000	4.6	2.10	10.34
FSFF(1)	17.423	1	.003	2.68	1.58	6.28
Constant	1.364	1	.243	.171		

Variable(s) entered on step 1: HusbandOccupation, Motheroccupation, Healthinformationtaken, agemarcat, Agefbirth, edmother, educhusband, SB, ethincityfinal, MDP, FSFF.[a]

Ouriginal

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