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ASSESSMENT OF DIETARY KNOWLEDGE AND PRACTICE OF PREGNANT MOTHERS AND ASSOCIATED FACTORS IN ADDIS ABABA PUBLIC HEALTH CENTERS, ADDIS ABEBA, ETHIOPIA, 2021

ABEBE, TESHAYE

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BAHIR DAR UNIVERSITY
BAHIR DAR INSTITUTE OF TECHNOLOGY
SCHOOL OF GRADUATE STUDIES
FACULTY OF CHEMICAL AND FOOD ENGINEERING
APPLIED HUMAN NUTRITION
MSc THESIS
ASSESSMENT OF DIETARY KNOWLEDGE AND PRACTICE OF
PREGNANT MOTHERS AND ASSOCIATED FACTORS IN ADDIS
ABABA PUBLIC HEALTH CENTERS, ADDIS ABEBA, ETHIOPIA, 2021

BY
ABEBE TESFAYE

NOV, 2021
BAHIR DAR, ETHIOPIA



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By ABEBE TESHAYE

**ASSESSMENT OF DIETARY KNOWLEDGE AND PRACTICE OF
PREGNANT MOTHERS AND ASSOCIATED FACTORS IN ADDIS
ABABA PUBLIC HEALTH CENTERS, ADDIS ABEBA, ETHIOPIA, 2021**

**A Thesis Submitted in the Partial Fulfillment of the Requirements for the
Degree of Master of Science in Applied human nutrition.**

Advisors: Dr. Zewdie Aderaw (PhD)

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NOV, 2021

Bahir Dar, EthioPIA

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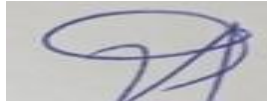
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DECLARATION

This is to certify that the thesis entitled “Assessment of Dietary knowledge and practice of pregnant mothers and associated factors in Addis Ababa public health centers, Addis Abeba, Ethiopia, 2021” 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.



Abebe Tesfaye

Name of the candidate


signature

Date NOV 2021



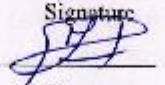
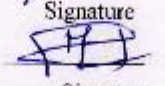
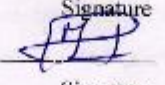

APPROVAL SHEET
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Approval of thesis for defense result

I hereby confirm that the changes required by the examiners have been carried out and

incorporated in the final thesis. Name of Student Abebe Tesfaye Signature  Date Nov 2021. As members of the board of examiners, we examined this thesis entitled "Assessment of Dietary knowledge and practice of pregnant mothers and associated factors in Addis Ababa public health centers, Addis Abeba, Ethiopia 2021". 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".

Board of Examiners:

Name of Advisor	Signature	Date
<u>D/r Zewdie Aderaw (PhD)</u>		<u>8/7/2021</u>
Name of External examiner	Signature	Date
<u>D/r Meselem Tesfaye (PhD)</u>	for 	<u>17/03/2021</u>
Name of Internal Examiner	Signature	Date
<u>D/r Mesfin Wogayehu (PhD)</u>		<u>16/11/2021</u>
Name of Chairperson	Signature	Date
<u>Mesfin Wogayehu</u>		<u>16/11/2021</u>
Name of Chair Holder	Signature	Date
<u>D/r Mesfin Wogayehu (PhD)</u>		<u>16/11/2021</u>
Name of Faculty Dean	Signature	Date
<u>D/r Metadel Kassahun (PhD)</u>		<u>24/03/2021</u>



ABSTRACT

Introduction: Maternal dietary knowledge and practice is an essential element to ensure pregnancy related outcomes and to ensure optimal gestational weight gain, reduce complications and ensures positive birth outcomes and the overall health of the mothers. Undernutrition leading global developmental challenge affecting nearly half of the world's population and responsible for the death of 3.5 million mothers and children annually and this burden results from lack on dietary knowledge and practice in Ethiopia, so it needs further investigation on this problem.

Objective: To assess dietary knowledge, practice and its associated factors of pregnant mothers toward maternal nutrition in Addis Ababa public health centers, Ethiopia, 2021

Methods: A cross sectional study conducted at Addis Ababa public health centers among 363 pregnant mothers attended ANC from April 1 to May 30, 2021. Pregnant mothers were selected by systematic random sampling technique using the total sampling frame of 3,370 and collected data were checked for its completeness and then entered into Epi-data version 3.1 and exported to SPSS version 26 for analysis, model fitness tested and logistic regression with 95% CI was performed to check the association.

Result: Maternal dietary knowledge was 73.9% and dietary practices 63.9% during pregnancy. Being occupation of dial laborer (AOR=0.229, 95% CI: (0.055-0.945)), husband's educational level of secondary education (AOR=4.303, 95% CI: (1.135-16.318)), family size > 4 (AOR=3.486, 95% CI: (1.553-7.823)), monthly income > 7500 birr (AOR= 0.392, 95% CI: (0.158-0.972)), having chronic illness (AOR=4.116, 95% CI, (1.599-10.599)), BMI (AOR=6.082, 95% CI: (1.342-27.551)), pregnancy interval (AOR=0.074, 95% CI: (0.014-0.387)), ANC visit (AOR=4.619, 95% CI: (1.206-17.701)), were significantly associated with dietary knowledge.

Conclusion and Recommendation: The over all maternal dietary knowledge was good and dietary practices was poor. Women occupational status, husband's education, family size, and BMI were associated with both knowledge and practices while monthly income, having chronic illness and pregnancy interval and ANC visit were only associated with knowledge.

Key words: Dietary, knowledge and practice, nutrition, malnutrition, Pregnancy, Addis Ababa.

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ACRONYMS

ANC	Ante Natal Care
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
BSc	Bachelor of Science
CHC	Community Health Center
CI	Confidence Interval
COR	Crude Odd Ratio
ETB	Ethiopian Birr
HC	Health Center
HIV	Human Immuno Virus
LBW	Low Birth Weight
MSc	Master of science
No.	Number
OPD	Out Patient Department
PI	Principal Investigator
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

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CHAPTER ONE

1. Introduction

1.1. Background

The human body system require a balanced nutrition for proper functioning and balanced nutrition is essential for health, physical growth, mental development, performance and productivity throughout all life span (Paknahad et al., 2019).Balanced nutrition helps to maintain normal growth and development of the fetus during pregnancy, improve delivery outcomes and prevent childhood diseases later in life, such as heart diseases and obesity (Tahir et al., 2019).

The nutritional requirement varies according to age, gender and during physiological changes such as pregnancy, because it is a critical period in a woman's life where there are many physiological and biological changes occurred to meet the mother's usual requirements as well as the needs of the growing fetus and enabling mother to maintain her own stores of nutrients required for fetal and infant health as well as for future breastfeeding practices (Koletzko et al., 2021).

Pregnancy is considered to be a delightful experience for the expectant mother and evidences manifested that adequate intake of nutrition is a key component for individual's health and well-being, particularly during pregnancy (Watson et al., 2014). Therefore the amount and diversity food requirements must increase during pregnancy to support maternal need and fetal growth and there fore to fulfill this need nutritional supplementations are given during pregnancy such as Iron, vitamin A, iodine, and calcium (*Guideline : Daily Iron and Folic Acid Supplementation in Pregnant Women*, n.d.).

Inadequate maternal nutrition results in increased risks of short term consequences such as; intra uterine growth restriction, low birth weight, preterm birth, prenatal and infant mortality and morbidity. Moreover, excessive intake of nutrients during pregnancy can lead to some pregnancy complications such as preeclampsia, gestational diabetes, macrosomia, dystocia and higher prevalence of cesarean section(Lynn, 2021). Furtherly as a long run outcomes, inadequate intake of nutrient are found to have pathphysiologic or metabolic depict that will appear as disorders of child growth and development as well as adult chronic disease after a long period of quiescence (Adikari et al., 2016).

Many women also suffer from a combination of chronic energy loss, poor weight gain during pregnancy, anemia, and other micronutrient deficiencies like vitamins, infections, inherited disorders, HIV and malaria. These along with inadequate obstetric care, contribute to high rates of maternal mortality and poor birth outcomes (Idowu et al., n.d.).

In developing countries indicates that malnourished individuals, women with a body mass index (BMI) below 18.5 show a progressive increase in morbidity and mortality rates. For social and biological reasons, reproductive agewomen are among the most vulnerable group to malnutrition, increased perinatal and neonatal mortality, risk of low birth weight (LBW) babies, stillbirths, and miscarriage are some of the consequences of malnutrition in women (Study, 1995). Malnutrition during pregnancy and its consequence maximally affects the health and long term outcomes of the population. Recently, high rate of LBW has been reported in most developing countries and it accounts for almost 30% of all births with maternal malnutrition as a dominant risk factor (Ali et al., 2000). Maternal under nutrition diminishes also women productivity, causing repercussions for herself, her family, her community, and the broader society (*Multi-Sectoral Nutrition Strategy*. (2014).

Therefore the dietary knowledge is an essential element to ensure positive pregnancy related outcomes, achieve healthy and improves their quality of life style (Nchangmugyia et al., 2016). Reports recommend that the nutritional knowledge during pregnancy is necessary to ensure optimal gestational weight gain and ensures positive birth outcomes and contribute to the overall health of the mothers. However, evidence revealed that mothers during pregnancy do not always follow these recommendations and the reasons for this are poorly understood (Tee, 2017).

Dietary practice is defined as observable actions or behavior of dietary habit and can be classified as having good dietary practices and poor dietary practices. The incidence of dietary inadequacies as a result of dietary habits and patterns in pregnancy is higher during pregnancy when compared to any other stage of the life cycle. Different scholars discovered that many women in developing countries restrict their food intake during pregnancy for different reasons such as to have smaller infants because smaller infants will carry a lower risk of delivery complications (Brems S, Berg A, 1988).

1.2. Statement of the Problem

Malnutrition has been identified as the major underlying problem for nearly half, 45% of all child and 5th of maternal deaths in a global level. Maternal and child undernutrition, is the leading global developmental challenge affecting nearly half of the world's population and responsible for the death of 3.5 million mothers and children annually (Blencowe et al., 2013).

Globally, 15 million babies are born with preterm due to inadequate maternal dietary intake and about 20 million neonates are born with low birth weight and more than 95% of these low birth weight are occurring in resource limited countries (World Health Organization, n.d.). In African region, the prevalence of maternal malnutrition was 15% and exceeds 20% in Ethiopia (WHO Regional Office for Africa, n.d.).

In 2011, an estimated 1.8 billion people, 28.5% worldwide consume inadequate amounts of iodine and are at risk for iodine deficiency disorders (Agency, 2013). Globally night blindness affects up to 9.8 million or 7.8% of pregnant women. Studies suggest that maternal dietary related night blindness correlates with a higher risk of infant mortality and LBW infants (*Dereje Bayissa Demissie 1 **, *Tesfaye Erena 2* and *Tufa Kolola 2 1'*, 2020). Globally, 40–98% of pregnant women are inadequate vitamin containing dietary intake (Central Statistical Agency, 2001).

In 2019 WHO maternal nutrition program recommended that maintaining good nutrition and healthy diet during pregnancy is critical for the health of the mother and unborn child. WHO nutrition education and counselling strategy focus on increasing the diversity and amount of foods consumed, promoting adequate weight gain through sufficient and balanced dietary intake, promoting consistent use of fortified foods. Implementation of this strategy have the effect of reducing of stunting and anaemia in women of reproductive age by 50% and low birth weight by 30% (Information & Assessment, n.d.).

The 2016 Ethiopian demographic and health survey (EDHS) report indicated that 22.4% of women's reproductive ages (15–49 years) were undernourished at the national level (Kaewkiattikun, 2017). National surveys in Ethiopia illustrated that undernutrition among pregnant women varies from 15.2–35.5% (Bookari et al., 2017) and poor dietary practice women range from 39.3–66.1% (Moges et al., 2015; Nelson et al., 2014).

Studies described that many related factors like being younger age, educational status, occupational status, having comorbidity illness, family size and body mass index has been encountered as statistically associated with maternal dietary knowledge and practice while some variables like husband occupation, husband educational status, pregnancy interval and pregnancy experience are important variables that were not statistically tested (Aliwo et al., 2019; Appiah et al., 2021; Ghaly, 2019; Nchangmugyia et al., 2016; Razzaq et al., 2018; Shehab3, 2012).

In Ethiopia there are only rare studies present on this topic but malnutrition problem is still increasing time to time, so it needs further studies, investigations and also there is no consideration given and have been a neglected maternal health care service of maternal dietary knowledge and practice of pregnant mothers. Research, Program reports, and other policy specifically related to maternal dietary principles, practices, and programs are not abundant. Also this findings will be pregnant mothers identify their level of knowledge and dietary practices on their dietary feeding and identify factors that hinder mothers to develop their knowledge and practice. Therefore, this study were fill such gaps and provide information on knowledge and practice of pregnant women and associated factors in Addis Subcity Public health centers, Addis Ababa, Ethiopia.

1.3. Significance of the study

In Ethiopia there are only rare studies present on this topic but malnutrition problem is still increasing time to time, so it needs further studies, investigations and also there is no consideration given and have been a neglected maternal health care service of maternal dietary knowledge and practice of pregnant mother toward maternal nutrition. Research, Program reports, and other materials specifically related to maternal nutrition principles, practices, and programs are not abundant. However there is evidence that indicates dietary knowledge and practice toward maternal nutrition is the back bone of improving outcomes maternal and child related malnutritions so the direct beneficiary of this findings will be pregnant mothers which enable mothers are more knowledgeable and enough dietary practice on their nutritional feeding and identify factors that hinder mothers to develop their knowledge and practice. The result will also benefit to ministry of health, regional health bureaus and other concerned bodies to identify the determinants of maternal dietary knowledge and practice toward

maternal malnutrition problems and develop clear national and regional maternal nutritional health policies. It will use as resource to search remedial action for policy makers, health officials, non-governmental organizations, partners, care givers and other concerned bodies; who involves on the health of pregnant mothers to identify determinant pulling factors that influence the maternal knowledge and practices. The results of this study will also used as an evidence based practice in maternal clinics and help in providing baseline data on dietary knowledge and practice and its determinant factors of mothers toward maternal nutrition among pregnant mothers in Addis Ababa primary health centers, Addis Ababa and also importance as a baseline data to the other incoming researchers.

CHAPTER TWO

2. Literature Review

2.2. Dietary Knowledge of pregnant women

A study conducted in America at EL-Hospital in 2012 among pregnant women revealed that 65.2% had good dietary knowledge during pregnancy, while 34.8% had poor dietary knowledge on maternal nutrition during pregnancy (Shehab3, 2012).

A multi institutional based study in the Manzini Region of Swaziland in 2014 among pregnant and lactating women Living with HIV showed that 67% had good knowledge on maternal nutrition, but 33% had poor knowledge on maternal nutrition (Masuku & Lan, 2014).

An institutional based cross-sectional study conducted in which 120 pregnant women visiting OPD of Civil Hospital Sialkot, Dask in 2018 described that 47.5% had good nutritional knowledge toward maternal nutritional intake (Razzaq et al., 2018) and an other cross-sectional survey conducted at Community Health Center (CHC) of the Aga Khan University Hospital, Karachi, Pakistan from July- September 2000 among 400 adult female respondents, who came to the outpatient services as a patient about 25% had been knowledgeable on maternal nutrition during lactation and pregnancy (Ali et al., 2000).

A cross sectional study conducted in Malawi in 2010 from pregnant mothers displayed that 70% of pregnant women had good knowledge and 30% had poor knowledge on maternal nutrition requirement during the period of pregnancy (Koppmair et al., 2016). A study conducted in Hospital Universiti Sains Malaysia in 2018 among antenatal mothers aged 18 years old and above revealed that 63.6% participants had good knowledge level and 36.4% had poor knowledge level on their dietary need during pregnancy and the first two years after delivery (Wong et al., 2018).

A cross-sectional study employed among selected 423 participants in Ghana between October and November 2019 indicated that 44.9% of the pregnant adolescents have high nutritional knowledge toward maternal nutrition requirement during pregnancy (Appiah et al., 2021).

A study conducted in Dakar, Senegal in 2019 among mothers showed that mothers who had knowledge scored less than 50% (H. O. Id et al., 2019) and another study conducted in Egypt in 2019 among pregnant mothers, sample of 320 pregnant women showed that as much of 81.6% of them had good knowledge and only 18.4% had poor knowledge on the nutritional intake of mothers during their pregnancy (Ghaly, 2019). A study conducted in Kenya in 2012 among 258 pregnant adolescents visiting the various Health Facilities showed 47.5% had good knowledge toward maternal nutrition (Mohamed Khalif Abdirahman (Bsc. (2019)).

A community based cross sectional study design conducted in Bahir Dar Town, Amhara Region, Northwest of Ethiopia from March 1 to April 1, 2016 among a total of 616 selected pregnant women revealed that 61.4% of the study participants had good dietary knowledge while 38.6% had poor dietary knowledge on nutritional requirements of mothers during their pregnancy (Nana & Zema, 2018).

A community-based cross-sectional study is conducted in Gulomekada district, Tigrey region, Ethiopia in 2016 among 296 mothers showed that 80.4% study participants had good knowledge on essential nutritional intake (Misgna et al., 2016) and another cross-sectional study with both quantitative and qualitative study design conducted in Nono Woreda, West Shoa Zone, Ethiopia in 2020 among 378 selected pregnant women the dietary knowledge about a balanced diet, 63.5% of the study participants had good dietary knowledge while 35.5% had poor dietary knowledge about a balanced diet (Dereje Bayissa Demissie 1 *, Tesfaye Erena 2 and Tufo Kolola 2 1', 2020).

2.3. Dietary practices of pregnant women

A study conducted in America at EL-Hospital in 2012 among pregnant women in the study showed that 58.9% of respondents had practices of specific dietary regimen, habit of eating fresh vegetables and daily drinking of milk during their pregnancy period (Shehab3, 2012).

A multi institutional based study in the Manzini Region of Swaziland in 2014 among Pregnant and Lactating Women Living with HIV revealed that 51% had practice on maternal nutrition intake during pregnancy (Masuku & Lan, 2014).

An institutional based cross-sectional study conducted in which 120 pregnant women visiting OPD of Civil Hospital Sialkot, Dask in 2018 show that 47.5% had good nutritional knowledge

toward maternal nutritional intake(Razzaq et al., 2018)and India in 16 May 2019 from selected pregnant mothers showed that during their pregnancy was 77.3% of mothers actually added or consumed one or more food items(Singh & Deepti, 2019). A cross-sectional descriptive study performed in Saudi Arabia on pregnant women from May to July 2016 showed that 91.44% consumes healthy diet while 8.56% consume poor diet(Abduljabbar et al., 2018).

A large survey conducted in Asian, Sub-Saharan African and Middle Eastern and North African origin in 2014 among sampled pregnant women showed that 34% and 31% had dietary practice of consuming vitamins and other fortified dairy products(*Guideline : Daily Iron and Folic Acid Supplementation in Pregnant Women*, n.d.). A survey conducted in a large scale maternal, newborn and child health program in Bangladesh in 2017 revealed that half (50%) of the pregnant mothers consumed the recommended nutritional adequacy and diversity while the remaining not during their pregnancy time(Nguyen et al., n.d.).

A cross sectional descriptive survey done in 100 randomly selected pregnant mothers in Cameroon in 2016 displayed that 92 % of mothers had knowledge on good maternal nutrition before pregnancy(Nchangmugyia et al., 2016) and A cross-sectional study employed among selected 423 participants in Ghana between October and November 2019 indicated that 44.9% of them have good eating habits during pregnancy(Appiah et al., 2021). A study conducted in Dakar, Senegal in 2019 among mothers showed that mothers who had adequate nutritional practice scored 27.1% during their pregnancy(H. O. Id et al., 2019).

A cross-sectional study design conducted in Egypt in 2019 among pregnant mothers from the sample of 320 pregnant women showed that 34.4% of them had good dietary practice while the remaining 65.6% had poor dietary practice to the sides of adequacy and diversity of food items intake(Ghaly, 2019).A study conducted in Kenya in 2012 among 258 pregnant adolescents visiting the various Health Facilities showed 47.1% had moderate practice on diet taking(Mohamed Khalif Abdirahman (Bsc. (2019))).

A community based cross sectional study design conducted in Bahir Dar Town, Amhara Region, Northwest of Ethiopia from March 1 to April 1, 2016 among a total of 616 selected pregnant women revealed that 39.3% of the study participants had good dietary practices and the rest 60.7% of pregnant women reported poor dietary practices in terms of nutritional taking(Nana & Zema, 2018). An other cross-sectional study conducted at JilleTumuga district, North East

Ethiopia from March to April 2017 among a total of 647 pregnant women displayed that adequate dietary diversity practice of pregnant women was found to be 31.4%, while 68.6 % had inadequate dietary diversity practice of mothers (Aliwo et al., 2019).

A community-based cross-sectional study is conducted in Gulomekada district, Tigrey region, Ethiopia in 2016 among 296 mothers impleid that 92.9 % had good practice and 7.1% had poor dietary practice of essential nutritional intake during pregnancy (Misgna et al., 2016) and an other cross-sectional study with both quantitative and qualitative study design conducted in Nono Woreda, West Shoa Zone, Ethiopia in 2020 among 378 selected pregnant women the dietary practice of balanced diet showed that 31% of the study participants had good dietary practices while the rest 69% of pregnant women had poor dietary practices (Dereje Bayissa Demissie 1 *, Tesfaye Erena 2 and Tufa Kolola 2 1', 2020).

An institution-based cross-sectional study conducted in Shashemane town, Oromia, Central Ethiopia in, March 2019 among 315 selected pregnant women attending antenatal clinic displayed that 25.4% of pregnant mothers consumed adequate dietary diversity practice where as 74.6 % not consumed adequate dietary diversity during their pregnancy (Desta et al., 2019). Other study conducted in Guto Gida Woreda, East Wollega Zone, Ethiopia during January to June, 2013 among a sample of 422 pregnant women on maternal nutrition showed only 33.9% of the respondents were found to have good nutritional practices while 66.1% had poor nutritional practice during their pregnancy (Factors & Woreda, 2013).

2.4. factors Associated with maternal dietary knowledge

Several studies which are conducted in different part of the world indicate that the significant association of variables with dietary knowledge vary from study to study among pregnant mothers. An institutional based study conducted in the Manzini Region of Swaziland in 2014 among pregnant and lactating mothers; variables such as Age, number of children, number of pregnancies, income, and BMI have been statistically significant with maternal dietary knowledge (Masuku & Lan, 2014).

A study conducted among 306 pregnant women in Spain, 2020 mothers who are being Christianity religious, pregnancy experience, and unemployed pregnant women, women with more

than two children, and women who free of any illness are statistically significant with maternal nutritional knowledge (Fern et al., n.d.).

An institutional based cross-sectional study conducted in which 120 pregnant women visiting OPD of Civil Hospital Sialkot, Dask in 2018; variables of age with 21-30 years, educational level of able to read and write, occupational status of being employed, and having high income have been significantly associated with maternal dietary knowledge (Razzaq et al., 2018).

A cross-sectional descriptive study performed in Saudi Arabia in pregnant women having chronic illness and having low BMI significantly associated with pregnant mothers dietary knowledge (Abduljabbar et al., 2018). A study conducted in Hospital Universiti Sains Malaysia in 2018 among antenatal mothers having occupational status of being employed and high monthly household income of participants are significantly associated with higher nutritional knowledge score of women (Wong et al., 2018).

A cross sectional descriptive survey done in Cameroon, 2016 among pregnant mothers who have increased maternal age, increased education level, increased number of parity and increased monthly family income are positively associated with nutritional knowledge (Nchangmugyia et al., 2016). A cross-sectional study employed among selected 423 participants in Ghana between October and November 2019 showed that educational level, occupation, ethnicity, and number of pregnancies are associated with good nutritional habit of pregnant mothers (Appiah et al., 2021) and another study in Kenya, 2012 showed that mothers having chronic illness, low educational level and low income statistically significant on nutritional knowledge of pregnant mothers (Mohamed Khalif Abdirahman (Bsc. (2019))).

A cross-sectional study in 2021 among 327 pregnant women conducted in an urban municipality of Baglung district in the western hill region of Nepal showed that women with income households, families size, employment are statistically significant with maternal nutritional knowledge (V. S. Id et al., 2021).

A community-based cross-sectional study is conducted in Gulomekada district, Tigrey region, Ethiopia in 2016 showed that being married marital status and able to read and write education

status are significantly associated with knowledge of mothers toward maternal nutrition(Misgna et al., 2016).

A community-based cross-sectional study was conducted among 403 randomly selected pregnant women, from May to June, 2019 revealed that family-size, monthly income status, and pregnancy interval were significantly associated with maternal knowledge (Supplements et al., 2020).

2.5. factorsAssociated with maternal dietary practice

A study done at Swaziland in 2014among pregnant mother having secondary and above educational level, employment status, income, religion and BMI are significantly associated with nutritional practices(Masuku & Lan, 2014).A study done in Senegal factors significantly related to healthy nutritional practices includes having two or more households and mothers with above primary school education, and high income level(H. O. Id et al., 2019).

A community based cross sectional study conducted in Bahir Dar from March 1 to April 1, 2016 among 616 pregnant women having high income, dietary information, having illness and dietary knowledge are shown to have significant association with dietary practices(Nana & Zema, 2018). A community based cross-sectional study conducted at JilleTumuga district in 2017 showed that dietary diversity practice of pregnant women is associated with maternal education, income, nutrition information(Aliwo et al., 2019).

A community-based cross-sectional study employed at Gedeo zone, southern Ethiopia from May to June 2018 displayed that being able to read and write educational status, monthly income, number of antenatal follow-upare determinants of dietary practices(Supplements, 2020).

Facility-based cross-sectional study conducted at Mettu Karl, Southwest Ethiopia in 2018 revealed that having family size >5 and severe food insecurity are three times significantly associated with sub-optimal dietary practices(Shemsu, 2020).An other study at NonoWoreda West Shoa, Ethiopia in 2020 showed marital status, and ANC visit to have a significant association with dietary practices of pregnant women(*Dereje Bayissa Demissie 1 **, *Tesfaye Erena 2 and Tufa Kolola 2 1'*, 2020).

A community-based cross-sectional study conducted among 403 randomly selected pregnant women, from May to June, 2019 in Illu Aba Bor Zone, Southwest Ethiopia showed that having four or more family-size, monthly income status, and birth interval are significantly associated with nutritional status of pregnant women(Supplements et al., 2020).

The study conducted at GutoGidaWoreda, Wollega Zone, Ethiopia in 2013information about nutrition and family size have positive significant relation with nutritional practices of mothers(Factors & Woreda, 2013).A crosssectional study conducted in Mishaworeda, South Ethiopia, in 2020 described that being able to read and write educational status, and occupation are variables having a significant association with dietary practice of pregnant mothers(Abute et al., 2020).

2.6. Conceptual Framework

The conceptual framework has been constructed for factors related to dietary knowledge and practice of pregnant mothers toward maternal nutrition from the literatures. Based on the literatures of dietary knowledge and practice of pregnant mothers related factors are divided into socio-demographic characteristics, maternal related characteristics related factors.

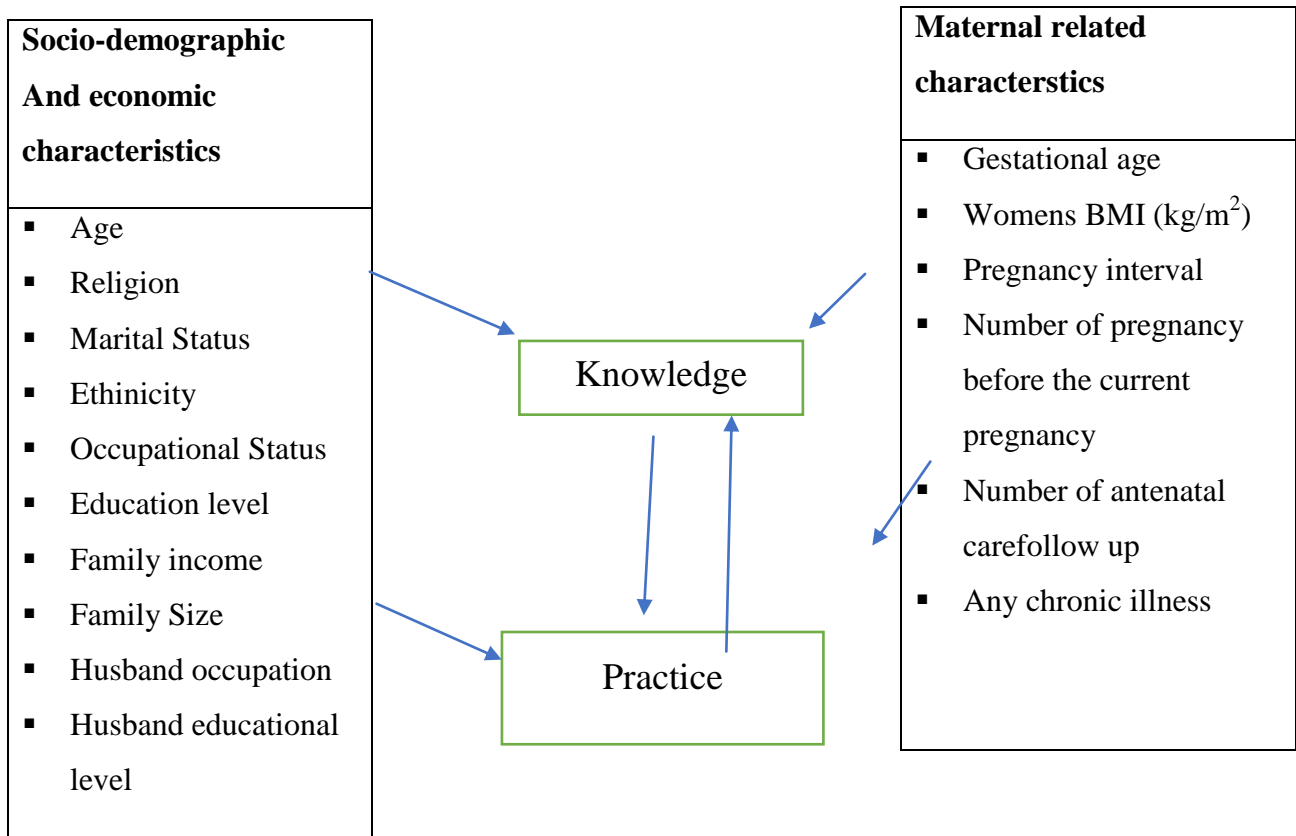


Figure 5: Conceptual framework constructed after reviewed different literatures study on dietary knowledge and practice of pregnant mothers and associated factors.

CHAPTER THREE

3. Objectives

3.1. General objective

- ❖ To assess dietary knowledge and practice of pregnant mothers toward maternal nutrition and associated factors in Addis Ababa health centers, Addis Abeba, Ethiopia

3.2. Specific objectives

- ❖ To determine level of dietary knowledge of pregnant mothers toward maternal nutrition.
- ❖ To determine level of dietary practice of pregnant mothers toward maternal nutrition.
- ❖ To identify factors that associated with dietary knowledge of pregnant mothers toward maternal nutrition.
- ❖ To identify factors that associated with dietary practice of pregnant mothers toward maternal nutrition.

CHAPTER FOUR

4. Methodology

4.1. Study Area and Study Period

Addis Ababa, capital city of the Federal Democratic Republic of Ethiopia, established in 1887 by emperor Menilik II. It is located at the center of the country that had 10 sub-cities and 116 Woredas with a total population of around 4.8 million according to Addis Ababa population (demography, maps, graphs) estimation in 2020 (Federal et al., 2012). Its area is estimated to be 530 Km² with altitude ranging from 2200 to 3000 meter above sea level, average temperature of 22.8°C and average rainfall of 1,180.4 mm³. The study conducted at selected Addis Ababa public health centers and Addis Ababa has ten subcities and three subcities selected using of simple random sampling methods, which are Gullele, Addis and Yekasubcities and Gullelesubcity has eight health centers and from this two health centers (Abebebekela and Addis Ray health centers) was selected randomly, Addis Subcity has ten health centers from this three health centers (Gullele, AddisuGebeya and Semen health centers) wasselected randomly and YekaSubcity has twelve health centers from this three health centers (Cotebe, Woreda9 and Woreda 12 health centers) wasselected randomly(Addis Ababa regional health beareu, 2021). The study was conducted from Aprile 1 to May 30, 2021.

4.2. Study designs

An institution based cross - sectional study design was used.

4.3. Source population

All Pregnant women who attend ANC follow up at selected public health centers during April 1 to May 30, 2021.

4.4. Study population

Randomly selected pregnant women who come for ANC service and available during the study period and who fulfilled the inclusion criteria at selected public health centers.

4.5. Eligibility criteria

4.5.1 Inclusion criteria

All pregnant women presented during data collection

4.5.2. Exclusion Criteria

Pregnant women unable to communicate with critical illnesses, physical impaired to speech, having known mental disorder during data collection were excluded.

4.6. Sample Size Determination

The sample size was calculated by using single population proportion formula, considering the following assumptions; prevalence of 61.4% had good dietary knowledge, which done in Bahir Dar, Northwest, Ethiopia among pregnant mothers (Nana & Zema, 2018), 95% confidence interval and 5% margin of error.

The sample size will be formulated using the formula.

$$n_i = \frac{(Z_{\alpha/2})^2 * p(1-P)}{d^2} = \frac{(1.96)^2 * (0.61) * (0.39)}{(0.05)^2} = 366 \text{ where as:}$$

n_i = the initial sample size required for the study

d^2 = margin of tolerable sampling error commonly used 0.05.

z = confidence interval, most common one is 1.96 for 95%.

p = population proportion prevalence is 61.4%.

Therefore, from the above sample size is:

$$n_i = \frac{(1.96)^2 * (0.61) * (0.39)}{(0.05)^2}, n_i = 366$$

Using correction formula; $(0.05)^2$

$$n_f = \frac{n_i}{366}$$

$$1 + \frac{n_i}{N} = 1 + \frac{366}{3,370} = 330$$

n_f = reduction of sample size

Nonresponse rate = 10% = 33

N = total study population

n_f = the total minimum sample size = 363

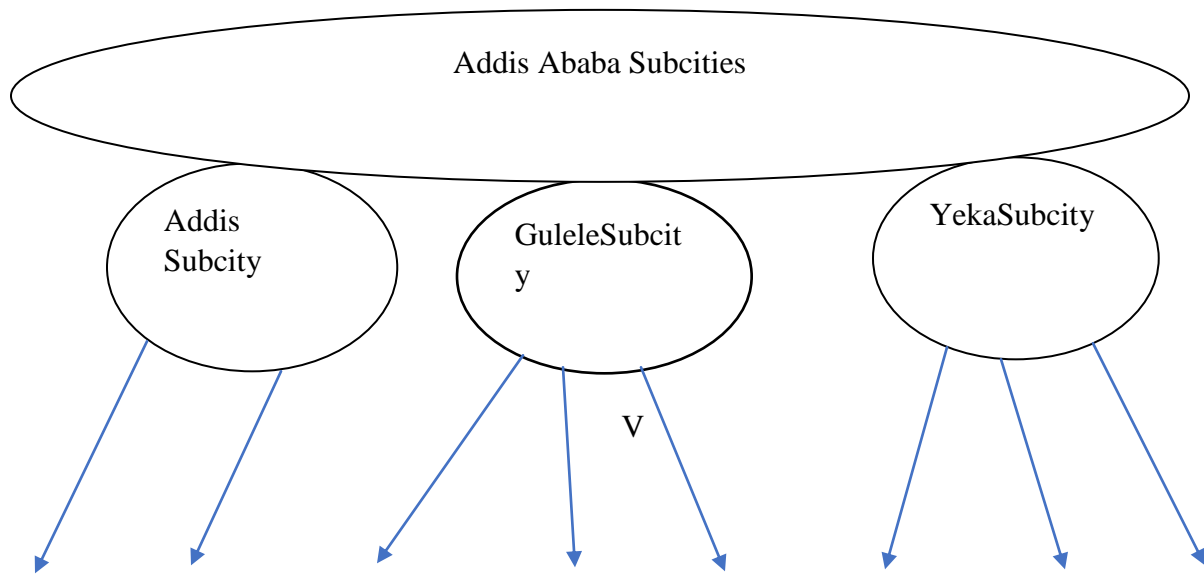
Sample size determination using epi info version 7.2.1 stat calculation program for associated variables (exposure marital status $p=52.9\%$ and exposure having nutritional information with $p=47.2\%$ and power= 80%) were statistically significant variables for dietary knowledge and practice among pregnant mothers and using the second general objectives (dietary practices) was 358 (Nana & Zema, 2018). The sample size determine by using factor variables (marital status and ANC visit) and second objectives were 304, 292, 358; which were lower than obtaining the sample size determination using first objective single population proportion formula, so using the population proportion determination was more representative and the final sample size of the study was 363.

4.7. Sampling Procedure

Addis Ababa had ten subcities and three subcities selected using of simple random sampling procedure using lottery method, which were Gullele, Addis and Yeka subcities and Gullele subcity had eight health centers and from this two health centers (Abebebekela and Addis Ray health centers) was selected randomly, Addis Subcity had ten health centers from this three health centers (Gullele, Addisu Gebeya and Semen health centers) was selected randomly and Yeka Subcity had twelve health centers from this three health centers (Cotebe, Woreda 09 and Woreda 12 health centers) was selected randomly and the number of study units was selected from each health center using proportional allocation method; which were Abebebekela health center 86 from 494 mothers, Addis Ray 66 from 383, Gullele 87 from 499, Addisu Gebeya 71 from 412, Semen 61 from 354, Cotebe 89 from 516, Woreda nine 67 from 388 and Woreda twelve 56 from 324 pregnant women selected proportionally from the total of 3,370 pregnant women attend ANC follow up within two month. Finally, the study subjects, pregnant mothers was selected by systematic random sampling technique using the total sampling frame of 3,370

total number of study subjects and mothers who was not present during the time of data collection was jumped and the next number was included and a total of 363 study subjects was selected every nine intervals

$$K=N/n$$



Simple Random Sampling

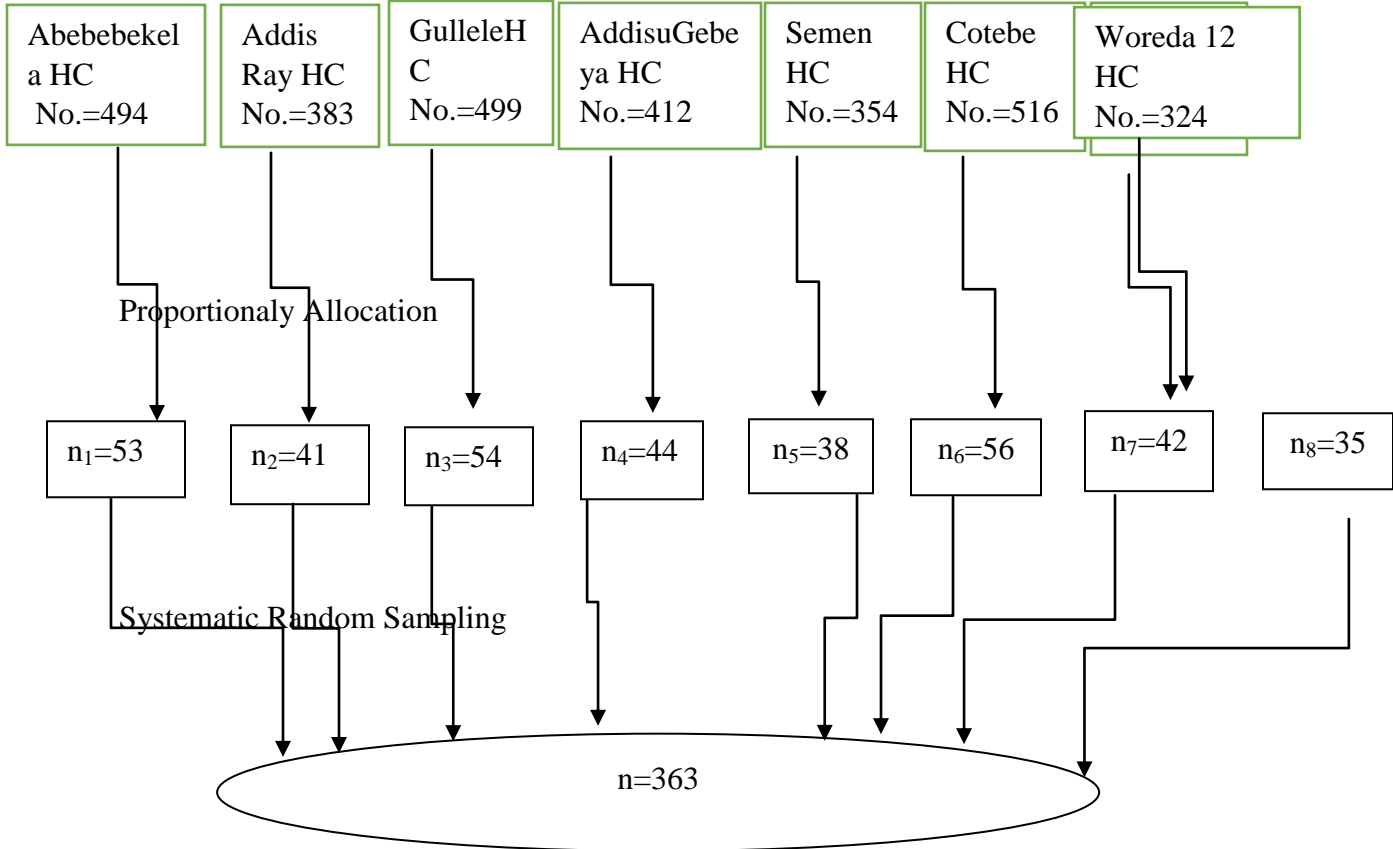


Figure 6: Schematic presentation of sampling technique a study on dietary knowledge and practice of pregnant mothers in Addis Ababa public health centers, Addis Ababa, Ethiopia, 2021.

4.8.variables

The dependent variable of the study was the Dietary knowledge of pregnant mothers and Dietary practices of pregnant mothers and the independent variables were maternal factor (Gestational age, Women BMI (kg/m^2), Pregnancy interval, Number of pregnancies before the current, Number of antenatal care, Any chronic illness) also, Socio-demographic factors (Age, Religion, Marital Status, Occupational Status Education level, Family income per month, Family Size, husband occupation, husband educational level)

4.9.Operational definitions

Good Knowledge: If respondents score $\geq 70\%$ on the ten (10) knowledge questions otherwise considered poor knowledge According to adopted from previous similar studies (Wong et al., 2018)

Good practices: If they correctly answer $\geq 70\%$ of fourteen (14) questions otherwise considered poor practices According to adopted from previous similar studies (Nana & Zema, 2018).

4.10. Data collection tools and procedures

4.10.1. Instruments and Measurements

First the questionnaire was prepared in English language then translated to Amharic and back to in English. Amharic version of the questionnaire was used for data collection.

Two BSc midwives as a supervisor and five diploma nurses as a data collectors with a one day training was used. and Data was collected using structured interviewer administered questionnaire having four parts. The socio-demographic characteristics, maternal related, and dietary knowledge related and dietary practice related questionnaire. Dietary knowledge related questionnaire is a dichotomous type scale adopted from previous similar studies of ten item measures and the one who scored $\geq 70\%$ out of 100% had good dietary knowledge while $< 70\%$ had poor knowledge (Wong et al., 2018) and dietary practice questionnaire adopted from previous similar studies of 14 item measures and the one who scored $\geq 70\%$ out of 100% had good dietary practice while $< 70\%$ had poor practice (Nana & Zema, 2018).

4.10.2. Data quality control

Two supervisors of BSc midwives and five data collectors of diploma nurses was recruited for distribution, training and orientation. After getting verbal consent the data collectors interviewed the participants using standardized interviewer administered questionnaire; which was ensured its grammatical and logical sequence by licensed linguist to be consistent, and easy understandable. After the data collectors were finished; as soon as submit the filled questionnaire to the principal investigator timely. In order to evaluate the clarity of the questions in the questionnaire and ensure the reactions of the respondents to the questions pretest was done on 5% of similar study subjects in Ras Desta hospital before one week of data collection and appropriate modification took. The collected data was reviewed and checked for completeness before data entry and incomplete data was discarded.

4.11.Data processing and analysis

First the data was checked for its completeness and consistency, then it was coded and entered in EPI data version 3.02 software. After entry, data was exported to statistical package for social science (SPSS) version 26 for analysis. Descriptive analysis using frequencies, proportions, graphs was performed to describe number and percentage of socio-demographic characteristics of the sample and other variables. Binary logistic regression analyses model was used to identify associated factors of dietary knowledge and practice. This was done by odds ratio and p-value with 95% confidence interval (CI). Explanatory variables with p-value ≤ 0.2 in the bivariate logistic regression was entered into multivariate logistic regression analysis to control possible confounding. Hosmer-Lemeshow's test and Omnibus tests was used to check the model fitness. P-value of less than 0.05 was used to declare level of statistical significant and adjusted odd ratio (AOR) with 95% CI was estimated to identify significantly associated variables with the dependent variables, dietary knowledge and practice. Finally the results was presented in text, tables and graphs based on the types of data.

4.12. Ethical Consideration

Ethical clearance was obtained from respective institution permission ethical review committee from each units. Verbal consent was obtained from each selected participant to confirm their willingness. Explanation of the survey purpose, description of the benefits and an offer to answer all inquiries will be made to the respondents. Also affirmation that they was free to withdraw consent and to discontinue participation without any form of prejudice made. Privacy and confidentiality of collected information was ensured throughout the process as no name wrote.

4.13. Plan for dissemination of the findings

The result of this study will be disseminated to Bahir Dar University, Institute of technology, School of chemical and food engineering, selected Addis Ababa public helath centers and Addis Ababa regional health bureau and federal ministry of health. The result of this finding will be also presented in different research conferences and will be sent to peer review international journals for publication.

CHAPTER FIVE

5.RESULT

5. 1. Socio-demographic characteristics

Out of the 363 sampled pregnant women, 352 responded to the questionnaires with a response rate of 97%. The mean age (\pm SD) of the participants was 28.92 (\pm 5.82) years, while the age range was 18-45 years. Majority of the respondents, 224 (63.6%) were in the age range of 25-34 years. Most study respondents were married 316(89.8%), and 158(44.9%) of respondents were orthodox. Regarding the Ethnicity the high proportion of respondents were oromo 145(41.2%) followed by Amhara 123(34.9%). Concerning family size 198(56.3%) of them had three up to four family members respectively. With regard to educational status 140(39.8%) of respondents were higher education and occupational status of 150(42.6%) of houswives. In the other way 195(55.4%) of their husbands had higher education and above and again the majority of respondents' husbands, 150(42.6%) of were business man and the estimated income of women, majority of the them 166(47.2%) earned greater than 7500 birr per month (Table 1).

Table 5: Socio-Demographics characteristics of pregnant mothers attending ANC in Addis Ababa public primary health centers, Addis Ababa, Ethiopia 2021 (N= 363)

Variables	Categories	Frequency	Percent (%)
Age in years	≤24	73	20.7
	25 to 34	224	63.6
	≥35	55	15.6
Religion	Orthodox	158	44.9
	Muslim	108	30.7
	Protestant	76	21.6
	Catholic	10	2.8
Marital status	Single	22	6.3
	Married	316	89.8
	Divorced	11	3.1
	Windowed	3	0.9
Ethnicity	Amhara	123	34.9
	Oromo	145	41.2
	Gurage	50	14.2
	Others	34	9.7
Educational status	Able to read and write	22	6.3
	Primary education	45	12.8
	Secondary education	90	25.6
	Higher education and above	195	55.4
Occupational status	Employed	143	40.6
	Bussnessman	150	42.6
	daily laboror	15	4.3
	Other	44	12.5
Family size	≤2	76	21.6
	3 to 4	198	56.3
	>4	78	22.2
husband educational level	Able to read and write	22	6.3
	Primary education	45	12.8
	Secondary education	90	25.6

husband occupation	Higher education and above	195	55.4
	Employed	143	40.6
	Businessman	150	42.6
	Daily laboror	15	4.3
	Other	44	12.5
Income	≤2500	18	5.1
	2501 – 5000	98	27.8
	5001 – 7500	70	19.9
	≥7501	166	47.2

5.2. Maternal related factors

Concerning the maternal related factors of pregnant women majority of the pregnant women were 130(36.9%) with the gestational age of 13-24 weeks and 324(88.6%) had BMI of 19 to 24 kg/m². 272 (77.3%) of the had more than two time pregnancy experience and 155 (44.0%) had one to two years of pregnancy interval between delivery. In medical status, 81(23.0%) of women had chronic diseases with pregnancy. Majority of women 223(63.4%) had two to three antenatal visit on the current pregnancy status and had 343 (97.4%) of women had nutritional information from different source of information (Table 2).

Table 6: Maternal related characteristics of pregnant mothers attending ANC in Addis Ababa public health centers, Addis Ababa, Ethiopia 2021 (N= 363)

Variables	Categories	Frequency	Percent (%)
Gestational age	≤12	28	8.0
	13 to 24	130	36.9
	25 to 36	181	51.4
	≥37	13	3.7
Women BMI (kg/m ²)	≤18	12	3.4
	19 to 24	312	88.6
	≥25	28	8.0
No. of pregnancy experience	≤2	272	77.3
	≥3	80	22.7
Pregnancy interval in years	0	84	23.9
	(no previous pregnancy)		
	1 to 2	155	44.0
	≥3	113	32.1

Number of antenatal care follow up	≥1	76	21.6
	2 to 3	223	63.4
	≥4	53	15.1
Any chronic illness	Yes	81	23.0
	No	271	77.0

5.3. Prevalence of dietary knowledge

Generally 268 (73.9%) of pregnant women had good dietary knowledge while the 95 (26.1%) of them had poor dietary knowledge.

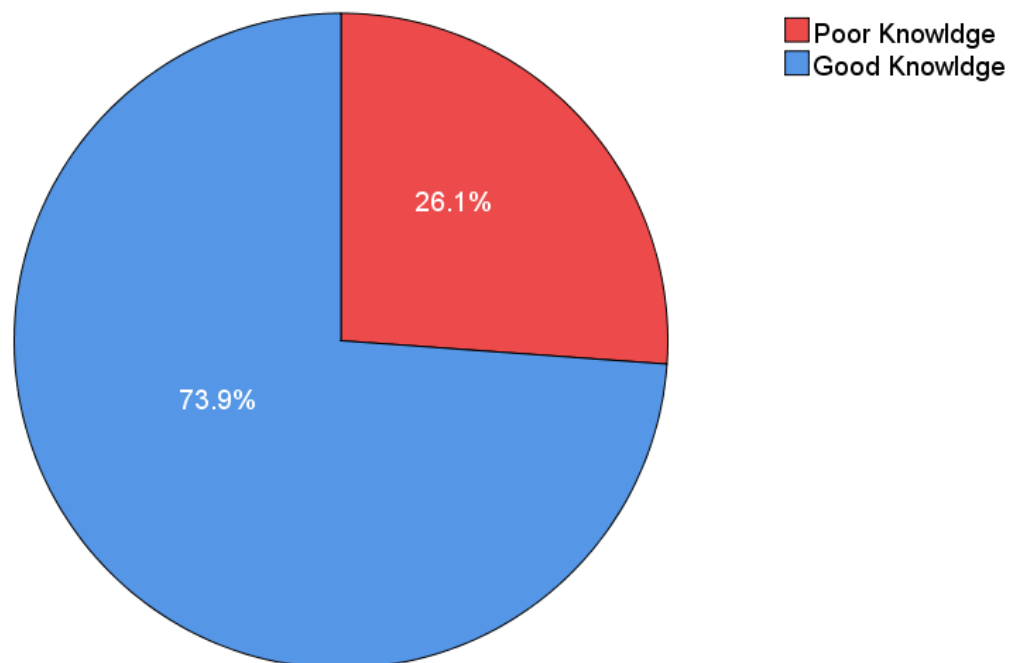


Figure 7: dietary knowledge of pregnant mothers attending ANC in selected Addis Ababa public health centers in Addis Ababa, Addis Ababa, Ethiopia, 2021 (N=363)

5.4. Prevalence of dietary practices

Respondants 232(63.9%) of pregnant womens had good dietary practices while the 131 (36.1%) of them had poor dietary practices.

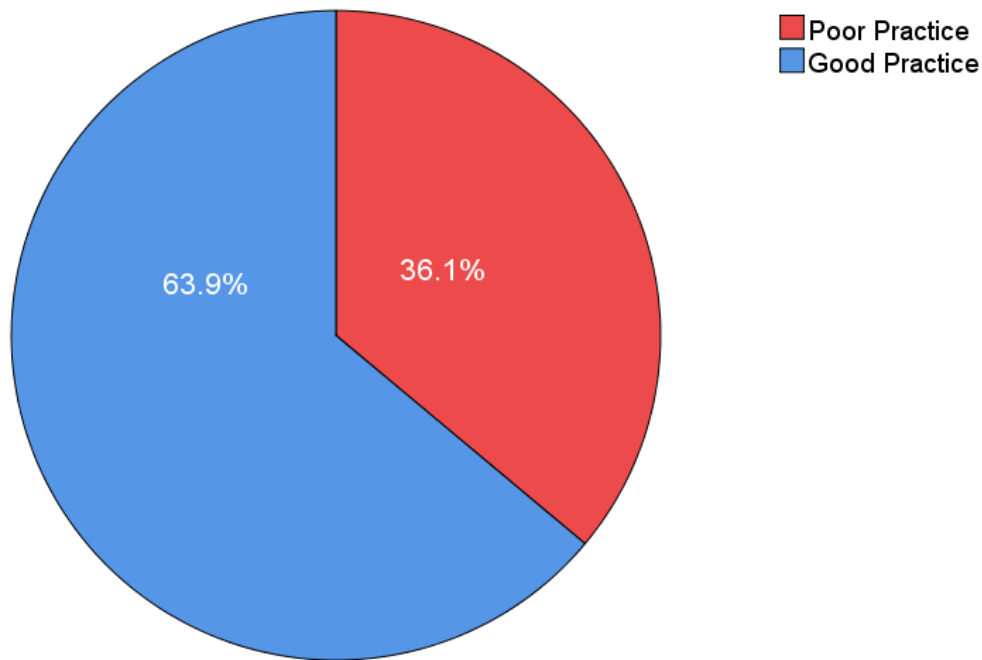


Figure 8: dietary practice of pregnant mothers attending ANC in selected Addis Ababa public health centers in Addis Ababa, Ethiopia, 2021 (N=363)

5.5. Associated factors dietary knowledge

In this study, womens being dialylaboror,husbands educational status, family size, monthly income, having chronic illness, BMI, pregnancy interval and number of ANC visit were significantly associated with maternal dietary knowledge during pregnancy.

In multivariate analysis, womensbeingdialylabororof occupational status (AOR=0.229, 95%CI :(0.055-0.945)) were almost having poor dietary knowledge than being employed

womens(AOR=1.602, 95%CI :(0.514-5.454)) . The womens whose their husband educational status of having secondary school and higer educationof educational status were three and eight times more likely knowledgeable about dietary during pregnancy than those unable to read and write educational status (AOR=4.303, 95% CI: (1.135-16.318)) and (AOR=8.540, 95% CI: (2.082-35.032)) respectively. Womens have more than four family members have threetimes more likely knowledgeable about dietary during pregnancy than womens who had only two family members (AOR=3.486, 95% CI: (1.553-7.823)) while womens who had average monthly income above 7,500 were more than twice having poor dietary knowledge(AOR= 2.551, 95% CI: (0.158-0.972)) than those who had avarege monthly income of less than 2500. Pregnant woments who had normal BMI (19 to 24 kg/m²) were six times knowlgable on dietary than those who had low BMI (AOR=6.082,95%CI: (1.342-27.551)) while womens having chronic illness with pregnancywere four times having dietary knowledge than those have no any chronic illness with pregnancy (AOR=4.116, 95% CI, (1.599-10.599)).Womenswo had more than one year of pregnancy interval have poor dietary knowledge during pregnancy than those had short pregnancy interval between delivery (AOR=0.074, 95%CI: (0.014-0.387)) and pregnant womens who had more than four times ANC visit were quarterly times knowledgeable than those who had only one ANC vist(AOR=4.619,95CI:(1.206-17.701

Table 7: Bivariate and Multivariate logestic regression of dietary knowledge of pregnant mothers in Addis Ababa public health centers, Addis Ababa, Ethiopia, 2021

ariables	Categories	Knowledge		Crude odd ratio (COR)	Adjusted odd ratio (AOR)	P-value
		Good	Poor			
Age	≤24	46	27	1.00	1	
	25 to 34	170	54	1.848(1.050-3.252)	0.562(0.133-2.383)	0.435
	≥35	44	11	2.348(1.040-5.298)	1.161(0.397-3.398)	0.786
Occupation	Employed	120	27	1.429(0.605-3.373)	1.602(0.514-4.989)	0.416
	Houswife	98	33	0.955(0.409-2.230)	1.772(0.576-5.454)	0.319
	Dialylaboror	14	23	0.196(0.072-0.533)	0.229(0.055-0.945)	0.042
	Others	28	9	1	1	
Her husband educational level	Able to read and write	9	13	1	1	
	Primary education	29	16	2.618(0.919-7.454)	1.671(0.348-8.018)	0.521
	Secondary education	60	30	2.889(1.110-7.517)	4.303(1.135-16.318)	0.032
	Higher	162	33	7.091(2.801-17.948)	8.540(2.082-35.032)	0.003

	education and above					
Family size	≤2	42	34	1	1	
	3 to 4	167	31	1.848(1.050-3.252)	0.231(0.048-1.098)	0.065
	> 4	51	27	2.348(1.040-5.298)	3.486(1.553-7.823)	0.002
Income	< 2500	10	8	1	1	
	2501- 5000	74	24	2.467(0.874-6.961)	1.334(0.237-7.517)	0.744
	5001 -7500	40	30	1.067(0.376-3.028)	1.216(0.501-2.953)	0.666
	> 7501	136	30	3.627(1.321-9.960)	0.392(0.158-0.972)	0.043
Chronic illness	Yes	64	17	1.441(0.793-2.618)	4.116(1.599-10.599)	0.003
	No	196	75	1	1	
BMI	< 18	4	8	1	1	
	19-24	235	77	6.104(1.789-20.831)	6.082(1.342-27.551)	0.019
	>25	21	7	6.000(1.374-26.196)	2.728(0.440-16.923)	0.281
Pregnancy interval	<1	56	28	1	1	
	1-2	115	40	1.437(0.806-2.565)	0.074(0.014-0.387)	0.002
	>3	89	24	1.854(0.978-3.515)	0.191(0.032-1.129)	0.068
Number of ANC	<2	51	25	1	1	
	2-4	166	57	1.428(0.811-2.512)	1.005(0.401-2.518)	0.991
	>4	43	10	2.108(0.912-4.873)	4.619(1.206-17.701)	0.026

5.6. Associated factors dietary practice

Secondly in this study, womens being employed, her husnands educational status, husbands occupational status, family size, and BMI were statistically associated with maternal dietary practices of mothers during pregnancy.

Pregnant womens being employed occupational status (AOR=2.738, 95% CI :(1.075-6.974))were more than two times practice dietary intake during pregnancy than those being employed womens. The womens whose their husband educational status of having primary school educational status (AOR=5.24795% CI: (1.321-20.850)) and womes whose husband beingbusiness man (AOR=2.419, 95%CI: (1.030-5.678))were five and two times more had good dietary practice during pregnancy than those unable to read and being student and self employed occupation of her husband respectively. Womens have more than three to four and more than four family members have gooddietary practice during pregnancy than womens who had only two family members (AOR=8.648, 95% CI: (3.183-23.497)) and (AOR=3.393, 95% CI: (1.116-10.312)) respectively. Pregnant womentswho hadlow BMI (<18 kg/m²) (AOR=0.069, 95% CI:

(0.007-0.660) have poor maternal dietary practice during pregnancy than those who had high BMI (19 to 25 kg/m²) pregnant women.

Table 8: Bivariate and Multivariate logistic regression of dietary practice of pregnant mothers attend ANC visit in Addis Ababa public health centers, Addis Ababa, Ethiopia, 2021

Variables	Categories	Practices		Crude odd ratio (COR)	Adjusted odd ratio (AOR)	P-value
		Good	Poor			
Age	< 24	38	35	1	1	
	25 to 34	152	72	4.536(2.588-7.951)	1.564(0.646-3.782)	0.321
	>35	35	20	1.879(0.991-3.563)	0.992(0.333-2.949)	0.988
Occupation	Employed	107	40	2.038(0.968-4.293)	2.738(1.075-6.974)	0.035
	Houswife	75	56	1.020(0.488-2.132)	0.675(0.277-1.647)	0.387
	Dialylaboror	22	15	1.117(0.444-2.815)	0.863(0.247-3.008)	0.817
	Others	21	16	1	1	

husband educational level	unAble to read and write	12	10	1	1	
	Primary education	31	14	1.845(0.646-5.273)	5.247(1.321-20.850)	0.019
	Secondary education	50	40	1.042(0.408-2.657)	1.758(0.553-5.585)	0.339
	Higher education and above	132	63	1.746(0.716-4.257)	1.888(0.586-6.076)	0.287
Occupational status of husband	Employed	76	67	0.785(0.396-1.558)	0.524(0.221-1.238)	0.141
	Busnessman	116	34	2.362(1.159-4.815)	2.419(1.030-5.678)	0.042
	Daily laboror	7	8	0.606(0.186-1.969)	0.484(0.109-2.146)	0.340
	Other	26	18	1	1	
Family size	≤2	31	45	1	1	
	3 to 4	150	48	4.536(2.588-7.951)	8.648(3.183-23.497)	0.000
	> 4	44	34	1.879(0.991-3.563)	3.393(1.116-10.312)	0.031
Chronic illness	Yes	57	24	0.687(0.402-1.174)	1.246(0.607-2.559)	0.549
	No	168	103	1	1	
BMI	< 18	11	1	8.250(0.933-72.957)	0.069(0.007-0.660)	0.020
	19 to 24	198	114	1.303(0.595-2.851)	0.047(0.004-0.535)	0.014
	>25	16	12	1	1	
Pregnancy interval	<1	38	46	1	1	
	1 to 2	103	52	2.398(1.392-4.130)	0.359(0.116-1.111)	0.075
	>3	84	29	3.506(1.920-6.404)	0.747(0.223-2.499)	0.636
Number of ANC	<2	42	34	1	1	
	2 to 4	148	75	2.398(1.392-4.130)	0.898(0.417-1.933)	0.783
	>4	35	18	3.506(1.920-6.404)	1.031(0.379-2.803)	0.953

6. Discussion

6.1. Maternal dietary knowledge and practice

Pregnant women having good dietary knowledge in this study the result of prevalence is 73.9% within (95% CI, 61%-87%). The study also similarly in line with the study reported from Amhara Region, Northwest of Ethiopia, Tigrey region of Ethiopia, and Nono Woreda, West Shoa Zone, Oromia of Ethiopia among pregnant women were 61.4 %, 80.4 % and 63.5 respectively (*Dereje Bayissa Demissie 1 **, *Tesfaye Erena 2* and *Tufa Kolola 2 1'*, 2020; Misgna et al., 2016; Nana & Zema, 2018) and This finding was relatively similar with the study reported from Malawi , Hospital Universiti Sains Malaysia, and Egypte, 65.2% 67%, 70%, 63.6%, 81.6% respectively

(Ghaly, 2019; Koppmair et al., 2016; Masuku & Lan, 2014; Shehab3, 2012; Tee, 2017) and also the dietary knowledge of women in this study was higher than the study conducted in Civil Hospital Sialkot, Dask, Aga Khan University Hospital, Karachi, Pakistan, Ghana, Dakar, Senegal, and Kenya pregnant women were 47.5, 25%, 44.9% , 50%, and 47.5% respectively (Ali et al., 2000; Appiah et al., 2021; H. O. Id et al., 2019; MOHAMED KHALIF ABDIRAHMAN (BSC., 2019; Shehab3, 2012) but in this study result women have poor dietary knowledge (73.9%) than study conducted in Cameroon women's dietary knowledge of 92% (Nchangmugyia et al., 2016). This variation might be resulted from making maternal nutritional health as global prioritizing problems, change in improving policy, service development and management protocol on maternal and child nutritional health programs and life style modification of people, nutritional information leak through different mass media may increase the dietary knowledge of women.

The maternal dietary practice during pregnancy on this study was 63.9% within (95% CI, 57.3%-70.5%). This finding was similar with the study reported from America at EL-Hospital pregnant women 58.9% (Shehab3, 2012). But in this study women had good dietary practice during pregnancy than the study conducted in Manzini Region of Swaziland, Civil Hospital Sialkot, Dask, Bangladesh , Ghana ,Dakar, Senegal ,Egypte , and Kenya were 51%, 47.5%, 50%, 44.9% , 27.1%, 34.4%, 47.1% respectively (Appiah et al., 2021; Ghaly, 2019; H. O. Id et al., 2019; Masuku & Lan, 2014; Mohamed Khalif Abdirahman (Bsc. (2019); Nguyen et al., n.d.; Shehab3, 2012) and also having good dietary intake practice than the dietary practice of pregnant women from Amhara Region, Northwest of Ethiopia and West Shoa Zone, Oromia region, Ethiopia were 39.3% and 31% respectively (*Dereje Bayissa Demissie 1 **, *Tesfaye Erena 2 and Tufa Kolola 2 I'*, 2020; Nana & Zema, 2018). while women in this study have poor dietary practice than some study reported from India, Saudi Arabia, Tigery region, north of Ethiopia pregnant women were 77.3%, 91.44% and 92.9 % respectively (Abduljabbar et al., 2018; Misgna et al., 2016; Singh & Deepthi, 2019) This variation might be resulted from increased maternal nutritional advice from health institution during ANC visit, majority of women on this study have more than three times ANC visit at current pregnancy may be the possible reason for increased maternal dietary practice during pregnancy.

6.2. Associated Factors of dietary knowledge

In this study women being dialylaborer (AOR=0.229, 95% CI :(0.055-0.945)) were negatively associated with maternal dietary knowledge and those women had poor dietary knowledge than women being other occupations of Housewife and employer (AOR=1.772, 95% CI :(0.576-6.974)) and (AOR=1.602, 95% CI :(0.514-4.989)). This result of study was similar with the study reported from Spain and Ghana (Appiah et al., 2021; Fern et al., n.d.). This might be due to women on daily laborer might devote their time on their physiological need of their demands rather than not focus on about nutritional information and mostly those groups are isolated from public communication network and so busy on their daily work.

Women's husband having educational status of up to secondary educational and higher education and above level four and eight times positively associated with maternal nutritional knowledge than their husbands being unable to read and write educational level. This finding was similar with studies from Cameroon and Ghana (Appiah et al., 2021; Nchangmugyia et al., 2016). The reason might be due to their husband may be health care providers and actually increased education leads to overall increase of knowledge including balanced diet and diversified foods.

In this result women having more than four family members were more than three times having nutritional knowledge than women having only two family members. This result was similar to the finding in Manzini Region of Swaziland and Spain (Fern et al., n.d.; Masuku & Lan, 2014). It might be due to share of dietary information based on each preference and may be also from previous pregnancy experience associate with knowledge.

Pregnant mothers having high average monthly income (>7500) (AOR=0.392, 95% CI: (0.158-0.972)) were negatively associated with maternal knowledge, having poor nutritional knowledge relative to low monthly income women (AOR=1.334, 95% CI: (0.237-7.517)), which was similar to the study done in Kenya (Mohamed Khalif Abdirahman (Bsc. (2019))). This might be by increased demand in dietary diversity leads to searching of more in access of diets based on their supply may associate low income with dietary knowledge.

Pregnant mothers having chronic illness with pregnancy were positively associated with dietary knowledge than have no illness. This study were similar with the reports of Saudi Arabia and Kenya (Abduljabbar et al., 2018; Mohamed Khalif Abdirahman (Bsc. (2019))). The reason may be due to women with chronic illness have more of clinical visit for their illness and counseled

about dietary modification and diversification during their chronic follow up may associate the variable with dietary knowledge. women with normal BMI and pregnant womens having more than four times ANC visit were statistical associated with good dietary knowledge than those over weight BMI and having only one ANC visit womens. this was similar with report from Manzini Region of Swaziland(Masuku & Lan, 2014). this might be from BMI monitoring experiences and maternal nutritional counseling during ANC clinic visit may associate the variable with knowledge.

6.3. Associated Factors of Dietary practice

Being employed occupational status were positively associated with dietary practice and almost twice having good dietary practice than being no employed and being students. this result was similar with Swaziland(Masuku & Lan, 2014), and Mishaworeda, South of Ethiopia(Abute et al., 2020)reports. this might be due to employed may earn better financial income, which increase their dietary adequacy and diversity

Womens whose husbands having educational status of up to primary school educational level and being business man occupational status were significantly associated with dietary practices relative to those their husband unable to read and write and being non employed. There were no similar study state like this. the reason may be due to those groups may have good dietary practice from their learning outcome of sciences and the business man husband may earn, the more he invests on family nutrition and health which in turn attributes to good dietary practices of family in general and pregnant women in particular.

Mothers who have more than three family members were significantly associated with maternal dietary practice. this were similar with the study in Senegal(H. O. Id et al., 2019), Mettu Karl, Southwest Ethiopia(Shemsu, 2020) ,Illu Aba Bor Zone, Southwest Ethiopia(Supplements et al., 2020), GutoGidaWoreda, and Wollega Zone, Ethiopia(Factors & Woreda, 2013). this may be due to prior pregnancy experience source of knowledge enhance the dietary practice of the current pregnancy.Pregnant women with under normal range BMI were negatively associated with maternal dietary practice relative to womens having high range of BMI (over weight) and this was similar to the study in Swaziland(Masuku & Lan, 2014). This may be due to under and over weightwomensdetermine by dietary intake practices

7. Conclusion and Recommendation

7.1. Conclusion

The over all maternal dietary knowledge during pregnancy were good (73.9%) and over all maternal dietary practices during pregnancy were poor(63.9%). Women being dialylaboror, her husbands educational status, size offamily members, high monthly income, having chronic illness, BMI, pregnancy interval and number of ANC visit were significantly associated with maternal dietary knowledge. Womens being employed, her husnands educational status, husbands occupational status, family size, and BMI were statisticaly associated with maternal dietary practices.

7.2. Recommendations

Health and health related managers

- ❖ It is recommended that increasing the educational status of the women and her husband and ANC visit enhance the dietary knowledge and practices.
- ❖ In addition it is better to prepare leaflets on maternal nutrition and give it for mothers and her husbands during ANC visit.
- ❖ Habite of eating practice at health center during ANC Visit

The Community at large

- ❖ Should focus on education and to eradicate poverty

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9. Annex

Informed Consent Form

My name is -----, I am working temporarily as a data collector for this graduation thesis proposal for BahirDar University, which is conducting a study of Dietary knowledge and practice of pregnant mothers and associated factors in Addis Ababa Public health centers.

The interview will take 15-20 minutes your honest and genuine participation in providing the needed records is very important and highly appreciated.

Can I get your consent?

If yes, proceed. If no, thank and stop here.

_____ (Signature of cleaner)

Date

Questionnaire code.....

Addis Ababa.....

HC name

1. Socio-demographic characteristics of the participants

Code	Question	Coding Categories	Skip
101	Age in years	-----years	
102	Religion	<ol style="list-style-type: none"> 1. Orthodox 2. Muslim. 3. Protestant 4. Catholic 5. Other 	
103	Marital status	<ol style="list-style-type: none"> 1. Single 2. Married 3. Divorced 4. Widowed 	
104	Ethnicity	<ol style="list-style-type: none"> 1. Amhara 2. Oromo 3. Tigrey 4. Others 	
105	Education level	<ol style="list-style-type: none"> 1. Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. Higher education and above 	

106	Occupational status	1. Employed 2. Housewife 3. Daily laborers 4. Others specifies	
107	Family size	-----	
108	husband educational level	1. Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. Higher education and above	
109	husband occupation	1. Employed 2. Business 3. Daily laborer 4. Others	
110	Income	----- ETB	

2. Maternal related variables

code	Question	Coding Categories	Skip
101	Gestational age	-----	
102	Women BMI (kg/m ²)	-----	
103	No. of pregnancy experience	-----	
104	Pregnancy interval	-----	
106	Number of antenatal care follow up	1. yes 2. no	
107	Any chronic illness	1. yes 2. no	

1. Dietary knowledge characteristics of pregnant women.

code	Question	Coding Categories	Skip
201	Food is important for growth and development of fetus	1.Yes 2.No	
202	Food is important for providing heat, energy and for the normal functioning of women's body	1.yes 2. No	
203	Food is important for fighting infection or disease.	1.yes 2. No	
204	Knowledge about balanced diet	1.yes 2. No	
205	Inadequate diet can cause miscarriage and still birth.	1.yes 2. No	
206	Knowledge about carbohydrate source foods	1.yes 2. No	
207	Knowledge about protein source foods	1.yes 2. No	
208	Knowledge about iron source foods	1.yes 2. No	
209	Knowledge about vitamin A source foods	1.yes 2. No	
210	Knowledge about Iodine source foods	1.yes 2. No	

2. Dietary practice characteristics of pregnant women.

Code	Question	Coding Categories	skip
301	Do you follow specific dietary regimen during pregnancy	1. Yes 2. No	
302	Did you use salt to cook the main meal	1. Yes	

	eaten by members of your family?	2. No	
303	Do you eat fresh citrus fruits, such as: Orange, Lemon, mango, or drink juice made from them?	1. Yes 2. No	
304	Do you drink coffee or tea?	1. Yes 2. No	
305	Do you have iron supplement?	1. Yes 2. No	
306	Do you have folic acid supplement?	1. Yes 2. No	
307	Do you have the habits of eating snacks between meals	1. Yes 2. No	
308	Do you the habits of eating more carbohydrates between meals?	1. Yes 2. No	
309	Do you eat protein daily?	1. Yes 2. No	
310	Do you eat fresh vegetables?	1. Yes 2. No	
311	Do you drink milk?	1. Yes 2. No	
312	Do you eat milk products?	1. Yes 2. No	
313	Do you eat meat?	1. Yes 2. No	
314	Do follow your weight during pregnancy?	1. Yes 2. No	

Thank you!

