ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF ALLIED HEALTH SCIENCES
DEPARTMENT OF NURSING AND MIDWIFERY

ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING MATERNAL NUTRITION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE CLINICS IN PUBLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA, 2015

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JUNE, 2015
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This thesis by Mikyas Arega is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of Masters of Science in Maternity and Reproductive Health Nursing.

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Acronyms/Abbreviations

ANC - Antenatal Care

BMI - Body Mass Index

DNA - Deoxyribonucleic Acid

EDHS - Ethiopian Demographic Health Survey

EFMoH- Ethiopian Federal Ministry of Health

FMOH – Federal Ministry of Health

IQ - Intelligent Quotient

IRB- Institutional Review Board

IYCN- Infant & Young Child Nutrition

KAP - Knowledge, Attitude and Practices

LBW – Low Birth Weight

NCDs - Non- Communicable Diseases

NTDs - Neural Tube Defects

UNICEF - United Nations International Children's Fund

SGA – Small for Gestational Age

SPSS- Statistical Packaging for Social Science

WHO - World Health Organization

Abstract

Background: Nutrition is a fundamental pillar of human life, health and development throughout the entire life span. Especially Pregnancy is a time of increased energy and nutrient needs for a woman in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy. However, little has been explored about nutritional knowledge, attitudes and practices among pregnant women attending antenatal clinics in Addis Ababa, Ethiopia. Therefore; this study was conducted to describe the nutritional knowledge, attitudes and practices among pregnant women attended selected public hospitals of Addis Ababa, Ethiopia.

Objective: The objective of this research was to assess Knowledge, Attitudes and Practices regarding maternal nutrition among pregnant women attending Antenatal care (ANC) clinics in selected Public Hospitals, Addis Ababa, Ethiopia, 2015.

Methods and Materials: An institutional based cross sectional study was complemented to collect relevant data among 322 pregnant women attended ANC clinics in selected public Hospitals in Addis Ababa, Ethiopia. A simple random sampling procedure was used to select public Hospitals and systematic sampling was used to select pregnant mothers using the hospitals registration list. The data was collected with Interview using a pre tested semi- structured questionnaire from April to May, 2015

Result: The data were analyzed using SPSS version 21. Multiple logistic regressions were run to assess factors that were associated with the dependent variables at $P< 0.05$ and to control the confounders. This study revealed that among 322 pregnant women only 87(27%), 156(48.4%) and 111(34.5%) of pregnant women had knowledge, favorable attitude and good practices of nutrition during pregnancy. There was a positive significant association between educational status of women, family income, attitude, number of pregnancies and nutrition knowledge during pregnancy. Knowledge had positive significant association with attitude of respondents towards nutrition during pregnancy. Knowledge, family income, husband education and occupation had a positive association with good practices of nutrition during pregnancy.

Conclusion and Recomendation: The knowledge, attitude and practices of nutrition during pregnancy were relatively low in the study area. The government and the concerned bodies should focus on education and to eradicate poverty.

Keywords: Knowledge; Attitude; Practice; Nutrition; Malnutrition; Pregnancy

1. Introduction

1.1. Background

All human beings need a balanced amount of nutrients for proper functioning of the body system. Nutrition is a fundamental pillar of human life, health and development throughout the entire life span(1). There are about 40 different nutrients that are essential for health. If any one of these is deficient in the diet the person will not be fully healthy and able to resist the agents of disease(2).

Malnutrition is now a problem in both poor and rich countries. In developed countries, obesity is rapidly becoming more widespread, bringing with it an epidemic of diet-related noncommunicable diseases (NCDs) such as diabetes and heart disease, which increase health care costs and reduce productivity. In developing countries, while widespread undernutrition and micronutrient deficiencies persist, obesity is also fast emerging as a problem(3).

In Ethiopia, nutritional disorders are among the main causes of morbidity and mortality. The major problems are protein-energy malnutrition and micronutrient deficiencies such as vitamin A, iron, and iodine(4). Twenty seven percent of women in Ethiopia are undernourished with a body mass index (BMI) of less than the 18.5 cutoff point and only four percent are obese with a BMI of more than 25.0. These figures put Ethiopia among sub-Saharan countries with the highest proportion of malnourished women(5).

Pregnancy is a time of increased energy and nutrient needs for a woman in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy. Proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of fetus without drawing on mother's own tissues to maintain her pregnancy(6).

The poor health and nutrition of women and the lack of care that contributes to their death in pregnancy and child birth also compromise the health and survival of the infants and children they leave behind(7). Undernutrition's most damaging effect on the fetus occurs during pregnancy and in the first two years of life, and the effects of this early damage on health, brain development, intelligence, educability, and productivity are largely irreversible(3).

The pregnant and lactating woman's diet should include a substantial increase in calories, protein, calcium, folic acid, iodine and iron. Pregnant women at particular risk for nutritional deficiencies

are adolescents, underweight women, obese women, women with chronic nutritional problems, women who smoke or ingest alcohol or drugs, low income women, and women with chronic illnesses such as diabetes or anemia(8).

1.2. Statement of the problem

Maternal mortality is unacceptably high . About 800 women die from pregnancy- or childbirth-related complications around the world every day(9). In 2013, 289 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and almost all maternal deaths (99%) occur in developing countries. More than half of these deaths occur in sub-Saharan Africa(9). According to Ethiopian Demographic Health Survey (EDHS) 2011, maternal mortality in Ethiopia was 676. Twenty percent of maternal deaths in Africa have been attributed to anaemia(10). In Sub-Saharan Africa, iron and folate deficiencies are the most common causes of anemia in pregnant women. Anemia has a variety of converging contributing factors but iron deficiency is the cause of 75% of anemia cases.

Many women in Africa suffer from chronic energy deficiency, inadequate weight gain during pregnancy, and poor micronutrient status. Insufficient food intake, high-energy expenditure, micronutrient-deficient diets, infections, and the demands of pregnancy and lactation contribute to maternal malnutrition(11).

Nutrition during the periconceptional period is a key component of healthy pregnancy outcomes(12). If there is maternal malnutrition on the pregnant mother, it will have consequences like: increased infection, anemia, decreased immune function, lethargy and weakness, low productivity, obstructed labor, high maternal mortality on the mother, and increased fetal and neonatal death, intrauterine growth retardation, low birth weight, preterm delivery, decreased immune function, birth defects, cretinism and decreased intelligent quotient (IQ) on the fetal side. It further affects the family and community socioeconomic conditions(8).

Maternal malnutrition is influenced not only by lack of adequate nutrition but also influenced by factors like social and psychological factors, nutritional knowledge of mothers and biological changes that influence perceptions of eating patterns during pregnancies(13).

In Ethiopia antenatal care (ANC) coverage by skilled provider in 2011 was 34%. Prevalence of anaemia among pregnant women was 22, but only 16.8% of pregnant mothers had taken iron tablets during pregnancy(14). Now-a-days, the Ethiopian government's commitment is above all times to improve the maternal and perinatal health in particular(15).

Many researches and projects focused on maternal health are common, but little attention is given to maternal nutrition in the study area(11). It is clear that maternal nutrition is crucial in reducing maternal and infant morbidity and mortality but no study has been conducted to assess nutritional knowledge, attitude and practices of pregnant mothers in the study area. So this study is aimed to assess the nutritional Knowledge, Attitude and Practices (KAP) among pregnant women attending ANC clinics in public hospitals, Addis Ababa, Ethiopia regarding the meaning, the importance and constituents of a well balanced diet and practices of taking the necessary nutrients during pregnancy.

1.3. Significance of the study

Malnutrition in pregnancy is associated with a host of adverse maternal and infant outcomes, including gestational diabetes, pre-eclampsia, and preterm birth with overnutrition; small for gestational age (SGA), low birth weight (LBW), and neonatal death with undernutrition(16).

Therefore the finding of this descriptive cross sectional study will contribute in filling the gap in understanding the knowledge, attitude and practices regarding maternal nutrition among pregnant women attending ANC clinics in the study area.

The results of the study will inform design of the nutrition education intervention strategies targeting pregnant women‟ due to their importance in reproductive and productive roles in the society.

Besides the health providers and Ethiopian Ministry of Health, others who are interested in the field of maternal health in general will benefit from this research.

2. Literature Review

2.1. Relevant information about micronutrients during pregnancy

Th components of a healthy diet include plenty of fruits, vegetables, low-fat dairy, lean protein, fish, fiber, and water. These items should be the primary focus of the diet as they provide the key nutrients necessary during pregnancy - Iodine, folic acid, iron, calcium, vitamin D, and omega-3 fatty acids(17).

Iodine

Iodine is a necessary element for the production of thyroid hormone. Iodine requirements increase approximately 50% during pregnancy to meet the higher demands caused by the increased production of thyroid hormones, foetal need of iodine supply from the mother and increased renal excretion of iodine due to physiology of pregnancy(18). The recommended dietary iodine intake for pregnant women is 220 microgram/day which is higher than the recommended iodine intake for adolescents and adults in general 150 microgram/day(19). If iodine deficiency occur during pregnancy the following disorder may result; spontaneous abortion, stillbirths, cretinism, congenital anomalies, psychomotor effects and mental retardation(18).

Folic Acid

Folic acid is an essential B vitamin required early in pregnancy for proper development of the baby's spinal cord in the fist 28 days of pregnancy, to synthesize, repair, and methylate deoxyribonucleic acid(DNA) as well as to act as a cofactor in certain biological reactions. It is especially important in aiding rapid cell division and growth, such as in infancy and pregnancy. Maternal folate defiiency is associated with neural tube defects Ths water-soluble B vitamin is found in dark green leafy vegetables, meats, fish, fortifid grains and cereals, legumes, and citrus fruits. Th recommendation for folic acid is 400 µg/day prior to pregnancy and 600 µg/day once pregnant (17, 20).

Iron

Iron is an essential nutrient for the human body. It is required for the transport of oxygen in the blood, as well as for the proper functioning of many processes in the body necessary for good health. It is well known that iron requirements increase during pregnancy to support the expanding blood volume, growth of the fetus, placenta, and other tissues associated with pregnancy. Good food sources of iron are generally from meat or seafood iron-fortifid cereals and oatmeal, beans, lentils, tofu, and spinach. Th recommendation for iron during pregnancy is 27 mg/day, almost double the requirement when not pregnant(17). Inadequate iron diet resulted with iron deficiency anaemia which relates to negative pregnancy outcomes, such as preterm delivery, low birth weight, infections, and even perinatal death(21).

Calcium & Vitamin D

Calcium and Vitamin D are essential for building the developing fetus' bones and teeth. Sources of calcium include milk, cheese, and yogurt; non-dairy sources include fortifid juices and milk alternatives, tofu, broccoli, and spinach. Vitamin D is found in fortifid milks and juices, salmon fish, tuna fish. And also Small amounts of vitamin D are found in beef liver, cheese, egg yolk, and some forms of mushrooms. Exposure to sunlight can also increase vitamin D status in the body through a chemical reaction in the skin. Th recommendation for calcium during pregnancy is 1000 mg/day and Vitamin D is 600 IU (15 µg)/day(17, 22).

Omega-3 Fatty Acids

The essential fatty acids, omega-6 (linoleic acid) and omega-3 (alphalinolenic acid), cannot be synthesized in the human body and therefore must be obtained exclusively from food sources. Their health benefits are: increase gestational length, increase cognition and visual performance, and decrease incidence of preterm birth, preeclampsia, and depression. DHA in particular is found in large amounts in the brain and in the retina, and accumulates rapidly in the third trimester of pregnancy.(17) The primary sources of omega-6s are grain-fed beef, processed foods, and liquid vegetable oils, and are abundant in the typical Western diet.. In contrast, omega-3s are found in only a few foods, primarily oily fish and select nuts and seeds. Pregnant mother should consume at least 8 – 12 ounces of fish per week(23).

Frequency of meal

pregnant women should eat more servings of various types of food, including the vegetables group, the milk and other dairies group, and the meat, eggs, and seafood group. In particular, pregnant women should eat less food at each meal or snack, and increase the frequency of eating to alleviate nausea and vomiting during pregnancy(24).

Table 1**:** General Western nutrition recommendation for both pregnant and non-pregnant women

<table>
<tr><td rowspan="2">Food groups</td><td colspan="3">Recommended food servings</td><td rowspan="2">Other recommendations</td></tr>
<tr><td>Non- pregnant women</td><td colspan="2">Pregnant women</td></tr>
<tr><td rowspan="2">Vegetables and fruits</td><td>Vegetables and fruits in total: ≥ 5 servings/day
Fruits: ≥ 2 servings/ day
Vegetables: ≥ 3 servings/day</td><td colspan="2">Vegetables and fruits in total: ≥ 6 servings/day
Fruits: ≥ 2 servings/ day
Vegetables: ≥ 4 servings/day</td><td rowspan="2">Eat clean and fresh fruits and vegetables.</td></tr>
<tr><td colspan="3">Juice /dry fruit: ≤ 1 servings/day</td></tr>
<tr><td>Bread and Cereals</td><td colspan="3">≥ 6 servings/ day</td><td>• Choose wholegrain products as they are high in fiber and other nutrients</td></tr>
<tr><td>Milk and other dairies</td><td>≥ 2 servings/day</td><td colspan="2">≥ 3 servings/day</td><td>• Choose low fat or reduced fat dairy products
• If drink soy milk, choose calcium-fortified milk.</td></tr>
<tr><td>Lean meats, chicken, seafood, beans and eggs.</td><td>≥ 1 servings/day</td><td colspan="2">≥ 2 servings/day</td><td>• Iron in lean meat, chicken, and seafood are more easily absorbed than other food</td></tr>
</table>

Source: Ministry of Health. (2013). *Eating for healthy adult New Zealanders and pregnant women*. Wellington, New Zealand

Thre are foods and drinks that should generally be avoided during pregnancy are: Saturated fat and sodium, Caffine, Alcohol, High-mercury fish, Unpasteurized food and drink, Raw sprouts, Undercooked eggs, meat, poultry and fish and should control intake of sugar(17, 24).

2.2. Knowledge, Attitude and practices of pregnant women towards maternal nutrition

A research results from Wollega, Ethiopia in 2013 revealed that 64.4% of women had nutrition knowledge during pregnancy. This research showed a positive significant relation between information about nutrition, educational status of mothers and family income and nutritional knowledge of mothers during pregnancy(1).

Iodine

A low consumption of iodized salt and poor iodine status during pregnancy may result from a lack of knowledge about the importance of iodine intake during pregnancy. In Ethiopia, where iodine deficiency disorders are a major public health problem, according to WHO/UNICEF, more than 90% of women did not know the importance of iodized salt and the causes of iodine deficiency(25).

Folic acid

In the United States, Sharp, et al. (2009) reported that women of childbearing age who were from low socioeconomic backgrounds knew little about the importance of the recommended daily intake of folic acid and only 63 (25%) of the total number of women surveyed (N=250) reported consuming folic acid supplements daily(26). Similarly, a New Zealand study identified that knowledge and understanding about recommended folic acid intake among women of child bearing age was relatively poor, with only 64% of the 1000 women surveyed being aware that pregnant women needed to take recommended

doses of folic acid(27). In Hail region-Saudi Arabia among 300 married women, 91.0% of the subjects were aware of folic acid, 81.0% knew that folic acid could prevent neural tube defects and 84.0% of the subjects took folic acid prior or during a certain stage of pregnancy(28).

A study which was conducted at Military Hospital and Combined Hospital Rawalpindi, Pakistan, among 400 married reproductive age women in 2013 revealed that 53.25% of them knew folic acid intake is important, 40.25% thought that folic acid defiiency among pregnant women results in abnormality in new born. Regarding the rich source of folic acid 60.25% of women had idea and from the total 23.25% were regularly having green vegetables and fruits. 51.25% of respondents had received folic acid supplementation during pregnancy. (20).

Research from New South Wales, Australia in 2013 had explained 81.6% (N=152) used supplements during their pregnancy; 67.7% took supplement brands which contained both folic acid and iodine in varying dosages. 36% of them started taking supplements before their pregnancy. The supplement use was significantly higher among pregnant women who were in the highest household income category. 75.6% of pregnant women understood that neural tube defects (NTDs) is the health problem associated with inadequate intake of folic acid and 39.5% of them knew the health problems associated with inadequate iodine intake. Half of the pregnant women had limited awareness about good sources of folic acid and iodine. Educated women from higher socio-economic backgrounds had better knowledge about the importance of folic acid and iodine in pregnancy(27).

Iron

A study on 400 pregnant women admitted to the Cuza-Vodă Obstetrics and Gynaecology Clinical Hospital in Iasi, Romania, 2010 showed that 45.3% of participants had used iron supplements during pregnancy. This study had put Age, level of education, being married and low gestational age at the first prenatal check-up and total number of prenatal medical visits as a factor for folic acid, iron and multivitamin supplements(29). Women with a higher level of nutritional knowledge used folic acid, iron and multivitamin supplements more frequently. In another Findings from cross-sectional analysis of data collected from 836 participants at Porto, Portugal, 2008, reported that Prevalence of use of supplements during pregnancy was 55.4% for folic acid, 81.9% for iron, and 76.2% for multivitamins(30). Similar study at rural area of India on 50 antenatal mothers showed that iron folate tablet was adequately consumed by 62% mothers among the study population(31).

Calcium and vitamin D

In 2014, a cross-sectional study on 116 pregnant women of Irish, Asian, Sub-Saharan African and Middle Eastern and North African origin at Ireland showed that 23% did not know any source of vitamin D and regarding their attitude 5% admitted that they did not like foods that were rich in vitamin D. 34% of women reported taking a supplement that contained vitamin D; whereas 78% reported consuming oily fish over the past month and 31% reported consuming vitamin D fortified milk(32).

Omega 3 fatty acids

A survey conducted in Western Province, Kenya, 2011 reported that 46% of the women in the study had a moderate level of nutritional knowledge(33) in similar study at USA on 124 pregnant mothers, attending the outpatient clinics of obstetrics and gynecology, revealed that 78.2% of women had a good knowledge about the importance of milk and milk products for pregnant women and also they knew that maternal malnutrition can endanger the newborn health. 45.9% and 49.2% knew correctly neither the meaning nor the constituents of the balanced diet for the pregnant women. 61.3% had good knowledge about the sources of iron and 71.8% knew the sources of calcium. It also revealed that women aged 25-35 years had higher mean of nutritional knowledge among respondents(34).

In western Kenya, Perumal N. et al (2011) Reported that 59.6% of the pregnant womens' attitude score was high (>7 out of 10)(33). Another study in USA by Latifa M. Fouda and her colligues in 2012 reported that 40.3% of women thought negatively that pregnant women should eat for two, also 44.4% thought that most of their diet (>3/4) must be of starchy food. The majority of women 88.7% had a positive attitude towards milk and milk products(34).

A quantitative cross sectional study at Mekelle town, Ethiopia, among 632 pregnant women in 2014 revealed that Injera and wet was the staple diet for 67.5% of pregnant women. Around half of the pregnant women ate three times per day. 57.8%, 33.4%, 45.7% pregnant women took meat once, milk twice and egg twice per week respectvely. similarly around half of pregnant women ate fruits once a week. 73% of pregnant women took vegetables twice per week(35).

A study which was conducted at Guto Gida Woreda, East Wollega Zone, Ethiopia, showed that from 419 pregnant women, 59.9% did not practiced the habit of eating snacks and 70.9% of them

did not ate carbohydrates between meals during their pregnancy. The study had indicated previous number of pregnancy and mother's occupation has associated with practices of mothers on nutrition during their pregnancy. This study had concluded that 33.9% of pregnant women were found to have good practice according to the questions offered to them to assess practices of mothers' maternal nutrition during their pregnancy. This study has also uncovered the practice of diet frequency of meal per day among pregnant women; 66.1% had diet frequency of meal 1-2 per day during their pregnancy. 20.3% and 13.6% had diet frequency of meals 3 - 4 and >5 per day respectively during their pregnancy(11).

A research on 124 pregnant females Tanta city, USA, showed that 42.7% of them had practiced daily servings of milk, milk products and animal protein. 61.3% of pregnant women practiced badly the habit of eating much starchy food between meals. About two thirds of women had a good practice of eating vegetables and fruits between meals. About 60 % practiced daily eating of enough servings of vegetables and fruits. The results of this study also showed that most of women were housewives and most of them stated that inadequate income considered as one of the main problems affecting the intake of well balanced diet during pregnancy(34)

2.3. Conceptual Framework

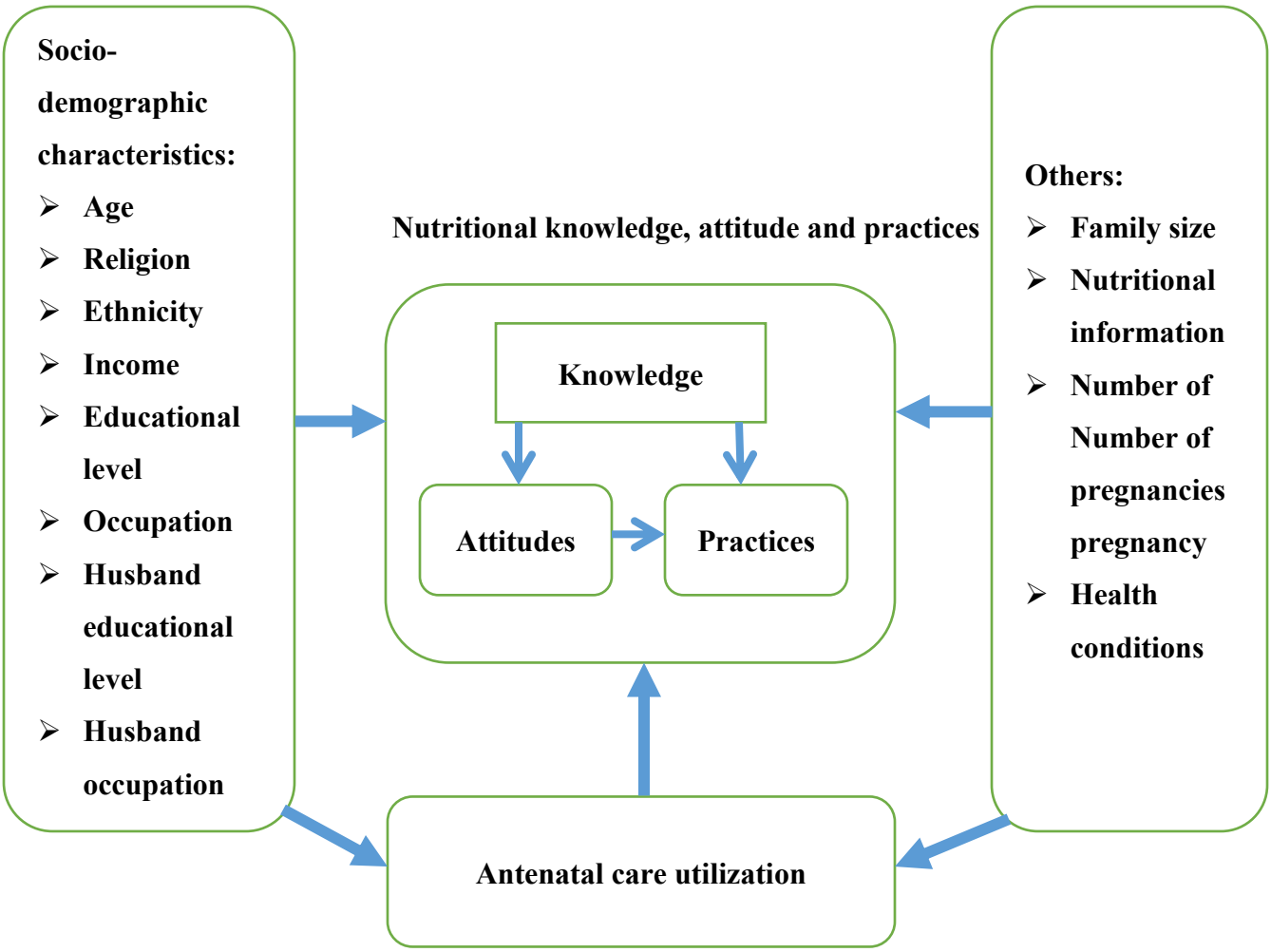

Figure 1: Conceptual model

Source: Developed by reviewing different literatures.

3. Objectives

3.1. General objective:

The general objective of this research was to assess Knowledge, Attitude and Practices regarding maternal nutrition among pregnant women attending ANC clinics in selected Public Hospitals, Addis Ababa, Ethiopia, 2015

3.2. Specific objectives:

3.2.1. To assess knowledge of pregnant mothers with regard to maternal nutrition

3.2.2. To assess attitude of pregnant mothers towards maternal nutrition and

3.2.3. To assess dietary practices among pregnant mothers in the study area

4. Methods and Materials

4.1. Study Design

An institutional based cross-sectional study was conducted to assess knowledge, attitude and practices among pregnant women about maternal nutrition during pregnancy with quantitative data collection method from April to May,2015.

4.2. The study area

Th study was conducted in Addis Ababa, the capital city of Ethiopia. It is the largest city in Ethiopia, established in 1887 by emperor Menilik II. It has the status of both a city and a state. The city is divided in to ten sub-cities. In 2014, it has a projected 3,194,999 million population of whom 1,679,998 were females and the rest 1,515,001 were males(36).

According to the information from Ministry of Health, in Addis Ababa there are 8 hospitals that give Antenatal services for the public. From 8 Hospitals 4 were randomly selected for this study. These were Tikur Anbessa Teaching Specialized Hospital, Saint Paulos Referral and teaching Hospital, Yekatit 12 Referral Hospital and Tirunesh Bejing Hospital.

Tikur Anbessa Teaching Specialized Hospital is the one and it has 500 beds in medical, gynecological and obstetrics, surgical, pediatrics and emergency departments and facilitated with the outpatient department (OPD) and it has also other specialized units and rooms.

Saint Paulos Hospital Millennium Medical College is a referral hospital was established to serve the economically under privileged population, providing services free of charge to about 75% of its patients. In 2007 it became a medical college and its core services include the provision of medical care, teaching and research.

Yekatit 12 hospital is one of the hospitals under Addis Ababa city administration health bureau that has been giving routine health services for the city community and other referral cases from different regional states of Ethiopia.

Tirunesh Bejing Hospital has 376 staffs which comprises of health professionals and supporting staffs. The services provided by the hospital are internal medicine, surgery, gynecologic and

obstetrics, pediatrics, dentistry, ophthalmology, psychiatry and etc including 24hours openness of the emergency room for service.

According to the information provided from each selected Hospitals the average pregnant mothers who attended the ANC clinics in the hospitals have been estimated about 2527 per month.

4.3. Source population

All Pregnant women who had visited Public Hospitals in Addis Ababa for antenatal care fellow up during April to May, 2015.

4.4. Study population

Pregnant women who had come to selected public Hospitals in Addis Ababa for antenatal care during April to May, 2015.

4.5. Eligibility Criteria

Inclusion All pregnant mothers those had come to the selected Hospitals for ANC follow up were included in the study.

Exclusion Criteria: seriously ill, laboring mothers and mothers with hearing abnormality and couldn't listen and speak Amharic were excluded from the study.

4.6. Sample Size Determination

The sample size was determined by using 64.4% of the pregnant mothers had nutritional knowledge during pregnancy in Wollega, Ethiopia(1). And using the following assumption: 64.4% of mothers had good attitude and practices with 5% marginal error and 95%CI and a non-response rate of 10%. Based on this assumption, the actual sample size for the study was determined using the formula for single population proportion.

$$n = \frac{(Z_{a/2})^2 P (1-P)}{d^2}$$

Where: n_i = Initial sample size

Z = **standard** normal distribution corresponding to significance level at a = 0.05 or confidence interval (CI), 95% = 1.96

P = expected proportion (0.644) of pregnant mothers nutritional knowledgeable, have good attitude and practices during pregnancy.

d = margin of error (5%) around P

Therefore:- $n_i = \frac{(1.96)^2 \times 0.644 \times 0.356}{(0.05)^2} = 352$

Since the average total study population in the study area is about 2,527 pregnant mothers who have attended ANC in the selected Hospitals which is below 10,000. So reduction formula was employed as follows:

$n_f = \frac{ni}{1+\frac{ni}{N}} = \frac{352}{1+\frac{352}{2527}} = 309$ Where $n_f =$ reduced sample size

N = total study population.

Nonresponse rate = 10% = 31

the total minimum sample size (n) = 340

4.7. Sampling procedure

Th calculated sample size was proportionally allocated to the randomly selected Public Hospitals in Addis Ababa based on the average number of clients 6 months prior to the study period in the respective antenatal care follow units. To select study subjects from each antenatal care unit, systematic sampling was applied by using client's registration order to get ANC care during the data collection period. Then every 7^{th} person as they registered was included in the sample at each antenatal care unit until the desired sample size was attained.

$K = \frac{2527}{340} = \sim 7$

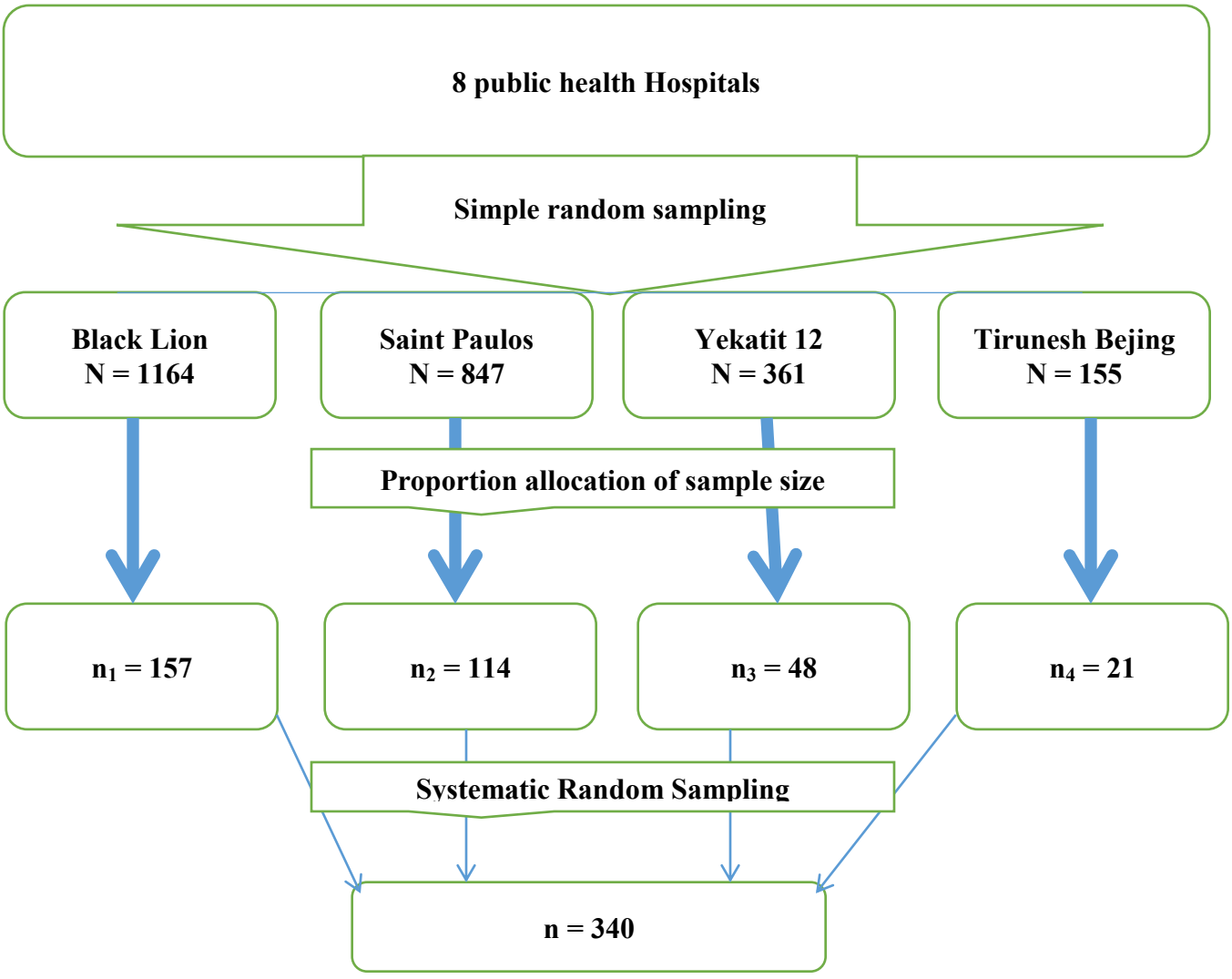

Figure 2: Schematic presentation of sampling procedure

4.8. Variables

4.8.1. Dependent variables

- Maternal nutritional knowledge
- Attitude towards nutrition and
- Dietary practices during pregnancy

4.8.2. Independent Variables:

- Socio-demographic characteristics
- Family Size
- Nutritional information
- Number of pregnancies
- health conditions

4.9. Data collection procedures:

Instrument: An unstructured, Semi-structured and structured questionnaire was prepared in English language. It was translated in to Amharic and after collection it was translated back to English to check for consistency by experts. The questionnaires was pre- tested in Ghandi Memorial Hospital antenatal care unit. Th pre-test was done on 5% of the total sample size. Then questionnaire was assessed for its clarity, length and completeness. Some questions were re-formed and re-ordered to carry out the objectives and interview respondents smoothly.

Data collectors: For administering the semi-structured questionnaire, four diploma Nurses were recruited to conduct an interview with one BSc Midwife supervisor. Training was given for one day on the objective, relevance of the study, informed consent, confidentiality of information and techniques of interview.

Quality Control

Quality of data was assured through the following measures:

- The data collection tool was pre-tested among 5% of the total sample size to assess, its clarity, length, completeness, consistency and required time to carry out the interview,
- Data collectors and supervisors were trained,
- Coding and data cleaning was done (checked frequencies and cross-tab for each item).

4.10. Operational Definitions

Antenatal Care: Antenatal care (ANC) is a medical and general care that is provided to pregnant woman during pregnancy based on local situation(37).

Nutrition: is the selection of **foods** and preparation of **foods**, and their ingestion to be assimilated by the body

Malnutrition: is refers to the excessive intake of food, especially in unbalanced proportions or lack of proper nutrition, caused by not having enough to eat, not eating enough of the right things, or being unable to use the food that one does eat.

Knowledge: it refers to an individual's understanding of nutrition, including the intellectual ability to remember and recall food- and nutrition-related terminology, specifi pieces of information and facts(38).

Knowledgeable: if respondents score for knowledge questions ≥ seventy percent from hundred.
Not knowledgeable: if respondents score for knowledge questions < seventy percent from hundred.

Attitudes: are emotional, motivational, perceptive and cognitive beliefs that positively or negatively inflence the behaviour or practice of an individual. An individual's feeding or eating behaviour is inflenced by his/her emotions, motivations, perceptions and thoughts. Attitudes inflence future behaviour no matter the individual's knowledge and help explain why an individual adopts one practice and not other alternatives. The terms attitude, beliefs and perceptions are interchangeable(38).

Favorable attitude: the respondents attitude score >the median
Unfavorable Attitude: the respondents attitude score ≤ the median

Practices: the observable actions of an individual that could affct his/her or others' nutrition, such as eating, feeding, cooking and selecting foods.Practice and behaviour are interchangeable terms, although practice has a connotation of long-standing or commonly practiced behaviour(38)

Good practices: the respondents had practiced according to food recommendations for pregnant mother and for frequency of food, at least once per day regarding fruits, vegetables, meat, milk and milk products. Concerning meal frequency, 4 and above meals per day.

Poor practices: the respondents had no practices parallel with food recommendation for pregnant women and for frequencies, less than once per day regarding fruits, vegetables, meat, milk and milk products. Regarding meal frequency, 3 and below per day.

Measurement of knowledge

Open-ended questions that require respondents to provide short answers in their own words, accompanied by a list of correct answers plus the options ―Other" and ―Don't know." Predefined options make analysis easier by listing expected responses. The data collector should ask the question and he/she should write down the response provided with Amharic using the respondent words.

Attitude

Attitude questions offring three response options:

- One positive;
- A ―middle option" that captures attitudes that are still uncertain; and
- One negative.

Practice:

Practice questions offring response options to assess:

- Intake of specific foods
- Frequency of intake of specifi foods and
- Others

SCORE

The knowledge questionnaire consisted of 15 questions. Each one had two (2) points for correct and complete answers(; one (1) point for the correct incomplete answers and a score of zero (0) for the incorrect or (no) answer.

As regards the practice, further 15 questions were designed to assess practices of mothers toward nutrition during pregnancy. The answers had scores of (1) points for good practice and zero (0) for bad practice.

Regarding the attitude, (9) questions were designed; the answers had (2) points for the answer of yes I like, one point for I am not sure and zero (0) for I Dislike.

4.11. Data analysis

Options were provided to make a preliminary analysis of the responses to knowledge questions. If the question had a single correct answer, the options were –Complete" –Incomplete" or –Does not know." If the question had several correct answers, the options were –ecompete" (if the respondent ggave more than one or all possible correct answers), —Incomplete" (if the respondent knew only one correct answer) and–Does not know" (if the respondent gave no correct answers) and –Number of correct responses" (to indicate the number of correct answers provided).

The investigator did not use multiple choice questions and true/false to measure knowledge because the responses could be the result of guessing and therefore give a false impression of knowledge.

The data was entered to Epi data version 3.1 and exported to SPSS version 21. After that the data was cleaned and analyzed using SPSS version 21. Th descriptive analysis such as frequency distribution, proportions, percentages, and measures of central tendency was used. Bivariate and multivariate analysis was performed between knowledge, attitude and practices of mothers on nutrition during pregnancy and each of the potential factors associated with knowledge, Attitude and practices of mothers on nutrition during pregnancy.

4.12. Ethical Consideration

Ethical clearance was obtained from Institutional Review Board(IRB) of Addis Ababa University, college of health sciences, School of allied health sciences, Department of Nursing and Midwifery. Then formal letter of cooperation was written to the Director of Tikur Anbessa, Saint Paulos referral Hospitals and Addis Ababa Health bureau and permission was obtained. Responses of clients were unnamed and data collectors were informed the clients that they have full right to discontinued or refused to participate in the study**.** Participation of respondents was voluntarily with informed consent after a detail explanation of the purpose of the study. The responses of clients were unnamed to keep the confidentiality. The data collectors were informed about the rights of respondents to refuse participation in the study.

4.13. Dissemination of result

The results of the study was presented to Addis Ababa University, College of health sciences, school of Allied health sciences, department of Nursing and Midwifery as part of master of science in Maternity and Reproductive Health Nursing thesis & it will also get shared to selected Hospitals. Efforts will be made to present the results on scientific conferences and peer reviewed journal publications will be considered.

5. Result

5.1. Socio-demographic characteristics

Out of the 340 sampled pregnant women, 322 responded to the questionnaires making a response rate of 94.7%. From out of 322 respondents 156, 101, 47 and 18 were from Tikur Anbessa, Saint Paulos, Yekatit and Tirunesh Bejing hospitals respectively. Different questions were asked to assess knowledge, Attitudes and practices of pregnant mothers on nutrition and socio-demographic determinant factors in the study area. The mean age (± SD) of the participants was 28.44 (± 4.199) years, while the age range was 18-42. About third quarter of the respondents, 243(75.5%) were in the age range of 25-34 years. Most study respondents, 307(95.3%) were married.

Table 1 shows that the majority, 210(65.2%) of respondents were orthodox Tewahdo religion followers followed by Muslims (73(22.7%)). Regarding the Ethnicity the high proportion of respondents were Amara (128(39.8%)) followed by Oromo (76(23.6%)). Concerning family size, 99(30.7%), 85(26.4%) of women had three and two family members respectively.

With regard to educational status about one third 108(33.5%) of respondents were at the level of primary and no formal learning and 103(32%) of the women had Diploma and above education. In the other way 89(27.7%) of their husbands had primary school and no formal learning educational status and 101(31.4%) had diploma and above. The majority of respondents, 201(62.4%) were house wives and again the majority of respondents' husbands, 239(74.2 %) of were not employee.

Regarding to estimated income of women, greater than one third of respondents (116(36.0%)) earned greater than 3500 birr per month, 108(33.5%) of respondents earned 2000-3500 birr and the rest 61(18.9%) of respondents earned less than 2000 birr.

Table 2 Distribution of Socio-Demographics characteristics of pregnant mothers attending ANC clinics in public Hospitals in Addis Ababa, 2015 (N= 322)

Variable		Number (%)
1. **Age**	≤ 24	50(15.5)
	25-34	244(75.5)
	35-44	28(8.7)
2. **Marital status**	Married	307(95.3)
	Single	6(1.9)
	Separated	5(1.6)
	Widowed	3(0.9)
	Divorced	1(0.3)
3. **Religion**	Orthodox Tewahido	210(65.2)
	Muslim	73(22.7)
	Protestant	36(11.2)
	Catholic	1(0.3)
	Others	2(0.6)
4. **Ethnicity**	Amara	128(39.8)
	Oromo	76(23.6)
	Gurage	64(19.9)
	Tigre	22(6.8)
	Others	32(9.9)
5. **Family size**	One	3(0.9)
	Two	85(26.4)
	Three	99(30.7)
	Four	65(20.2)
	Five and above	70(21.7)
6. **Educational level**	No formal Schooling and Primary School	108(33.5)
	Secondary School	111(34.5)
	Diploma and above	103(32.0)
7. **Your husband educational level**	No formal Schooling andPrimary School	89(27.7)
	Secondary School	132(41.0)
	Diploma and above	101(31.4)
8. **Occupation**	Housewife	201(62.4)
	Private business	67(20.8)
	Employee	54(16.8)
9. **husband occupation**	Not employee	239(74.2)
	Employee	83(25.8)
10. **Monthly Income**	<2000 birr	98(30.4)
	2000 - 3500 birr	108(33.5)
	>3500 birr	116(36.0)

5.2. Obstetrics and medical characteristics

Concerning the obstetric score, about one quarter of the respondents, 84(26.1%) were premigravida. From those who had history of delivery, 144(63.2%) had experience of abnormal previous delivery. In medical status, 36(11.2%) of women had associated diseases with pregnancy.

As table 2 shows below, about two third of women (210(65.2%)) had four and above antenatal visit on the current pregnancy but only 131(40.7%) of women said as they had gotten pregnancy related nutritional information.

Table 3: Distribution of Obstetrics and medical characteristics of pregnant mothers attending ANC clinics in selected public Hospitals in Addis Ababa, 2015 N = 322)

Variable			Number (%)
11. Obstetrical score.	Primigravida		84(26.1)
	Multigravida		238(73.9)
12. Previous delivery	Normal		84(36.8)
	Abnormal		144(63.2)
13. Associated diseases	Yes		36(11.2)
	No		286(88.8)
14. Number of antenatal visits on current pregnancy	One		33(10.2)
	Two		28(8.7)
	Three		51(15.8)
	Four and above		210(65.2)
15. Nutritional information	Yes	1. Health provider	89(27.6)
		2. Books and websites	15(4.7)
		3. Media	15(4.7)
		4. Family	7(2.1)
		5. Friends	5(1.6)
		Total	131(40.7)
	No		191(59.3)

5.3. Knowledge of mothers on maternal nutrition during pregnancy

The findings showed that 75(23.3%), 207(64.3%), 218(67.7%), 147(45.7%) and 114(35.4%) of the respondents had a complete correct answer to what is balanced diet, pregnant mothers' diet differ than others, component of balanced diet, danger of malnutrition for pregnant mother and the fetus respectively. On the other way, 140(43.5%), 146(45.3%), 300(93.2%), 146(45.3%) and 129(40.1) did not know the importance of protein, milk and its products, folic acid, iron and the benefit of birth spacing for pregnant woman respectively.

Regarding sources of nutrients, 140(43.5%), 171(53.1%), 75(23.3%) and 54(16.8%) of women had complete correct answers to the sources of protein, vitamins, calcium, and iron respectively. Only 79(24.5%) of women mentioned the presence of two micronutrient supplies for pregnant women. The least scored character was question number 25, only 7(2.2%) of respondents complete correct answer to the importance of folic acid.

Generally only 87(27%) of respondents were knowledgeable (who score 70% and above for knowledge questions). The rest, 235(73%) of women were not knowledgeable (score less than 70%) about maternal nutrition during pregnancy.

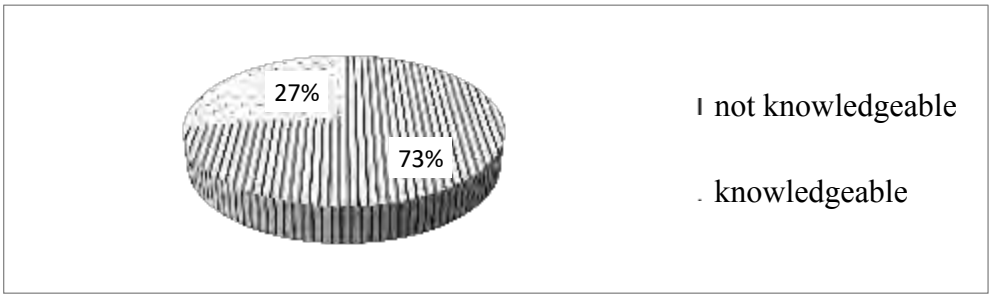

Figure 3: Nutrition knowledge level of pregnant mothers attending ANC clinics in selected public Hospitals in Addis Ababa, 2015 (N=322)

Table 4: Nutrition knowledge of pregnant mothers attending ANC clinics in selected public Hospitals in Addis Ababa, 2015

Variable	Knows		Doesn't know
	1. complete Number (%)	2. Incomplete Frequency (%)	Frequency (%)
16. Good balanced diet	75 (23.3)	187 (58.1)	60 (18.6)
17. pregnant diet differ than other diet	207 (64.3)	81 (25.2)	34 (10.6)
18. Component of balanced diet	218 (67.7)	48 (14.9)	56 (17.4)
19. Sources of protein(animal& plants)	140 (43.5)	85 (26.4)	97 (30.1)
20. Importance of protein	86(26.7)	96 (29.8)	140 (43.5)
21. Sorce of vitamins	171 (53.1)	36 (11.2)	115 (35.7)
22. Source of calcium	75 (23.3)	20 (6.2)	227 (70.5)
23. Importance of milk &its products	87 (27.0)	89 (27.6)	146 (45.3)
24. Micronutrient supplements for pregnant women	79 (24.5)	161(50.0)	82 (25.5)
25. health benefit for taking folic acid supplements	7 (2.2)	15 (4.6)	300 (93.2)
26. Source of iron	54(16.8)	62 (19.3)	206 (64.0)
27. Importace of iron to pregnant	159(49.4)	17 (5.3)	146 (45.3)
28. Benefit of birth spacing	119(37.0)	74(23.0)	129 (40.1)
29. Danger of malnutrition for pregnant	147 (45.7)	118 (36.6)	57 (17.7)
30. Danger of malnutrition for baby	114 (35.4)	156 (48.4)	52 (16.1)

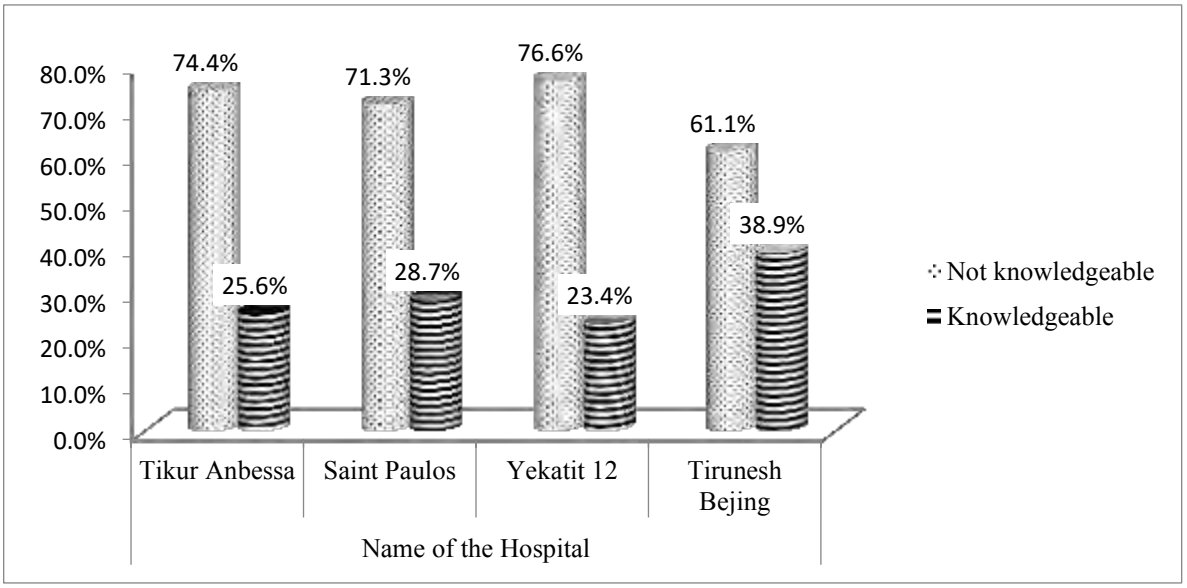

Figure 4: Distribution of nutrition knowledge among pregnant mothers that had attended ANC clinics in 4 selected public hospitals, Addis Ababa, Ethiopia, 2015. (N = 322)

5.4. Attitudes of mothers on maternal nutrition during pregnancy

As regards the attitude, less than one third of women, 96(29.8%) of women thought negatively about eating more food during pregnancy. Above one tenth of respondents, 39(12.1%) thought negatively about eating more carbohydrate during pregnancy than non-pregnancy state. The majority of women, 266(82.5%), 280(87%), 280(87%) and 287(89.1%)) had a positive attitude towards taste of omega 3 rich foods, eating more proteins or beans during pregnancy, taste of meat and other iron-rich food items and milk and milk products respectively.

As fig. 3 shows, the highest positive attitude score were for preparing meals with iron-rich foods (293(91%)) followed by preparing meals with iodized salt (292(90.7%)).

In general up on the computed median 156(48.4%) of respondents had favorable attitude and 166(51.6%) had unfavorable attitude towards nutrition during pregnancy.

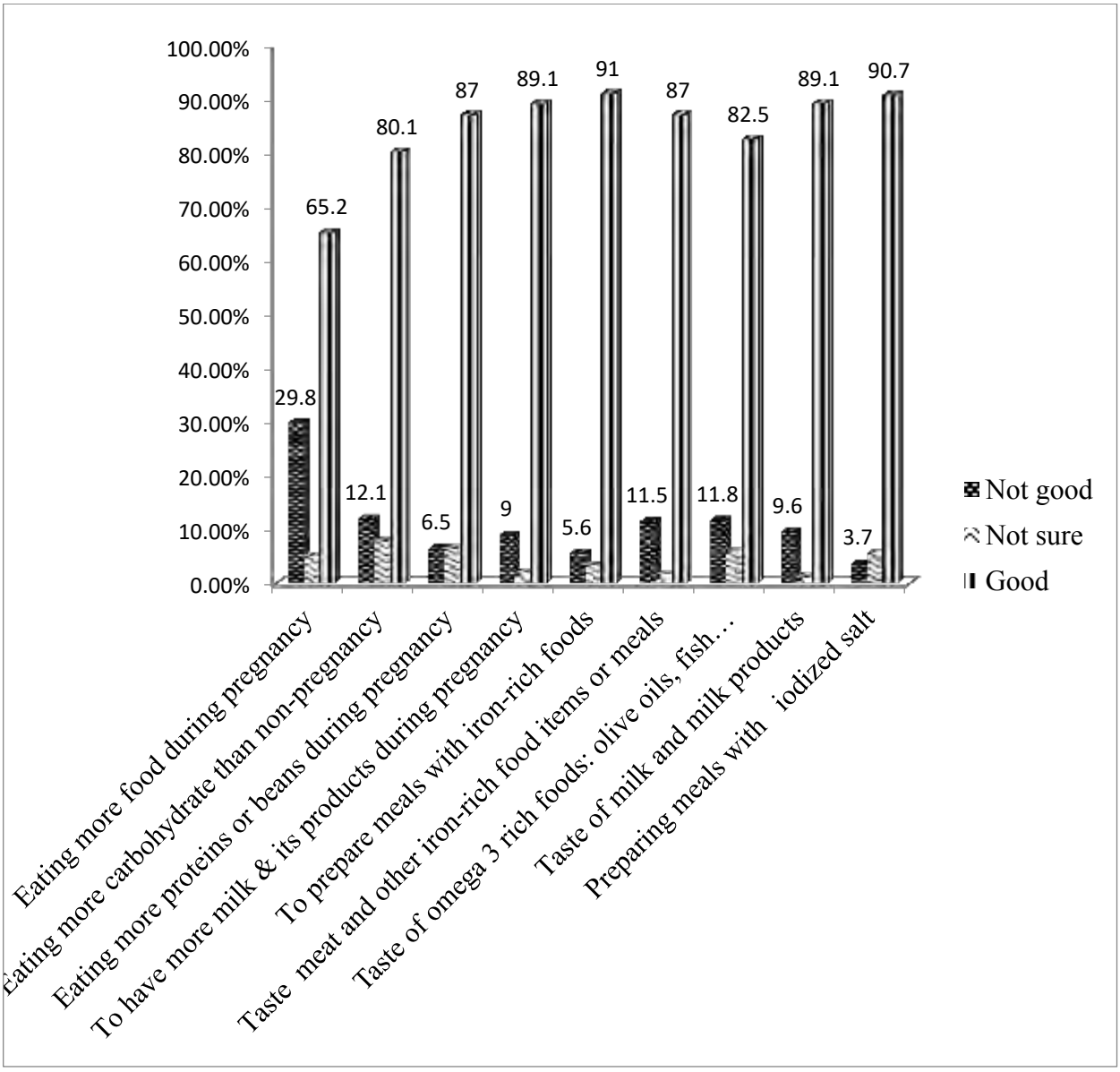

Figure 5: Level of nutritional Attitude among pregnant mothers attending ANC clinics in public Hospitals in Addis Ababa, 2015 (N = 322)

5.5. Practices of mothers on maternal nutrition during pregnancy

Concerning the practice, only 26(8.1%) of women follow specific dietary regimen, greater than three quarter, 238(73.9%) of women used iodized salt to prepare their daily main meals, less than one fourth of women, 77(23.9%) had the habit of eating fresh citrus fruits/juice, most of women, 303(94.1%) of women had the habit of taking protein daily and less than one third, 101(31.4%), 57(17.7%) of women practiced daily servings of milk and milk products respectively. As regards fresh vegetable, only 87(27%) of respondents practiced daily servings. But 84(26.1%), 245(76.1%), 235(73%), 19(5.9%), 222(68.9%) and 266(82.5%) of women had poor practices of daily servings of fresh fruits, vegetables, protein, milk and milk products respectively.

Concerning caffeine drinking, greater than two thirds, 261(81.1%) of pregnant women had the habit of drinking coffee/tea.

Regarding the diet frequency of meal per day, the majority of respondents, 211(65.5%) had diet frequency of four and above per day. The rest 111(34.5%) respondents had 1-3 servings per day. Greater than two third, 219(68%) of respondents had the habits of taking snacks and 204(63.4%) had the habit of eating more carbohydrates between meals than non-pregnant state.

Concerning micronutrient supply, 204(63.4%) of women had iron tablets and took them correctly. But only 25(7.8%) of women had folic acid supplies at three months before pregnancy and within three months after conception.

Table 5: Nutritional practices of pregnant mothers attending ANC clinics in selected public Hospitals in Addis Ababa, 2015 (N = 322)

S.no.	Characters	Good Number (%)	Poor Number (%)
40.	Following specific dietary regimen	26(8.1)	296(91.9)
41.	Using salt to cook the main meal	238(73.9)	84(26.1)
42.	Habit of eating fresh citrus fruits/juice	77(23.9)	245(76.1)
43	Habit of taking coffee or tea	61(18.9)	261(81.1)
44	Iron Supply	204(63.4)	118(36.6)
45	Folic Acid supply	25(7.8)	297(92.2)
46	Frequency of meal per day	211(65.5)	111(34.5)
47	Habit of taking snacks between meals	219(68.0)	103(32.0)
48	Habit of eating more carbohydrates between meals	204(63.4)	118(36.6)
49	Eating protein daily	303(94.1)	19(5.9)
50	Habit of eating fresh vegetables	87(27.0)	235(73.0)
51	Drinking milk	101(31.4)	221(68.6)
52	Eating milk products	57(17.7)	265(82.3)
53	Eating meat	21(6.5)	301(93.5)
54	Following weight	259(80.4)	63(19.6)

In general, 111(34.5%) of the respondents were found to have good practice depending up on questions offered to them to assess practices of mothers' maternal nutrition during their pregnancy.

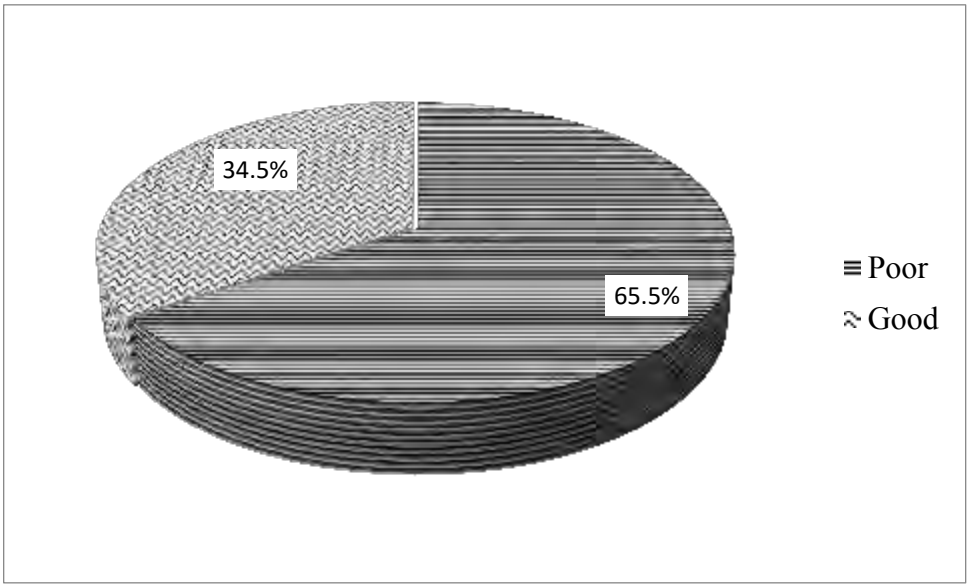

Figure 6: Nutrition practice level of pregnant mothers attending ANC clinics in selected public Hospitals in Addis Ababa, 2015 (N=322**)**

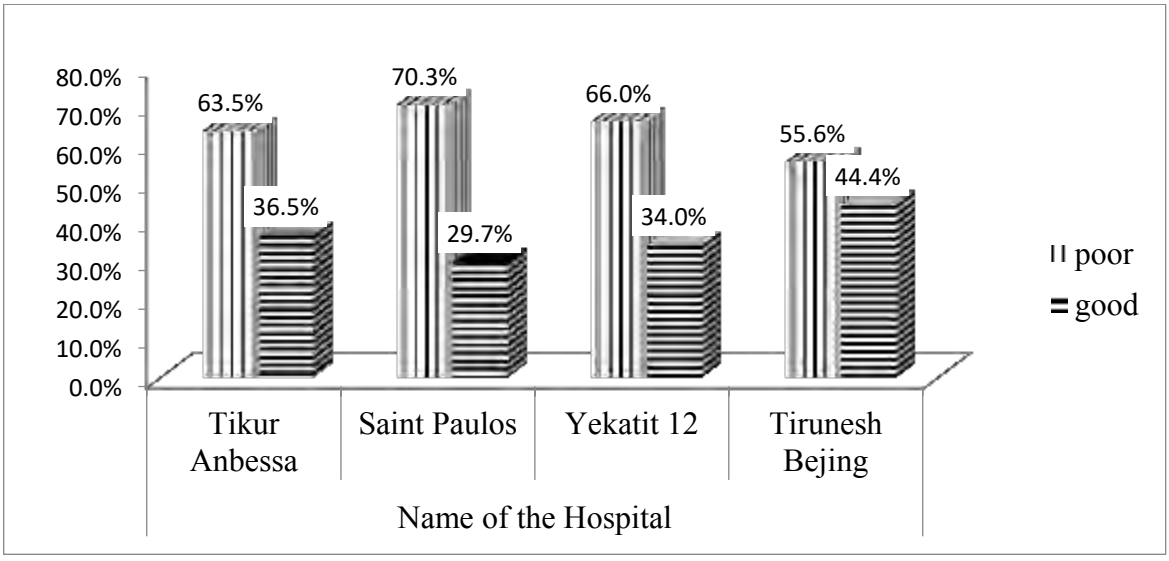

Figure 7: Distribution of nutrition practices among pregnant mothers that had attended ANC clinics in 4 selected public hospitals, Addis Ababa, Ethiopia, 2015. (N = 322)

5.6. Bivariate and Multivariate of nutrition knowledge, Attitudes and practices of study participants

In this study bivariate analysis, educational status of mothers, husband educational level, occupation, monthly average income and attitude had statistical association with the knowledge of mothers on nutrition during pregnancy ($p<0.001$). Associated diseases with pregnancy had significant association with nutritional knowledge during pregnancy ($p<0.05$). whereas, husband occupation, family size, type of previous delivery, number of pregnancies, number of antenatal visits and nutrition information have no association with the knowledge of mothers on nutrition during pregnancy ($p>0.05$).

After bivariate analysis, those predictors which showed statistical significance and p value less than 0.2 were used to run multivariate analysis. In a multivariate analysis, those who had secondary school educational status were 3 times more likely knowledgeable about nutrition during pregnancy than who had primary school or no formal education (AOR=3.047, 95% CI: 1.046-8.873) and also those respondents who had Diploma and above were 8 times more likely knowledgeable about nutrition during pregnancy than women who had primary school or no formal education (AOR=8.054, 95% CI: (2.843 26.130).

In addition, in a multivariate analysis average monthly income, number of pregnancies, and attitude had significant positive relationships with a woman's odds of nutrition knowledge during pregnancy with p value of $p<0.01$, $p<0.5$ and $p<0.001$ respectively. Relative to women with unfavorable attitude, women with favorable attitude had significantly greater odds of nutrition knowledge during pregnancy (AOR=4.4, 95% CI: 2.315-8.299) as indicated in Table 6

In the other hand, husband educational level, occupation and associated diseases with pregnancy didn't show significant association with knowledge of mothers on nutrition during pregnancy on further multivariate analysis.

Regarding attitude, bivariate analysis shows that educational status, husband educational status, occupation, type of previous delivery and knowledge had significant association on maternal attitude towards nutrition during pregnancy($p<0.05$). Age, family size, husband occupation, associated diseases, number of pregnancy, number of antenatal visits and nutritional information had not association with maternal attitude.

On multivariate analysis, only knowledge level of respondents had significant association with maternal attitude towards nutrition during pregnancy ($p<0.001$). Those knowledgeable women had 5.5 times more likely to had favorable attitude about nutrition during pregnancy than women who were not knowledgeable (AOR=5.5, 95% CI: 2.411-12.650) as indicated in table 7.

Concerning practices, in bivariate analysis age, types of previous delivery, educational status of women and their husbands had significant association with practices of mothers on nutrition during their pregnancy ($P<0.05$) and women's occupation, their husband occupation, monthly average income, attitude and knowledge had statistical association with good practices of mothers on nutrition during their pregnancy ($P<0.001$). Whereas, family size, pregnancy associated diseases, number of antenatal visits, nutritional information and number of pregnancies had no association with practices of mothers on nutrition ($P>0.05$).

In a multivariable analysis husband education and occupation, monthly average income and knowledge were displayed significant positive relationships with a woman's odds of nutrition practices during pregnancy ($P<0.05$). Relative to not knowledgeable women, those who were knowledgeable respondents had significantly more odds of practices on nutrition during pregnancy (AOR= 2.675, 95% CI: 1.138-6.288)

The finding of this study shows that women whose husbands had diploma and above educational status had 6.375 times more likely to have good nutritional practices than women whose husbands had primary or no formal learning during pregnancy (AOR=6.375, 95%CI: 1.798-22.605) and also wives of employed husbands had 2.896 times more likely good nutritional practices than those who had unemployed husbands AOR = 2.896, 95% CI: 1.256-6.675) as shown in table 8.

In addition the finding revealed that average monthly income had significant association with practices of mothers on nutrition (P<0.05).Women who had >3500 birr per month during pregnancy had 3 times more likely to have good nutrition practices than women who had no information during pregnancy (AOR= 3.073, 95% CI: 1.010-9.350).

Table 6: Bivariate and Multivariate of nutrition knowledge of study participants

Variables		Knowledge		95% CI	
		Yes	No	COR	AOR
Education	**Diploma and above**	55(53.4%)	48(46.6%)	19.5(7.842-48.384)***	**8.054(2.843-26.130)****
	Secondary school	26(23.4%)	85(76.6%)	5.2(2.045-13.222)**	**3.047(1.046-8.873)***
	Primary & no formal education	6(5.6%)	102(94.4%)	1	1
Husband education	**Diploma and above**	49(48.5%)	52(51.5%)	7.4(3.464-15.996)***	1.276(0.452-3.604)
	Secondary school	28(21.2%)	104(78.8%)	2.1(0.976-4.635)	1.015(0.384-2.682)
	Primary & no formal education	10(11.2%)	79(88.8%)	1	1
Occupation	**Employee**	28(51.9%)	26(48.1%)	4.2 (2.228-7.927)***	0.889 (0.378-2.094)
	Private business	18(26.9%)	49(73.1%)	1.4 (0.756-2.719)	0.46 (0.200-1.040)
	House wives	41(20.4%)	160(79.6%)	1	1
Monthly average income	**> 3500**	54(46.6%)	62(53.4%)	13.4(5.414-32.941)***	**5.95(2.025-17.480)****
	2000-3500	27(25.0%)	81(75.0%)	5.1(2.009-13.002)**	**3.093(1.076-8.890)****
	< 2000	6(6.1%)	92(93.9%)	1	1
Obstetric score	**Multigravida**	71(29.8%)	167(70.2%)	1.807(0.980-3.330)	**2.175(1.034-4.573)***
	Premigravida	16(19.0%)	68(81.0%)	1	1
Associated diseases	**Yes**	15(41.7%)	21(58.3%)	2.1 (1.039-4.337)*	0.655(0.276-1.554)
	No	72(25.2%)	214(74.8%)	1	1
Attitude	**Favourable**	67(42.9%)	89(57.1%)	5.496(3.124-9.666)***	**4.4(2.315-8.299)*****
	Unfavourable	20(12.0%)	146(88.0%)	1	1

***= $p<0.001$, ** = $p<0.01$, *=$p<0.05$, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

Table 7: Bivariate and Multivariate of nutrition Attitudes of study participants

Variables		Attitudes		95% CI	
		Favourable	**Unfavourable**	**COR**	**AOR**
Education	**Diploma and above** **Secondary school** **Primary & no formal education**	68(66.0%) 49(44.1%) 39(36.1%)	35(34.0%) 62(55.9%) 69(63.9%)	3.437(1.952-6.054)*** 1.398(0.813-2.406) 1	0.826(0.275-2.482) 0.721(0.320-1.621) 1
Husband education	**Diploma and above** **Secondary school** **Primary & no formal education**	62(61.4%) 65(49.2%) 29(32.6%)	39(38.6%) 67(50.8%) 60(667.4%)	3.289(1.810-5.978)*** 2.007 (1.147-3.512)* 1	1.572 (0.529-4.671) 1.994 (0.943-4.215) 1
Occupation	**Employee** **Private business** **House wives**	34(63.0%) 33(49.3%) 89(44.3%)	20(37.0%) 34(50.7%) 112(55.7%)	2.139(1.153-3.971)* 1.221(0.702-2.125) 1	1.569(0.421-3.452 0.681(0.296-1.569) 1
Monthly average income	**> 3500** **2000-3500** **< 2000**	68(58.6%) 54(50.0%) 34(34.7%)	48(41.4%) 54(50.0%) 64(65.3%)	2.667(1.529-4.651)** 1.882(1.074-3.300)* 1	2.237(0.905-5.530) 0.975(0.447-2.127) 1
Previous delivery	**Abnormal** **Normal**	57(60.0%) 60(45.1%)	38(40.0%) 73(54.9%)	1.825(1.070-3.113)* 1	1.184(0.630-2.225) 1
Knowledge	**Knowledgeable** **Not knowledgeable**	67(77.0%) 89(37.9%)	20(23.0%) 146(62.1%	5.496(3.124-9.666)*** 1	**5.5(2.411-12.650)***** 1

***= p<0.001, ** = p<0.01, *=p<0.05, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

Table 8: Bivariate and Multivariate of nutrition practices of study participants

Variables		Practices		95% CI	
		Good	Poor	COR	AOR
Age	**35-44**	12(42.9%)	16(57.1%)	4.607(1.542-13.767)**	0.639(0.121-3.377)
	25-34	92(37.7%)	152(62.3%)	3.718(1.606-8.610)**	0.901(0.225-3.619)
	15-24	7(14.0%)	43(86.0%)	1	1
Education	**Diploma and above**	58(56.3%)	45(64.0%)	9.419(4.686-18.934)**	1.202(0.308-4.695)
	Secondary school	40(36.0%)	71(64.0%)	4.117(2.050-8.267)**	1.837(0.598-5.643)
	Primary & no formal education	13(12.0%)	95(88.0%)	1	1
Husband education	**Diploma and above**	64(63.4%)	37(36.6%)	7.892(4.015-15.511)***	**6.375(1.798-22.605)****
	Secondary school	31(23.5%)	101(76.5%)	1.400(0.714-2.748)	1.905(0.661-5.491)
	Primary & no formal education	16(18.0%)	73(82.0%)	1	1
Occupation	**Employee**	28(51.9%)	2648.1%)	3.341(1.791-6.231)***	1.522(0.505-4.581)
	Private business	34(50.7%)	33(49.3%)	3.196(1.795-5.692)***	1.229(0.491-3.074)
	House wives	49(24.4%)	152(75.6%)	1	1
Husband occupation	**Employee**	41(49.4%)	42(50.6%)	2.357(1.412-3.935)**	**2.896(1.256-6.675)***
	Not employee	70(29.3%)	169(70.7%)	1	1
Monthly average income	**> 3500**	70(60.3%)	46(39.7%)	13.391(6.310-28.419)***	**3.073(1.010-9.350)***
	2000-3500	31(28.7%)	77(71.3%)	3.543(1.631-7.695)**	1.459(0.501-4.249)
	< 2000	10(10.2%)	88(89.8%)	1	1
Previous delivery	**Abnormal**	45(47.4%)	50(52.6%)	2.425(1.392-4.226)**	1.632(0.776-3.432)
	Normal	36(27.1%)	97(72.9%)	1	1
Knowledge	**Knowledgeable**	55(63.2%)	32(36.8%)	5.494(3.237-9.325)***	**2.675(1.138-6.288)***
	Not knowledgeable	56(23.8%)	179(76.2%)	1	1
Attitude	**Favourable**	69(44.2%)	87(55.8%)	2.342(3.237-9.325)***	1.577(0.728-3.414)
	Unfavourable	42(25.3%)	124(74.7%)	1	1

***= p<0.001, ** = p<0.01, *=p<0.05, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

6. Discussion

This study was conducted to investigate the level of nutritional knowledge, attitudes and their dietary practices of pregnant women during pregnancy and associated factors in Addis Ababa, Ethiopia.

This study revealed that 60(18.6%) and 56(17.4%) of the respondents did not know the meaning and component of balanced diet respectively. This study result was not agreed with the study reported from Guto Gida woreda, East Wollega Zone, Ethiopia that more than half (57.8% and 74.0%) of women did not know the meaning of food and the main food groups respectively (1). This might be due to the difference in educational status of respondents.

The findings of this study illustrated that the knowledge about importance of milk and its products, importance of protein, importance of iron, the common food sources of vitamins, calcium and iron was 87(27%), 86(26.7%), 149(49.4%), 171(53.1%), 75(23.3%) and 54(16.8%) respectively which was much lower (78.2%, 68.5%, 57.3%, 62.9%, 71.8% and 61.3% respectively) than reported by Latifa et al((34). It might be due to the low nutrition information and low socio-economy of the study participants.

This study result showed that 147(45.7%) and 114(35.4%) of respondents had the knowledge (complete score) that the danger of malnutrition on the mother and baby respectively. This result was in agreed with the result from east Wollega that 34.8 % respondents had the knowledge that inadequate nutrition during pregnancy can be the cause of miscarriage or preterm birth and agreed with a study conducted in America at EL-Hospital in which the women in the study lacked the awareness of consequences of inadequate nutrition during pregnancy on the mother and fetus (1, 34).

In general according to the answers given by the respondents to the knowledge assessing questions, only 87(27%) of respondents were knowledgeable about nutrition during pregnancy. This figure is lower than the study conducted in east Wollega (64.4%) and Malawi (70%) of pregnant women had knowledge on nutrition (1, 39)). This low nutritional knowledge might be due to avoiding of guessed answers by asking open ended questions and low information about nutrition during pregnancy.

Regarding Attitude, majority of the respondents, 287(89.1%) like the taste of milk and milk products during pregnancy which was in agreed with a study conducted in America that 88.7% of respondents like the taste of milk and its products during pregnancy (34). Most of the respondents 280(87%) thought that eating more proteins or beans during pregnancy was good which was higher than the above study result that 82.3% respondents thought that eating more proteins during pregnancy was good. This might be due to ―Enjera" with ―shiro" is the staple diet for the majority of Ethiopians, which means ―Shiro" constitutes bean, pea and chick pea.

Concerning practices, findings of this study showed that 26(8.1%), 87(27%) and 101(31.4%) of respondents had practices of following specific dietary regimen, habit of eating fresh vegetables and daily drinking of milk respectively which was lower (25.8%, 58.9% and 42.7% respectively) than the result of the study from America. It might be due to the culture and socio economic difference (34).

Further this study showed that the majority, 209(65%) of respondents had 4 and above meal frequency per day, more than two third, 219 (68%) of the respondents had practiced the habit of eating snacks between meals and 204(63.4%) of respondents had the Habit of eating more carbohydrates between meals during their pregnancy which was higher than the study conducted in East Wollega, that revealed only 33.9% of respondents had 3 and above meal frequency per day, the frequency of snack consumption per day was 40.1% and 29.1% of respondents had the habit of eating more carbohydrates between meals(11). This might due to the difference in residence and economy.

This study uncovered that most, 303(94.1%) of the respondents had the habit of eating either plant or animal protein daily which was greater(42.7%) than the study conducted by Latifa and et al(34). This difference might be due to Ethiopians use plant proteins to prepare their staple food.

The findings also showed that majority, 204(63.4%) of respondents had good iron supply during pregnancy which was in agreed the result (63.7%) from America (34) and Similar study from India on antenatal mothers showed that iron folate tablet was adequately consumed by 62% of mothers among the study population(31). Only 25(7.8%) of respondents knew as they had taken folic acid before 3 months and within 3 months after conception. This figure is much lower than the study result from Pakistan and Australia (51.25% and 81.6% respectively) (20, 27). The

difference could be attributed to socio-economic differences and the low coverage of pre-conception care in Ethiopia.

In general, 111(34.5%) of the respondents were found to have good practice depending up on questions offered to them to assess practice of mothers' nutrition during their pregnancy. This figure was similar with the study conducted in Wollega that 33.9% of the pregnant women had good practices on nutrition during pregnancy (11).

Associated factors of nutritional knowledge, attitudes and practices of mothers during pregnancy

In this study age was not important predictor of knowledge of pregnant women in the study area. The finding of the study is similar with findings from East Wollega, Ethiopia(1). Nutritional information also was not associated with maternal nutritional knowledge which is not similar with the above study. The probable reason for observed discrepancy may be the difference study setting of the two-study population with respect to exposure to adequate nutrition information during pregnancy which was related with client load in the selected public Hospitals.

Educational level, monthly income and attitude during pregnancy were identified as important predictors of knowledge of women on nutrition during pregnancy among the study participants in multivariate analysis. Similar study conducted in Wollega showed that educational level and monthly income were significantly associated with maternal nutritional knowledge (1). The finding of this study identified that attitude about nutrition during pregnancy had significant association with nutrition knowledge of mothers during pregnancy ($p<0.001$). In multivariate analysis those women who had favorable attitude about nutrition were significantly greater odds nutrition knowledge compared to the pregnant women with unfavorable attitude about nutrition during pregnancy (AOR=4.4, 95%CI: 2.315-8.299). In similar study conducted in Malaysia demonstrated that individuals with better nutritional knowledge levels are significantly higher in educational level, nutritional attitude and occupational status. The finding of the study stated that individuals with a higher educational level had better nutrition knowledge and higher nutrition knowledge of employed women in study may be explained by more access to internet, books and magazines as source of information in work area(40).

Obstetric score also had significant association with nutritional knowledge (P< 0.05). Multigravida women had greater odds of nutrition knowledge than premigravida women (AOR = 2.175, 95% CI; 1.034-4.573). This difference attributed to multigravida mothers might have greater opportunity (through experience) to get nutrition information than premigravida women.

This study result revealed that knowledgeable women had 5.5 times more likely to have favorable attitude than who were not knowledgeable about nutrition during pregnancy (AOR = 5.5, 95% CI: 2.411-12.650). This difference might be knowledgeable women prefer nutrition for its nutritional value rather than its taste, color and prestige.

Knowledge was significant predicting factors for practices in this study, women who were knowledgeable about nutrition during pregnancy had more odds of practices than women who were not knowledgeable (AOR = 2.675, 95 CI: 1.138-6.288). This result supported by the fact that good knowledge about basic nutrients and adequate well balanced diet usually resulting in positive dietary practices which are important determinants of optimum health from conception until death (1). Husband education, husband occupation and monthly income were significantly associated with nutrition practices of women during pregnancy. This was might be due to the majority of participants were house wives and they were economically dependent on their husbands. Similar finding in Tanta city, USA showed that most of women were housewives and most of them stated that inadequate income considered as one of the main problems affecting the intake of well balanced diet during pregnancy (34).

7. Strength and Limitation

7.1. Strength

- It was conducted within a good time which was free from seasonal influence
- The study was conducted in four public hospitals that give Antenatal care among 8 Public Hospitals in Addis Ababa; therefore, it can be generalize to Public Hospitals of Addis Ababa, Ethiopia

7.2. Limitation

- The experience of pregnant women attended private Hospitals was not explored.
- The fact that studies conducted in Ethiopia are limited on the topic, no enough literature to discuss with Ethiopian context
- Due to social desirability bias respondents might respond what they didn't believe and experience

8. Conclusion and Recommendation

8.1. Conclusion

Based on the findings of the present study, It can be concluded greater than two third (of pregnant women aged less than 35 years which is advisable to being pregnant. The majority of them were housewives with and less than one third of respondents were earned less than 2000 birr per month. Where more than half of women in the present study lacked the basic and the essential knowledge regarding the importance, constituents and sources of most of the types of vitamins and minerals.

This study also showed that most of women had a poor level of knowledge and practices about nutrition during pregnancy. Furthermore, the most significant predicting factors for knowledge in this study were high women education followed by monthly income and attitude. Monthly income, husband education and occupation were significant predicting factors for nutritional practices during pregnancy. Again, this study presented the association between women's knowledge, attitude and practices of nutrition during pregnancy. So, it is obvious that good knowledge about maternal nutrition usually resulting in good dietary practices which are important for health of the mother and the fetus.

8.2. Recommendations:

Health and Health related staffs:

- It is recommended providing adequate health education about proper and balanced maternal nutrition at pre-conception care for future mothers and during early pregnancy. In addition it is better to prepare leaflets on maternal nutrition and give them for mothers.

Health and Health related managers:

- Supplyin the antenatal units and MCH centers with enough vitamins and minerals necessary for pregnant women and supplying them with adequate audiovisual materials that help nurses in health teaching.
- Enforce good prenatal care nutritional counseling of supplementation of iron and folic acid.
- But it needs further study to find out the reason behind the low coverage of minerals.

The Community at large

- Should focus on education and to eradicate poverty.

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Annexes

Annex 1. Information Sheet

Information sheet and Consent form for pregnant women (EnglishVersion)

Addis Ababa University , School of allied health sciences,Department of Nursing Midwifery

Section I. Information sheet

01. Name of the study area (Hospitals) _____

02. Questionnaire identification no. _____

INTRODUCTION: Good morning/afternoon? My name is _____. In this

Study which is undertaken by Addis Ababa University, College of Health sciences, school of allied Health sciences, department of Nursing and Midwifery, you and me would have a short discussion of about 20-30 minutes only and I am asking you to help us. Before we go to our discussion, I will request you to listen carefully to what I am going to read to you about the purpose and general condition of the study and you will tell me whether you agree or disagree to participate in this study at the end.

The purpose of this study is to assess nutritional Knowledge, Attitude and Dietary practices of pregnant women attending ANC clinics in public Hospitals in Addis Ababa, 2015. The study will be conducted through interviews. The results of the study will inform design of the nutrition education intervention strategies targeting pregnant women‟ due to their importance in reproductive and productive roles in the society. I would like to assure you that privacy will be maintained strictly throughout. A code number will identify every participant and no name will be used. Your responses to any of the questions will not be given to anyone else and no reports of the study will ever identify you. If a report of results is published, only information about the total group will appear.

The interview is voluntary and your participation / non-participation, or refusal to respond or stop responding to the questions will have no effect now or in the future on services that you or any member of your family may receive from the service providers.

Are you willing to participate in this study?

1. **[ ] Yes. 2. [ ] No**

Thank you!!!

NB: 1. If the study subjects agree to participate in the study, go to consent form

2. No need of enforcing the clients to be included in the study

Annex 2. Consent

Section II. Consent form for pregnant women (English Version)

I undersigned have been informed about the purpose of this particular research project. I have been informed that I am going to respond to this question by answering what I know concerning the issue. I have been informed that the information I give will be used only for the purpose of this study and my identity as well as the information I give will be treated confidentially. I have also been informed that I can refuse to participate in the study or not to respond to questions if I am not interested. Furthermore I have been informed that I can stop responding to the questions at any time in the process. Based on the above information I agree to participate in this research voluntarily.

Signature: _____

Date: _____

NB: 1. If the study subject is voluntary to participate in the study, start the interview.

2. Interviewer signature certifying that informed consent has been given verbally by the respondent.

Name _____

Signature _____

Date _____

Tele. _____

3. If there are things that require clarification please don't hesitate to ask the Interviewer or the principal investigator for clarification.

Address of the principal investigator

Mikyas Arega

Addis Ababa University, College of Health Sciences, School of allied health sciences, Department of Nursing and Midwifery

Mobile: 09-13-51-69-94

Email: miky24real@gmail.com

Addis Ababa

Annex 3. English version Questionnaire

Table 7: Socio-Demographic Characteristics

S.no.	Question	Response	Skip
101.	Age	_____years	
102.	Marital status	1. Single 2. Married 3. Divorced 4. widowed 5. Separated	
103.	Religion Orthodox	1. Orthodox Tewahdo 2. Muslim 3. Catholic 4. Protestant 5. Others(specify)_____	
104.	Ethnicity	1. Amhara 2. Tigrie 3. Oromo 4. Guragie 5. others specify_____	
105.	Family size	1.One 2. Two 3. three 4. four 5. Five and above	
106.	Educational level	1. No formal learning 2. primary school 3. secondary school 4. college education 5. other specify_____	
107.	Your husband educational level	1. No formal learning 2. primary school 3. secondary school 4. college education 5. other specify_____	
108.	Occupation	1. Housewife 2. Private business 3. Employee 4. Other specify_____	
109.	Your husband occupation	1. Housewife 2. Private business 3. Employee 4. Other specify_____	
110.	Monthly income	_____	
Obstetrics and medical Characteristics			
201.	Obstetrical score.	1. Gravida_____ 2. Para_____	

202.	Previous delivery	1. Normal 2. Abnormal	
203.	Associated diseases:	1. Hypertension 2. Diabetes 3. Renal disease 4. Other specify___ 5. No	
204.	How many antenatal visits do you have on the current pregnancy?	1. One 2. Two 3. Three 4. Four 5. Other specify	
205.	Have you gotten pregnancy related nutritional information?	1. Yes 2. No	If Yes, from where? 1. Health provider 2. Family 3. Media 4. Friends 5. Others specify _____

Knowledge Questions

301. What is Good balanced diet mean for you?

_____

1. A balanced diet means getting the right types and amounts of foods and drinks to supply nutrition and energy for maintaining body cells, tissues, and organs, and for supporting normal growth and development.
1. Doesn't know

Preliminary analysis: Knows: 1. Complete (if knows more than one) _____
2. Incomplete_____
3. Does not know_____
Number of correct responses_____

302. How should a pregnant woman eat in comparison with a non-pregnant woman to provide good nutrition to her and her baby to help him grow?

_____

1. Eat more frequently (eat more times each day)
2. Eat more protein-rich foods
3. Eat more iron-rich foods
4. Use iodized salt when preparing meals
5. Other
6. Doesn't know

Preliminary analysis: Knows: complete(if knows more than one)_____
Incomplete_____

Does not know_____

Number of correct responses_____

303. Can you list the Componamnt of balanced diet?

_____

1. Carbohydrate
2. Fat
3. Protein
4. Minerals
5. Vitamins
6. Fiber
7. Water
8. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

304. Can you list Sources of protein (animal& plants)?

_____

1. **Plant sources** of protein that contains all nine essential amino acids in adequate proportions: Legumes: beans, chickpeas, lentils, peas, peanuts, soybeans and
   Complementary sources: Grains like barley, oats, rice, wheat, sun flower, sesame
   Animal sources: meat and other animal products are complete proteins.
2. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

305. What is the importance of protein for both mother &baby?

_____

a. It provides the amino acids needed for adequate bone and muscle development, for development of new cells in the placenta and maternal tissues and encourages healthy blood production. And also has been linked to lower the risk of neonatal death and the occurrence of certain birth defects.
b. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

306. Can you list Sorces of vitamins?

_____

a. Meat,
b. poultry,
c. fish,
d. seafood,
e. eggs,
f. milk and milk products,
g. fruits,
h. vegetables and
i. grains
j. others specify:_____
k. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

307. List the Source of calcium.

_____

1. Milk,
2. Cheese,
3. Yogurt
4. Spinach
5. Others specify:_____
6. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

308. What is the importance of milk & its products?

_____

1. Dairy products are excellent sources of calcium, protein, vitamin D, andphosphorus. These nutrients are important for baby's developing bones, teeth, muscles, heart, and nerves, and for blood clotting.
2. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

309. Most women would benefit from two types of supplements, or tablets, during pregnancy. Which are they?

_____

a. Iron supplements
b. Folic acid supplements
c. Others specify_____
d. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

310. What is the health benefit for taking folic acid supplements/tablets?

_____

a. For normal development of the nervous system of the unborn baby (brain, spine and skull)
b. To prevent birth defects/abnormalities the nervous system of the unborn baby (brain, spine and skull)
c. Others specify _____
d. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

311. Can you list examples of foods rich in iron?

_____

1. Organ meat: Liver, Kidney, Heart
2. Flesh meat: Beef, Lamp, Goat, andChicken
3. Fish and seafood
4. Teff
5. Egg

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

312. What is the importance of Iron?

a. To prevent physiologic anemia

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

313. It is recommended that a woman waits at least two or three years between pregnancies, that is before coming pregnant once again. Please can you tell me why this is recommended?

_____

a. To rebuild/fil up their body stores of nutrients (fat, iron and others)
b. For the mother to be healthier before having a new baby/to be prepared for the arrival of a new baby
c. Other specify _____
d. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

314. Describe the dangers of malnutrition for pregnant women.

_____

a. increased infection,
b. anemia,
c. decreased immune function,
d. lethargy and weakness,
e. low productivity,
f. obstructed labor,
g. high maternal mortality on the mother
h. others specify _____
i. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

315. Describe the dangers of malnutrition for the fetus.

_____

1. Increased fetal and neonatal death,
2. Intrauterine growth retardation,
3. Low birth weight, preterm delivery,
4. Decreased immune function,

5. Birth defects,
6. Cretinism and decreased IQ.
7. Others_____
8. Doesn't know

Preliminary analysis: Knows: complete (if knows more than one) _____

Incomplete_____

Does not know_____

Number of correct responses_____

Table 8: Attitude questions

Questions	**Perceived benefis:**
401. How good do you think it is to eat more food during pregnancy?	1. Not good 2. o u're not sure 3. Good
402. How good do you think it is to eat more carbohydrate than non-pregnancy?	1. Not good 2. o u're not sure 3. Good
403. How good do you think it is to eat more proteins or beans during pregnancy?	1. Not good 2. o u're not sure 3. Good
404. How good do you think it is to have more milk & its products during pregnancy?	1. Not good 2. o u're not sure 3. Good
405. How good do you think it is to prepare meals with iron-rich foods such as beef, chicken or liver?	1. Not good 2. o u're not sure 3. Good
406. How much do you like the taste of meat and other iron-rich food item or meals	1. Dislike 2. o u're not sure 3. Like
407. How much do you like the taste of omega 3 rich foods like: olive oils, fish…?	1. Dislike 2. o u're not sure 3. Like
408. How much do you like the taste of milk and milk products?	1. Dislike 2. o u're not sure 3. Like
409. How good do you think it is to prepare meals with iodized salt?	1. Not good 2. o u're not sure 3. Good

Table 9: Practice Questions

501. Do you follow specific dietary regimen during pregnancy?	1. Yes 2. No 3. Don't know/no answer	
502. Did you use salt to cook the main meal eaten by members of your family last night?	1. Yes 2. No 3. Don't know/no answer	If Yes: What kind of salt did you use? 1. Iodized 2. Not iodized 3. Don't know/no answer
503. Do you eat fresh citrus fruits, such as: Orange, Lemon, mango, or drink juice made from them?	1. Yes 2. No 3. Don't know/no answer	If Yes: how many times? 1. Once a day 2. Twice a week 3. Three times 4. Other specify_____ 5. Don't know
504. If yes for question No.4, When do you usually eat fresh citrus fruits?	1. 2 hours Before a meal 2. During the mealor just after a meal 3. 2 hours Aftr a meal 4. Other (specify) ____ 5. Don't know	
505. Do you drink coffe or tea?	1. Yes 2. No 3. Don't know	If yes, When do you usually drink coffe or tea? 1. Two hours or more before or after a meal 2. Right before a meal 3. During the meal 4. Right aftr a meal 6. Other (specify)_____ 7. Don't know/no answer
506. Do you have iron supplement?	1. Yes, I have 2. No, I have not 3. Don't know	If yes, do you take it daily? 1. Yes 2. No 3. Don't know
507. Do you have folic acid supplement?	1. Yes, I have 2. No, I have not 3. Don't know	If yes, when did you start taking this supplement? 1. Before pregnancy 2. Within the first trimester 3. Later 4. Don't know
508. How many times do you have meal daily?	1. Once 2. Twice 3. Three times 4. Four and above	

509. Do you have the habits of eating snacks between meals?	1. Yes, I have 2. No, I have not 3. Don't kno	
510. Do you the habits of eating more carbohydrates between meals?	1. Yes, I have 2. No, I have not 3. Don't know	
511. Do you eat protein (plant source) daily?	1. Yes 2. No 3. Don't know	If yes, how many times? 1. Once a day 2. Twice a week 3. 3 times a week 4. Other specify _____ 5. Don't know
512. Do you eat fresh vegetables?	1. Yes 2. No, 3. Don't know	If yes, how many times? 1. Once a day 2. Twice a week 3. 3 times a week 4. Other specify ____ 5. Don't know
513. Do you drink milk?	1. Yes, I have 2. No, I have not 3. Don't know	If yes, how many times? 1. Once a day 2. Twice a week 3. 3 times a week 4. Other specify ____ 5. Don't know
514. Do you eat milk products?	1. Yes 2. No 3. Don't know	If yes, how many times? 1. Once a day 2. Twice a week 3. 3 times a week 4. Other specify_____ 5. Don't know
515. Do you eat meat?	1. Yes 2. No 3. Don't know	If yes, how many times? 1. Once a day 2. Twice a week 3. 3 times a week 4. Other specify_____ 5. Don't know
516. Do follow your weight during pregnancy?	1. Yes 2. No 3. Don't know	

Annex 4: Amharic Version Information sheet

ነፍሰ- ጡር ለሆኑ ሴቶች የመረጃ መስጫና የፈቃደኝነት መጠየቂያ ቅጽ
አዲስ አበባ ዩኒቨርስቲ
ጤና ሳይንስ ኮሌጅ፣ ነርሲንግና ሚድዋይፍሪ ት/ት ቤት
ክፍል አንድ፤ የመረጃ መስጫ ቅጽ

1. ጥናቱ የሚካሄድበት ሆስፒታል ስም----------
2. የመጠይቁ መለያ ቁጥር----------

መግቢያ፡ እንደምን አደሩ/ዋሉ ስሜ---------- ይባላል፡፡ በአዲስ አበባ ዩኒቨርስቲ፤ በጤና ሳይንስ ፋኩሊቲ ፤ በነርሲንግና ሚድዋይፈሪ ት/ቤት አስተባባሪነት በሚከናወነው ጥናት እኔና አርሰዎ አጠር ያለና ከ 20-30 ደቂቃ ሚወስድ ውይይት ይኖረናል፡፡ ለዚህም ውይይት እነዲተባበሩኝ በትህትና እጠይቃለሁ፡፡ ወደ ውይይቱ ከመግባታችን በፊት ስለ ጥናቱ አላማና ጠቅላላ ሁኔታ ስለማነብለዎት በጥሞና እንዲያዳምጡኝ እጠይቃለሁ፡፡ በመጨረሻም በጥናቱ ለመሳተፍ መስማማትዎንና አለመስማማትዎን ይነግሩኛል፡፡

የዚህ ጥናት አላማ በአዲስ አበባ የሚኖሩ ነፍሰ-ጡር ሴቶች ስለ ምግብ ያላቸውን ግንዛቤ፣ አመለካከት እና ተግባር ምን እንደሚመስል ለማወቅ ሲሆን ጥናቱ የሚካሄድበት መንገድ በመረጃ ሰበሰባቢው በሚቀርብ መጠይቅ ይሆናል ::እርሰዎ የሚሰጡት መረጃ በአዲስ አበባና በሀገር አቀፍ ደረጃ ለሚገኙ ነፍሰ-ጡር ሴቶች ስለ ምግብ የሚያስፈልጋቸውን መረጃ ለማዳረስ ይረዳል፡፡

በቆይታዎ ሁሉ ምስጢር እንደምንጠብቅ እያረጋገጥኩኝ ለእያንዳነዱ ተሳታፊ የተለየ መለያ ቁጥር ሲሆን ስመዎን ግን አንጠቅስም :: ለማንኛውም ጥያቄ የሚሰጡት ምላሽ ለሌላ ሰው ተላልፎ አይሰጥም፡፡ የጥናቱ ውጤት ሪፖርትም ስለ እርሰዎ አይገልጽም፡፡ በተጨማሪም የጥናቱ ሪፖርት ቢታተም የሚያወጣው ስለ አጠቃላይ ተሳታፊ ሰዎች ብቻ ይሆናል፡፡ መጠይቁ በፈቃደኝነት ላይ ብቻ ሲሆን የእርሰዎ መሳተፍ ወይም አለመሳተፍ እንዲሁም ጥያቄዎችን ለመመለስ ፈቃደኛ አለመሆንና በጥቄው ወቅት አቋርቶ መውጣት አሁንም ይሁን ወደፊት እርሰዎም ይሁኑ ቤተሰበዎ በሚያገኙት አገልግሎት ላይ ምንም አይነት ተጽዕኖ አይኖረውም፤ በጥናቱ ላይ ተሳታፊ በመሆነዎም የነሚሰጥ ክፍያም አይኖርም፡፡

ለመሳተፍ ፈቃደኛ ነዎት?

1. ( ) አዎ 2. ( ) አይደለሁም

አመሰግናለሁ!!!
ማስታወሻ፡ የትናቱ ተሳታፊ በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ከሆኑ ወደ ፈቃደኝነት ማረጋገጫ ቅጽ ይለፉ፡፡

Annex 5: Amharic version consent form

ክፍል 2፡ ነፍሰ-ጡር ለሆኑ ሴቶች የፈቃደኝነት መጠየቂያ ቅጽ

ከታች ፊርማየን ያኖረኩት እኔ የጥናቱ ዓላማ የተነገረኝ ሲሆን ለምጠየቀው ጥያቄ የማቀውን መመለስ እንደምችል፤ እኔ የምሰጠው ለዚህ ጥናት አገልግሎት ብቻ የሚውል ሲሆን ስሜንና የምሰጠውን መረጃ በምስጢር እንደሚጠበቅ ተነግሮኛል፡፡ ፍላጎት ከሌለኝ በጥናቱ ያለመሳተፍ ፤ጥያቄ ያለመመለስና በጥያቄው መካከል አቋርጬ መውጣት እንደምችል ተነግሮኛል፡፡ በዚህ መሰረት በጥናቱ ለመሳተፍ ፈቃደኛ መሆኔን በፊርማየ አረገግጣለሁ፡፡

ፊርማ ----------
ቀን ----------

ማስታዎሻ፡

1. የጥናቱ ተሳታፊ በጥናቱ ፈቃደኛ ከሆኑ መጠይቁን ይጀምሩ፡፡
2. የጥናቱ ተሳታፊ ፈቃደኛ መሆናቸውን የሚያረጋግጥ የመረጃ ሰብሰባቢው ስምና ፊርማ
   ስም _____
   ፊርማ_____
   ስልክ _____

ማንኛውም ገለጻ የሚያስፈልጋቸው ነገሮች ካሉ መረጃ ሰበሰባቢውንም ሆነ ዋና ተመራማሪውን በአካልም ሆነ በአድራሻው ይጠይቁ፡፡

<u>የዋና ተመራማሪው አድራሻ ፡</u>
ሚኪያስ አረጋ
አዲስ አበባ ዩኒቨርሲቲ፤ ጤና ሳይንስ ኮሌጅ፤በነርሲነግና ሚድዋይፈሪ ድህረ ምረቃ ት/ቤት
ስልክ ቁጥር 09 13 51 69 94, ኢሜል፡ miky24real@gmail.com , አዲስ አበባ

Annex 6. Amharic Version Questionnaire

Table 10: ክፍል 1፡ ማህበራዊና ነባራዊ ሁኔታ

ተ.ቁ	ጥያቄ	መልስ
1.	ዕድሜ (በዓመት)	_____
2.	የጋብቻ ሁኔታ	1. ያላገባ 2. ባለትዳር 3. የፈታች 4. ባል የሞተባት 5. የተለያየች
3.	ሃይማኖት	1. ኦርቶዶክስ ተዋህዶ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ሌሎች (ይጠቀስ)
4.	ብሔር	1. አማራ 2. ትግሬ 3. ኦሮሞ 4. ጉራጌ 5. ሌሎች (ይጠቀስ)
5.	የቤተሰብ ብዛት	1. አንድ 2. ሁለት 3. ሦስት 4. አራት 5. አምስትናከዛበላይ
6.	የትምህርት ደረጃ	1. ያልተማረች 2. 1-8ኛ ክፍል 3. 9-12ኛ ክፍል 4. የኮሌጅ ት/ት እና ከዛ በላይ
7.	የባለቤትሽ የት/ት ደረጃ	1. ያልተማረ 2. 1-8ኛ ክፍል 3. 9-12ኛ ክፍል 4. የኮሌጅ ት/ት እና ከዚያ በላይ
8.	የስራ ሁኔታ	1. የቤት እመቤት 2. የግል ስራ 3. የመንግስት ሰራተኛ 4. ሌሎች (ይጠቀስ)
9.	የባለቤትሽ የስራ ሁኔታ	1. የግል ስራ 2. የመንግስት ሰራተኛ 3. ሌሎች (ይጠቀስ)
10.	የወርገቢ	1. ከ 2500 በታች 2. 2500-5000 3. 5001-10000 4. ከ 10000 በላይ

የወሊድ እና ጤና ሁኔታ			
11.	የወሊድ ሁኔታ፡ 1. ከአሁኑ ፅንስ ጋር ምን ያክል ጊዜ ፀንሰዋል? 2. ፅንስ ከ 28 ሳምንታት በላይ ለምን ያክል ጊዜ ፀንሰው ወልደው ያቃሉ?	1. _____ 2. _____	
12.	ለመጨረሻ ጊዜ ሲወልዱ	1. ችግር አላጋጠመኝም 2. ችግር ገጥሞኝ ነበር 3. አልወለድኩም	
13.	ከእርግዝናሽ ጋር የተያያዘ የበሽታ ሁኔታ	1. የደም ግፊት 2. የስኳር 3. የኩላሊት 4. ሌሎች (ይጠቀስ) 5. የለብኝም	
14.	ለዚህ ፅንስ ምንያክል የቅድመ-ወሊድ ክትትል አድርገዋል?	1. አንድ 2. ሁለት 3. ሦስት 4. አራትና ከዚያ በላይ	
15.	ከእርግዝና ጋር በተያያዘ ስለ ስርዐተ-ምግብ መረጃ አግኝተሻል?	1. አዎ	አዎ ከሆነ መልስዎ፡ መረጃውን ከየት አገኙ? 1. ከጤና ባለሙያ 2. ከቤተሰብ 3. ከመገናኛ ብዙሃን 4. ከጓደኛ 5. ሌሎች ምንጮች_____
		6. አላገኘሁም	
ግንዛቤን የተመለከተ መጠይቅ			
16.	የተመጣጠነ ምግብ ማለት ምን ማለት ነው?	_____	
17.	ነፍሰ- ጡር ሴትን ነፍሰ-ጡር ካልሆነች ሴት ጋር ስናወዳድር የአመጋገብ ሁኔታዋ ምን ምን መምሰል አለበት?	_____	
18.	የተመጣጠነ ምግብ ምን ምን ይይዛል?	_____	
19.	ፕሮቲን ከምን ከምን እናገኛለን?	ከእንስሳት፡_____ ከእፅዋት፡_____	
20.	ፕሮቲን ለእናትና ለፅንሱ የሚሰጠው ጥቅም ምንድን ነው?	_____	
21.	ቫይታሚን ከምን ከምን ምግቦች እናገኛለን?	_____	
22.	ካልሸየም የተባለውን ንጥረ-ምግብ የያዙ የምግብ አይነቶችን ግለጭልኝ?	_____	
23.	ከወተትና የወተት ተዋፅኦ ምግቦች ምን ምን ንጥረ- ምግቦች ይገኛሉ? 21.1. እነዚህ ንጥለ- ምግቦች ለእናትና ለፅነሱ ምን ጥቅም አላቸው?	_____	
24.	ለነፍሰ-ጡር እናቶች የሚሰጡ እና በእንክብል መልክ የሚዘጋጁ ንጥረ-ምግቦችን ቢያንስ ሁለቱን ይነግሩኛል?	_____	

25.	ቫይታሚን ቢ9 (ፎሊክ አሲድ) ለፅንሱ የሚሰጠው ጥቅም ምንድን ነው?	
26.	ደም ማነስን የሚከላከሉ ንጥለ- ምግቦችን የያዙ የምግብ አይነቶችን ሊዘረዝሩልኝ ይችላሉ?	
27.	አይረን የተባለው ንጥረ- ምግብ ጥቅሙ ምንድን ነው?	
28.	ልጅን ቢያንስ ለሁለት ዓመት አራረቆ መውለድ ለእናት የሚሰጠው ጤናዊ ጥቅም ምንድን ነው?	
29.	ያልተመጣጠነ ምግብ መመገብ እናት ላይ ሊያደርስ የሚእለውን የጤና ችግር ቢገልጹልኝ?	
30.	ያልተመጣጠነ ምግብ መመገብ በፅንሱ ላይ ሊያስከትል የሚችለውን የጤና ችግር ቢገልጹልኝ?	
የምግብ አመለካከትን የሚለካ መጠይቅ		
31.	በእርግዝና ወቅት አብዝቶ ስለመመገብ ያለዎት ዕይታ ምን ይመስላል?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው
32.	ከበፊቱ ይልቅ በእረግዝና ወቅት ሃይል ሰጭ ምግቦችን በዛ አድርጎ ስለመመገብ ያለዎት አመለካከት ምንድን ነው?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው
33.	ከበፊቱ ይልቅ በእረግዝና ወቅት የሰውነት ገንቢ ምግቦችን እንደ በቁላና መሳሰሉ ምግቦችን በዛ አድርጎ ስለመመገብ ያለዎት አመለካከት ምንድን ነው?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው
34.	በእረግዝና ወቅት ወተትና የወተት ተዋፅኦችን በብዛት መመገብ ላይ ያለዎት አስተያየትስ ምን ይመስላል?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው
35.	የደም ማነስን መከላከል የሚያስችሉ ንትረ- ምግቦችን ለምሳሌ፡ የበሬ ስጋ፤ጉበት፤ዶሮ ወጥ፤እና ጤፍ የመሳሰሉትን የያዙ የምግብ አይነቶችን ለማዘጋጀት ያለዎት ዝንባሌ ምን ይመስላል?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው
36	የደም ማነስን የሚከላከለውን ንጥረ- ምግብ የያዘ እንደ ስጋና የመሳሰሉትን ምግቦች ጣዕም እነዴት ያዩታል?	1. እጠላለሁ 2. እርግጠኛ አይደለሁም 3. እወዳለሁ
37.	አሜጋ 3 የተባለውን የቅባት ንጥረ-ምግብ የያዙ እንደ ወይራ ዘይት፤ዓሳና ለመሳሰሉት ምግቦች ጣዕም ያለዎት አስተያየት?	1. እጠላለሁ 2. እርግጠኛ አይደለሁም 3. እወዳለሁ
38.	ለወተትና የወተት ተዋፅኦዎች ጣዕም ያለዎት አመለካከት?	1. እጠላለሁ 2. እርግጠኛ አይደለሁም 3. እወዳለሁ
39.	ምግብን በአዮዲን በበለፀገ ጨው ስለ ማዘጋጀት ምን ያስባሉ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለሁም 3. ጥሩ ነው

የአመጋገብ ተግባርን የተመለከተ መጠይቅ			
40.	በእርግዝና ወቅት የሚመገቧቸውን የምግብ አይነቶች ዝርዝር አውጥተው ይጠቀማሉ?	1. አዎ 2. አልተቀምም 3. አላውቅም	
41.	ላንችና ለቤተሰቦችሽ ትናንት ባዘጋጀሽው ምግብ ላይ ጨው ጨምረው ነበር?	1. አዎ 2. አልጨመርኩም 3. አላውቅም	መልሰዎ አዎ ከሆነ ምን አይነት ጨው የተጠቀሙ? 1. በአዮዲን የበለፀገ 2. በአዮዲን ያልበለፀገ
42.	ተቆረጠው ያልቆዩ እንደ ብርቱካን፤ሎሚ፤ማንጎና የመሳሰሉ ፍራፍሬዎችን ወይም ከነርሱ የተዘጋጁ ጭማቂዎችን የመመገብ ልምድ አለዎት?	1. አዎ 2. ለኝም 3. አላውቅም	መልሰዎ አዎ ከሆነ ምን ያክል ጊዜ? 1. በቀን አነዴ 2. በሳምንት ሁለት ጊዜ 3. በሳምንት ሦስት ጊዜ 4. ሌሎች ይጥቀሱ 5. አላስታውስም
43.	ለ 40ኛው ጥያቄ መልሰዎ አዎ ከሆነ ፍራፍሬዎችን (ጭማቂውን) መቸ ነው የሚመገቡት?	1. ከምግብ 2 ሰዓት በፊት 2. ከምግብ በኋላ ወዲውኑ 3. ከምግብ አንድ ወይም ሁለት ሰዓት በኋላ 4. ሌሎች(ይጥቀሱ) 5. አላስታውስም	
44.	ቡና ወይም ሻይ የመጠጣት ልምድ አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም	መልሰዎ አዎ ከሆነ መቸ ነው የሚጠጡት? 1. ምግብ ከመብላቴ ከሁለት ሰዓት በፊት ዎም ከበላሁ ከሁለት ሰዓት በኋላ 2. ምግብ ከመብላቴ ከጥቂት ደቂቃዎች በፊት 3. ምግብ ከበላሁ ከጥቂት ደቂቃዎች በኋላ 4. ሌሎች 5. አላስታውስም
45.	የደም ማነስን የሚከላከል እንክብል አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም	መልሰዎ አዎ ከሆነ በየቀኑ ይወስዳሉ? 1. አዎ 2. አልወስድም 3. አላስታውስም
46.	ቫይታሚን ቢ9(ፎሊክ አሲድ) እንክብል አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም	መልሰዎ አዎ ከሆነ መቸ ነው የጀመሩት? 1. ከመፀነሴ በፊት 2. ከፀነስኩኝ በኋላ በመጀመሪያዎቹ 3 ወራት ውስጥ 3. ከፀነስኩኝ ከ 3 ወር በኋላ 4. አላስታውስም
47.	በቀን ምን ያክል ጊዜ ይመገባሉ?	1. አንድ ጊዜ 2. ሁለት ጊዜ 3. ሦስት ጊዜ 4. አራት ጊዜ 5. ሌሎች (ይጠቀስ) 6. አላስታውስም	
48.	በዋና ዋና የመመገቢያ ሰዓታት መካከል መክሰስ(ማቆያ) የመመገብ ልምድ አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም/አላቅም	

49.	በዋና የምግብ ሰዓታት መካከል ሃይል ሰጭ ምግቦችን የመመገብ ልምድ አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም/አላቅም	
50.	ከእፅቃት ወይም ከእንስሳት የሚገኙ ገንቢ ምግቦችን የመመገብ ልምድ አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም/አላቅም	
51.	ተቆርጠው ያልቆዩ አትክልቶችን የመመገብ ልምድ አለዎት?	1. አዎ 2. የለኝም 3. አላስታውስም/አላቅም	መልሰዎ አዎ ከሆነ ምን ያክል ጊዜ? 1. በቀን አነዴ 2. በሳምንት ሁለት ጊዜ 3. በሳምንት ሦስት ጊዜ 4. ሌሎች ይጥቀሱ 5. አላስታውስም
52.	ወተት ይወስዳሉ/ይጠጣሉ?	1. አዎ 2. አልጠጣም 3. አላስታውስም	መልሰዎ አዎ ከሆነ ምን ያክል ጊዜ? 1. በቀን አነዴ 2. በሳምንት ሁለት ጊዜ 3. በሳምንት ሦስት ጊዜ 4. ሌሎች ይጥቀሱ 5. አላስታውስም
53.	የወትተ ተዋፅኦችን ይመገባሉ?	1. አዎ 2. አልመገብም 3. አላስታውስም	መልሰዎ አዎ ከሆነ ምን ያክል ጊዜ? 1. በቀን አነዴ 2. በሳምንት ሁለት ጊዜ 3. በሳምንት ሦስት ጊዜ 4. ሌሎች ይጥቀሱ 5. አላስታውስም
54	ስጋ ይመገባሉ?	1. አዎ 2. አልመገብም 3. አላስታውስም	መልሰዎ አዎ ከሆነ ምን ያክል ጊዜ? 1. በቀን አነዴ 2. በሳምንት ሁለት ጊዜ 3. በሳምንት ሦስት ጊዜ 4. ሌሎች ይጥቀሱ 5. አላስታውስም
55.	በእርግዝና ወቅት ክብደተዎን ይከታተላሉ?	1. አዎ 2. አልከታተልም 3. አላስታውስም/አላቅም	

DECLARATION

I, the undersigned, declared that this thesis is my original work and has not been presented for a degree in this or any other university, and all source materials used for the thesis have been fully acknowledged.

Name of the student: **Mikyas Arega Muluneh**

Signature: _____

Place: Addis Ababa

Date of submission: _____

This thesis has been submitted for examination with my approval as university advisor.

Advisor Name: **Erdaw Tachebele** (BSc, MSc, Ph.D. fellow)

Signature _____

Date _____