

Effect of nutrition education by health professionals on pregnancy specific  
nutrition knowledge and practice of pregnant women



**By:**

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As members of the examining board of the final MPH open defense, we certify that we have read and evaluated the thesis prepared by Ashenafi Zelalem entitled, ” Effect of nutrition education by health professionals on pregnancy specific nutrition knowledge and practice of pregnant women” and recommend that it is accepted as fulfilling the thesis required for the degree of **Master of Public Health**.

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Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the School of graduate Council (SGC) of the candidate’s Major School.

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## **Abstract**

**Background:** Evidence show that nutrition counseling during pregnancy has significant impact on dietary habit of pregnant women, and on maternal and birth outcome of pregnancy. The World Health Organization (WHO) recommends that health care providers need to give adequate, specific and acceptable nutrition related advice to pregnant women during every visit of antenatal care (ANC). However, studies show that health professionals working at antenatal clinics have insufficient knowledge level and do not provide proper nutrition education. As a result, pregnant women are generally ill equipped when it comes to decisions on appropriate nutrition during pregnancy.

**Objective:** To assess the effect of training health professionals on the knowledge and practice of pregnant women on appropriate nutrition during pregnancy in Akaki Kality Sub-city, Addis Ababa.

**Methodology:** A before-after cohort study was conducted on 406 pregnant women and 24 ANC providers in Akaki Kality Sub-city, Addis Ababa. A training was given to 24 health professionals in 8 health institutions based on prepared module after which they provided ANC clients with nutrition counseling. Knowledge and counseling practice of Health professionals was assessed before training while knowledge and practice of pregnant women on pregnancy specific nutrition was assessed before and after receiving counseling from their trained providers. Data was managed using SPSS 20. Change in knowledge and practice of pregnant women on nutrition during pregnancy was analyzed by using paired t-test and 95% Confidence Interval of proportions.

**Results:** The response rate of this study was 92.3% for health professionals and 95.3% for pregnant women. Two third of ANC providers were knowledgeable on nutrition during pregnancy but only 4.2% practiced good nutrition counseling to their clients. Other pregnant women were the source of information for pregnant women on Nutrition during pregnancy (59.1%). The mean knowledge and practice score of pregnant women was 5.5 (SD  $\pm$ 2) out of 9 and 6.2 (SD  $\pm$  2) out of 11 respectively. After the implementation of the nutrition education program the proportion of pregnant women with knowledge on nutrition during pregnancy increased from 53.9 (95%CI: 48.9, 58.8) to 97% (95%CI: 94.8, 98.5) while the pregnancy specific dietary practice of the pregnant women increased from 46.8% (95%CI 41.8, 51.7) to 83.7% (95%CI: 79.8, 87.2).

**Conclusions and Recommendations:** ANC providers have fair knowledge on nutrition during pregnancy but were not providing nutrition counseling to pregnant women on ANC follow up visits. Nutrition counseling to pregnant women with trained ANC providers improves knowledge and practice of ANC attendants. So attention should be given to promoting nutrition education at the ANC for pregnant women to get reliable and accurate information from health professionals.

## **ACRONYMS**

ANC.....	Ante Natal Care
BMI.....	Body Mass Index
EDHS .....	Ethiopian Demographic and Health Survey
FAO.....	Food and Agriculture Organization of the United Nations
ENGIENE.....	Empowering New Generations to Improve Nutrition and Economic opportunities
FGD.....	Focus Group Discussion
GWG.....	Gestational Weight Gain
IOM.....	Institute of Medicine, American
Km.....	Kilometer
OR .....	Odds Ratio
PTB .....	Pre-term Birth
RDA .....	Recommended Dietary Allowance
RR .....	Relative Risk
SES.....	Socio- economic status
SPRING .....	Strengthening Partnership, Result, and Innovations in Nutrition Globally
SPSS .....	Statistical Package for Social Science
US/USA .....	United states of America
WHO.....	World Health Organization

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# **1 INTRODUCTION**

## **1.1 Background**

Nutritional awareness and practice of woman during pregnancy will determine their nutritional status which significantly affects the outcome of pregnancy. A pregnancy diet with sufficient energy, with a variety of nutrients, minerals, and vitamins, and the mother's avoidance of toxins and contaminants, is important to ensure health for the mother and the growing fetus while poor quality diet during pregnancy is associated with unhealthy maternal weight gain, increased infections, preeclampsia, anaemia, preterm birth or miscarriage.(1-3)

Pregnant women were seen to have low level of nutrition knowledge and practice and subjected to low adherence to iron folate supplementation especially in low income countries like Ethiopia. This findings emphasize that pregnant women are in no position to make health and diet related informed decisions during their course of pregnancy.(1, 4)

So pregnant women need to have proper nutrition education from their Antenatal care (ANC) provider which reinforces good dietary behavior and practice. In developed nations there are dietitians who are considered as the primary source of dietary information during pregnancy but in developing nations like Ethiopia ANC providers are in a prime position to provide healthy eating information to pregnant women. While dietitians are cited as major source of nutrition information in western countries, other pregnant mothers and family members are mentioned for developing ones.(1, 4, 5)

Increased awareness of the impact of nutrition in pregnancy has resulted in increased emphasis on nutrition education particularly in ANC setup. World Health Organization (WHO) recommends that ANC providers should provide adequate, specific and acceptable nutrition related advice to their ANC clients during every visit of antepartum, but the reality is far from the ideal situation. Though there are many hypothesized reasons for low practice of nutrition education by ANC providers, low knowledge and confidence level of health professionals is thought to be the most prominent one in studies done on western and Asian countries.(1, 6)

The goals of nutrition education for pregnant women are relatively clear aiming at appropriate maternal weight gain, nutritional adequacy of the maternal diet, and positive infant outcomes, such as satisfactory birth weight.(1, 2, 7)

In Ethiopia there are studies done on the knowledge and practice of pregnant women with regard to nutrition during pregnancy which shows that pregnant mothers were restricting their food intake, not adhering to micronutrient supplementations and were not taking additional meals during pregnancy mainly due to low level of knowledge. Some also showed they were not aware of the benefits of supplementary nutrients provided during ANC visits.(8-10)

Studies in western countries show that health professionals at ANC clinics have low to moderate knowledge level and lack the proper practice of nutrition education. Even in some African countries ANC providers are seen to lack the knowledge and confidence level to provide nutrition related information to their clients. But little is known regarding the extent to which ANC providers in Ethiopia fulfill their role in nutrition education.(11-15)

## **1.2 Problem statement**

Balanced maternal nutrition during pregnancy ensures the physiological weight gain of the mother and the growth and development of the fetus. Nutritional education during ANC appears to be effective in improving maternal and infant outcomes by promoting the use of balanced nutrition among pregnant women.(1, 2)

In a country where Anemia in women of reproductive age group is 17%, proportion of women of reproductive age with BMI<18.5 is 28 % and 82.8% subclinical iodine deficiency in pregnancy, the role of nutrition counseling at ANC visit is undeniably crucial to stop intergenerational cycle of malnutrition.(4, 16)Adherence to supplementation of important nutrients like Iron and Folate during pregnancy is also affected by knowledge of pregnant women and nutrition education provided during ANC sessions.(17, 18)

The Intergenerational effect of Protein energy undernutrition and Micronutrient deficiencies are one of the major reasons for maternal mortality in Ethiopia and that is why the country recognizes and follows the first 1000 days initiative to prevent it using simple nutrition improving activities including nutrition education. But the focus on nutrition during pregnancy and the process of nutrition education during antenatal period is subtle.

Though there are some researches done in other African countries and India, there is lack of study in developing countries, especially in the study area, on the knowledge and practice of health professionals and pregnant women on appropriate nutrition during pregnancy.

This study tries to assess nutrition education given by health professionals and its effect on knowledge and practice pregnant women on appropriate nutrition during pregnancy. The information is believed to fill an important research gap contributing to the national effort in improving nutritional status of women and children to explore strategies to improve nutritional status during the first 1000 days of life.

The result of this study will also help in filling the gap in the lack of studies on the area of nutrition education during pregnancy.

## **2 Rationale of the study**

There are strong evidences that show nutrition counseling during pregnancy has significant impact on dietary habit of pregnant women, maternal and birth outcome of pregnancy.(1, 2, 19) But it has not been explored to be true in our country especially in the study area.

This study is intended to provide insight effect of nutrition counseling on knowledge and practice of pregnant women. It also explores the knowledge and practice of pregnant women and health care providers on appropriate nutrition during pregnancy.

It will serve as baseline for studies and programs working on interventions to improve national and global nutrition status of pregnant women. The Intervention of this study, Training and nutrition education at the ANC, can also be duplicated to cover the gap of nutrition education in the city and the country as a whole.

### **3 LITRATURE REVIEW**

#### **3.1 Nutrition Education and Its Effect**

There has been controversy about the impact of antenatal education on pregnancy outcome. However, a recent synthesis of experience with information, education and communication makes the point that it works. In other words, an appropriate strategy of nutrition education leads to or reinforces desirable attitudes and behavior among pregnant women.(1, 6, 20)

A 2014 pooled systemic review on nutrition education and counseling showed that it resulted in improvements in various maternal and fetal outcomes like anemia (Odd Ratio (OR) 0.70(0.58–0.84)), Pre-Term Birth (PTB) (OR 0.81(0.66–0.99) and birth weight (OR 0.86(0.70–1.04)).(5)

An Iranian study with objective of determining effects of nutrition education on levels of nutritional awareness found that the awareness level of pregnant women about healthy nutrition was significantly increased from 3% before intervention to 31% after the nutritional education intervention independent of their age or literacy levels.(21)

A study done in India which studies the difference in nutrition knowledge level of pregnant mothers before and after face to face counseling showed significant change in their knowledge with regard to Balanced diet (from 1.87 pre-test mean to 4.3 at posttest), nutrients and food sources (from 3.2 pre-test mean to 9.4 at posttest), special nutritional requirement during pregnancy (from 2.8 pre-test mean to 15 at posttest), importance of breast feeding (from 2.8 pre-test mean to 15 at posttest). Overall nutritional knowledge has improved from mean of 22 in the pre-test to 32.7 at posttest significant at 1% level.(17)

In a Dutch study which assessed the effect of nutrition counseling on food and nutrient intake of rural pregnant women there was change in dietary practice of mothers in experimental group after nutrition counseling. There was increase in the amount and frequency of food intake. Mother in counseled group started using iodized salt for cooking. Mean hemoglobin level in the intervention group at post-Nutrition Education was 9.65 g/dL, which was significantly higher ( $p < 0.001$ ) than non- Nutrition Education (7.85 g/dL) and pre-nutrition education (8.84 g/dL) group. Mothers gain more weight after counseling as compared to the control group.(22)

A Positive Deviance-based Antenatal Nutrition Project conducted in Egypt in 2006 found out that nutrition education and supplementation in at risk pregnant women was effective in decreasing prevalence of low birth weight (26.9% vs. 11.9 in the comparison group) and in persuading pregnant women to eat more food (54.9 % vs. 10.6% of the comparison group) and more animal food products. It also found that the experimental group increased their consumption of food like meat and vegetables. More than half of experimental group increased food intake as only one tenth of control group was taking sufficient food. More than half of mothers in experimental group increased meat intake after counseling as only few mothers in control group were taking sufficient meat. (23)

Nutrition education is seen to have significant positive effect on important maternal and fetal outcomes and also in improving knowledge and practice of mothers on nutrition during pregnancy.

### **3.2 Knowledge and Practice of Health Professionals**

Nutrition Education strategy is only achievable if there is adequate nutrition knowledge, positive attitude and correct practice among health professional. But despite this fact many researches show inadequacy in knowledge of professionals with low practice on nutrition education provision for pregnant women.

A United States (US) study which assessed current attitude, practice behavior and barriers in delivering nutrition counseling states that only 40% of the health professionals gave nutrition counseling and spend 5 or more minute for it though three quarter of the professionals recognize the importance of nutrition counseling. The main perceived barriers for not giving nutrition counseling were lack of time, patient noncompliance, inadequate teaching material, inadequate reimbursement (benefits) and low physician confidence. (11)

In a study that explore United Kingdom midwives' education in, knowledge of and attitudes to nutrition in pregnancy, 46% of the midwives scored poorly in knowledge and only 33% felt comfortable giving dietary advice.(12)

A Canadian study which sets to determine the information that pregnant women report receiving when being counseled about weight gain found that only 28.5% reported that their health care provider had made a recommendation about how much weight they should gain. (14)

A study in Australia, on whether pregnant women are informed about iodine and nutritional supplementation, hinted that Health professionals have low level of knowledge in Food source with less than 50% of them identifying correct food source of Iodine and only 26% were providing counseling to their clients properly.(13)

Self-reported nutritional knowledge was inadequate among Scandinavian doctors and nurses, with 39% lacking nutritional assessment techniques and 26% having difficulty to identify malnourished client. The most common cause of inadequate nutritional practice were insufficient knowledge, from 67% in Norway to 48% among the Danish responders, followed by lack of interest and lack of responsibility.(15)

In a Qualitative Dutch study aiming to obtain an in-depth understanding of verbal and written nutrition communication in midwifery practice, women appreciated talking about nutrition with the midwife because of her expertise but midwives rarely helped women to identify and clarify their nutrition-related questions and problems even with the help of nutrition brochure.(24)

A Swedish qualitative study describing women's experiences of dietary information and the change of dietary habits during pregnancy found that pregnant women had to discover dietary information by themselves, and only when health problems or symptoms occurred did they receive guidance from the midwife.(25)

A study done in New Zealand showed that midwives were knowledgeable on nutrition and has good attitude though only 40 % of them reported they have had formal nutrition education.(26)

Majority of the studies give away a consensus that though ANC providers have positive attitude towards nutrition education, majority of them are not knowledgeable on the matter and performing poorly on practicing nutrition education to pregnant women.

### **3.3 Knowledge and Practice of pregnant women**

Maternal under-nutrition diminishes a woman's productivity, causing repercussions for herself, her family, her community, and the broader society. Maternal malnutrition is influenced not only by lack of adequate nutrition but also influenced by factors like socio demographic factors, and nutritional knowledge of mothers during pregnancies.(27)Level of nutritional knowledge also has a strong association with the use of supplements during pregnancy.(18)

Having knowledge on nutrition is crucial to shape the dietary behavior and practice of women which in turn affects the outcome of pregnancy. Nutrition knowledge of pregnant women have been assessed either by determining knowledge level or by assessing their dietary intake. Though most researches have looked at knowledge level of pregnant women alone, some tried to compare it with nutrition knowledge of non-pregnant women.

A study in US reported that women of child bearing age who were from low socio economic background knew little about the importance of the recommended daily intake of folic acid and only 25% of them reported consuming folic acid supplements daily.(28)

A Dutch study showed that pregnant women were reported to have higher nutrition awareness than non-pregnant women, especially concerning food items to avoid. (29)

In a Polish study that assessed the nourishment practices of pregnant women and the degree of knowledge, majority of the respondents (71.2%) thought information about healthy diet practices during pregnancy is not widely available and not easily obtained. The main sources of information listed as answers are: own experience (49.4%), a doctor (32.2%), a nurse (18.4%), friends and family (17.2%) and books with information folders (13.8%). The media has a marginal contribution to the formation of the respondents' awareness as far as this issue is concerned (9.2%). Only 24.1% of the women believe that they eat healthily.(30)

A Pakistani study on Nutritional Beliefs and Practices in Pregnant and Lactating Mothers in an Urban and Rural Area of Pakistan showed that 84% of mothers had knowledge that diet should be changed by increasing, adding or avoiding some special food items in the diet during pregnancy and lactation, but only 65.5% practiced them. The reasons for this deficient knowledge and practice of dietary intake are lack of nutritional knowledge and poor economy. (31)

A Malaysian study aiming to investigate the association between knowledge, dietary behavior and nutritional status among pregnant women found that mean (Standard Deviation) score for nutrition knowledge, attitude and practices for pregnant women was 13.8(3.4), 14.9(2.6) and 3.7(0.8) which presented 65.7%, 57.3% and 74% correct response rate respectively. Nutritional knowledge score was positively correlated with gestational weight gain ( $r = 0.166$ ,  $p < 0.05$ ) and hemoglobin level ( $r = 0.200$ ,  $p < 0.05$ ). The study forwarded the results in being moderate. (32)



A 2014 Indian study aiming to assess the nutritional status and the level of knowledge about nutrition during pregnancy among pregnant and postpartum women showed that knowledge about the consequences of malnutrition in pregnancy (27.4%), and the amount and types of food to be taken during pregnancy was found unsatisfactory. (33)

The results of an Egyptian study revealed that more than half of women (54%) had a poor level of knowledge and practices regarding the intake of essential nutrients and basic food elements meeting the nutritional demands of the mother and the fetus. (34)

A study from Swaziland on Factors associated with knowledge of personal gestational weight gain recommendations showed that pregnant women have moderate knowledge, attitude and practice with mean percentage scores of nutritional knowledge (67%), attitude (67%), and practices (51%). (35)

A Kenyan study on Health and nutrition knowledge, attitudes and practices of pregnant women attending and not-attending ANC clinics found majority of pregnant women(78.7%) were seen to have moderate to low nutrition knowledge score, 4-6 and <4 respectively. It also found that pregnant women has low dietary diversity score with 80.7% of them scoring 4-7 and 15.4% scoring <4. The Nutrition Knowledge level of those attending ANC was not significantly different from those not attending ANC. (36)

Studies on nutrition knowledge of pregnant women in Ethiopia is targeted towards specific micronutrient or to breast feeding like in an eastern Ethiopia study 90% of women did not know the importance of iodized salt and the cause of iodine deficiency. (37)

A study done in East Wollega showed the knowledge of pregnant mothers was relatively low with only 52.5%, 50.6% and 72.3% of them having knowledge that food during pregnancy is important for bodies' energy and heat, proper functioning of the body, and for growth and development of the fetus respectively. It also showed that 70.6% had no knowledge about common food sources of protein, carbohydrate, iron, vitamin A and iodine respectively. Information about nutrition, family income and educational status of mothers had a positive significant relation with mothers' nutrition knowledge.(38)

In a study done in Wondo Genet on dietary practice and associated factors among pregnant women about 21% of them were restricting their food intake and 75.2% of them did not take any additional meal during pregnancy concluding on the suboptimal state of dietary intake. (10)

A 2014 Empowering New Generations to Improve Nutrition and Economic opportunities (ENGINE) report on maternal diet and nutrition practices and their determinants in four regions of Ethiopia showed that most pregnant and lactating women were aware of the nutritional benefits of eating different types of foods in order to have a “variety of foods,” but did not necessarily understand the value of eating from different food groups. Most of the women reported trying to consume a variety of carbohydrates (grains and tubers e.g. bread, injera, potato, macaroni) each day. The study identified nausea and food aversions, concern about risk and complications during late pregnancy, and limited access to sufficient and clear information about dietary diversity as barriers to improving maternal diets. (39)

## **4 OBJECTIVES**

### **4.1 General objective**

The general objective of this study is to assess the effect of training health professionals on the knowledge and practice pregnant women on appropriate nutrition during pregnancy in Akaki Kality Sub-city, Addis Ababa.

### **4.2 Specific objectives**

1. To determine the Knowledge and counseling skills of ANC providers on appropriate nutrition during pregnancy
2. To assess the Knowledge and practice of appropriate nutrition among pregnant women attending ANC clinics.
3. To assess the effect of training health professionals on nutrition counseling on the knowledge and practice of pregnant women attending ANC clinics.

## **5 METHODS & MATERIALS**

### **5.1 Study Setting**

Akaki Kality sub city is one of the 10 sub cities of Addis Ababa city administration which is located in the southern part of the city, 20 Km far from the center of the city and it is the largest sub city covering an area of 12,347 hectares (23.7% of the total land area of Addis Ababa city). It is bordered by Oromia region on the South, South East and North West, by Nifasilk Lafto sub city on the North East and by Bole sub city on the North directions. Projections from the 2007 population and housing census estimate the total population for the year 2014/15 of Akaki Kality sub city to be 218,995. The Sub-city is characterized by typical flow of illiterate population especially women to work in one of the many factories located in the Sub-city. Due to its closeness to neighboring Oromia towns and new condominium settlements the Sub-city has an estimate of 200,000 extra catchment population in addition to the population projection.

There are 43 Health officers, 39 nurses with bachelor degrees, 71 clinical nurses and 36 midwives in the Sub-city working in different duties in the six government and 1 NGO health centers and a single governmental Hospital in Akaki Kality Sub-city. According to 2007 E.C (2014/2015 G.C) report estimate, there were 5,030 pregnant women in the Sub city, with coverage for the first and fourth ANC visits at 147% and 93% respectively.

According to the recent Mini-DHS survey in 2014 antenatal care at governmental health institutions of Addis Ababa is being provided by mix of health professionals from which 44.9% were provided by doctors, 48.8% by nurses and midwives and 0.4% by other unspecified professionals like Health Officers. (40)

### **5.2 Study design and study period**

Facility based before-after cohort study was employed from March to May of 2016.

### **5.3 Study Population**

#### **5.3.1 Source population**

All General Practitioners, Health officers, Nurses and Midwives in Akaki Kality Sub-city were the source population for the health professionals while all pregnant women in the Sub-city were the source population of ANC clients.

### 5.3.2 Study population

General Practitioners, Health officers, Nurses and Midwives who are working as ANC providers during the study period were the study population.

Second and third trimester pregnant women who are attending ANC in the Sub-city were the study population of ANC clients.

## 5.4 Inclusion & Exclusion criteria

### 5.4.1 Inclusion criteria

- All health professionals providing ANC who were willing to participate in the research were included
- Pregnant women who are on their second and third trimester pregnancy were included in the study

### 5.4.2 Exclusion criteria

- Providers who were not working at ANC during the study period (Due to rotation, leave or training).
- Pregnant women who were sick or term for labour or in their first trimester pregnancy at the time of the study.

## 5.5 Sample size

Minimum sample size was calculated for the three specific objectives as follows;

### Objective 1

All of the Twenty six (26) ANC providers from the seven health centers and a hospital were selected to participate in the research as their number is very few.

### Objective 2

The sample size for the second objective was calculated using one sample population proportion as the formula depicted below.

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

Where:

n = Sample size

$Z_{1-\alpha/2} = 1.96$  critical value (confident limit)

P = 52.7% (Proportion of Knowledgeable pregnant women on appropriate nutrition during pregnancy in East Wollega, Ethiopia).

d = 5% precision (marginal error)

DE = 1

Thus  $n = \frac{(1.96)^2(0.527)(1-0.527)*1}{(0.05)^2}$

Total sample size = 383

Non response rate = 10 % x 383 = 38

Total sample size= **421**

### **Objective 3**

As for the pregnant women a formula of sample size for a cohort study was taken with an assumption of 50 % proportion of knowledge on nutrition among pregnant women due to the lack of similar study in the study area. Assuming a 10 percentage point increase in the knowledge of pregnant women (about appropriate nutrition during pregnancy) after intervention the following sample size was computed using the sample of pregnant women to be studied.

Two population proportion formula;

$$n = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 pq(r+1)}{r(p_1 - p_2)^2}$$

Where n = sample size of each group

$Z_{1-\alpha/2}$  = standard normal deviate for two-tailed test based on alpha level, which is 1.96 by taking 95% confidence level.

$Z_{1-\beta}$  = standard normal deviate for one-tailed test based on beta level (0.84 for power of 80%)

r = ratio of unexposed to exposed (1:1 - equal proportion)

$p_1$  = proportion of pregnant women with knowledge on nutrition during pregnancy after being provided with nutrition education =60%

$p_2$  = proportion of pregnant women with knowledge on nutrition during pregnancy before provision of nutrition education = 50 %

$$P = p_1 + rp_2/r+1 = 0.55$$

$$q = 1 - P = 0.45$$

Substituting those values in the formula will give us a sample size of 388 pregnant women. Considering 10 % drop-out from follow-up, we got a final **426** samples of pregnant women.

## 5.6 Sampling procedure

There were 19 health professionals working as ANC attendants in the selected government health facilities of the Sub-city. Considering the rotation and annual leave of the professionals, one health professional selected by the Medical Director was added to each health facilities. So a total estimated **26** Health professionals were included in the research. The participant professionals were 5 from SGCHC, 2 from Sirti HC, 4 from Kality HC, 3 from Akaki HC, 3 from Saris HC, 2 from Gelan HC, 2 from Selamfre HC and 3 from Tirunesh Beijing Hospital. Two health professionals refused to participate in the study due to other commitments they were having during the study period.

Sample size of the pregnant women attending ANC was proportionally distributed among selected health facilities based on the number of ANC clients seen per week (data obtained from register and tally sheets at the ANC) during the study period.

Simple random sampling was then used to select the pregnant mothers from each facility based on their medical registration number.

Table-1: Sample distribution of pregnant women among Health institutions of Akaki Kality Sub city, April 2016.

Name of health facility	ANC clients per week from March – April, 2016 G.C	Sample size
Tirunesh Beijing Hospital	170(19%)	80
Kality Health Center	160(18%)	75
Akaki Health Center	150(16%)	70
Sirti Health Center	140(15%)	66
Selam Fire Health Center	40(4%)	19
Gelan Health Center	80(9%)	37
Saint Gabriel Catholic Health Center	70(8%)	33
Saris Health Center	100(11%)	47
Total	910(100%)	426

## **5.7 Study variables**

### **5.7.1 Dependent variables**

- Satisfactory knowledge of Pregnant women on nutrition (Yes, No)
- Appropriate nutrition related practice among pregnant women (Yes, No)
- Satisfactory knowledge of health professionals on nutrition during pregnancy (Yes, No)
- Satisfactory Counseling skill among health professionals (Yes, No)

### **5.7.2 Independent variable**

- On health professionals–
  - Work experience (in years)
  - Salary/benefits (in birr)
  - Recent Training on nutrition (yes, no)
  - Sex (male, female)
  - Self-Reported level of confidence (not confident, moderately confident, confident)
- On ANC clients –
  - Gravidity (Primi-gravida, Multi-gravida)
  - Parity (Nuli-para, Primi-para, Multi-para, Grand Multi-para)
  - Number of ANC visits ( 1 visit, 2 visits, 3 visits , 4 and more visits)
  - Educational status of pregnant women (Illiterate, Read and write, Primary Education, Secondary Education, Collage and above)
  - Age(in completed years)
  - Source of Information ( Doctor, Nurse/Midwife, Other pregnant women, family, friends, TV, Radio, Books, Did not receive any information)

## **5.8 Data collection tools and procedures**

Quantitative Data collection tool for Health Professionals was modified from Food and Agriculture Organization of the United Nations (FAO)/WHO questionnaire on KAP of nutrition, WHO ANC guideline, Institute of Medicine (IOM) publication of nutrition service in prenatal care and other assessment tools found from literatures.(33, 35, 41-43) It has socio demographic data, professional data and knowledge assessment section. Observation checklist derived from



WHO ANC guideline, SPRING Tool for Rapid Evaluation of Facility-Level Nutritional Assessment Counseling and Supply (NACS) and other previous researches used to assess the nutrition related counseling skill of providers at ANC clinic.

The Knowledge assessment questions were 10 point questions which include knowledge on maternal and fetal complications of maternal under nutrition, amount and frequency of meal during pregnancy, energy requirement during pregnancy, gestational weight gain (GWG), supplementation, use of folate, duration of iron supplementation, food source of Iron, iodized salt use and things to avoid during pregnancy. The practice checklist of 12 points was designed to assess if the provider was forwarding nutrition specific messages and if he/she was exercising his/her counseling skill to the par.

Data from pregnant women was collected in two phases using data collection tool of 9 point knowledge and 11 point practice questions. The tool was modified from FAO/WHO KAP assessment of nutrition and a book for Nutrition and Lifestyle for pregnancy and Breastfeeding. The tool also has data on their socio demographic status, pregnancy and ANC follow-up, and source of information. Satisfaction on previously received information on nutrition in pregnancy and use /Type of Mobile phone was also assessed for future recommendation.

Phase one of the data collection from Pregnant Women was conducted right before receiving nutrition counseling from their ANC providers while phase two was collected after the client was appointed for 1 week after the counseling session. To those that did not make it to the appointment on date, the PI used phone interview to obtain the post-counseling data.

The data collection tools were pre-tested at Nifas-Silk Lafto Sub-city Woreda 10 Health Center for 10 pregnant women and one midwife.

Three clinical nurses and one Health officer supervisor were trained for two days on data collection tools, interviewing skill and the whole research objective and methodology.

### **Intervention**

The Intervention selected for the purpose of this research is classified in to two stages.

**Stage 1:** Training of health professionals on appropriate nutrition during pregnancy and counseling skill.

A manual based training was given to 16 female and 8 male ANC providers for 2 days. The training was given by the Principal Investigator based on prepared module and leaflet on important messages on appropriate nutrition during pregnancy. It focused on eating well during pregnancy, problems of poor nutrition, food groups and micronutrients, Important minerals and vitamins in pregnancy and their food source, harmful substances in pregnancy, gestational weight gain and ‘GATHER’ counseling skill. (See Annex for the module)

The training used Presentation, Drills, discussions and role play as a method and was evaluated by pre-post test result of participants. The pre-post test questions were the same 10 point questions used to assess the knowledge of Health professionals. Average score of the participants increased from 67% to 89%.

Trainees were provided with module prepared from different books and literatures, a copy of Dietary Guide, Maternal Nutrition during pregnancy and lactation by Linkages project of USA and leaflet of important messages of nutrition to provide to ANC clients. (44-49)

#### **Stage 2: Nutrition Education by trained ANC providers**

Trained health professionals started providing nutrition education to pregnant women preselected and assessed before the intervention (but not limited to this women). The messages included in the leaflet provided during the training were the main focus of the nutrition education. The Provider was also expected to address issues raised by the pregnant women.

Due to the setup of ANC clinics in some of the health facilities, where 2-3 clients are in the room at the same time, and client load at the morning shift nutrition counseling was conducted in less ideal situations.

### **5.9 Data quality Assurance**

Data collection supervisor and data collectors were trained for 2 day on the data collection tool and basics of interviewing in addition to strict instructions on consistency and completeness of the tool. The data collection processes was closely monitored by the Principal Investigator.

The Interview questionnaire of pregnant women was translated to Amharic by the Investigator and then back to English by another person in order to check for the consistency between the two translations. The questionnaires were pre-tested before the actual data collection on 5% of the sample size. During data collection, Principal Investigator checked daily how the data collection

process is going on. During submission of the filled data, the principal investigator also checked the completeness of filled questionnaires.

### **5.10 Data processing and analysis**

Data was entered to, cleaned and analyzed using IBM, SPSS version 20 for Windows. Summary statistics, such as frequency and percentage, were computed to get descriptive statistics of the data after checking for data reliability.

Knowledge and practice of health professionals was seen for association with their respective independent variables with bivariate logistic regression.

Bivariate analysis was also used to test the association between independent variables and pregnant women's overall Knowledge at pre-test and between the independent variables and their pre-counseling practice. Variables which were found to be significantly associated with overall knowledge were retained for subsequent multivariate analysis.

Knowledge questions on the dataset of health professionals were all dichotomized to 1 and 0 (1 is having knowledge and 0 is not having knowledge) to provide an overall score out of 11. Having or not having knowledge was declared by using a score of 8 as cut point. All of the 12 components in the Practice of nutrition counseling were given a score 0 for no practice, 1 for incorrect practice and 2 for correct practice to bring a maximum score of 24. Good practice of nutrition counseling was declared for score 12 and above, while score <12 was stated as having poor practice.

At the Data set of pregnant women the categorical data from the knowledge part of the data collection was recorded to dichotomous data of 1 and 0, where 1 is having Knowledge and 0 is having no knowledge. With this the knowledge components of the tool were entered to compute an overall score of knowledge from 9. Knowledge was then declared as knowledgeable (score 6 and above from 9) and not knowledgeable (score <6 from 9). (7, 10, 21, 41, 43)

Practice components of the questionnaire of pregnant women were dichotomized to 1 and 0, where 1 is having good practice and 0 is having no practice on specific pregnancy related dietary practice. Each component was given a score of 1 for good practice to provide a sum for overall practice out of 11. Good overall practice was declared for score of 7-11 while poor practice for score under 7. (21, 33, 43)

Each dichotomized pre-test Knowledge component was compared with their respective post-test questions to see the significance of change in each component. For each component Confidence Interval of proportions in the pre and post counseling phase was calculated and observed for overlap. The change in each component from pre to post counseling was said significant if the Confidence intervals of the two proportions does not overlap. This similar technique was also used to see significance of change in practice score and in each practice components.

The overall knowledge and practice scores of pregnant women before and after nutrition education were tested using paired t-test.

## **6 Operational definitions**

**Appropriate Nutrition during Pregnancy:** A pregnancy diet with sufficient energy, with a variety of nutrients, minerals, and vitamins, and the mother's avoidance of toxins and contaminants. (45, 47) It includes balancing the five major food types:

- Fruits and vegetables
- Starchy, fiber-rich foods (potatoes, rice, bread, pasta)
- Protein-rich foods (meat, fish, eggs, pulses)
- Milk and dairy products (cheese and yoghurt)
- A sparing amount of foods high in fat and sugar.
- A good fluid intake

**Knowledge of Health Professionals:** A health professional was considered knowledgeable when he/she answered 8 and above and not knowledgeable when he/she answered <8 from 11 knowledge questions. This questions were knowledge on maternal complications of under nutrition during pregnancy, frequency and amount to eat during pregnancy, energy requirement during pregnancy, gestational weight gain, early supplementation of folic acid and benefits, use of iodized salt, duration of Iron supplementation tablets and food source of iron, And food and drink related restrictions during pregnancy.

**Knowledge of pregnant Women:** A pregnant woman was classifies as knowledgeable if her knowledge score was 6 and above out of 9 and not knowledgeable if her score was <6 out of 9. The knowledge components were knowledge of the pregnant women on eating variety of food, increasing amount to eat during pregnancy, use of iodized salt, iron supplement duration and

food source of Iron, need for supplements in addition to regular foods, diet related restrictions during pregnancy.

**Healthy dietary practice among pregnant women:** A woman was considered as having appropriate pregnancy specific nutrition practice if she is practicing at least 7 of the following 11 practices listed below: (4, 28, 47, 49)

1. Adding at least one additional meal from what used to be in her non pregnant state,
2. Eating 2 to 3 servings of meat, fish, nuts or legumes,
3. Eating 2 to 3 servings of dairy (milk, eggs, yogurt, cheese),
4. Eating 2 servings of green vegetables; 1 serving of a yellow vegetable,
5. Eating 3 servings of fruit,
6. Eating 3 servings of whole grain breads, cereals, or other high-complex carbohydrates,
7. Using Iodized salt,
8. Adheres to her Iron supplements every day (less than 10 missed days),
9. Avoids alcohol use and smoking,
10. Decreases caffeine intake from what was in her pre-pregnancy days,
11. Not avoiding food types totally during the pregnancy period,

**Good nutrition practice (among health professionals):** A health professional was classified as having 'Good nutrition practice' if s/he during scored 6 or more on the following observations, while score <6 was considered as having poor practice. A score of '-1', '0' and '1' was given for 'no practice', 'incorrect practice' and 'correct practice' respectively making the maximum possible score at 12. (6, 19)

1. Weight Measured
2. ANC provider informed client on weight
3. ANC provider gave information on Pregnancy outcomes with maternal malnutrition
4. ANC provider counseled the client on GWG for the client's pre-pregnancy BMI
5. ANC provider asked client on nausea, vomiting, pica or any diet related problems and discussed how to manage them
6. ANC provider gave information to client on what and how frequently to eat
7. ANC provider gave information to client on what things to avoid during pregnancy (smoking, Alcohol, caffeine)
8. ANC provider asked client on adherence of supplementations

9. ANC provider gave information on using Iodized salt
10. ANC provider received questions from the client and answered it clearly

## **7 Ethical Considerations**

Ethical clearance was obtained from Addis Ababa University School of Public Research Ethics Committee. Support letter to Akaki-Kality Sub-city Health Office and Tirunesh Beijing Hospital was received from Addis Ababa University School of Public Health. Akaki- Kality Sub-city wrote cooperative letter to Health centers selected for the study.

An informed verbal consent was obtained from all the study participants. The participants were given the right to withdraw from the interview any time they like without any consequence. Besides this all the information collected from the study subjects was in private and the information was handled confidentially. Information was given to all participants about the objective, the contents of the study, and the re-assessment process.

## **8 RESULT**

### **8.1 Result of Health Professionals**

#### *A. Socio-Demographic profile of health professionals*

A total of 26 Health professionals were approached and 24 agreed to participate in the study making the response rate at 92.3%. Of the participants 16 (66.7%) were females. Age of the participants ranged from 20 to 34 with the mean age of  $26.67 \pm 4$  years with 45.8% of them belonging to age group of 25 to 29 years.

Health professionals providing ANC service comprised of two (8.3%) Health Officers, Four (16.7%) clinical Nurses, One (4.2%) Nurse with bachelor degree and 17 (70.8%) midwives. Seven (29.2%) were degree holders while 17 (70.8%) were diploma graduates. Three quarter of the participants (18) were single while the rest were married (6). The mean year of service of the providers was 3.67 years (range 1, 8) with an average monthly salary of 2719 birr (range 1330, 6000).

Half of the participants used Android application smartphones which support Amharic apps, 10 (41.6%) used phones that support Amharic text message and the rest two (8.3%) used regular phones with only English setups.

Assessment of the confidence level of ANC providers on nutrition counseling shows that 11 (45.8%) rate themselves as being fully confident, 10 (41.7%) as moderately confident and three (12.5%) not confident. Nineteen of the providers (79.2%) think that they would provide clients with more nutrition counseling if messages and reminders were sent to their phone.

Table-2: socio demographic and professional background of health professionals providing ANC in Akaki Kaliti Sub-city, April 2016

Variable	Categories	No	%
Sex	Female	16	66.7
	Male	8	33.3
Age	20-24	7	29.2
	25-29	11	45.8
	30-34	6	25.0
Profession	Health Officer	2	8.3
	Clinical Nurse	4	16.7
	BSC Nurse	1	4.2
	Midwife	17	70.8
Educational status	Diploma	17	70.8
	Degree	7	29.2
Marital status	Single	18	75.0
	Married	6	25.0
Monthly salary (ETB)	<1500	5	20.8
	1500-1999	8	33.3
	3000-3499	4	16.7
	3500-3999	2	8.3
	4000-4499	2	8.3
	4500-4999	1	4.2
	5000-5499	1	4.2
	5500-6000	1	4.2
Confidence on Nutrition education provision	Not Confident	3	12.5
	Moderate	10	41.7
	Confident	11	45.8

### ***B. Knowledge on Nutrition During pregnancy***

The mean knowledge score of health professionals on nutrition during pregnancy was 7.5 (SD  $\pm$ 1.9) out of 11, with 16(66.7%) of the providers knowledgeable on nutrition during pregnancy.

Major knowledge gap was seen on maternal complications of under nutrition during pregnancy (29.2%), gestational weight gain (37.5%), and energy requirement during pregnancy (45.8%); while higher knowledge was seen on use of Iodized salt (100%), restriction of alcohol (87.5%), decreasing coffee intake (95.8%) and increasing frequency and amount to eat during pregnancy (87.5%).



All of the studied health professionals knew pregnant women should use iodized salt and 19 (79.2%) knew the benefits of folic acid on pregnancy outcome. Three quarter of ANC providers (18) knew Iron supplementation to be given for 6 months and 15 (62.5%) identified meat, liver and fish to be good food source for Iron.

No significant association was found between overall knowledge and socio-economic and professional variables.

Table-3: Knowledge of appropriate nutrition during pregnancy among health professionals providing ANC in Akaki Kality Sub-city, April 2016

<b>Knowledge Components</b>	<b>Categories</b>	<b>No</b>	<b>%</b>
Knowledge on maternal complications of under nutrition in pregnancy	No	17	70.8
	Yes	7	29.2
Knowledge on how frequently and what amount a pregnant should eat	No	3	12.5
	Yes	21	87.5
Knowledge on energy requirement during pregnancy	No	13	54.2
	Yes	11	45.8
Knowledge on gestational weight gain	No	15	62.5
	Yes	9	37.5
Knowledge on need of folate supplement early during pregnancy	No	10	41.7
	Yes	14	58.3
Knowledge on using iodized salt use during pregnancy	No	0	0
	Yes	24	100.0
Knowledge on benefit of folate during pregnancy	No	5	20.8
	Yes	19	79.2
Knowledge on duration of iron supplementation in pregnancy	No	6	25.0
	Yes	18	75.0
Knowledge on food source for iron	No	9	37.5
	Yes	15	62.5
Knowledge on alcohol and cigarette restriction in pregnancy	No	3	12.5
	Yes	21	87.5
Knowledge on decreasing coffee during pregnancy	No	1	4.2
	Yes	23	95.8

### C. Practice of Nutrition Counseling

According to this research the mean nutrition counseling practice score of health professionals was 2.87 (SD  $\pm$ 1.26) out of 12, with only 1(4.2%) having correct practice of nutrition counseling.

All Providers weigh the pregnant mother up on first encounter with her, but only 12.5% of them clearly informed the client on her weight. Only 12 (50%) of health professionals mentioned gestational weight gain to the mother. Nineteen providers (79.2%) asked their clients about pica, nausea and vomiting but only seven (29.2%) forwarded solutions to the problems. Avoiding alcohol and smoking was discussed with clients by 16 (66.7%) ANC providers. Counseling on eating of variety of food during pregnancy was done by only 6(25%) providers while 9(37.5%) health professionals discussed addition of extra meal during pregnancy with ANC clients.

Table-4: Practice of nutrition counseling among health professionals providing ANC in Akaki Kality Sub-city, April 2016

Practice	Categories	No	%
Measuring weight	Not done	0	0
	incorrectly done	0	0
	correctly done	24	100
Informing client on weight	Not done	0	0
	incorrectly done	21	87.5
	correctly done	3	12.5
Informing client on gestational weight gain	Not done	12	50.0
	incorrectly done	12	50.0
	correctly done	0	0
Informing on maternal and fetal complications of under nutrition in pregnancy	Not done	19	79.2
	incorrectly done	5	20.8
	correctly done	0	0
Counseling on diet related symptoms alike pica, nausea and vomiting	Not done	5	20.8
	incorrectly done	12	50.0
	correctly done	7	29.2
Counseling on food sources of important minerals, variety food,	Not done	14	58.3
	incorrectly done	4	16.7
	correctly done	6	25.0
Counseling on addition of one meal, small portions and frequent feeding	Not done	11	45.8
	incorrectly done	4	16.7

	correctly done	9	37.5
Counseling on avoiding alcohol and smoking	Not done	8	33.3
	incorrectly done	0	0
	correctly done	16	66.7
Counseling on iron supplement and checking for adherence	Not done	13	54.2
	incorrectly done	7	29.2
	correctly done	4	16.7
Counseling on food source of iron	Not done	24	100
	incorrectly done	0	0
	correctly done	0	0
Informing use of iodized salt	Not done	24	100
	incorrectly done	0	0
	correctly done	0	0
Receiving questions on diet and related matter and addressing it	Not done	22	91.7
	incorrectly done	0	0
	correctly done	2	8.3

## 8.2 Result of Pregnant Women

### A. Socio-Demographic Characteristic

Out of 426 pregnant women interviewed in the pre-counseling assessment 406 were successfully followed to the post-counseling interview. Data of the 406 completed interviews is taken for the analysis here after which is 95.3% retention rate.

The mean age of pregnant women was 26.6 (SD  $\pm 3.9$ ) with 217 (78.1%) of them between the age 20 and 29. One hundred fifty seven (38.7%) of the pregnant women were housewives, 309 (76.1%) have completed at least primary education, 372 (91.6%) are currently married, and 309 (76.1%) were Orthodox. The study participants had an average 2.7 (SD  $\pm 1$ ) family size and average monthly household income of 3,141 ETB (SD  $\pm 1,588$  ETB)

When looking at their obstetric history 208 (51.2%) were Primigravida, 220 (54.2%) Nuli-para, 237 (58.4%) on their third trimester of pregnancy and 116 (28.6%) coming for their first ANC follow up for their current pregnancy. The mean gestational age of ANC attendants was 27.1 (SD  $\pm 6.8$ ).

Table-5: Socio demographic status of pregnant women attending ANC in Akaki Kality Sub-city, April 2016

Variable	Categories	Frequency	Percent (%)
Age	15-19	21	5.2
	20-24	136	33.5
	25-29	181	44.6
	≥30	68	16.7
Gravidity	Prim gravida	208	51.2
	Multigravida	198	48.8
Parity	Nuli-para	220	54.2
	Primi-para	118	29.1
	Multi-para	66	16.3
	Grand multi-para	2	0.5
Religion	Orthodox	309	76.1
	Muslim	64	15.8
	protestant	29	7.1
	others	4	1.0
Gestational Age	Second TMP	169	41.6
	Third TMP	237	58.4
Number of ANC visits	1	116	28.6
	2	126	31.0
	3	122	30.0
	4+	42	10.3
Marital status	Single	23	5.7
	Married	372	91.6
	Separated	5	1.2
	Divorced	4	1.0
	Widowed	2	0.5
Level of Education	Illiterate	44	10.8
	Read and write	53	13.1
	Primary Education	118	29.1
	Secondary Education	94	23.2
	Collage and above	97	23.9
Partner's Level of Education	Illiterate	20	4.9
	Read and write	51	12.6
	Primary Education	102	25.1
	Secondary Education	117	28.8
	Collage and above	96	23.6
Occupational status	Unemployed	43	10.6
	Student	10	2.5
	Housewife	157	38.7
	House servant	6	1.5
	Daily laborer	4	1.0
	Merchant	5	1.2

	Government employee	72	17.7
	Private employee	109	26.8
Family size	1	14	3.4
	2	198	48.8
	3	118	29.1
	4+	76	18.6
Monthly Family Income (ETB)	<1500	65	16.0
	1500-1999	4	1.0
	2000-2499	69	17.0
	2500-2999	21	5.2
	3000-3499	96	23.6
	3500-3999	19	4.7
	4000-4499	43	10.6
	4500-4999	4	1.0
	≥ 5000	85	20.9
Receiving Nutrition Information	Yes	356	87.7
	No	50	12.3

### ***B. Knowledge on Nutrition During Pregnancy***

The mean overall knowledge score of pregnant women on nutrition during pregnancy was 5.5 (SD  $\pm$ 2) out of 9. This is 53.9% proportion of pregnant women knowledgeable on nutrition during pregnancy.

Less than half of the pregnant women (43.8%) have perception of having to eat variety of food during pregnancy and 270 (66.5%) have knowledge on the need to eat more during pregnancy than their non-pregnant state. Meat, liver and fish were known by 129 (31.8%) participants as a good food source of Iron, while 145 (34.7%) thought vegetables as good food source for Iron and 132 (32.5%) said they don't know.

Use of Iodized salt during pregnancy was known by 323 (79.6%) of the participants. Only 144 (35.5%) of the study participants answered duration of Iron supplementation being for 6 months, while 113 (27.8%) said it was given for 3 months and the rest did not know the duration of Iron tablet supplementation.

One third of the pregnant women in the study (275) knew the need for supplementation of important minerals and vitamins during pregnancy. Of the study participants, 335 (82.5%) and 263 (64.8%) knew maternal under nutrition would bring fetal and maternal complications respectively.

Table-6: Knowledge of nutrition during pregnancy among pregnant women attending ANC in Akaki Kality Sub-city, April 2016

Knowledge Type	Categories	No	%
Knowledge on eating variety food without avoiding food	Variety of food	178	43.8
	Only what she craves	165	40.6
	Don't know	63	15.5
Knowledge on increasing amount of food during pregnancy	More food	270	66.5
	Less food	25	6.2
	The same as	111	27.3
Knowledge on food source for iron	Red meat, liver and fish	129	31.8
	Fruits and vegetables	145	35.7
	Don't know	132	32.5
Knowledge on using iodized salt during pregnancy	No	83	20.4
	Yes	323	79.6
Knowledge on fetal complication of maternal under nutrition	No	71	17.5
	Yes	335	82.5
Knowledge on maternal complications of under nutrition	No	143	35.2
	Yes	263	64.8
Knowledge on duration of Iron supplementation	6 months	144	35.5
	3 months	113	27.8
	don't know	149	36.7
Knowledge on necessity of supplementation because of inadequacy of nutrients in foods	No	131	32.3
	Yes	275	67.7
Knowledge on effect of maternal under nutrition on fetal weight	Low birthweight and still birth	336	82.8
	No effect on fetal Weight	5	1.2
	Don't know	65	16.0

In this study other pregnant women were the source of information for 59.1% pregnant women. Health professionals, Nurses/Midwives or doctors, were collectively put as source of information by 57.8% of the ANC attendants. Family and friends were mentioned as source of information by 24.1% and 17.2% of the pregnant women. Fifty (12.3%) pregnant women did not receive any information on nutrition during pregnancy.

From those who claimed to have received nutrition counseling, 235 (65.6%) claim they have received enough information from their sources while the rest 123 (34.4%) think the information they received was not adequate.

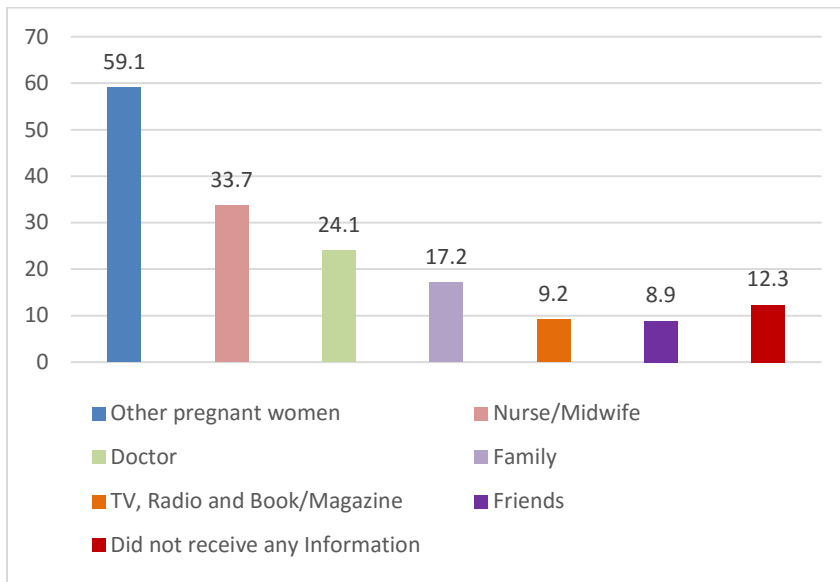


Figure-1: Source of information for nutrition knowledge of pregnant women attending ANC in Akaki Kaliti Sub-city, April 2016

The overall knowledge score of pregnant women was seen to have significant association with number of pregnancies, gestational age, educational status, monthly family income and receiving nutrition information. The odds of being knowledgeable among multigravidas was 2.19 times than Primigravida (AOR=2.19, 95%CI: 1.19, 4.01) while odds of being knowledgeable among women on their third trimester of pregnancy was 2.01 times higher than those at their second trimester (AOR=2.01, 95%CI: 1.05, 3.86).

In this study number of ANC visits did not determine knowledge of pregnant women. The odds of being knowledgeable on appropriate nutrition during pregnancy among pregnant women increased from women with no education to those who completed primary school (AOR=3.56, 95%CI: 1.2, 10.54), to those who finished secondary school (AOR= 5.82, 95%CI: 1.9, 17.7) and to those who have had collage education (AOR= 5.49, 95%CI: 1.69, 17.8). Women who received nutrition information were seen to have higher odds of being knowledgeable on nutrition during pregnancy than those who did not receive information (AOR= 19.1, 95%CI: 4.2, 86.7).

Table-7: Determinants of nutrition knowledge of pregnant women attending ANC in Akaki Kality Sub-city, April 2016

Characteristic		Knowledgeable		Total No	COR(95%CI)	AOR(95%CI)
		No	Yes			
Age	15-19	71.4	28.6	21	1	1
	20-24	50.0	50.0	136	2.5(0.92, 6.83)	1.47 (0.39, 5.44)
	25-29	38.1	61.9	181	<b>4.06(1.5, 10.95)</b>	1.65(0.64, 4.29)
	≥30	51.5	48.5	68	2.36(0.82, 6.8)	1.31(0.31, 5.48)
Gravida	Prim gravida	51.4	48.6	208	1	1
	Multigravida	40.4	59.6	198	<b>1.56(1.05, 2.32)</b>	<b>2.19(1.19, 4.01)*</b>
Gestational Age	Second TMP	56.8	43.2	169	1	1
	Third TMP	38.4	61.6	237	<b>2.1(1.41, 3.15)</b>	<b>2.01(1.05, 3.86)*</b>
Number of ANC visits	1	54.3	45.7	116	1	1
	2	51.6	48.4	126	1.12(0.67, 1.85)	0.58(0.28, 1.22)
	3	37.7	62.3	122	<b>1.96(1.17, 3.29)</b>	1.43(0.61, 3.37)
	4+	31.0	69.0	42	<b>2.65(1.25, 5.61)</b>	1.83(0.61, 5.50)
Level of Education	Illiterate	81.8	18.2	44	1	1
	Read and write	69.8	30.2	53	1.95(0.74, 5.11)	1.12(0.34, 3.68)
	Primary Education	49.2	50.8	118	<b>4.65(1.99, 10.85)</b>	<b>3.56 (1.2, 10.54)*</b>
	Secondary Education	31.9	68.1	94	<b>9.6(3.98, 23.15)</b>	<b>5.82(1.9, 17.73)*</b>
	Collage and above	26.8	73.2	97	<b>12.3(5.05, 29.87)</b>	<b>5.49(1.69, 17.8)*</b>
Occupational status	Unemployed	52.3	47.7	43	1	1
	Student	60.0	40.0	10	0.73(1.81, 2.95)	1.2(0.20, 7.22)
	Housewife	45.2	54.8	157	1.33(0.68, 2.59)	0.49(0.19, 1.25)
	House servant	66.7	33.3	6	0.55(0.09, 3.31)	0.64(0.08, 4.79)
	Daily laborer	100	0	4		
	Merchant	60.0	40	5	0.73(0.11, 4.81)	0.46(0.05, 4.18)
	Government employee	22.2	77.8	72	<b>3.83(1.7, 8.63)</b>	1.24(0.39, 3.96)
	Private employee	55.6	44.4	109	0.88(0.43, 1.77)	0.41(0.15, 1.08)
Monthly Family Income (ETB)	<1500	58.5	41.5	65	1	1
	1500-1999	50.00	50.0	4	1.41(0.18, 10.62)	0.25 (0.02, 2.14)
	2000-2499	60.9	39.1	69	0.91(0.45, 1.81)	0.56(0.22, 1.43)
	2500-2999	66.7	33.3	21	0.70(0.25, 1.97)	0.85(0.21, 3.36)
	3000-3499	45.8	54.2	96	1.66(0.88, 3.14)	0.73(0.31, 1.7)
	3500-3999	10.5	89.5	19	<b>11.96(2.6, 56.1)</b>	<b>6.2(1.16, 33.4)*</b>
	4000-4499	48.8	51.2	43	1.47(0.67, 3.2)	0.69(0.25, 1.94)
	4500-4999	50.0	50.0	4	1.41(0.18, 10.62)	0.74(0.54, 3.3)
	≥ 5000	25.9	74.1	85	<b>4.03(2.02, 8.05)</b>	2.1(0.76, 6.26)
Receiving Nutrition Information	Yes	39.0	61.0	356	<b>37.4(8.9, 156.6)</b>	<b>19.1(4.2, 86.7)*</b>
	No	96.0	4.0	50	1	1

\*significant at P<0.05



### *C. Practice of appropriate nutrition during pregnancy*

All of the pregnant women were assessed during the main Orthodox Church fasting period but due to the limited number of pregnant women who reported fasting (5.4%) the analysis was not adjusted in anyway. The result presented is the practice before the nutrition counseling, the post-counseling result is included in the next section.

Two hundred eighty three (69.7%) of the participants have added at least one additional meal during their current pregnancy. When asked on the type of food recommended at servings of a day's meal, 204 (50.2%) were in line with meat and legume servings (protein foods), 172 (42.4%) in line with dairy products, and 187 (46.1%) in line with green vegetable servings. Less than half (44.1%) of the pregnant women reported eating at least two fruits per day.

The adherence of pregnant women for Iron supplement tablet in one week before the survey was 69%. Three hundred thirty six (82.8%) reported using iodized salt for cooking in their current pregnancy. Only 55 (13.5%) pregnant women reported alcohol use and 250 (61.6%) decreased their coffee consumption during their current pregnancy.

One hundred eleven (27.3%) participants have avoided one or more food types in their current pregnancy. The most frequently avoided foods were meat, grains, dairy products and spicy foods. The reason for avoiding food groups were having nausea and vomiting with consuming the food (39.6%), not liking the food (49.5%) and being told by other people it will harm the pregnancy (9.9%).

The overall score on practice of pregnant women was found to have a mean of 6.2 (SD  $\pm$ 2) out of 11 with proportion of 46.8% (190) women with good practice on nutrition during pregnancy.

Table-8: Pregnancy specific Nutrition practice among pregnant women attending ANC in Akaki Kality Sub-city, April 2016

<b>Nutrition Practice specific to Pregnancy</b>	<b>Categories</b>	<b>No</b>	<b>%</b>
Addition of at least one additional meal from non-pregnant diet	No	123	30.3
	Yes	283	69.7
Eating 2 to 3 servings of meat, fish, nuts or legumes per day	No	202	49.8
	Yes	204	50.2
Eat 2 to 3 servings of dairy (milk, eggs, yogurt, and cheese) per day	No	234	57.6
	Yes	172	42.4
Eat 2 servings of green vegetables; 1 serving of a yellow vegetable per day	No	219	53.9
	Yes	187	46.1
Eat 2 to 3 servings of fruit per day	No	227	55.9
	Yes	179	44.1
Eat 3 servings of whole grain breads, cereals, or other high-complex carbohydrates	No	128	31.5
	Yes	278	68.5
Use Iodized salt	No	70	17.2
	Yes	336	82.8
Taking 7 Iron supplement tablets in the past week	No	126	31.0
	Yes	280	69.0
alcohol use and smoking in the current pregnancy	No	351	86.5
	Yes	55	13.5
Decreasing coffee use	No	156	38.4
	Yes	250	61.6
Avoiding one or more food type during pregnancy	No	295	72.7
	Yes	111	27.3

The pregnancy specific dietary practice of pregnant women was seen to be affected by gestational age, Occupational status and monthly household income. The odds of having good nutrition practice among Women on their third trimester of pregnancy was 1.58 higher than those at their second trimester (AOR=1.58, 95%CI: 1.02, 2.45). The odds of having good nutrition practice in pregnancy among students was 8.13 times higher than Unemployed pregnant women (AOR= 8.13, 95%CI: 1. 45, 45.6). The odds of having good practice on nutrition during pregnancy was higher among

Table-9: Determinants of pregnancy specific dietary practice of pregnant women attending ANC in Akaki Kality Sub-city, April 2016

Variable	Categories	Good Practice		Total No	COR(95%CI)	AOR(95%CI)
		No	Yes			
Gestational Age	Second TMP	59.8	40.2	169	1	1
	Third TMP	48.5	51.5	237	<b>1.57(1.05, 2.35)</b>	<b>1.58(1.02, 2.45) *</b>
Occupational status	Unemployed	65.9	34.1	44	1	1
	Student	20.0	80.0	10	<b>7.73(1.45, 41.1)</b>	<b>8.13(1.45, 45.6) *</b>
	Housewife	55.4	44.6	157	1.56(0.77, 3.13)	1.24(0.58, 2.62)
	House servant	66.7	33.3	6	0.97(0.16, 5.89)	1.23(0.19, 7.83)
	Daily laborer	100	0	4		
	Merchant	60.0	40.0	5	1.29(1.94, 8.57)	1.01(0.14, 7.37)
	Government employee	50.0	50.0	72	1.93(0.89, 4.2)	1.39(0.60, 3.23)
	Private employee	47.2	52.8	109	<b>2.16(1.04, 4.48)</b>	1.69(0.77, 3.71)
Monthly Family Income (ETB)	<1500	67.7	32.3	65	1	1
	1500-1999	50.0	50.0	4	2.09 (0.28, 15.9)	1.77 (0.23, 13.9)
	2000-2499	53.6	46.4	69	1.81(0.89, 3.66)	1.72(0.81, 3.65)
	2500-2999	66.7	33.3	21	1.05(0.37, 2.98)	0.89(0.30, 2.69)
	3000-3499	40.6	59.4	96	<b>3.06(1.58, 5.93)</b>	<b>2.65(1.32, 5.23) *</b>
	3500-3999	73.7	26.3	19	0.75(0.24, 2.35)	0.71(0.22, 2.30)
	4000-4499	53.5	46.5	43	1.82(0.84, 4.03)	1.71(0.74, 3.96)
	4500-4999	100	0	4		
	≥ 5000	45.9	54.1	85	<b>2.47(1.26, 4.84)</b>	<b>2.14(1.03, 4.43)*</b>

\*significant at p<0.05

### 8.3 Effect of Nutrition Education

Nutrition education provided to pregnant women during their ANC visit was seen to have a positive outcome on the knowledge and pregnancy specific dietary practice. After the implementation of Nutrition education the proportion of pregnant women with good knowledge of nutrition during pregnancy increased from 53.9 (95%CI: 48.9, 58.8) to 97% (95%CI: 94.8, 98.5) while the pregnancy specific dietary practice of the pregnant women increased from 46.8% (95%CI 41.8, 51.7) to 83.7% (95%CI: 79.8, 87.2).

The analysis showed that the provided nutrition counseling have a significant increase on all knowledge components except Knowledge of effect of maternal under nutrition on fetal weight (82.5% to 89.4%). The proportion of pregnant women with knowledge on eating variety of food increased significantly from 43.8% to 85.7%, Knowledge on amount of food to eat increased significantly from 66.5% to 88.9%, Knowledge on food source of iron increased significantly

from 31.8% to 86.9%, Knowledge on using iodized salt increased significantly from 79.6% to 95.6%, Knowledge on maternal complication of under nutrition during pregnancy increased significantly from 64.8% to 91.4%, and Knowledge on duration of Iron supplementation increased significantly from 35.5% to 92.1%.

Table-10: Pre and post counseling knowledge of pregnant women attending ANC in Akaki Kality Sub-city, April 2016

Knowledge Questions	Categories	Pre-Counseling		Post_Counseling	
		No	Proportion (95%CI)	No	Proportion (95%CI)
Overall knowledge	Knowledgeable	219	53.9 (48.9, 58.8)	394	<b>97.0(94.8, 98.5) *</b>
	Not Knowledgeable	187	46.1	12	
Knowledge on eating variety food without avoiding food	No	228	56.2	58	
	Yes	178	43.8(38.9, 48.8)	348	<b>85.7(81.9, 88.9)*</b>
Knowledge on increasing amount of food during pregnancy	No	136	33.5	45	
	Yes	270	66.5(61.6, 71.0)	361	<b>88.9(85.4, 91.7)*</b>
Knowledge on food source for iron	No	277	68.2	53	
	Yes	129	31.8(27.3, 36.5)	353	<b>86.9(83.3, 90.1)*</b>
Knowledge on using iodized salt during pregnancy	No	83	20.4	18	
	Yes	323	79.6(75.3, 83.4)	388	<b>95.5(93.1, 97.1)*</b>
Knowledge on fetal complication of maternal under nutrition	No	71	17.5	43	
	Yes	335	82.5(78.4, 86.1)	363	89.4(85.9, 92.2)
Knowledge on maternal complications of under nutrition	No	143	35.2	35	
	Yes	263	64.8(59.9, 69.4)	371	<b>91.4(88.2, 93.9)*</b>
Knowledge on duration of Iron supplementation	No	262	64.5	32	
	Yes	144	35.5(30.8, 40.3)	374	<b>92.1(89.1, 94.5)*</b>
Knowledge on necessity of supplementation because of inadequacy of nutrients in foods	No	131	32.3	36	
	Yes	275	67.7(62.9, 72.2)	370	<b>91.1(87.9, 93.7)*</b>
Knowledge on effect of maternal under nutrition on fetal weight	No	70	17.2	9	
	Yes	336	82.8(78.7, 86.3)	397	<b>93.3(90.4, 95.5)*</b>

*\*Confidence interval of the proportions does not overlap suggesting Significant in change from pre-counseling*

The finding of this research shows that Nutrition education also have a positive effect on change of pregnancy specific dietary practice components. Higher proportion of pregnant women changed their practice of pregnancy related diet in addition of an extra meal (from 29.2% to 100%), eating 2 servings of green leafy vegetables (from 46.1% to 88.2%), use of Iodized salt (from 82.8% to 96.1%), and adherence to Iron supplementation tablets (from 69% to 100%).

There was no significant change in practice of pregnant women with regard to consuming recommended daily servings of grains and cereals and servings of dairy products among the study subjects after nutrition education.

**Table-11: Pre and post counseling practice of pregnant women attending ANC in Akaki Kality Sub-city, April 2016**

Nutrition Practice specific to Pregnancy		Pre-Counseling		Post_ Counseling	
		No	Proportion(95%CI)	No	Proportion(95%CI)
Overall practice	Good practice	190	46.8(41.8, 51.7)	340	<b>83.7(79.8, 87.2)*</b>
	No practice	216	53.2	66	16.3
Added at least one additional meal from non-pregnant diet	No	123		0	0
	Yes	283	69.7(64.9, 74.1)	406	100**
Ate 2 to 3 servings of meat, fish, nuts or legumes per day	No	202	49.8	157	38.7
	Yes	204	50.2(45.3, 55.2)	249	<b>61.3(56.4, 66.1)*</b>
Ate 2 to 3 servings of dairy (milk, eggs, yogurt, and cheese) per day	No	234	57.6	204	50.2
	Yes	172	42.4(37.5, 47.3)	202	49.8(44.8, 54.7)
Ate 2 servings of green vegetables; 1 serving of a yellow vegetable per day	No	219	53.9	48	11.8
	Yes	187	46.1(41.1, 51.0)	358	<b>88.2(84.6, 91.2)*</b>
Ate 2 to 3 servings of fruit per day	No	227	55.9	161	39.7
	Yes	179	44.1(39.2, 49.1)	245	<b>60.3(55.4, 65.1)*</b>
Ate 3 servings of whole grain breads, cereals, or other high-complex carbohydrates	No	128	31.5	127	31.3
	Yes	278	68.5(63.7, 72.9)	279	68.7(63.9, 73.2)
Used Iodized salt	No	70	17.2	16	3.9
	Yes	336	82.8(78.7, 86.3)	390	<b>96.1(93.7, 97.7)*</b>
Took 7 Iron supplement tablets in the past week	No	126	31.0	0	0
	Yes	280	69.0(64.2, 73.4)	406	100**
Used Alcohol	No	351	86.5(82.7, 89.6)	406	100**
	Yes	55	13.5	0	0
Decreased coffee use	No	156	38.4	95	23.4
	Yes	250	61.6(56.6, 66.3)	311	<b>76.6(72.2, 80.6)*</b>
Avoided one or more food type during pregnancy	No	295	72.7(68.0, 76.9)	339	<b>83.5(79.5, 86.9)*</b>
	Yes	111	27.3	67	16.5

**\*\* One-sided, 97.5% confidence interval**  
**\*Confidence interval of the proportions does not overlap suggesting Significant in change from pre-counseling**

## 9 Discussion

The present study found that two third of ANC providers were knowledgeable on nutrition during pregnancy but only 4.2% practiced good nutrition counseling to their clients. The mean knowledge and practice score of pregnant women was 5.5 (SD  $\pm$ 2) out of 9 and 6.2 (SD  $\pm$  2) out of 11 respectively. Other pregnant women were the source of information for pregnant women on Nutrition during pregnancy (59.1%). After the implementation of the nutrition education program the proportion of knowledgeable pregnant women on nutrition during pregnancy significantly increased from 53.9% to 97%while the pregnancy specific dietary practice of the pregnant women increased from 46.8% to 83.7%.

In this study 66.7% of the health professionals were knowledgeable on nutrition during pregnancy. This result was higher than 54% knowledgeable health professionals in the United Kingdom (12) but lower than 74% health professionals with knowledge in a Dutch cross sectional study (24). This result discrepancies could be due to the difference in sets of questions used to assess knowledge or due to difference in socio-demographic characteristic of pregnant women between the countries.

In this study major Knowledge gap among health professionals was seen on Maternal Complications of under nutrition during pregnancy (29.2%), gestational weight gain (37.5%), and energy requirement during pregnancy (45.8%). This concepts are ever-changing and hard to track if one is not following publications or having capacity building packages time to time.(1, 28)

This study found that only 4.2% of the health professionals practiced nutrition counseling to their clients. A study done in Canada found a higher proportion of health professionals (28.5%) who practice nutrition education to their clients. (14)An Australian cross sectional study also found a higher proportion (26%) of health professionals. (13)The quality of service, client load and knowledge level of the professionals in this study may be the cause of lower practice. Very low proportion of health professionals with correct practice in this study may also be due to single point and single time assessment of the health professionals.

Midwives and nurses in this study were the source of information for only 20.5% of the pregnant women A Gambian study also found a lower proportion of pregnant women (35%) recalling

being informed on nutrition and diet by their ANC provider. (22) This showed the lower practice of ANC providers but especially in low income countries like Ethiopia.

Proportion of pregnant women with good nutrition related knowledge was found in this study to be 53.9%. This is lower than Malaysian study which found proportion of pregnant women with nutrition knowledge as 65.7%. (32) It is even lower than the proportion found in other African countries like Swaziland (67%). (35) But it was the same level with the result of a study done in East Wollega, Ethiopia (64.4%). (38) The finding of the present study was higher than finding of an Egyptian study which revealed only 46% knowledgeable pregnant women on nutrition. (34)

This study found 64.8% pregnant women knew maternal under nutrition would bring fetal complications. This result was higher than the result from East Wollega, Ethiopia where 34.8 % respondents had the knowledge that inadequate nutrition during pregnancy can be the cause of miscarriage or preterm birth. (38) A cross sectional study in India found an even lower proportion of mothers (27.4%) with this knowledge. (33) This could be due to difference in disease causation beliefs of the areas which is affected by difference in cultural and spiritual influences.

It was also found in this study that 270 (66.5%) have knowledge on need of eating more during pregnancy than their non-pregnant state which is lower than 84% of Pakistani mothers who have knowledge on increasing, adding food items in the diet during pregnancy. (31)

In this study 31.8% pregnant women have knowledge on food source of Iron; which was lower than a 61.3% proportion found in an Indian study. (17) This study also shows only 35.5% of the study participants answered duration of Iron supplementation being for 6 months, while 113 (27.8%) said it was given for 3 months and the rest did not know the duration of Iron tablet supplementation. Though Iron supplementation information was being distributed by TV, radio and posters at ANC, it was not bringing change in the target group.

In this study instead of health professionals, other pregnant women were source of information for most of the pregnant women on nutrition during pregnancy. This is in agreement with a result of Polish study where half of the pregnant women mentioned own experience as source of information. (31)

Knowledge of pregnant women on nutrition during pregnancy was seen to have significant association with Number of pregnancies, Gestational age, Educational status ever receiving

nutrition information and Monthly family Income. Similar with study done in East Wollega which states Information about nutrition, family income and educational status of mothers had a positive significant relation with mothers' nutrition knowledge. (38)Educational status having positive effect also reported in and Irish study on relationship between socioeconomic status and nutritional knowledge in women during pregnancy.

Number of ANC visits was not associated with knowledge of pregnant women in this study. This was also indicated in a Kenyan study where nutrition knowledge level of those attending ANC was not significantly different from those not attending ANC. This shows the gap in provision of nutrition education by health professionals at the ANC. This gap is presumed to be due to lack of time for counseling, client load at the ANC and lack of training on the subject of nutrition during pregnancy. (36)

The proportion of pregnant women in this study with good pregnancy specific nutrition practice were 46.8%. A higher proportion of pregnant women with good practice were seen in Malaysia (74%) and Pakistan (65.5%). (32, 31)A study in Swaziland found a close proportion with 51% good practice among pregnant women. (35)

In this study 69.7% of the pregnant women have added at least one additional meal from non-pregnant diet. This was the opposite of a study done in Wondo genet where 75.2% of the pregnant women did not take any additional meal during pregnancy. The economic disparities and knowledge may have an effect on this difference. (10)

When pregnant women in this study were asked on their practice of recommended food servings of meal per day during pregnancy, 172 (42.4%) were in line with dairy products, and 187 (46.1%) in line with green vegetable servings. This is a bit lower than a study in the USA where 42.7% and 58.9% of respondents had a habit of daily drinking of milk and eating fresh vegetables respectively. (29)Difference in diet of the two communities and the knowledge difference may have created this disparities.

The adherence for Iron supplements in one week before the survey of this study was 69% which is close to results from America (63.7%) and India (62%) on antenatal mothers consuming Iron folate tablets. The similarity of intervention strategies, supplementation and one to one education, in Iron supplementation may be the cause for this similarity.



One hundred eleven (27.3%) participants of this study have avoided one or more food types in their current pregnancy. In a study done in Wondo Genet on dietary practice and associated factors among pregnant women about 21% of them were restricting their food intake. (10)It was also notes among 16% of Nigerian pregnant women.

The reason for avoiding food groups were having nausea and vomiting with consuming the food (39.6%), not liking the food (49.5%) and being told by other people it will harm the pregnancy/food taboo (9.9%). This reasons mentioned in Shashamane study where the avoidance were due to food taboos. A study in Shashamane found that half (49.8%) of the pregnant women in the area were avoiding one or more foods due to food taboos. (8)A lower proportion in this area as compared to Shashamane could be due to difference in belief and educational level of women.

In this study the most frequently avoided foods by pregnant women were meat, grains, dairy products, vegetables and spicy foods. This is almost similar with what pregnant women in Shashamane were avoiding, linseed, honey, milk, fatty meat, eggs, fruits and vegetables.

In the present study the pregnancy specific dietary practice of pregnant women was seen to be associated with gestational age, Occupational status and monthly household income. No association was found with ever receiving nutrition information and pregnancy specific dietary practice of pregnant women. With increasing gestational age, pregnant women tend to have less nausea and vomiting and increased appetite, which will prompt them to eat more and eat variety of foods if their income is good. But since the information they received was mostly informal, which by itself is molded to societal beliefs than scientific information, they tend to show no change in practice.

After the implementation of Nutrition education in this study the proportion of pregnant women with good knowledge of nutrition during pregnancy increased from 53.9% to 97% which supports the positive effect of nutrition counseling seen in an Iranian study, knowledge change from 3% to 31%. (21)It also agrees with study done in India which found an overall nutritional knowledge improvement from mean of 22 in the pre-test to 32.7 at posttest. (17)This similarities show the effectiveness of nutrition education in improving knowledge of pregnant women on nutrition during pregnancy. Higher change in nutrition knowledge among pregnant women in

this study could also be due to the short interval between the pre and posttest and the fact that there was only one post counseling assessment.

In this study pregnancy specific dietary practice of the pregnant women increased from 46.8% to 83.7%. Increase in consumption of most foods seen after nutrition counseling of this study was in agreement with a Dutch study where there was a significant increase in the amount of almost all the food groups consumed in the post-Nutrition Education as compared to non-Nutrition Education and pre-Nutrition Education group. (22)

In this study no significant change was seen in the practice with regard to vegetables and grain, probably because these foods are frequently consumed that Pregnant Women may neglect to mention them OR due to actual low practice due to the fact that since these are foods consumed regularly pregnant women may think they are already taking plenty of them to add to their practice.

## **10 Strength and Limitations**

### **Strength**

- In the present study both quantitative and qualitative methods were used. Using qualitative method has helped in identifying practical challenges of providing nutrition education at the ANC.
- The use of before-after cohort study instead of a survey study helped in studying.
- The issue studied in this research is hardly investigated, if at all, elsewhere in Ethiopia as to the investigator's knowledge putting this finding as a baseline to document effect of training health professionals on the knowledge and practice of pregnant women on nutrition during pregnancy.

### **Limitations**

- Though maximum effort was made to restrict the knowledge and practice change to the effect of nutrition education at the ANC, limiting the effect of other sources like TV and radio broadcastings was beyond the scope of this research.
- Use of Iodized salt in the practice questionnaire only shows the intention of Pregnant women, as there was no confirming they are actually using iodized salt (like doing titer test).
- Because the small sample size of health professionals the result of knowledge and practice of health professionals may bring Type II error.
- Social desirability bias may bring higher proportion of correct practice among pregnant women on the follow-up questioning (as the practice is self-reported).
- The presence of supervision by PI during nutrition education may have an effect on the performance of ANC providers and on knowledge and practice of pregnant women.

## **11 Conclusions and Recommendations**

### **11.1.1 Conclusions**

- The knowledge level of Health professionals on nutrition during pregnancy and their confidence on nutrition counseling is fair but were giving hardly any nutrition counseling when compared to what WHO and other organizations are recommending. There is also a huge training need from the providers.
- Pregnant women have poor knowledge on nutrition during pregnancy especially on food source of Iron, duration of Iron supplementation, and eating variety of food. This knowledge was significantly related with Number of pregnancies, Gestational age, Educational, Monthly family Income, and ever receiving nutrition information.
- Most pregnant women have low knowledge on nutrition during pregnancy and were relying on non-professional advice on the subject. The prime source of Information for pregnant women's knowledge on nutrition during pregnancy were not health professionals at the ANC, but other pregnant women.
- Pregnancy specific nutrition practice was seen to be low especially with regard to consumption of fruits, dairy products, and green leafy vegetables. Adherence to Iron supplement tablets was low. Pregnancy specific nutrition practice was significantly related with gestational age, Occupational status and monthly household income.
- Nutrition education to pregnant women during their ANC visit works to increase the awareness of pregnant women about nutrition during pregnancy. It also helps to improve dietary intake during pregnancy and enhance adherence to supplements.

### 11.1.2 Recommendations

#### a) Health professionals

- Health Professionals providing ANC should focus in giving nutrition related advice to their clients in addition to giving advice on danger signs of pregnancy as this things are very much related. Health institutions could help in arranging appointments of ANC clients by time in order to solve time and client load issues of not providing nutrition education.

#### b) Health Officials at RHB/MoH

- Though there are organizations working on 1000 days of critical time for combating intergenerational cycle of under nutrition, little is done with regard to interventions to promote appropriate nutrition during pregnancy. So the MOH and other concerning organizations should broaden the current focus on Iron during pregnancy to simple practical nutrition education and other measures.
- The finding of this study shows use of at least Amharic text mobile phones by both pregnant women and health professionals, so intervention choices like apps or text message reminders to health professionals at the ANC to provide nutrition counseling or directly to pregnant women to notify on appropriate nutrition during pregnancy could be tried. And since this is the era of technology and social media, other media like Facebook and twitter could be tried to help in promotion of appropriate nutrition for pregnant women.

#### c) Further Research

- Most interventions towards nutrition are more on children due to abundant researches and intervention options in that area. So in order to provide scientific evidence and explore intervention options, Organizations and universities should promote researches on nutrition during pregnancy.
- Other related researches like effect of nutrition education on gestational weight gain, hemoglobin level and maternal or fetal complications are rare in the study area. Studying this with a well acceptable method will help in bringing more evidence to promote nutrition education during ANC visits.

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### 13 ANNEX I. Conceptual frame work

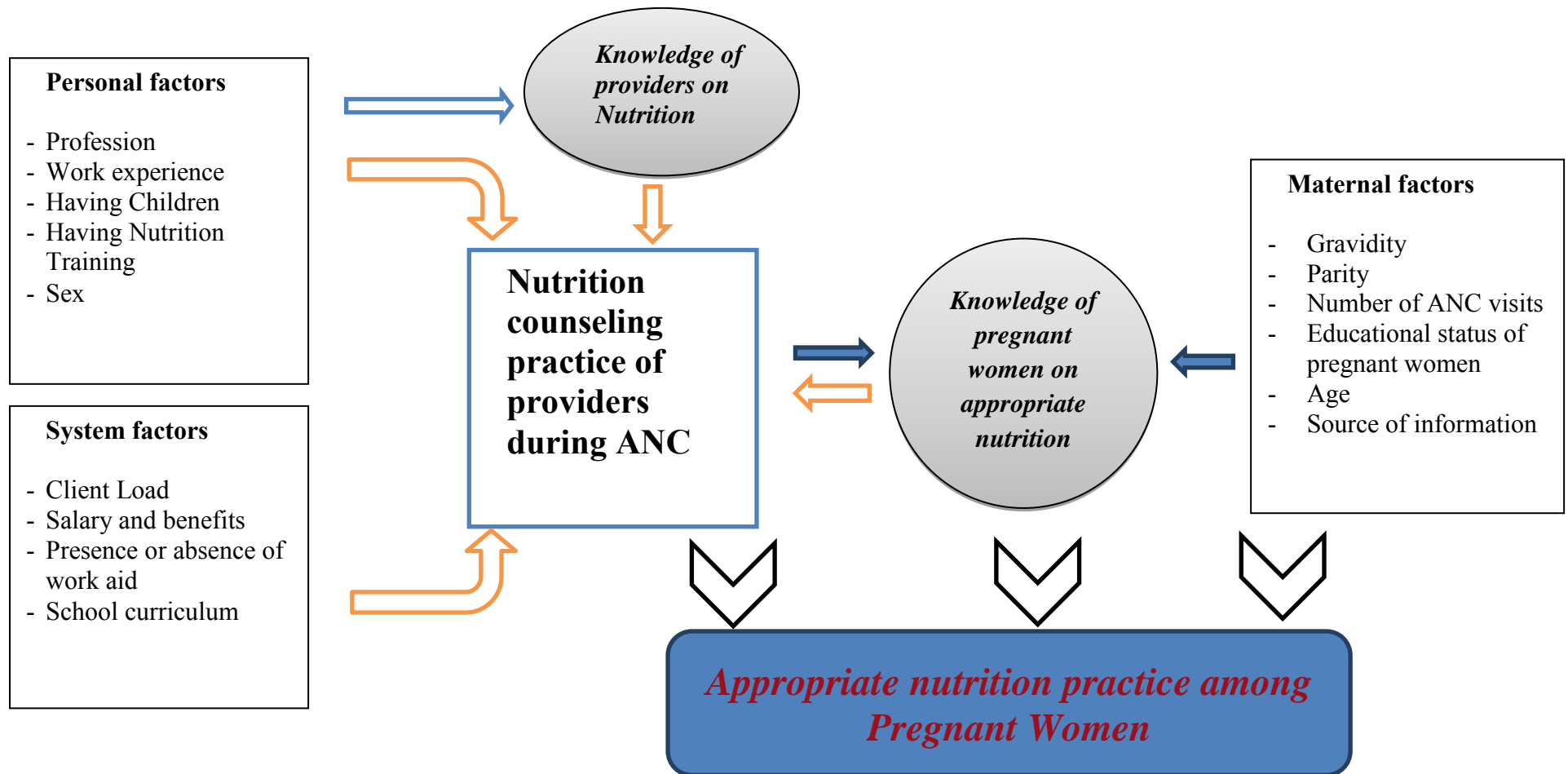


Figure-2: Conceptual framework of Knowledge and Practice of health professionals and pregnant women on appropriate nutrition During Pregnancy, Akaki Kality Sub-city, Addis Ababa.

## **14 ANNEX II: Questionnaires**

### **Informed Consent for health professionals**

Good day to you Sir/Madam, my name is \_\_\_\_\_ and I am working on a study in collaboration with AAU. The main goal of the study is to assess the nutrition knowledge and practice of health professionals and pregnant women on appropriate nutrition during pregnancy. This knowledge will help us in providing proper nutritional counseling for pregnant women in the future and will help in shaping the ANC care of the Sub City for the better. We would appreciate your participation in this survey very much. Should you agree to participate, I will ask you questions about your social and professional background and your current knowledge on appropriate nutrition in pregnancy. You will also be assessed for your practice of nutrition education to your clients using observation checklist.

Whatever information you provide will be kept strictly confidential by using codes and will not be shown to other individuals not included in this study. You can choose not to participate now or at any time during our interview. However, we hope that you will actively participate in this study since the insights and data we get from you are very important. The interview will take only about 20 minutes of your time. You will not have any direct incentives by participating in the interview.

After the interview you will receive a three days training on basic knowledge of appropriate nutrition during pregnancy and counselling skill. After the training you are expected to provide counseling on appropriate nutrition during pregnancy to your ANC clients who are selected for this study. The knowledge and practice of your clients on appropriate nutrition during pregnancy will be assessed in two rounds before and after you provide them with counseling.

If you have any questions you can ask the PI of the research Ashenafi Zelalem (0912045664)

At this time, do you want to ask me anything about the survey? (If yes answer his/her questions politely)

May I begin the interview now? (Circle)

1 = Yes 2 = No (Thank her for her time and end the interview)

Signature of participant: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Signature of interviewer: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Signature of Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

## Questionnaire for Health professionals

### Part One: Background Information

No	Questions and filters		Coding classifications	Remark
	Participant Code		HP _____	
Q101	Name of the Health Facility		_____	
Q102	Level of institution	1 2	Hospital Health center	
Q103	Number of ANC clients seen per week		_____	
Q104	Age of the participant in completed years		_____ yrs.	
Q105	Sex	1 2	Female Male	
Q106	Profession	1 2 3 4 5	Physician/GP Health Officer Clinical Nurse BSC Nurse Midwife	
Q107	Educational status	1 2 3	Diploma Degree Masters and above	
Q108	Marital status	1 2 3 4 5	Married Single Separated Divorced Widowed	
Q109	Monthly Salary		_____ ETB	
Q110	Years of service / Experience		_____ years	
Q111	Do You have a mobile phone	1 2	Yes No	
Q112	Type of Mobile Phone you use	1 2 3 4 5	-Android phone supports Amharic -Android phone not supporting Amharic -Regular phone supports Amharic Texting -Regular phone not support Amharic texting Others _____ x	

Q113	How confident do you feel in providing nutrition counseling to your ANC clients	1 2 3	Not confident Moderately confident Confident	
Q114	Do you think you would provide clients with more nutrition counseling if messages and reminders were sent to your phone?	1 2	Yes No	

**Part two: Knowledge Assessment questions**– Please answer the following questions by circling on the code of the choice you think is the answer(s). If you are not sure or don't know the answer please state "Don't know".

No	Questions		Answers and Coding	Skip to
Q201	Which one of the following pregnancy complications can we prevent with proper nutrition practice and supplementations during pregnancy?(Multiple answers)	1 2 3 4 5 6	-Increased infections -Preeclampsia -Anaemia -Preterm birth -Miscarriage -Don't know	
Q202	How should a pregnant woman eat in comparison with a non-pregnant woman to provide good nutrition to her baby and help him grow?	1 2 3 4	-Eat more at each meal and more frequently than non-pregnant -Eat more at each meal and more frequently than non-pregnant -Eat the same as non-pregnant -Don't know	
Q203	What should be the energy consumption of Pregnant women during their second and third trimester?	1 2 3 4	-Not Different from non-pregnant women -Additional 450Kcal/day in the second and 300Kcal/day in the third trimester -Additional 300Kcal/day in the second and 450Kcal/day in the third trimester -Don't know	
Q204	What is the recommended Gestational weight gain during pregnancy?	1 2 3 4	-12.5-18 Kg for all pregnant women -11.5 – 16 Kg for mothers with pre-pregnancy BMI of 18.5-24.9 -Weight loss to pregnant women with BMI > 30 -Don't know	
Q205	Which one of the supplements during pregnancy should be given early in the first trimester pregnancy?	1 2 3 4	-Iron supplements -Folic acid supplements -Multi vitamin supplements -Don't know	
Q206	Using iodized salt when preparing meals is the most effective and easy way to get enough iodine	1 2	Yes No	

	for pregnant women.	3	Don't Know	
Q207	Why it is so important to take folic acid supplements during pregnancy?	1 2 3	-For normal development of the nervous system of the unborn baby (brain, spine and skull) -To prevent birth defects/abnormalities the nervous system of the unborn baby (brain, spine and skull) -Don't know	
Q208	For how long should a pregnant women take Iron supplementation?	1 2 3 4	-For as long as she tolerates taking the tablets -For 3 months during pregnancy -For 6 months during pregnancy and lactation -Don't know	
Q209	Choose foods that are good source of hem iron?	1 2 3 4	-Meat and fish -Green leafy vegetables -Fruits -Don't Know	
Q210	Which of the following are strictly forbidden during pregnancy during pregnancy.	1 2 3	-Drinking coffee -Using alcohol and smoking --Don't Know	
Q211	Pregnant women should stop using alcohol and smoking.	1 2 3	Yes No Don't Know	

**Part Three: Observation Checklist for nutrition counseling at ANC clinic**

Participant Code HP _____					
No	Character	Correctly done	Done but incorrectly	Not Done	Score
Q401	Weight Measured	2	1	0	
Q402	Informing On Weight to the Pregnant woman	2	1	0	
Q403	ANC provider informed client on GWG	2	1	0	
Q404	ANC provider informed the client on maternal and fetal complications of under nutrition in pregnancy	2	1	0	
Q405	ANC provider gave information on diet related symptoms alike pica, nausea and vomiting	2	1	0	
Q406	ANC provider gave information on food sources of important minerals, variety food,	2	1	0	
Q407	ANC provider gave information to the client on addition of one meal, small portions and frequent feeding	2	1	0	

Q408	ANC provider gave information to the client on what things to avoid during pregnancy (smoking, Alcohol, caffeine)	2	1	0	
Q409	ANC provider gave information on iron supplement and checking for adherence	2	1	0	
Q410	ANC provider gave information on food source of iron	2	1	0	
Q411	ANC provider gave information on use of iodized salt	2	1	0	
Q412	ANC provider received questions on nutrition and related issues from the client and answered it clearly	2	1	0	

### **Informed Consent for ANC clients**

Good day to you madam, my name is \_\_\_\_\_ and I am working as a data collector for a study we are conducting in collaboration with AAU. The main goal of the study is to assess the nutrition knowledge and practice of health professionals and pregnant women on appropriate nutrition during pregnancy. This knowledge will help us in providing proper nutritional counseling for pregnant women in the future and will help in shaping the ANC care of the Sub City for the better. We would appreciate your participation in this survey very much. Should you agree to participate, I will ask you questions about basic information of you and your pregnancy, your basic knowledge of nutrition during pregnancy and your dietary practices during your current pregnancy. You will be asked this questions now and two weeks after receiving counseling by ANC provider on the subject. For the interview part, there is no right or wrong answer to each question.

Whatever information you provide will be kept strictly confidential by using codes and will not be shown to other individuals. Your contact information like phone Number will be taken as a follow up for your second interview.

Your Participation is voluntary, and you can choose not to participate now or at any time during our interview. However, we hope that you will actively participate in this study since the insights and data we get from you are very important.

The interview will take only about 20-30 minutes of your time. You will not have any direct incentives by participating and your decision to participate in the study will not affect the service you will get from your ANC clinic.

If you any questions, you can contact the Principal Investigator (Ashenafi Zelalem: 0912045664).

At this time, do you want to ask me anything about the survey? (If yes answer her questions politely)

May I begin the interview now? (Circle)

1 = Yes 2 = No (Thank her for her time and end the interview)

Signature of participant: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Signature of interviewer: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Signature of Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

### **Questionnaire for Pregnant women**

#### **Part One: Background and locating Information**

No	Questions and filters	Coding classifications	Code	Remark
Q501	Client Code	PW _____		
Q502	Locating Information (Phone Number)	_____		
Q503	Age of the participant	_____ yrs.		
Q504	Gravida/ Number of pregnancies	_____		
Q505	Para / Number of born children	_____		
Q506	Gestational Age in weeks	_____		
Q506	Marital status	Married Single Separated Divorced Widowed	1 2 3 4 5	
Q507	Educational status	Illiterate Read and Write Primary Education Secondary Education	1 2 3 4	



		Collage/ University level	5	
Q508	Husband's Educational status	Illiterate Read and Write Primary Education Secondary Education Collage/ University level	1 2 3 4 5	
Q509	Current occupation?	Unemployed Student Housewife House servant Daily laborer Merchant Government Employee Private employee Others specify <u>  </u>	1 2 3 4 5 6 7 8 9	
Q510	Religion	Orthodox Muslim Protestant Other, Specify _____	1 2 3 4	
Q511	Number of ANC visits for current pregnancy	_____		
Q512	Monthly family income	_____ ETB		
	Do you have a mobile phone	Yes No	1 2	
Q513	What type of phone do you use	_____		
Q514	Do you think you could be benefited if you get information on nutrition through your mobile phone	Yes No	1 2	

**Part two: Knowledge Assessment questions-**

<b><u>No</u></b>	<b><u>Questions</u></b>	<b><u>Coding Classifications</u></b>	<b><u>Skip to</u></b>
Q601	During her pregnancy a pregnant woman	Should not avoid any food group Should avoid some food groups and eat only what she craves	1 2

		Don't Know	3	
Q602	With regard to amount of food she eats a pregnant woman should	Eat more food Eat less food No difference from non-pregnant women	1 2 3	
Q603	Which food groups are the best source of Iron	Meat, liver and fish Green vegetables Don't Know	1 2 3	
Q604	A pregnant woman should Use iodized salt when preparing meals	Yes No Don't Know	1 2 3	
Q605	When a pregnant woman is undernourished, the fetus will be at risk of health problems.	Yes No Don't Know	1 2 3	
Q606	Food intakes during pregnancy have influence on maternal outcome during pregnancy.	Yes No Don't Know	1 2 3	
Q607	For how long should a pregnant women take Iron supplementation tablets?	6 months 3 months Don't Know	1 2 3	
Q608	Pregnant women cannot get enough nutrients through what they eat and drink?	Yes No Don't Know	1 2 3	
Q609	What effect does maternal undernutrition have on the weight of the fetus?	having a low-birth-weight baby No effect on the weight Don't Know	1 2 3	
Q610	Where do you get your information on nutrition in pregnancy from?	A doctor/Nurse/Midwives Other pregnant women Books/Magazines Family Friends Radio/TV Did not receive any information	1 2 3 4 5 6 7	

		Others	8	
Q611	Do you believe that you have received enough dietary information to make informed decisions concerning what to do and what not to do for nutrition during pregnancy?	Yes	1	
		No	2	
		Don't Know	3	

### **Part Three: Dietary Practice assessment questions**

<b>No</b>	<b>Nutrition Practice during pregnancy</b>	<b>Coding Classifications</b>		<b>Remark</b>
Q701	Do You add at least one additional meal from what used to be in your non pregnant state?	Yes	1	
		No	2	
Q702	Do You Eat 2 to 3 servings of meat, fish, nuts or legumes, and fish per day?	Yes	1	
		No	2	
Q703	Do You Eat 2 to 3 servings of dairy (milk, eggs, yogurt, and cheese) per day?	Yes	1	
		No	2	
Q704	Do You Eat 2 servings of green vegetables; 1 serving of a yellow vegetable per day?	Yes	1	
		No	2	
Q705	Do You Eat 2 to 3 servings of fruit per day?	Yes	1	
		No	2	
Q706	Do You Eat 3 servings of whole grain breads, cereals, or other high-complex carbohydrates?	Yes	1	
		No	2	
Q707	Do You Use Iodized salt?	Yes	1	
		No	2	
Q708	Have you taken all 7 Iron supplement tablets in the past week?	Yes	1	
		No	2	
Q709	Have You Avoided alcohol use and smoking in your current pregnancy?	Yes	1	
		No	2	
Q710	Have you decreased your coffee intake during your current pregnancy?	Yes	1	
		No	2	
Q711	Are you Avoiding one or more food type during pregnancy?	Yes	1	If no skip Q712 and Q713
		No	2	
Q712	If Yes to Q710 Kind of food avoided	_____		
Q713	If Yes to Q710 Reason for avoiding the food item	_____		

**Amharic Version of Questionnaire for pregnant women**

**ለነፍሱ-ጡር እናቶች የተዘጋጀ መጠይቅ**

ይህ መጠይቅ በጤና ተቋም የቅድመ-ወሊድ ክትትል ለሚያደርጉ ነፍሱጡር እናቶች የተዘጋጀ ነው።

**የስምምነት ሰነድ**

ጤና ይስጥልኝ፣ ስሜ \_\_\_\_\_ ይባላል፣ ከአዲስ አበባ ዩኒቨርሲቲ ጋር በመሆን በምናደርገው ጥናት ላይ የመረጃ ሰብሳቢ ነኝ። የጥናቱ ዋና አላማ የጤና ባለሙያዎችና ነፍሱጡር እናቶች በእርግዝና ጊዜ መኖር ስለሚገባው የአመጋገብ ሁኔታ ያላቸውን እውቀትና ተግባር ማጥናት ነው። ይህንን ማወቃችን በክፍለ ከተማው ጤና ተቋማት በቅድመ-ወሊድ ክትትል ክፍል የሚደረግን የስነ-ምግብ ምክር አገልግሎት ለማሻሻል ይረዳናል። ጥናቱም ለማካሄድ የእርሶን ትብብር እንፈልጋለን። በጥናቱ ለመካፈል ፈቃደኛ ከሆኑ ስለእርሶና ስለእርግዝናዎ፣ በእርግዝና ወቅት ስለሚኖር የአመጋገብ ሁኔታ ያለዎትን እውቀትና በአሁኑ እርግዝና ጊዜዎት ስላሉት የአመጋገብ ሁኔታ ጥያቄዎችን እጠይቅዎታለሁ። እነዚህን ጥያቄዎች ሁለት ጊዜ (አሁንና ከባለሙያ ምክር ካገኙ በኋላ) እጠይቅዎታለሁ።

ማንኛውም የሚሰጡን መረጃ ሚስጢራዊነቱ እንደሚጠበቅ እና ለማንኛውም ሰው አሳልፈን የማንሰጥ መሆኑን እገልጸዎታለሁ። በዚህ ጥናት የእርሶ ተሳትፎ በፍቃደኝነት ላይ የተመሰረተ ነው እንዲሁም ከጥያቄዎቹ ሙሉውን ወይም በከፊል መልስ አለመስጠት ይችላሉ። ሆኖም የሚሰጡን መረጃ ለዚህ ጥናት በጣም ስለሚጠቅመን በጥናቱ ንቁ ተሳትፎ እንደሚያረጉ ተስፋ አለን።

ቃለመጠይቁ ከ 20-30 ደቂቃ ብቻ ይፈጃል። በጥናቱ በመሳተፍ ምንም አይነት ቀጥተኛ ጥቅም ባያገኙም ከእርግዝና ክትትል ክፍል የሚያገኙት የስነ-ምግብ ምክር አገልግሎት በተዘዋዋሪ ይጠቅሞታል። በጥናቱ የመሳተፍ ወይም ያለመሳተፍ ውሳኔዎች በሚያገኙት አገልግሎት ላይ ተፅዕኖ አያደርግም።

በጥናቱ ወቅት ጥያቄ ካለዎት ዋና አጥኚውን (አሸናፊ ዘላለም - 0912045664) ማግኘት ይችላሉ።

ስለ ጥናቱ ጥያቄ አለዎት? (አዎ ከሆነ ጥያቄውን በትህትና መልስ/ሺ)

ጥያቄዎቹን መጀመር እችላለሁ?

- 1- አዎ    2- አይ (አመስግኖ መጠይቁን ማቆም)

**ክፍል 1: አጠቃላይ መረጃ መጠይቅ**

ተ.ቁ	ጥያቄ እና ማጥሪያ	መልሶች	መለያ ኮዶች	አለፍ
Q501	መለያ ቁጥር/ኮድ	PW _____		
Q502	አድራሻ/ስልክ ቁጥር	_____		
Q503	እድሜ	_____ አመት		
Q504	የእርግዝና ቁጥር/ሰንት ጊዜ አርግዘሽ ነበር	_____		

Q505	የወለድሻቸው ልጆች ብዛት			
Q506	የአሁኑ እርግዝና ስንት ሳምንቱ ነው			
Q507	የትምህርት ደረጃ	<p>ያልተማረች</p> <p>ማንበብና መጻፍ የምትችል</p> <p>የመጀመሪያ ደረጃ ትምህርት ያጠናቀቀች</p> <p>ሁለተኛ ደረጃ ትምህርት ያጠናቀቀች</p> <p>ኮሌጅ/ዩኒቨርሲቲ ደረጃ</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	
Q508	የጋብቻ ሁኔታ	<p>ያላገባች</p> <p>ያገባች</p> <p>የተለያዩች</p> <p>የፈታች</p> <p>ባሏ የሞተባት</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	
Q509	የባለቤትሽ የትምህርት ደረጃ	<p>ያልተማረ</p> <p>ማንበብና መጻፍ የሚችል</p> <p>የመጀመሪያ ደረጃ ትምህርት ያጠናቀቀ</p> <p>ሁለተኛ ደረጃ ትምህርት ያጠናቀቀ</p> <p>ኮሌጅ/ዩኒቨርሲቲ ደረጃ</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	
Q510	የስራ ሁኔታ	<p>ስራ የሌላት</p> <p>ተማሪ</p> <p>የቤት እመቤት</p> <p>የቤት ሰራተኛ</p> <p>የቀን ሰራተኛ</p> <p>ነጋዴ</p> <p>የመንግስት ሰራተኛ</p> <p>የግል ስራ</p> <p>ሌሎች</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p>	
Q511	ሀይማኖት	<p>አርቶዶክስ</p> <p>ሙስሊም</p> <p>ፕሮተስታንት</p> <p>ካቶሊክ</p> <p>ሌላ፣ (ገለፅ) _____</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	
Q512	ለአሁኑ እርግዝና ስንት ጊዜ የቅድመ-ወሊድ ክትትል መጥተዋል			
Q513	አብረውሽ የሚኖሩ የቤተሰቦችሽ ቁጥር ስንት ነው			
Q514	የቤተሰብ ወርሃዊ ገቢ ስንት ነው			ብር

Q515	ምን አይነት ሞባይል ስልክ ትጠቀሚያለሽ	-አማርኛ የሚሰራ ስማርት ስልክ -አማርኛ የማይሰራ ስማርት ስልክ -አማርኛ የፅሁፍ መልክት የሚቀበል -ሌላ፣ _____ (ገለፅ) _____	1 2 3 4	
Q516	በሞባይል ስልክ ስለ ስነ-ምግብ መረጃዎች ብታገኝ የምትጠቀሚ ይመስልሻል	አዎ አይ	1 2	

**ክፍል 2: የእውቀት ጥያቄዎች** - ከዚህ በታች ያሉትን ጥያቄዎች በቀጥታ በመጠየቅ ምላሻቸው ከምርጫው የሚጠጋጋውን ያክብቡ

ተ.ቁ	ጥያቄ እና ማጥሪያ	መልስና መለያ ኮዶች	እለፍ
Q601	የምግብ አይነትን ስታስብ አንድ ነፍሰጡር እናት ...	- ምንም አይነት ምግብ መርጦ ከምግብነት መተው የለባትም - ደስ ያላትን ምግብ ብቻ በተደጋጋሚ መመገብ አለባት - አላውቅም	1 2 3
Q602	ነፍሰጡር እናት ነፍሰጡር ካልሆኑት ጋር ሲተያይ...	- የበለጠ ብዙ መመገብ አለባት - ያነሰ መመገብ አለባት - ተመሳሳይ መጠን መመገብ አለባት	1 2 3
Q603	በብረት ማእድን የበለፀጉ የሚባሉት ምግቦች የትኞቹ ናቸው?	- ስጋ፣ ጉበትና አሳ - አትክልትና ፍራፍሬዎች - አላውቅም	1 2 3
Q604	ነፍሰጡር እናት ምግብ ስታበስል በውስጡ የአይደሉን ንጥረ-ነገር የተጨመረበት ጩታ መጠቀም አለባት?	- አዎ - አይደለም - አላውቅም	1 2 3
Q605	ነፍሰጡር እናት ለምግብ እጥረት ከተዳረገች የምትወልደው ልጅ ላይ የጤና ችግር እንዲመጣ ያደርጋል?	- አዎ - አይደለም - አላውቅም	1 2 3
Q606	በእርግዝና ጊዜ የሜወሰዱ ምግቦች በእርግዝናው ውጤት (በእናቲቱ የጤና ሁኔታ) ላይ ተፅዕኖ አላቸው?	- አዎ - አይደለም - አላውቅም	1 2 3
Q607	ነፍሰጡር እናት የብረት ማእድን ኪኒን ለምን ያህል ጊዜ መውሰድ አለባት?	- ለ 6 ወር ያህል - ለ 3ወር ያህል - አላውቅም	1 2 3
Q608	ነፍሰጡር እናቶች ከሚመገቡትና ከሚጠጡት በእርግዝና ጊዜ የሚያስፈልጋቸውን በቂ ንጥረ-ነገሮች ያገኛሉ?	- አዎ - አይደለም - አላውቅም	1 2 3
Q609	የነፍሰጡር እናት በቂ ምግብ አለመመገብ/ለምግብ እጥረት መዳረግ ህፃኑ ላይ ምን ያመጣል?	- የክብደት መቀነስና በማህፀን እንዳለ መሞትን ሊያስከትል ይችላል - ምንም አይነት ጉዳት አያስከትልም - አላውቅም	1 2 3
Q610	በእርግዝና ጊዜ ስለሚኖርሽ አመጋገብ መረጃ ያገኘሽው ከየት/ከማን ነው?	- ከሃኪም - ከነርስ/አዋላጅ ነርስ - ከሌላ ነፍሰጡር እናት	1 2 3 4

		<ul style="list-style-type: none"> <li>- ከመፅሀፍ/መፅሄት</li> <li>- ከቤተሰብ አባል</li> <li>- ከጓደኛ</li> <li>- ከሬዲዮ</li> <li>- ከቴሌቪዥን</li> <li>- ምንም መረጃ አላገኘሁም</li> <li>- ሌላ፣ (ገለፅ)</li> </ul>	5 6 7 8 9 10	
Q611	በእርግዝናኝ ጊዜ እንዴት አይነት አመጋገብ መከተል እንዳለብኝ ለመወሰን የሚያስችል መረጃ አግኝቻለሁ ብለኝ ታስቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አግኝቻለሁ</li> <li>- አይ አላገኘሁም</li> </ul>	1 2	

**ክፍል3- የአመጋገብ ልምድ መጠይቅ** - ከዚህ በታች ያሉትን ጥያቄዎች በደንብ በማብራራት በመለሰችው ምርጫ ላይ ያክብቡ

ተ.ቁ	ነፍሰጡር እናት የአመጋገብ ልምድ	ምላሽ	Remark	
Q701	ነፍሰጡር ሳትሆኑ በሬት ከምትመገቡ ምግብ በተጨማሪ ቢያንስ አንድ ተጨማሪ ምግብ ጨምረኛል ወይ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q702	በቀን ከ 2-3 ስጋ/አሳ/ባቄላ/አተር ያለው ማእድ ትመገቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q703	በቀን ከ 2-3 የወተት ተዋፅኦ ያለው (ወተት፣አይብ፣እርጎ) ማእድ ትመገቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q704	በቀን 2 ቢጫ አትክልት ያለው ማእድ ትመገቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q705	በቀን 3 ፍራፍሬ ትመገቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q706	በቀን 3 የጥራጥሬ ዘር ያለው (ዳቦ፣የጥሬ እህል) ማእድ ትመገቢያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q707	ምግብ ስታበስይ በውስጡ የአዳዲስ ንጥረ-ነገር የተጨመረበት ጨው ትጠቀሚያለኝ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q708	ባለፈው ሳምንት ውስጥ የብረት ንጥረ-ነገር ኪኒንን(አይረን) ሳታቆርጩ በየቀኑ ወስደኛል?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q709	በእርግዝናኝ ጊዜ መጠጥና ሲጋራን ተጠቅመኛል?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q710	በእርግዝናኝ ጊዜ ቡናና ሻይ ቀንሰኛል?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	
Q711	በአሁኑ እርግዝና ወቅት ጨርሶ የተውሻቸው ምግቦች ነበሩ?	<ul style="list-style-type: none"> <li>- አዎ አደርጋለሁ</li> <li>- አይ አላደርግም</li> </ul>	1 2	አይ አላደርግም ከሆነ Q712 እና Q713ን እለፍ
Q712	ለጥያቄ Q710 ምላሹ አዎ ከሆነ የተተወው የምግብ አይነት ምንድን ነው?	_____		
Q713	ለጥያቄ Q711 ላይ የተጠቀሰውን ምግብ ለመተው ምክንያቱ ምንድን ነው?	_____		

## **15 ANNEX VI: Training Module on Nutrition Counseling for Health professionals providing ANC service**

### *Learning Objectives*

After the completion of this module training participants will be able to:

- Identify common problems associated with malnutrition during pregnancy
- Identify common sources of food for each food groups
- Understand importance of selected micronutrients and minerals for pregnant women
- Know the recommended weight gain for their specific clients
- Provide counseling to ANC attendants on gestational weight gain, eating more variety of food, food sources of important nutrients and micronutrient and vitamin supplementations.
- Follow nutritional status and dietary intake of pregnant women in every ANC follow up visit.
- Adopt other innovative ways to provide nutrition counseling to pregnant women.

### **Nutrition during pregnancy**

In this section we describe the nutritional requirements in pregnancy in detail and explain how you can advise women about eating well, even if they have very little money for additional food.

#### *Eating well*

Eating well means eating a variety of healthy foods and also eating enough food. This combination helps a pregnant woman and her baby stay healthy and strong because it:

- Helps a woman resist illness during her pregnancy and after the birth
- Keeps a woman's teeth and bones strong
- Gives a woman strength to work
- Helps the baby grow well in the mother's uterus
- Helps a mother recover her strength quickly after the birth
- Supports the production of plenty of good quality breast milk to nourish the baby.



### *Eating a variety of foods*

It is important for pregnant women (like everyone else) to eat different kinds of food: main foods (carbohydrates), grow foods (proteins), glow foods (vitamins and minerals), and go foods (fats, oils and sugar), along with plenty of fluids. We will describe each of these food groups in more detail later in the study session.



Figure 1: Eating well means eating a variety of foods to get all the right nutrients, especially during pregnancy and breastfeeding, and eating enough food for good health.

### *Eat more food*

Pregnant women and women who are breastfeeding need to eat more than usual. The extra food gives them enough energy and strength, and helps their babies grow. They need to increase their usual food intake by at least 200 calories per day, or even more than this if they were underweight before they became pregnant. There are many ways to increase daily food intake by this amount: for example, one more serving of maize porridge and 12 ground nuts a day would meet this additional requirement.

Some pregnant women feel nauseated and do not want to eat. But pregnant women need to eat enough even when they do not feel well. Simple foods like injera or rice can be easier for these women to eat. For women who suffer from nausea, encourage small and frequent meals.

### *Problems from poor nutrition*

Poor nutrition can cause tiredness, weakness, difficulty in fighting infections and other serious health problems. Poor nutrition during pregnancy is especially dangerous. It can cause

miscarriage or cause a baby to be born very small or with birth defects. It also increases the chances of a baby or a mother dying during or after the birth.

### *Talking to women about food*

When you see pregnant women for antenatal care, or at village meetings and celebrations, in the market, try to find ways to enquire sensitively about the food they eat. The earlier pregnant women start eating healthier foods, the better chance they have to stay healthy, to have normal births and to have healthy babies.

To find out whether a woman is eating well, ask her what she usually eats, and how much. For example, ask her: ‘What did you eat yesterday?’ Be sure to tell her what is healthy about what she eats, reinforce the positive efforts she is making to eat well. Then, if it is appropriate, make a suggestion for how she could eat better.

Remember that education about food is not enough on its own to change eating behaviour. Even if a woman knows the best foods for health, she may not eat them. Many families cannot afford to buy enough food or a wide variety of foods. Some women may simply not like the taste of some healthy foods. To help a woman eat better, suggest healthy foods that she can afford and will choose to eat.

### *Eating well with little money*

The biggest cause of poor nutrition is poverty. A very poor family can eat better by spending money wisely and not wasting what little they have. A father who buys alcohol, tobacco and ‘chat’ (or khat) could instead buy nutritious food or he could buy a hen to lay eggs. A mother who buys her children sweets or soda pop could instead buy eggs, beans or other low-cost, healthful foods. Here are some ideas that families can use to eat better with little money.

### *Beans, peas and lentils*

Beans, peas and lentils belong to a family of vegetables called legumes. All legumes have a lot of protein and vitamins, and they usually do not cost much. They have even more vitamins if they are sprouted before being eaten. Planting legumes makes soil richer. Other crops such as maize will grow better in a field where legumes once grew.

### *Less expensive meats and animal products*

Blood and organ meats like liver, heart and kidney have a lot of iron and may cost less than other meats. Fish and chicken are as healthy as other meats, and usually cost less — especially for a family that fishes or raises their own chickens. Eggs have a lot of protein, iron, and vitamin A. Eggs give more protein for less money than almost any other food.

### *Whole grains*

Grains like teff, wheat, rice and corn are more nutritious when they have not been refined (processed to take out the color). Taking out the color takes out healthy things too. White bread and white rice have fewer vitamins, minerals and proteins than brown bread or brown rice. Dark teff and brown injera are more nutritious than the light-colored ones.

### *Vegetables and fruits*

When vegetables are boiled or steamed, some of the vitamins from the foods go into the cooking water. Use this water to make soups. The outside leaves of plants are usually thrown away, but sometimes they can be eaten. The leaves of the cassava plant have more vitamins and protein than the root. Many wild fruits and berries are rich in vitamins and natural sugars that give energy.

### *Breast milk*

Breast milk costs nothing, and has all the nutrition a baby or young child needs. Young children who are on exclusive breastfeeding do not need fortified milks or other foods until after the age of 6 months.

## **Food groups and their nutrients**

### *Main foods (carbohydrates)*

In most parts of the world, people eat one main food at each meal. This main food may be injera, rice, maize, wheat, millet, cassava, plantain, kocho, bulla, godere, shenkora, gishta, breadfruit or another low-cost, starchy food which is rich in carbohydrates. These foods give the body energy. But to grow and stay healthy, the body needs other types of food too.

### *Grow foods (proteins)*

Grow foods contain protein, which is needed for the growth of muscles, bones, and strong blood. Everyone needs protein to be healthy and to grow. Some grow foods that are high in proteins are:

- Legumes (beans, peas, soybeans, and lentils)
- Eggs
- Cheese, milk and yogurt
- Nuts and seeds
- Cereal, wheat, corn and rice
- Meat, poultry and fish.

Meat, fish and cheese are nutritious foods but they can carry parasites or disease when they are eaten raw. Pregnant women should eat fish, meat or cheese only when it is well cooked or pasteurized.

### *Go foods (sugars and fats)*

Go foods contain sugars and fats, which give the body energy. Everyone needs these foods to be healthy. Some healthy go foods that are high in sugars are: Fruits and Honey.

Some 'go foods' that are high in fats are:

- Some nuts (e.g. peanuts) and some seeds (e.g. sunflower)
- Avocados
- Vegetable oils, butter and lard
- Fatty meat
- Milk and cheese
- Eggs
- Fish.

These days, many people eat more sugars and fats than they need. That is because more people drink sugary soda pop, or eat foods that come from packages instead of foods made at home. These packaged, sugary and fatty foods are expensive and not as healthy as fresh products. They also damage the teeth. It is better to eat go foods that are natural, not packaged.

### *Glow foods (vitamins and minerals)*

Glow foods contain vitamins and minerals, which help the body fight infection and keep the eyes, skin and bones healthy and strong. Vitamins and minerals are known as micronutrients because they are very small. Fruits and vegetables are high in vitamins and minerals. It is important for pregnant women to eat as many different fruits and vegetables as they can.

### *The five most important vitamins and minerals*

Pregnant and breastfeeding women need more of these five vitamins and minerals than other people do iron, folic acid, calcium, iodine and vitamin A. They should try to get these vitamins and minerals every day.

Drill Question - Why do you think that a pregnant woman needs more of these vitamins and minerals?

Answers: The baby needs them to grow and be healthy and to prevent birth defects. A pregnant woman needs them to have enough energy to look after herself and her family, to fight infections and to keep her strong for completing the pregnancy, giving birth safely and breastfeeding the baby afterwards.

### *Iron*

Iron helps make blood healthy and prevents anaemia (you will learn about diagnosing and treating anaemia in Study Session 18 of this Module). A pregnant woman needs a lot of iron to have enough energy, to prevent too much bleeding at the birth, and to make sure that the growing baby can form healthy blood and store iron for the first few months after birth. It is also important in the production of good breast milk.

These foods contain a lot of iron:

- Poultry (chicken) and Egg yolk
- Fish
- Sunflower, pumpkin and squash seeds
- Beans, peas and lentils
- Dark leafy green vegetables
- Nuts
- Hard squash
- Meat (especially liver, kidney and other organ meats)
- Whole grain products
- Dried fruit

Pregnant and breastfeeding women should try to eat at least one iron-rich food every day.

### *Taking iron pills*

It can be difficult for a pregnant woman to get enough iron, even if she eats iron-rich foods every day. She should also take iron pills (or liquid iron drops) to prevent anaemia. These medicines may be called ferrous sulfate, ferrous gluconate, ferrous fumarate or other names (ferrous comes from the Latin word for iron).

Iron pills or drops can be obtained from pharmacies and health institutions, but throughout Ethiopia you will give iron pills routinely to pregnant women as part of focused antenatal care. She should receive 300 to 325 mg (milligrams) of ferrous sulphate once a day taken by mouth, preferably with a meal for 6 months including post-partum time. This dosage is usually supplied in a single tablet combined with folate.

The iron pills may cause nausea, make it hard for the woman to pass stool(constipation), and her stool may turn black, but it is important for the woman to keep taking the iron pills because anaemia can cause complications during pregnancy, during delivery, and after the baby is born. It is helpful for the woman to take the iron pill with a meal, drink plenty of fluids, and eat plenty of fruits and vegetables to avoid nausea and constipation. The black color of the stool is a normal side-effect from the iron and is not harmful.

### *Folate (folic acid)*

Folic acid supplements during pregnancy is important for normal development of the nervous system of the unborn baby (brain, spine and skull) and to prevent birth defects/abnormalities the nervous system of the unborn baby. It is important if possible for a woman to get enough folic acid in her diet before she becomes pregnant and she should certainly do this in the first few months of pregnancy. Foods rich in folate that pregnant and breastfeeding women should try to eat every day include:

- Dark green, leafy vegetables
- Whole grains (brown rice, whole wheat)
- Meat (especially liver, kidney and other organ meats)
- Fish
- Peas and beans
- Eggs
- Sunflower, pumpkin and squash seeds
- Mushrooms.

As well as eating as many of these foods as she can, all pregnant women should also take 400 mcg (micrograms) of folic acid tablets orally every day during pregnancy. She should be able to get these tablets from you as part of Focused Antenatal Care.

### *Calcium*

A growing baby needs a lot of calcium to make new bones, especially in the last few months of pregnancy. Women need calcium for strong bones and teeth. These foods (Figure 14.5) contain a lot of calcium:

- Yellow vegetables (hard squash, yams)
- Lime (carbon ash)
- Milk, curd, yogurt and cheese
- Green, leafy vegetables
- Bone meal and egg shells
- Molasses and soybeans
- Sardines

Women can also get more calcium in these ways:

- Soak bones or eggshells in vinegar or lemon juice for a few hours. Then use the liquid to make soup or eat with other foods.
- Add lemon juice, vinegar or tomatoes when cooking bones.
- Grind eggshells into a fine powder and mix into food.
- Soak maize in lime (carbon ash) before cooking it.

### *Iodine*

Iodine prevents goiter (swelling of the neck) and other problems in adults. Lack of iodine in a pregnant woman can cause her child to have cretinism, a disability that affects thinking and physical features. The easiest way to get enough iodine is to use iodized salt instead of regular salt. It is available in packet form labelled 'Iodized salt' in many market places.

### *Vitamin A*

Vitamin A prevents poor vision at night or when light intensity is low and helps to fight infections. Lack of vitamin A also causes blindness in children. A woman needs to eat plenty of vitamin A-rich food during pregnancy and while breastfeeding.

- Liver, fish liver oil, milk, eggs and butter.
- Dark yellow and green leafy vegetables and yellow fruits contain lots of vitamin A. Name some of these vegetables and fruits.
- Carrots, mangoes, spinach, cabbage. (You may have suggested other good examples.)

### *Fluids*

Along with eating healthy foods, women should drink plenty of clean water (6 to 8 glasses a day) and other healthy fluids every day. Fruit juices, animal milks and many herbal teas are all healthy fluids to drink

### *Some substances may harm your baby*

#### 1. Alcohol

Try not to drink alcohol during pregnancy. Alcohol crosses placenta and can lead to physical, growth and mental problems in some babies. It is especially important not to drink alcohol at the

time of conception and during the first 3 months of pregnancy when the embryo is most vulnerable to the toxic effects of alcohol.

## 2. Smoking

Try not to smoke during pregnancy or at least try to reduce smoking substantially. Mothers who are heavy smokers are at much higher risk of having low birth weight babies. Smoking can also be a cause of premature birth, miscarriage and stillbirth and may impair your child’s growth and development.

Remember: it is never too late to stop or at least reduce smoking or drinking. Your baby will benefit from each alcoholic drink or cigarette you give up!

## 3. Caffeine

Effects of caffeine on the fetus are not well established yet. Tea, cocoa and cola-type drinks contain about the same amount of caffeine while coffee contains about twice as much caffeine.

Try to limit your coffee intake to 3-4 cups a day

### *Body Weight and Gestational Weight Gain*

A commonly asked question is “how much weight should I gain?” A great deal of healthy individual variation exists. BMI is calculated by dividing weight in kg by height in m<sup>2</sup>. It is a simple way to assess body weight in relation to health, and is intended to promote acceptance of a wider range of healthy weights and variations in size.

Many evidences indicate that gestational weight gain, particularly during the second and third trimesters, is an important determinant of fetal growth. Institute of Medicine has put the “normal” weight gain in pregnancy according to the pre-pregnancy BMI of the women.

BMI before conception(kg/m <sup>2</sup> )	Recommended weight gain (kg)	Average weight increase* in II and III trimester (average kg/week)
<18.5 (undernourished)	12.5–18.0	0.51 (0.44–0.58)
18.5–24.9 (normal)	11.5–16.0	0.42 (0.35–0.50)
25.0–29.9 (overweight)	7.0–11.5	0.28 (0.23–0.33)
≥30 (obese)	5.0–9.0	0.22 (0.17–0.27)



Messages to be given during Nutrition Education to pregnant women.

**Consequences of Maternal Malnutrition**

*Consequences for maternal health*

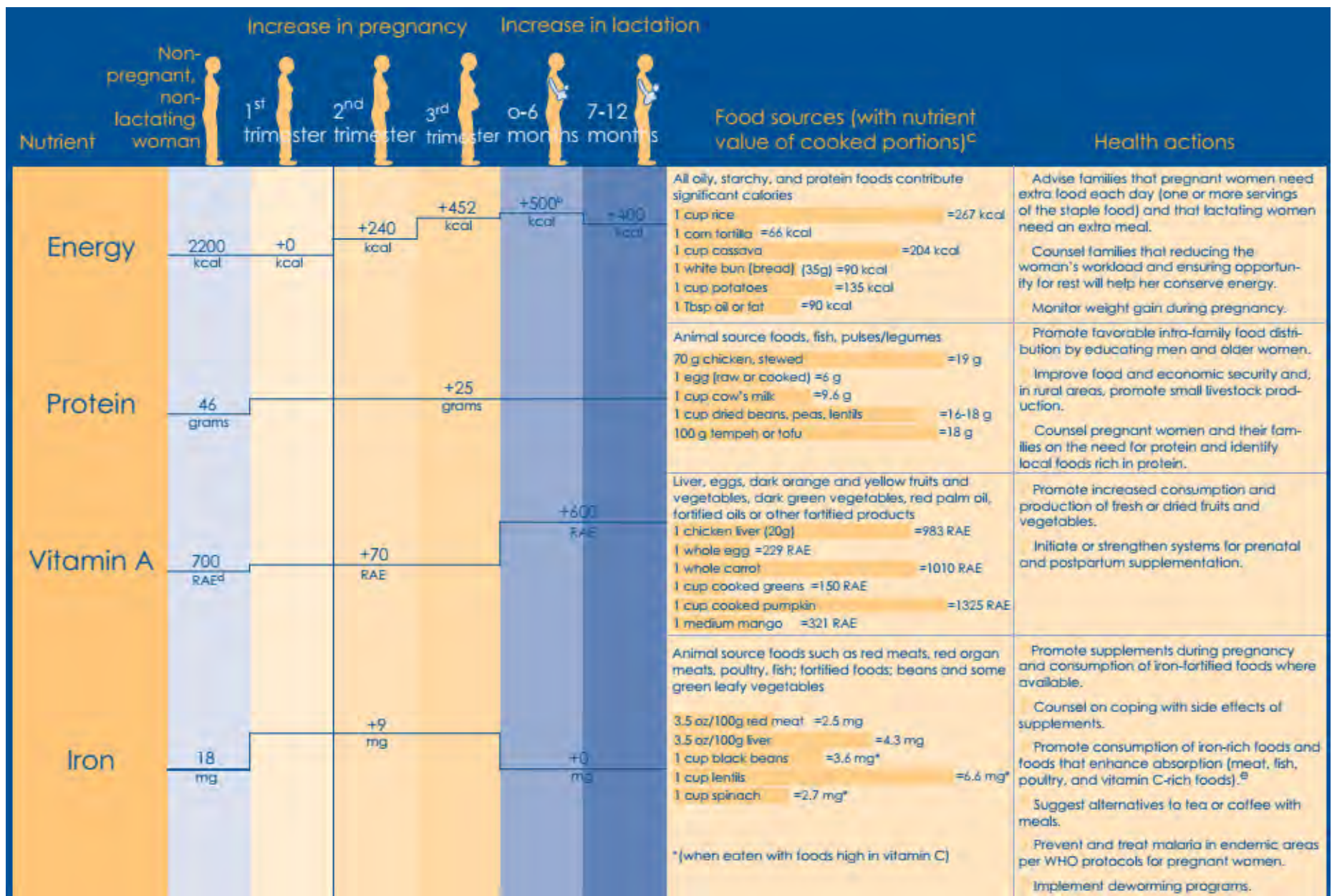
- *Increased risk of maternal complications and death*
- *Increased infection*
- *Anemia*
- *Lethargy and weakness, lower productivity*

*Consequences for fetal and infant health*

- *Increased risk of fetal, neonatal, and infant death*
- *Intrauterine growth retardation, low birth weight, prematurity*
- *Birth defects*
- *Cretinism*
- *Brain damage*
- *Increased risk of infection*

*Things to consider during diet in pregnancy*

- *Eat at least one additional meal from what you used to eat during non-pregnancy state*
- *Eat small and frequent meals to decrease nausea and vomiting*
- *Eat at least 2 to 3 servings of meat, fish, nuts or legumes, and fish; 2 to 3 servings of dairy; 2 servings of green vegetables; 2 to 3 servings of fruit; 3 servings of whole grain breads, cereals per day.*
- *Use Iodized salt when cooking food. (use when serving food)*
- *Take your Iron tablets daily as they are meant to prevent severe anemia and death in pregnancy. You can also get Iron from good Iron source foods like Organ meat like liver, red meat and fish.*
- *Do not restrict your diet to few foods because you can only get few minerals and vitamins from single food group. Don't avoid any food type especially during pregnancy.*
- *Pica, nausea and vomiting are common during pregnancy. You can prevent and treat them easily so if you have symptoms don't forget to counsel your ANC provider.*



Folate	400 µg	+200 µg	+100 µg	Dark green leafy vegetables, legumes, nuts, liver 3.5 oz/100g liver =217 µg 1/2 cup peanuts =106 µg	Counsel women to increase consumption of folate-rich foods. Provide supplements (combination of iron-folate acid), particularly during first weeks of pregnancy.
	150 µg	+70 µg	+140 µg	Sea food, iodized salt 3.5 oz/100g marine fish or shellfish =80 µg	Promote consumption of iodized salt. Where iodine deficiency is endemic and iodized salt is not available, supplementation may be needed.
Calcium	1000 mg	+0 mg		Milk and milk products, whole fish (including bones), dark green leafy vegetables, legumes 1 cup whole milk or yoghurt =306 mg 1 cup dark leafy green vegetables =150-300 mg 1 cup white beans or chickpeas =95 mg	Promote consumption of calcium-rich foods throughout the life cycle.
Zinc	8 mg	+3 mg	+4 mg	Organ meats, red meat, poultry, whole fish 3.5 oz/100g liver, kidney =4.2-6.1 mg 3.5 oz/100g beef, pork =2.9-4.7 mg 3.5oz/100g seafood (fish, etc) =0.5-5.2 mg	Promote small livestock production and aquaculture for targeted feeding of children and pregnant and lactating women. Promote germination and fermentation to reduce phytate in cereal-based diets.

Source: Maternal Nutrition during Pregnancy and Lactation. In: LINKAGES: Breastfeeding L, Related Complementary Feeding, and Maternal Nutrition Program, Group CSCaRCNW, editors. Washington, DC2004

*Checklist for each antenatal counselling session*

It has been adapted for use in counselling pregnant women, but it incorporates the general principles of counselling that you can apply to any client in your health care.

Checklist for ‘GATHER’ counselling skill (modified for pregnant women).

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<b>Greet</b>	<b>Did you:</b>
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	Welcome each pregnant woman on arrival?
	Discuss in a comfortable and private place?
	Assure the pregnant woman of confidentiality?
	Express caring and acceptance by words and gestures throughout the meeting?
	Explain what to expect?

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<b>Ask</b>	<b>Did you:</b>
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	Ask the pregnant woman’s reason for the visit?
	Encourage the pregnant woman to do two-thirds of the talking?
	Ask mostly ‘open’ questions?
	Pay attention to both what the client said and how it was said?
	Put yourself in the woman’s shoes — expressing understanding of what she said without criticism or judgment?
	Ask about the pregnant woman’s feelings?
	Ask about her preferences?

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<b>Tell</b>	<b>Did you</b>
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	Start the discussion focusing on the pregnant woman’s preference(s)?
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Discuss the danger symptoms of pregnancy in relation to the gestational age?

Give information about danger symptoms of pregnancy to help her make her own decisions?

Avoid 'information overload'?

Use words familiar to the client?

Discuss the advantages of early reporting if she encountered danger symptoms during pregnancy?

---

**Help**

**Did you**

---

Let the pregnant women know that the decision is hers?

Help the pregnant women be able to realize common danger symptoms?

Help her think over the consequences for her own or her baby's life?

Advise the pregnant women without controlling and frustrating?

Let the pregnant women decide?

Make sure the pregnant women's choices are based on accurate understanding?

List any medical, social, cultural or religious reasons for making a different decision – probably different from what you might like to achieve?

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**Explain**

**Did you:**

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Provide what the client wants, if there is no medical reason not to?

Explain when the woman should come to you if one of the danger symptoms appeared?

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Help her to explain in her own words how much she understands each of the danger symptoms of pregnancy?

Explain using printed instructions, pictures and diagrams?

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**Return**

**Did you:**

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Plan when the next visit should be?

Discuss with the pregnant woman if she can come back with her husband or partner?

Assure the pregnant woman that she should come back at any time, for any reason?

Assure her to come back soon, even if she missed the day of her scheduled appointment for some reason beyond her control?

Assure her that it is her full right to go to any other health facility at any time?

Thank the pregnant woman for attending for antenatalcare?

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## **DECLARATION**

I, the under signed, declared that this thesis is my original work, and has not been presented for a degree in any other university and that all source of material used for this thesis and all people and institution that gave support for this have been duly acknowledge.

Name: **Ashenafi Zelalem**

Signature: \_\_\_\_\_

Date of submission: \_\_\_\_\_

This Thesis work has been submitted with my approval as University Advisor.

Advisor's Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_