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School of Public Health

Graduate Study Program

**Prevalence and associated factors of under nutrition among
pregnant women attending antenatal care at Chanco Hospital,
Oromia region, June, 2022**

By: Teshome Dagne

Addis Ababa, Ethiopia

October, 2022



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By: Teshome Dagne

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**Research Thesis submitted to the Department of Public Health;
Presented in Partial Fulfillment of the Requirements for the
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Millennium Medical College**

Addis Ababa, Ethiopia

October, 2022

Abstract

Back Ground: World Health Organization defines under-nutrition as insufficient intake of energy and nutrients to meet an individual's needs to maintain good health. Undernutrition is a significant global health concern, particularly in pregnant women. There is scarce of documented data regarding knowledge or food insecurity are lacking used for prioritizing, designing and initiating intervention programs, in chancho Hospital.

Objectives: To assess Prevalence and associated factors of under nutrition among pregnant women attending antenatal care at Chanco Hospital, Oromia region, Ethiopia, June, 2022.

Methods: The study area was Chanco hospital. Institutional based cross-sectional study design was employed from June 1 to 30, 2022. Study was conducted on pregnant women on antenatal care follow up. IBM® Statistical Package for Social Science version 26 was used for analysis. Variables with a p-value < 0.05 (95% CI) in multivariable binary logistic regression was declared statistically significant. Study was conducted from June 1 to 30, 2022.

Results: A total of 279 pregnant women were participated in this study with a response rate of 96.8%. The overall prevalence of undernutrition among pregnant women was 36.9%. In multivariable logistic regression, main source of income is trade (AOR=5.246, 95% CI: 1.106-24.887) and employed (AOR=3.406, 95% CI:1.031-11.248), not receiving dietary counseling during ANC follow up (AOR=5.686, 95% CI: 2.124-15.221), protected well source of drinking water (AOR=10.301, 95% CI: 1.087-97.629), poor dietary knowledge (AOR=5.686, 95% CI: 2.124-15.221) and mildly food insecure (AOR=.115, 95% CI: .045-.293) and moderately food insecure (AOR=.0631, 95% CI: .015-.268) were factors significantly associated with under-nutrition among pregnant women.

Conclusion and recommendations: Pregnant women were affected by under-nutrition and prevalence was high. It was found that different independent factors were associated with pregnant women under-nutrition. Stakeholders like woreda health office, local and international NGOs and health professionals needs to work together to prevent pregnant women under-nutrition

Key words: Pregnant women, Under nutrition, MUAC, Antenatal Care, Chanco Hospital.

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Acronyms

ANC=Antenatal Care

AOR= Adjusted Odds Ratio

CI=Confidence Interval

COR=Crude Odds Ratio

EDHS=Ethiopian Demographic and Health Survey

FANTA= Food and Nutrition Technical Assistance

IUGR=Intra Uterine Growth Retardation

MDDS=Minimum Dietary Diversity Score

MDDW =Minimum Dietary Diversity for Women

MDDW=Minimum Dietary Diversity for Women

MUAC=Mid Upper Arm Circumference

PI=Principal Investigator

POR=Pooled Odds Ratio

RR=Relative Risk

SDG=Sustainable Development Goals

SPSS=Statistical Package for Social Science

WHO= World Health Organization

1. Introduction

1.1 Back Ground

Nutrition is recognized as a key determinant of health and well-being, and a contributor to human capital development (1). World Health Organization defines under-nutrition as insufficient intake of energy and nutrients to meet an individual's needs to maintain good health. Nutrition necessities range with age, gender, and for the duration of physiological changes such as pregnancy (2). Undernutrition is a significant global health concern, mainly in pregnant women. Adequate nutrition is essential for a woman throughout her life cycle, and pregnant women require various diets and increased nutrient intake to cope with the extra needs during pregnancy. Use of dietary supplements and fortified foods need to be encouraged for pregnant women to ensure an adequate supply of nutrients for both mother and fetus. Global occurrence of under-nutrition in mothers is about 462 million (3). On the other hand, Sustainable Development Goal No. 2 targeted to end all forms of malnutrition by 2030, which include achieving, by 2025, the internationally agreed targets on stunting and wasting in children below 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older ones. According to the World Health Organization African region data, prevalence rate of pregnant women under-nutrition was 23.5% in pregnant women (1)

Changes in food-related behaviors take place for the duration of being pregnant than at any other stage of life. Pregnant women need to increase food consumption to fulfill the increased energy need associated with the growth of the fetus. This performs a central role in influencing maternal, neonatal, and child health outcomes (4).

Ethiopia is one of the nations with a Significant numbers of pregnant women suffered from malnutrition (5). The government of Ethiopia has released National Nutrition Program and prioritized interventions like enhance maternal nutrition including sufficient intake of diversified foods to improve the nutritional status of women. Even though, maternal under-nutrition has declined over the past 16 years, from 30% in 2000 to 22% in 2016, Ethiopia is still among countries with a high burden of maternal undernutrition (6). The government of Ethiopia has developed a revised national nutrition program in 2016 to deal with the double burden of malnutrition in pregnant and lactating women (7).

Even though a progress of this program implementation needs to be supported with a continuous evidence through research (8), there is limited institution based studies important for prioritizing, designing and initiating intervention program, especially in study area. The aim of this study was, therefore, to determine Magnitude and associated factors of under-nutrition among pregnant women visiting ANC clinics in Chancho Hospital.

1.2 Statement of the problem

Maternal undernutrition is highly prevalent in resource-poor settings, generally ranging from 10% to 19% in these settings, but reaching up to more than 20% in some areas, such as in sub-Saharan Africa, south-central and southeastern Asia, and Yemen(9). Women decreasing their energy intake have a higher risk of preterm delivery (10). Poor nutrition in pregnancy in combination with infections is a common cause of maternal and infant mortality and morbidity, low birth weight and intrauterine growth retardation (IUGR) (11).

Even though in recent years the global public health and nutrition community has focused primarily on obesity and specific micronutrient deficiency interventions, maternal and child undernutrition continues to place a big burden on low- and middle-income countries. In developing countries, more than 3.5 million mothers and children below five die unnecessarily each year due to the underlying cause of under-nutrition, and millions are permanently disabled by the physical and mental effects of a poor dietary intake in the early months of life. It is estimated that 13 million children are annually born with intrauterine growth retardation, 19 million children are affected by severe acute malnutrition, majority in south-central Asia and sub-Saharan Africa, secondary to under-nutrition at a time of pregnancy (12). In spite of extensive global financial growth, in latest decades, maternal undernutrition is highly prevalent in most countries in south-central and southeastern Asia and Sub-Saharan Africa (13). Women of reproductive age, especially pregnant women, in developing countries are recognized to be at risk of poor nutritional status, including multiple micronutrient deficiencies, with a high risk of adverse effects on the mother and pregnancy outcomes (12). Poor maternal nutrition prior to and during pregnancy is highly linked with increased risk of maternal anemia, mortality, and adverse birth outcomes such as Low Birth Weight and Preterm Birth (14).

According to Ethiopian Demographic Health Survey 2016, 22% of women were under nourished. In addition, 24% of children under age 5 are underweight, 38% of children are stunted and 10% are wasted in Ethiopia (6).

Different literatures identified many factors associated with pregnant women under-nutrition. Socio demographic factors such as age of women (15,16) maternal or husband educational status (8,17,18) and place of residency (8) were some of factors significantly associated with pregnant women under-nutrition. In addition, monthly income (16,18,19) Pregnancy related factors

(8,15,17,18,20), Eating pattern (19), food insecurity (20,21,23,(22), poor dietary knowledge (23),26) and Dietary Diversity (15,17) were also among identified as determinants.

Maternal nutrition during pregnancy is crucial in reducing maternal and infant mortality which are the target area in achieving sustainable development goals (7). In addition, burden of pregnant women under nutrition is still high (12). Even though community-based researches conducted at different parts in Ethiopia, data regarding knowledge or food insecurity are lacking. Although these variables were not commonly incorporated in most studies, pregnant women under-nutrition might be determined by these factors significantly. Identifying and addressing these probable factors connected to pregnant women undernutrition helps to improve the nutritional status of both the mother and her fetus. This study plays significant role in filling this gap, especially at study area. Therefore, this study was aimed to assess prevalence and associated factors of under nutrition among pregnant women visiting ANC clinics in Chanco Hospital, Oromia region, Ethiopia, 2022.

1.3 Significance of the Study

The government of Ethiopia is working to end hunger, achieve food security and improve nutrition and achieve Sustainable Development Goals (SDGs) by 2030. However, Sustainable Development Goals cannot be achieved without improving maternal and child nutrition. It is clear that maternal nutrition is crucial in reducing maternal and infant morbidity and mortality. Even though many studies conducted at different areas in Ethiopia on identifying factors associated with pregnant women under-nutrition, the prevalence is still high. Some variables could be missed which determines this problem. This study incorporates knowledge and food insecurity variables in the study which is not commonly used in other studies. This study therefore plays an important role in filling this gap. It then helps for program managers working on maternal health in region, woreda health office, Chanco Hospital and other governmental and nongovernmental organizations working on maternal health to implement programs aimed at intervening on factors associated with under-nutrition among pregnant women. It will also help health workers in creating awareness about adequate nutrition, factors affecting nutrition status, counselling and education among pregnant women. The study will also be used for researchers and planners for the secondary source of data.

2. Literature Review

2.1 Prevalence of Pregnant Women Undernutrition

Malnutrition is taken into consideration as a first-rate chance to public fitness by the WHO. In spite of complete international economic growth, the superiority of maternal under-nutrition is excessive high in Sub-Saharan Africa (25). According to the World Health Organization African region data, prevalence rate of undernutrition was 23.5% in pregnant mother (1).

From cross sectional study conducted in India, the prevalence of low (<23 cm) and severely low MUAC (<21cm) was 38% and 7% respectively(16).

One systematic review and meta-analysis, showed the pooled prevalence of undernutrition in Africa, including Ethiopia found between 11 and 36%, with mean of 23.5% (95%CI: 17.72–29.32; $I^2 = 98.5\%$)(14).

Ethiopia is one of the developing countries with a high load of maternal and child under-nutrition. Even though, maternal under-nutrition has declined from 30% in 2000 to 22% in 2016, it is still too far from achieving the Sustainable Development Goal (SDG)(6). One Systematic Review and Meta-Analysis revealed pooled prevalence of pregnant women under-nutrition was 29.07 in Ethiopia (5).

Study carried out in Ethiopia found that burden of under-nutrition is continues to be high with occurrence of 38% amongst young pregnant women(12). Different researches in Ethiopia found that the prevalence of malnutrition among pregnant women is different from location to location which ranges from 14.4% in Gondar Town (21) to 52.6% in Kacha Birra District, Southern Ethiopia(17). In addition, institution and community based cross-sectional researches conducted in different parts of Ethiopia showed a great variation. From the study done in Jimma Zone, magnitude was 44.9%(19). Another study from Public General Hospitals in Tigray showed above one-third (40.6%) of pregnant mothers were under-nourished(15).

One study done in Gojjam found out only 33.0% [95% CI: (29.5, 36.7)] of the study participants consumed a diversified meal(26).

2.2 Factors Associated with Pregnant Women Undernutrition

2.2.1 Sociodemographic Factors

Several studies revealed the association between pregnant women under-nutrition and socio demographic factors. In Africa, according to systematic review and meta-analysis pooled odds ratio finding, rural residency (POR = 2.6%; 95%CI: 1.48–4.65; I² = 0%), and low educational status of partners (POR = 1.7%; 95%CI: 1.19–2.53; I² = 54.8%) determined maternal malnutrition (14).

In different areas in Ethiopia, cross sectional studies on firm age of women and educational status of husband had significant association with pregnant women under-nutrition. Age of women (AOR=2.169, 95% CI: 1.015–4.634) at Miesso Health center (27) and (AOR = 0.15; 95% CI: 0.03, 0.93) at Silte Zone (24) showed significant association with the nutritional status of the study participants. From institution based cross-sectional study at Alamata General Hospital, age group of 15-24years old (AOR: 0.19, 95% CI: 0.057, 0.638) and pregnant women with educational level of university (AOR: 0.25, 95% CI: 0.079, 0.789) were some of factors negatively associated with under nutrition, whereas, women with husbands of primary education (AOR: 17.461, 95% CI: 3.401, 89.634), is one of factors positively associated with under-nutrition(28).

Teshome *et al* (2021), on study at kacha bira district, showed Maternal under-nutrition is triggered by educational status of husband. Mothers of husband with illiterate to elementary education were 41.1% % (AOR= 0.589, 95% CI: 0.369-0.940) times more likely to be mal nourished than educational status of above elementary (17). In addition, study in Gondar Hospital showed factors significantly associated with the undernutrition were living in rural areas (AOR = 2.26), low educational status of women[no formal education (AOR = 2.91) and primary education (AOR = 2.69)] were significant association with pregnant women under-nutrition(8).

On the other hand, study conducted at Public General Hospitals in Tigray revealed occupation of pregnant mothers was found conversely associated with the pregnant women nutritional status. Women whose occupation is agriculture were more likely [AOR =2.6, 95% CI: 1.5, 4.5] to have under-nutrition than their counterpart (15).

2.2.2 Reproductive Factors

An institutional based cross-sectional study in India showed some of factors significantly associated with the pregnant women under nutrition were no utilization of family planning methods (AOR=0.319; 95%CI 0.131-0.775) and less number of ANC visit (AOR=3.253; 95%CI 1.342-7.888) (29).

A community-based cross-sectional study conducted in southern Ethiopia indicated women with unintended pregnancies were 2.06 times (AOR 2.06, 95% CI 1.27–3.36) more likely to be under-nourished than their counterparts. In addition, the odds of developing under-nutrition was decreased by 54% (AOR 0.46, 95% CI 0.27–0.78) for pregnant women who had at least one ANC visit compared to those with no ANC visits (20).

Similar study designs revealed birth interval was significantly associated with the nutritional status of pregnant women at different areas. From study at Ilu Aba bor, the odds of under-nutrition was 2.3 times higher among pregnant women with sub-optimal birth interval compared to those with the optimal birth interval [AOR=2.3 (1.10, 4.87) (22). Similarly, at Silte Zone Birth intervals > 2 years (AOR = 0.18; 95% CI: 0.04, 0.76) had significant association with pregnant women under-nutrition(24).

Another community based cross sectional study conducted on humanitarian setting at Rayitu district showed, mothers who did not receive antenatal care (ANC) during their pregnancy had 1.83 higher odds of (AOR = 1.83, 95% CI:1.10,3.02) to be malnourished as compared to mothers who received ANC(30).

Moreover, History of too many births (AOR = 2.55) at Gondar Hospital(8), Women who wanted pregnancy (AOR 0.25, 95% CI: 0.14, 0.448) at Public General Hospitals in Tigray (15) second trimester gestational age [AOR=0.338 (0.159-0.718)] at kacha bira district (17) had shown statistically significant association with maternal under-nutrition.

2.2.3 Dietary, Socio Economic, Environmental Factors and other factors

The study in Ethiopia conducted on young pregnant women revealed higher wealth status, RR = 0.72, 95% CI [0.47, 0.95], higher minimum dietary diversity for women, RR = 0.87, 95% CI [0.77, 0.98], protected water source, RR = 0.93, 95% CI [0.86, 0.96] and animal source food consumption RR = 0.85, 95% CI [0.77, 0.94] decreased the risk of under-nutrition(12).

A community based cross-sectional study conducted in rural communities in southern Ethiopia showed minimum dietary diversity for women of five or more food groups (AOR 0.24, 95% CI 0.07–0.82) and being from food-secure households (AOR 0.26, 95% CI 0.16–0.43) were independent protective factors against under-nutrition (20).

Another community-based cross-sectional study revealed household food security (AOR = 3.1; 95% CI: 2.1–4.6), low dietary diversity score (AOR = 4.9; 95% CI: 2.6–9.2), medium dietary diversity score (AOR = 2.3; 95% CI: 1.2–4.7), absence of latrine (AOR = 1.8; 95% CI: 1.2–2.6) and having family resource decision making by husband only (AOR = 1.7; 95% CI: 1.1–2.6) were significantly associated factors(31).

Shiferaw *et al* (2019), at Gumay district stated prenatal dietary advice was never given for more than half, 213 (57.0%) pregnant women during current pregnancy. Factors such as, prenatal dietary advices from health professional 2.73 times (AOR=2.73, 95% CI: 1.53, 4.89), Pregnant women who had not practiced frequent hand washing habits 6.55 times, having no latrine 9.23 times (AOR=9.23, 95% CI: 3.48, 24.46) (and monthly income $\leq$ 1000 ETB 8.72 times (AOR=8.72, 95% CI: 4.80, 15.83) more likely to have acute under-nutrition compared to their counterparts(19).

Moreover, family income (AOR=2.056, 95% CI: 1.051–4.023) from study at miesso health center (27) and coffee consumption sometimes (AOR: 0.57; 95%CI: 0.36–0.89) as compared to daily consumers at Gondar Town(21), showed significant association with pregnant women under-nutrition.

Another study conducted in public hospitals, southwest Ethiopia showed food insecurity and nutritional knowledge have significant association with pregnant women under-nutrition. Mother from a food-insecure household was 1.8 times more likely under-nourished (AOR ¼ 1.8, 95% CI: 1.04, 3.15) than their counterparts. The mother who had poor dietary knowledge was 3.25 more likely under-nourished (AOR ¼ 3.25, 95% CI: 1.94, 5.47) than their counterparts(23).

The conceptual framework of this study is developed from literature review by identifying factor which affect pregnant women under-nutrition. It is summarized as maternal socio-demographic factor, socio economic status; pregnancy related factors, Dietary Factors and Environmental factors (fig. 1).

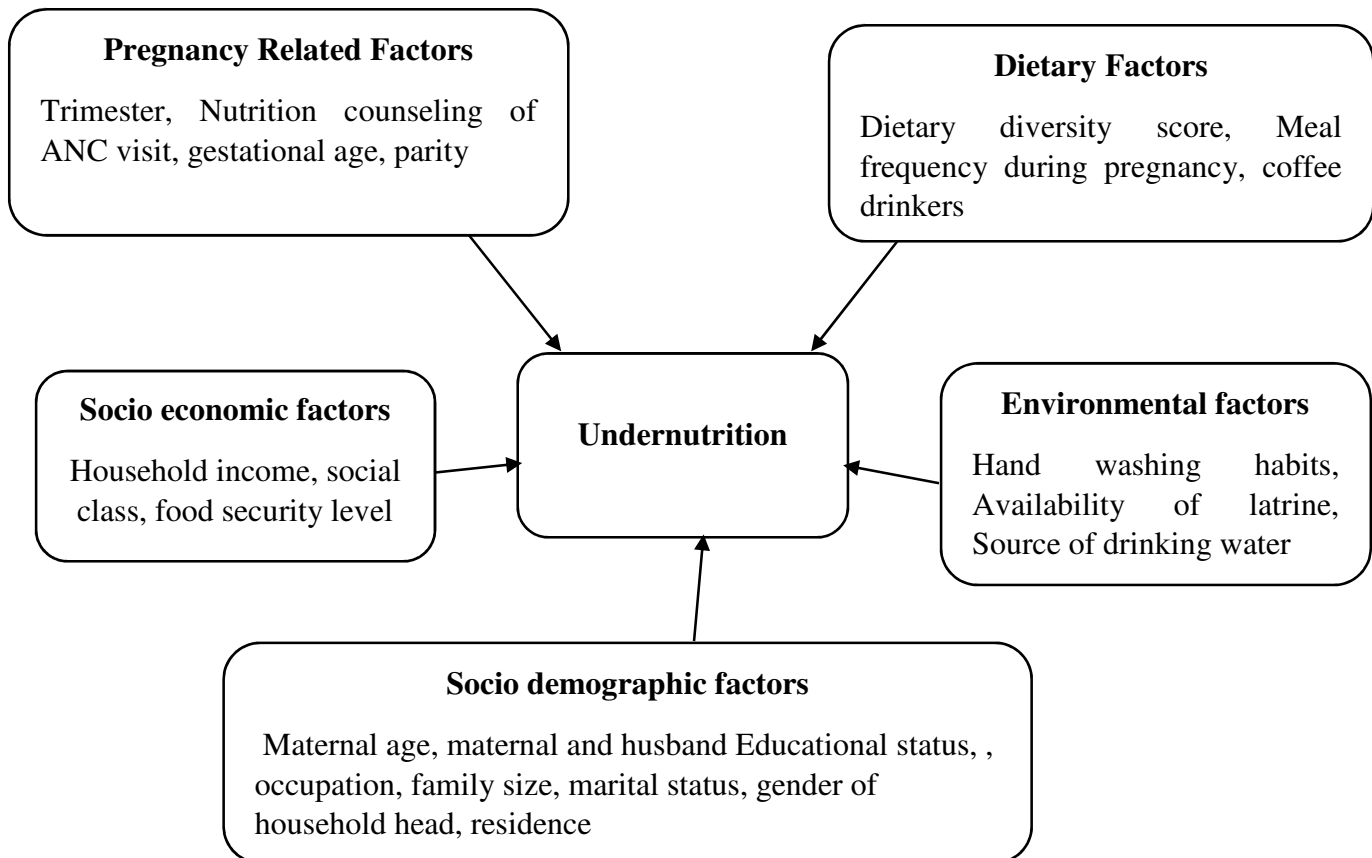


Fig 1. Conceptual frame work that shows the interaction between dependent and independent variables

Source: Adopted from different literatures(5,12,15,17,19,21,28,31).

3. Objectives

3.1 General objective

- To assess prevalence and associated factors of under nutrition among pregnant women attending antenatal care at Chancho Hospital, Oromia region, Ethiopia, June, 2022.

3.2 Specific objectives

- To assess prevalence of under-nutrition among pregnant women attending antenatal care at Chancho Hospital, Oromia region, Ethiopia, June, 2022.
- To identify factors associated with under-nutrition among pregnant women attending antenatal care at Chancho Hospital, Oromia region, Ethiopia, June, 2022.

4. Methods

4.1 Study Area and setting

The study area is Chanco primary hospital, Chanco town of Oromia Special Zone Surrounding Finfinne (OSZSF) Oromiya administrative Region of central Ethiopia. It is 40 km towards north from Capital city of Ethiopia, Addis Ababa. According to information on data from Chanco Hospital 2021(un published), it provides health care service for a total catchment population of 175,703, of which 88,554 males and 87149 females. Total pregnant women are 6, 097 in number. The average number of pregnant mothers attending antenatal clinics for antenatal care (ANC) is estimated at 564 in average per month. In addition, from woreda health office, the district has a total of three towns (Chanco, Dubar and Darba) and contains 23 rural kebeles. There are 1 hospital, 6 health centers, 23 health posts and 6 private health facilities found in this district. Study was carried out from June 1 to 30, 2022.

4.2 Study design

- Institutional based cross-sectional study design was employed. Cross-sectional study takes place at a single point in time that describes the characteristics exist in population.

4.3 Population

4.3.1 Source of population

All pregnant women attending the ANC clinic at chanco hospital during the study period.

4.3.2 Study population

Randomly selected pregnant women attending the ANC clinic at chanco hospital during the study period were study population.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

- Pregnant women in any trimester attending ANC service at chanco hospital were included.

4.4.2 Exclusion criteria

- Mothers with hearing and speaking difficulty were excluded from the study.
- Women who did not visit ANC clinic in one month during data collection.

- Pregnant woman with un-usual dietary intake in previous 24 hours such as feasts, fasting and celebrations were excluded from the study.
- Women who had observable psychiatric or substance abuse problem.

4.5 Sample size determination

4.5.1 Sample size determination for First objective

The sample size was determined using single population proportion formula at 95% of confidence interval with prevalence of undernutrition of previous study 21.8%, from facility based cross-sectional study conducted at Silte Zone (24) with 5% margin of error (d=0.05). The sample size was the following.

$$n = \frac{(Z \alpha/2)^2 p(1-p)}{d^2}$$

Where:

n= The desired sample size

Z = Standard normal variable at 95% confidence level (1.96)

d = Margin of error (0.05)

p = Proportion of pregnant women with under nutrition.

$$n = \frac{(1.96)^2 0.218(1-0.218)}{(0.05)^2}$$

n=262. Adding 10% non-response rate, final sample size is: $262 + \frac{262 \times 10}{100} = 262 + 26 = 288$

4.5.2 Sample size determination for second objective

Sample size for factors associated with pregnant women undernutrition is calculated by using EPI info statistical software version 7 for some of the associated factors obtained from different literatures with the subsequent assumption:

- Confidence level =95%,
- Power =80
- The ratio of unexposed to exposed equivalent to 1.

Table 1. Sample size determination for second objective

Variable	P1 (%)	P2 (%)	CI	Power	Allocation ratio	AOR	Total sample size	Reference
GA	56.4	43.6	95%	80	1:1	0.338	128+10%=141	(17)
ANC visit	41.5	58.5	95%	80	1:1	0.424	224+10%=246	(12)
Maternal educational status	59.8	40.2	95%	80	1:1	2.51	202+10%=222	(19)

From the above sample size calculation for the two objectives, I used the highest sample size; that is **288** from the first objective.

4.6 Sampling technique

The study participants were selected after identifying an average one-month antenatal care follow up of pregnant women at Chanco Hospital (June 1 to 30, 2022). The planned daily data collection was carried out by selecting study subjects using systematic random sampling from order of clients visit. The sampling interval was calculated by dividing the average monthly attendance for antenatal care follow up, which was 564, to calculated sample size. Hence, the calculated sample interval was $564/288=2$. The first study participant was selected by lottery method during ANC follow-up and continued at every two intervals until the required numbers of samples were met. Therefore, eligible pregnant women attending ANC clinic within one month during data collection was included in the study based on their order of visit.

4.7 Variables

4.7.1 Dependent variable

- Under-nutrition: This dependant variable was coded as 1 for “yes” if MUAC is <230 mm, categorized as under-nutrition. It was coded as 0 for “no” for MUAC ≥ 230 mm, categorized as normal.

4.7.2 Independent variable

Socio-demographic factors - Age of women, educational status, household education, women’s occupation, number of family members, place of residence, etc

Pregnancy related factors - Trimester, Nutrition counseling during ANC visit, GA, parity

Dietary Factors- meal frequency during pregnancy, dietary counseling during ANC follow up, skipping meals, dietary diversity score, coffee intake during pregnancy

Socio- economic status - Source of household income, food security, monthly income, having latrine, source of drinking water, family size.

Environmental Factors-Hand washing habits, Availability of latrine, Source of drinking water

Other factors- knowledge status, women's decision-making autonomy.

4.8 Data collection procedure and instruments

Data was collected through face-to-face interviewer-administered structured questionnaires by two B.Sc. midwiferies after the interviewers explained the purpose of the study and obtained the participant's verbal consent to participate in the study. The questionnaire was prepared in English and translated to Afan Oromo and Amharic, local languages. Therefore, they used local languages during data collection and by maintaining each respondent's privacy. Principal investigator facilitated or arranged for interviewer like place for interview, material like measuring tape.. Most of recently published papers based on a review of evidence revealed that MUAC is a preferred anthropometric measurement during pregnancy in nutritional programs (33) and other studies conducted in Ethiopia (15,17,19,20,28,30). Anthropometric measurements (MUAC) measurement was conducted using non-elastic and non-stretchable tape and estimated to the nearest 10 mm. MUAC was measured for mothers stand in Frankfurt plane and sideways to measure the left side, arms hanging loosely at the side with the palm facing inward, taken at marked midpoint of upper left arm. This was carried out after participants get ANC service and after interview is accomplished. Maternal nutrition was assessed and categorized as under-nutrition (MUAC < 230 mm) and normal (MUAC ≥ 230 mm (12,13,15,17,19,24,33,34). The questionnaire has six parts; socio-demographic, socio economic, healthcare and environmental characteristics, Pregnancy related parts, knowledge related parts and dietary parts adopted from different literatures. The standardized data collection questionnaire for measurement of Sociodemographic items were adopted from the Ethiopian demographic and health survey 2016 (6). Data on minimum dietary diversity for women (MDDW) and Knowledge related information were collected using the

standard FAO 2016 tool (35), whereas house hold food insecurity was adopted to this study, from FANTA (36).

Operational Definitions

Anthropometric measurement: Measurement of Mid upper arm circumference of pregnant women using measuring tape.

Under nutrition: Mid-upper arm circumference values below a cutoff point $<230\text{mm}$ were categorised as under-nutrition(12,13,15,17,19,24,34).

Normal: Mid-upper arm circumference values $\geq 230\text{mm}$ is considered normal(12,13,15,17,19,24,34).

Pregnant women: Women with visible pregnancy to interviewer's naked eye or their self-report identified visible pregnancy and pregnancy checklist positive for invisible pregnancy.

Trimester: When gestational age up to ≤ 13 weeks is 1st trimester pregnancy, from 14-27 weeks is 2nd trimester pregnancy and ≥ 28 weeks to 40 weeks is 3rd trimester pregnancy(37).

Drinking water sources: 'Protected' if protected wells, tap/hand pump and not otherwise(19,35).

Dietary diversity scores: created by summing up the number of food groups consumed over a 24-hour period by the pregnant women. There are around 10 different food groups as proposed by the FAO guideline 1. Grains, white roots and tubers, and plantains 2. Pulses (beans, peas and lentils) 3. Nuts and seeds 4. Dairy 5. Meat, poultry and fish 6. Eggs 7. Dark green leafy vegetables 8. Other vitamin A-rich fruits and vegetables 9. Other vegetables 10. Other fruits.

It categorized as good if ≥ 5 and poor if < 5 food groups ingested within the last 24 hours(35).

Meal frequency: Considered to be recommended (adequate) when respondents take an additional meal (> 3 meals per day) as a result of the current pregnancy, otherwise in adequate(24).

Food security: A state in which all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Household Food Insecurity Access Scale (HFIAS) questions will be used which is asked with a recall period of four weeks (one month). The questionnaire consists of nine occurrence questions that represent a generally increasing level of severity of food insecurity (access), and nine "frequency-of-occurrence" questions that are asked as a follow-up to each occurrence question to determine how

often the condition occurred. Each occurrence question consists of two response options (0 = no, 1 = yes) with three response options representing a range of frequencies (1 = rarely, 2 = sometimes, 3 = often). The maximum score for a household is 27 (“yes” response to all nine frequency-of-occurrence questions, coded 3); the minimum score is 0 (“no” to all occurrence questions, coded as 0). The higher the score, the more food insecurity, the lower the score, the less food insecurity experienced.

Food Secure: Q1a=0 or Q1a=1 and Q2 to Q9=0.

Mildly Food Insecure: Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) and Q5 to Q9=0.

Moderately Food Insecure: Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2 and Q7 to Q9=0.

Severely Food Insecure: Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3 (36).

Good knowledge: If respondents score $\geq 70\%$ on the knowledge questions (24).

Poor knowledge: If respondents score $< 70\%$ on the knowledge questions(24).

4.9 Data quality control

To assure the quality of data, standard data collection tool adopted from EDHS 2016, FAO 2016 and FANTA questionnaire and tape meter were used. The questionnaire was first prepared in English, translated into Afan Oromo and amharic, and then translated back to English to ensure the consistency. Data was collected in Afan Oromo and Amharic which are local languages. Prepared questionnaires were pre-tested on 5 % of pregnant mothers at Muke turi primary hospital found at 30 kilometers from Chanco town to identify the content, clarity and sequence of question to avoid any ambiguity raised during data collection. Then, the required number of modified questionnaires after pretest were duplicated and prepared for field work. Two mid-wifery data collectors were trained for one day on objective of the study and data collection procedures by principal investigator. During data collection, the principal investigator reviewed filled questionnaire on a daily basis. Before data entry, each questionnaire was given a unique code by the principal investigator.

4.10 Data processing and analysis

Collected data was checked for completeness and cleaned by running frequency for each variables using SPSS for any missing before analysis procedure. Then, data were coded and entered to Epi info version 7.2.5 and exported to IBM® SPSS version 26 for analysis. Mean, proportion/percentage and standard deviation analysis were conducted to understand the nature of data. Variables with a p-value < 0.20 (95% CI) in the bivariable logistic regression analysis were modeled into the multivariable binary logistic regression analysis to assess the associated factors of maternal nutritional status after checking model fitness. Model fitness was checked by using Hosmer–Lemeshow goodness of fit test (P value=0.79). In multivariable logistic regression analysis, variables with a p-value of < 0.05 were considered statistically significant. Inter method was used in analysis procedures. Finally, the results of the study were presented using tables, figures and text based on the obtained data.

4.11 Ethical considerations

The proposal was approved by St. Paul's millennium medical college, Department of public health and written ethical clearance will be obtained. Then a formal letter of cooperation was obtained from Department of public health. Finally, after explaining the purpose and process of the research to the study participants, informed consent was obtained from each study participants. To keep privacy of the respondents, the name and any identity were not asked during data collection.

4.12 Dissemination of results

The final report will be presented and submitted St. Paul's millennium medical college, Department of public health. Results of this study will be sent to Chanco Hospital. Efforts will be made to present on scientific conferences and it will be published on local or international journals.

5. Results

5.1 Socio-demographic characteristics of study participants

Of the total 288 pregnant women enrolled in the study, 279 of them responded making a total response rate of 96.8 %. About 98 (35.1%) of study participants were between 20 and 24 years of age. Of the total study participants, majority 205 (73.5%) of them were orthodox by religion and 208 (74.6%) Oromo by ethnicity. Concerning educational status, 97 (34.8%) were secondary school attendants. Only 38 (13.6%) house hold is held by mothers and 136 (48.7%) of them were House wives in occupation. Majority, 92.1% of house-holds family size were below 5 members in number. Main source of income for 117 (41.9%) households was trade with average monthly income of 6484.59 (mode 7000) Ethiopian birr (table 1 below).

Table 2: Socio-demographic and socio economic characteristics of pregnant women attending antenatal care clinic at Chancho Hospital, June 2022.

Variables		Frequency (N=279)	Percent (%)
Age group	15-19	14	5.0
	20-24	98	35.1
	25-29	93	33.3
	30-34	55	19.7
	>=35	19	6.8
Residence	Urban	238	85.3
	Rural	41	14.7
Religion	Orthodox	205	73.5
	Muslim	26	9.3
	Protestant	48	17.2
Ethnicity	Oromo	208	74.6
	Amhara	45	16.1
	Gurage	26	9.3
Educational status	No education	46	16.5
	Primary school	94	33.7
	Secondary school	97	34.8
	More than secondary	42	15.1

Occupation	House wife	136	48.7
	Employee	66	23.7
	Merchant	57	20.4
	Daily laborer	13	4.7
	Farmer	7	2.5
Marital status	Single	20	7.2
	Married	241	86.4
	Others *	18	6.5
Head of house hold	Mother	38	13.6
	Husband	241	86.4
Educational status of husband (N=241)	No education	17	6.1
	Primary school	110	39.4
	Secondary school	95	34.1
	More than secondary	20	7.2
Occupation of husband (N=241)	Employee	70	25.1
	Merchant	91	32.6
	Daily laborer	51	18.3
	Farmer	30	10.8
Number of family members	<5	257	92.1
	>= 5	22	7.9
Main Source of income	Farming	38	13.6
	Trade	117	41.9
	Employment	88	31.5
	Daily laborer	36	12.9
Average monthly income	<=2000.00	2	0.7
	2000.00-4000.00	56	20.1
	>=4000.00	221	79.2

*Divorced, Widowed

5.2 Pregnancy related characteristics

From study participants, one hundred thirty-nine (49.8%) of pregnant women were in the second trimester of pregnancy during data collection. Concerning ANC follow up, eighty-eight (31.5%) participants attended at least one ANC follow-up during their current pregnancy. More than half, 56.3% of participants experiences pregnancy for the first time. Prenatal dietary advice was never given for about three fourth, 199 (71.3%) of pregnant women during current pregnancy. In addition, majority 217 (77.8%) of them were not told when to return to health institution for appointment (table 2 below).

Table 3. Pregnancy related characteristics of pregnant women attending antenatal care clinic at Chancho Hospital, June 2022.

Variables		Frequency (N=279)	Percent (%)
Gestational age	1st trimester	15	5.4
	2nd Trimester	139	49.8
	3rd Trimester	125	44.8
Pregnancy intentioned	Yes	233	83.5
	No	46	16.5
Number of ANC contact	One	88	31.5
	Two and above	191	68.5
Gravida	Primigravida	157	56.3
	Multi gravida	109	39.1
	Grand multigravida	13	4.7
Number of life births	0	159	57.0
	1-2	106	38.0
	>=3	14	5.0
Dietary counselling	Yes	80	28.7
	No	199	71.3
Told when to return	Yes	217	77.8
	No	62	22.2

5.3 Health care, environmental and feeding characteristics

Majority of respondents, 90.0% got drinking water from tap water with only few 8 (2.9%) of them got from protected well. In addition, almost all, 97.8% of the owned latrine in their garden. About half, 143 (51.3%) knew additional meal is needed during pregnancy. Concerning daily meal frequency, 170 (60.9%) of respondents had history of above three meals consumption and the rest 109 (39.1%) consumed three or below meals within a day during current pregnancy (table 3 below).

Table 4. Health care, environmental and feeding characteristics` characteristics of pregnant women attending antenatal care clinic at Chanco Hospital, June 2022.

Variables		Frequency (N=279)	Percent (%)
Source of drinking water	Tap water	251	90.0
	Pumping water	20	7.2
	Protected well	8	2.9
Latrine availability	Yes	273	97.8
	No	6	2.2
Ever skip meal	Yes	122	43.7
	No	157	56.3
Know additional meal needed during pregnancy	Yes	143	51.3
	No	136	48.7
Daily meal frequency	Above Three	170	60.9
	Three or below	109	39.1

5.4 Knowledge Status

Respondents were asked to assess their knowledge on food groups needed for pregnant women. More than half, 158 (56.6%) knew diversified diet and 165 (59.1%) of them knew benefit of diversified diet. In addition, dietary sources of macronutrients carbohydrates and proteins were known by below half of respondents that are 133 (47.7%) and 127 (45.5%) respectively. Moreover, dietary sources of micronutrients Vitamin A and vitamin C were not known by most of respondents which were 188 (67.4%) and 173 (62.0%) respectively. Concerning complications, 137 (49.1%) of participants knew maternal complication whereas only 108 (38.7%) of them knew fetal complication of maternal under-nutrition (table 4 below).

Table 5. Knowledge characteristics of pregnant women attending antenatal care clinic at Chancho Hospital, June 2022.

Questions		Frequency	Percent (%)
Know diversified diet	Yes	158	56.6
	No	121	43.4
Know benefit of diversified diet	Yes	165	59.1
	No	114	40.9
Know dietary sources of macronutrients carbohydrates	Yes	133	47.7
	No	146	52.3
Know dietary sources of macronutrient proteins	Yes	127	45.5
	No	152	54.5
Know dietary sources of macronutrients, EFA	Yes	186	66.7
	No	93	33.3
Know dietary sources of micronutrients iron	Yes	152	54.5
	No	127	45.5
Know dietary sources of micronutrients Vitamin A	Yes	91	32.6
	No	188	67.4
Know dietary sources of micronutrients iodine	Yes	166	59.5
	No	113	40.5
Know dietary sources of micronutrients Vitamin C	Yes	106	38.0
	No	173	62.0
Know the use of iodized salt during pregnancy	Yes	68	24.4
	No	211	75.6
Know the maternal complication of maternal under-nutrition	Yes	137	49.1
	No	142	50.9
Know the fetal complication of maternal under-nutrition	Yes	108	38.7
	No	171	61.3

Nutrition specific knowledge of the study participants was assessed. Nutritional knowledge was computed by counting participants responded “yes” and accepted they knew dietary diversities and

they did not know if responded “no”. Respondents score $\geq 70\%$ on the knowledge questions were accepted knowledgeable, otherwise not knowledgeable. From the study, 30% of the respondents had good nutrition knowledge and the rest 70% had poor knowledge (Figure 2. below).

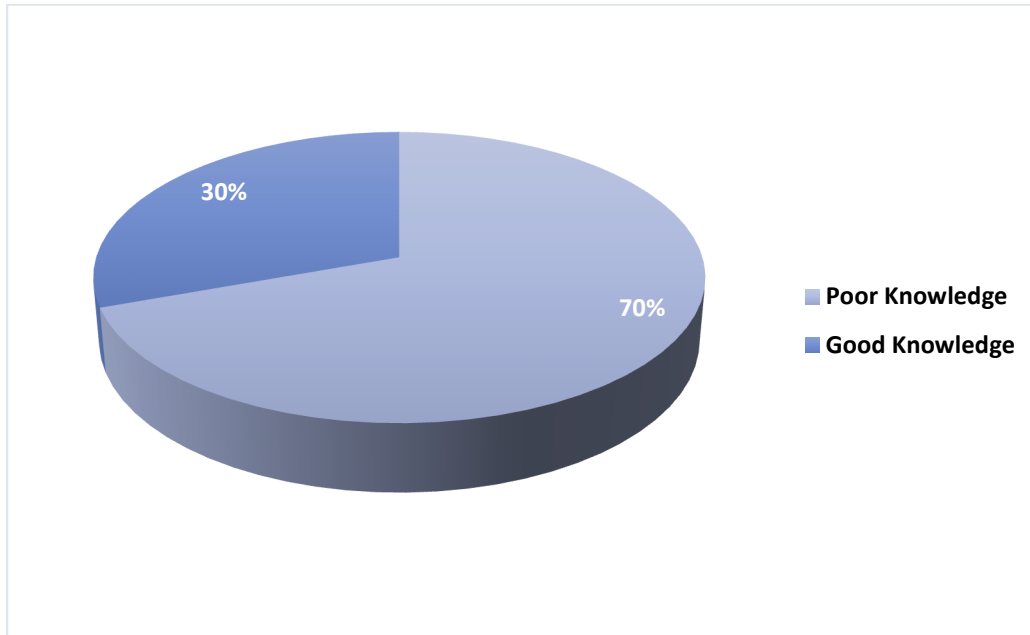


Figure 2. Knowledge status of pregnant women attending antenatal care clinic at Chanco Hospital, June 2022

5.5 Dietary Diversity

The study revealed 266 (95.3%) of the pregnant women reported consuming cereal-based foods in the last one day preceding the survey. Majority, two hundred thirty-four (83.9%) consumed pulses and two hundred sixty-eight (96.1%) consumed nuts and seeds. In addition, 252 (90.3%) of respondents reported consumption of other vegetables. On the other hand, only 48 (17.2%) of the respondents reported consumption of meat, poultry and fish while 56 (20.1%) consumed eggs. Besides, 85(30.5%) of the respondents reported consuming dark green leafy vegetables and 53 (19.0%) consume other vitamin A rich fruits and Vegetables (table 5 below).

Table 6. dietary diversity consumption of pregnant women attending antenatal care clinic at Chancho Hospital, June 2022.

Variables		Frequency	Present (%)
Grains, white roots and tubers	Yes	266	95.3
	No	13	4.7
Pulses (beans, peas and lentils)	Yes	234	83.9
	No	45	16.1
Nuts and seeds	Yes	268	96.1
	No	11	3.9
Dairy and their products	Yes	67	24.0
	No	212	76.0
Meat, poultry and fish	Yes	48	17.2
	No	231	82.8
Eggs	Yes	56	20.1
	No	223	79.9
Dark green leafy vegetables	Yes	85	30.5
	No	194	69.5
Other vitamin A rich fruits and Vegetables	Yes	53	19.0
	No	226	81.0
Other vegetables	Yes	252	90.3
	No	27	9.7
Other fruits	Yes	58	20.8
	No	221	79.2

The study showed one hundred ten (39.4%) of pregnant women had poor dietary diversities. Normality of distribution of data was checked using histogram, skewedness and kurtosis and it was normally distributed. The mean dietary diversity score of pregnant women was 4.97(SD±1.169) (figure 3 below).

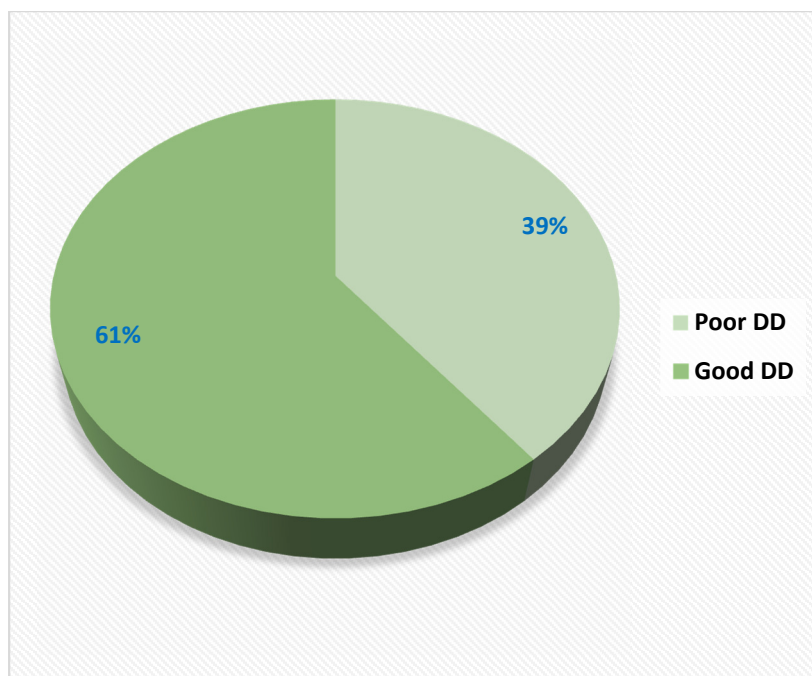


Figure 3. dietary diversity score of pregnant women attending antenatal care clinic at Chanco Hospital, June 2022.

5.6 household food security status

From food security asked pregnant women, 92 (33.0%) of them were from food secured household and 90 (32.3%) of pregnant women from mildly food in secured household. In addition, 79 (28.3%) of pregnant women were from moderate food in secured household and 18 (6.5%) from severely insecure households (Figure 4. Below).

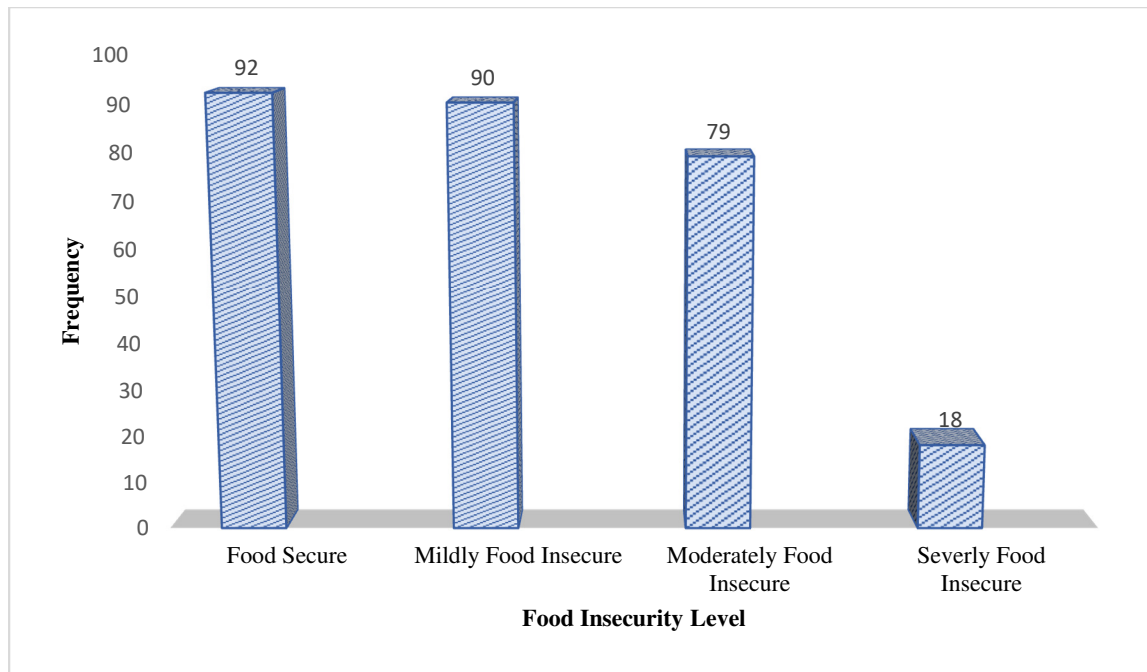


Figure 4. Food security status of pregnant women attending antenatal care clinic at Chancho Hospital, June 2022.

5.7 Nutritional status of pregnant women

According to this study, the prevalence of under-nutrition, based on MUAC less than 230 mm, among pregnant women was 36.9% and 63.1% of respondents had normal nutritional status. Data was normally distributed and the mean MUAC measurement was 240mm (SD±1.95) (figure 5 below).

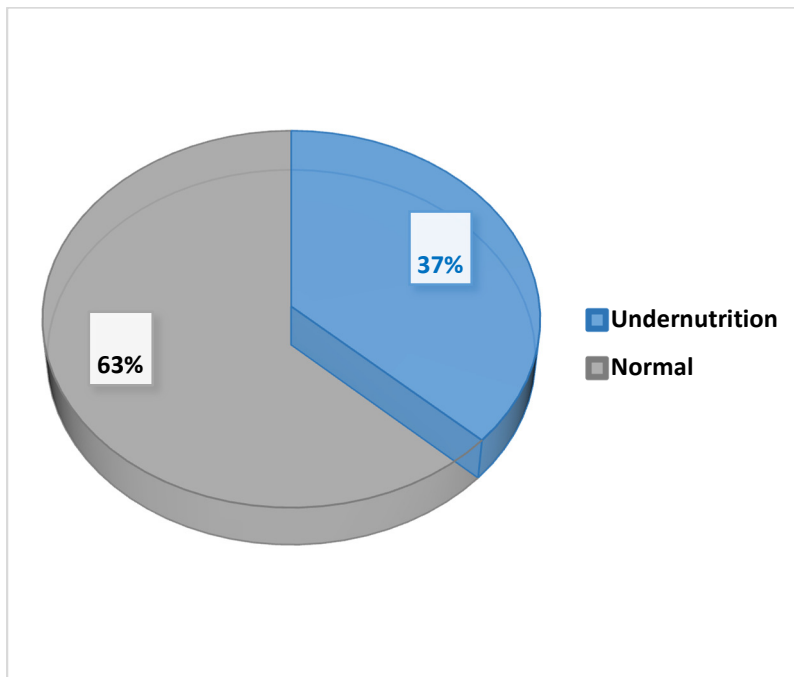


Figure 5. Nutritional status of pregnant women attending antenatal care clinic at Chanco Hospital, June 2022.

5.8 Factors associated with under-nutrition

In bivariate analysis a total of 11 variables (Age Category, main Source income, number of pregnancies, gestational age, counselling provided, source of drinking water, number of ANC follow up, dietary diversity, head of house hold, level of knowledge and food security) were variables with p-value < 0.25 and became candidate for multivariable analysis. Finally, 5 variables (Main Source income, Counseling provided, Source of drinking water, Level of knowledge and food security) were independent variables with p-value < 0.05 and declared as statistically significantly associated factors with pregnant women under-nutrition.

In this study average main source of family income of the respondents showed statistically significant association with under-nutrition. Pregnant women whose household main source of

income trade was 5.246 times (AOR=5.246, 95% CI: 1.106-24.887) and employed source of income was 3.406 times (AOR=3.406, 95% CI:1.031-11.248) more likely to have under-nutrition compared to whose main source of income is farmers.

In addition, pregnant women who reported did not receiving dietary counseling at least once during ANC follow up had 5.686 times (AOR=5.686, 95% CI: 2.124-15.221) more likely to have under-nutrition.

Source of drinking water was also significantly associated with pregnant women under-nutrition. Pregnant women who's protected well source of drinking water was 10.301times more likely to have under-nutrition than whose source of drinking water was tap water (AOR=10.301, 95% CI: 1.087-97.629).

Household food security status was also another variable that showed statistically significant association with pregnant women under-nutrition. The likelihood of undernutrition was 88.5 % (AOR=.115, 95% CI: .045-.293) and 94% (AOR=.0631, 95% CI: .015-.268) less likely among women whose house hold was mildly food insecure and moderately food insecure respectively, than pregnant women from severely food insecure households.

Similarly, pregnant women who had poor knowledge are 5.686 times more likely to have under-nutrition than knowledgeable pregnant women (AOR=5.686, 95% CI: 2.124-15.221) (table 6 below).

Table 7. Factors associated with pregnant women undernutrition of attending antenatal care clinic at Chanco Hospital, June 2022.

Variables		Undernutrition		COR (95% CI)	AOR (95% CI)
		Yes	No		
Age Category	15-19	5(35.7%)	9(64.3%)	1	1
	20-24	32(32.7%)	66(67.3%)	3.086(.734-12.981)	2.496 (.332-18.767)
	25-29	24(25.8%)	69(74.2%)	3.536(1.271-9.838) *	3.234(.614-17.050)
	30-34	30(54.5%)	25(45.5%)	4.929(1.739-13.964) *	2.965(.639-13.755)
	>=35	12(63.2%)	7(36.8%)	1.429(.489-4.176)	.789(.173-3.597)
Main Source income	Farming	13(34.2%)	25(65.8%)	1	1
	Trade	40(34.2%)	77(65.8%)	2.404(.940-6.146)	5.246(1.106-24.887) *
	Employed	30(34.1%)	58(65.9%)	2.406(1.125-5.147) *	3.406(1.031-11.248) *
	Daily laborer	20(55.6%)	16(44.4%)	2.417(1.095-5.333) *	2.486(.758-8.153)
Number of pregnancies	Primigravida	48(30.6%)	109(69.4%)	1	1
	Multi gravida	49(45.0%)	60(55.0%)	1.946(.621-6.099)	.549(.095-3.184)
	Grand multigravida	6(46.2%)	7(53.8%)	1.050(.331-3.328)	.626(.130-3.023)
Gestational age	1st Trimester	8(53.3%)	7(46.7%)	1	1
	2nd Trimester	66(47.5%)	73(52.5%)	.264(.088-.791) *	.412(.074-2.288)
	3rd Trimester	29(23.2%)	96(76.8%)	.334(.196-.569) *	.553(.208-1.472)
Counseling provided	Yes	10(12.5%)	70(87.5%)	1	1
	No	93(46.7%)	106(53.3%)	6.142(2.993-12.601) *	5.686(2.124-15.221) *
Source of drinking water	Tap water	90(35.9%)	161(64.1%)	1	1
	Pumping water	7(35.0%)	13(65.0%)	5.367(1.061-27.144) *	6.099(.689-54.006)
	Protected well	6(75.0%)	2(25.0%)	5.571(.880-35.268)	10.301(1.087-97.629) *
Number of ANC follow up	One	46(52.3%)	42(47.7%)	1.862(1.051-3.300) *	1.287(.520-3.185)
	Two	40(37.0%)	68(63.0%)	4.252(2.159-8.373) *	2.260(.628-8.126)
	Three & above	17(20.5%)	66(79.5%)	1	1
Level of knowledge	Poor knowledge	92(47.4%)	102(52.6%)	6.068(3.034-12.136) *	5.686(2.124-15.221) *
	Good knowledge	11(12.9%)	74(87.1%)	1	1
Dietary diversity	Poor	52(47.3%)	58(52.7%)	1	1
	Good	51(30.2%)	118(69.8%)	2.074(1.261-3.413)	.737(.369-1.474)
Head of house hold	Mother	18(47.4%)	20(52.6%)	1	1
	Husband	85(35.3%)	156(64.7%)	.605(.304-1.206)	.486(.170-1.386)
Food security	Food secure	13(14.1%)	79(85.9%)	.576(.267-1.242) *	.674(.260-1.749)
	Mildly insecure	20(22.2%)	70(77.8%)	.068(.032-.145) *	.115(.045-.293) *
	Moderatelyinsecure	56(70.9%)	23(29.1%)	.047(.013-.165)	.063(.015-.268) *
	Severely insecure	14(77.8%)	4(22.2%)	1	1

*p-value less than 0.05

6. Discussion

Cross-sectional study was conducted to assess nutritional status of pregnant women at Chanco Hospital. It is found that about seven in ten pregnant women in this study are under-nourished. Main Source of income, prenatal counselling, source of drinking water, level of knowledge and food security are independent predictors of pregnant women under-nutrition.

Finding of pregnant women under-nutrition (36.9%) is higher than the study conducted in Alamata general hospital (22.3%) (28), Gonder town (14.4%) (21), southern Ethiopia (31.4%) (20) and in Ethiopia (22%) (6) of the study participants who were undernutrition. Moreover, this finding is higher when compared with systematic review and meta-Analysis revealed pooled prevalence of pregnant women under-nutrition in Ethiopia, which is 29.07% (5).

On the other hand, this finding is consistent with cross sectional study conducted in India, that was 38% (16) and study conducted on young pregnant women in Ethiopia 38% (12).

But, this finding is lower when compared with the study conducted in different parts of Ethiopia. It is lower than findings from study at Kacha Birra District (52.6%) (17), Gumy District 44.9% (19) and in Public General Hospitals in Tigray (40.6%) (15) that are conducted on pregnant women undernutrition. These discrepancies might be because of differences in study period, sample size, socio demographic characteristics, socio-economic activities, instruments used, study design and the cutoff point of MUAC measurement that was used between the studies.

From this study, about three fourth, 71.3% of pregnant women do not get prenatal dietary advice during current pregnancy. This finding is almost similar with 72.6% at Guji zone(20) and higher than finding at Gumy district, showed 57% of respondents did not get dietary counselling (19).

The study showed 31.5% of study participants attend at least one ANC follow-up during their current pregnancy. This is higher when compared with the study conducted at Gumy district, 16.6% (20) but lower than study at Guji Zone, 78.2% (21) of them attend at least one ANC follow up.

From pregnant women asked about food security, 33.0% of them are from food secured household. This finding is lower than finding of 61.4% at Guji zone(20) , 94.47% at Gondar town(21), 55.6% at Gumy district(19), 52.6% at Ilu aba bora (22) and 44.7% at konso district(31). On the other

hand, it is higher than 16.9% in public hospitals in Tigray (16). Justification for this discrepancy could be the study period and socio-economic activities of residents. Currently there is market inflation and it is becoming hard to get foods to eat and money to buy foods as the annual inflation rate in Ethiopia eased to 34% in June, 2022 (38). In addition, in this study area, there is limited variety of crops cultivated because of topography of the land. This could also be the reason why low number of food-secured households seen in this finding.

On the other hand, 70% of the respondents have poor nutrition knowledge. This finding is higher than finding of 62.8% at ilu aba bora(22), 38.6% at northern Ethiopia (39) and 49% at Silte zone(24). Justification could be difference in accessibility of women to health institution that help to get more nutrition-based information from media than other related study areas.

The study shows pregnant women who didn't receive prenatal dietary advices from health professional are 5.686 times more likely to have under-nutrition compared to those who received counselling. This finding on effect of prenatal dietary counselling on under-nutrition among pregnant women goes with other previous studies done in southern Ethiopia (17). This could imply prenatal dietary counselling is one of the key interventions that improves pregnant women nutritional status by bringing behavioral change.

In addition, household food security status is another variable that showed statistically significant association with pregnant women under-nutrition. The likelihood of undernutrition is 88.5 % less likely among women of house hold mildly food insecure and 94% less likely among moderately food insecure than pregnant women from severely food insecure households. This finding is supported by the study from gumy district, south west Ethiopia (19), guji zone(20) , konso district and southern Ethiopia (31).This might imply that women from food in secured house hold might not get nutritionally adequate foods.

Moreover, mothers who have poor dietary knowledge are 5.686 more likely undernourished than their counterparts. Similarly, studies conducted at southwest Ethiopia at public hospitals of Bench-Sheko and Kaffa zone(23) and institution based cross sectional study conducted at silte zone (24), showed pregnant women with poor dietary knowledge are more likely to be under-nourished than those with good knowledge. The implication might be women with good knowledge on dietary source of foods could change their feeding habit towards healthy and diversified foods which improves their nutritional status.

Not only this, main source of family income shows statistically significant association with under-nutrition in this study. Pregnant women whose household trade main source of income are 5.246 times more likely to become under-nutrition than families with farmer main source of income. Similarly, employed source of income are 3.406 times more likely to have under-nutrition compared to whose main source of income are farmers. Justification could be pregnant women from farmers' households could get more access to diversified diet from owned lands. Therefore, either knowingly or unknowingly they could eat multiple dietary sources of food and results in improved nutritional status.

More over, source of drinking water for family is also another factor that determined pregnant women under-nutrition. Pregnant women who use protected well for drinking water was 10.301 times more likely to have under-nutrition than those used tap water for drinking water. Implication could be un protected well are prone to be contaminated with different sources such as animals, floods and also humans. Contaminated water using for drinking may expose for different infectious diseases which could lead to under-nutrition.

7. Conclusion and Recommendation

7.1 Conclusion

Pregnant women were affected by under-nutrition and prevalence was high. It was found to be higher than EDHS 2016 and in many other similar studies, hence it should be considered as a major public health problem in this study area. The study found that different independent factors were associated with pregnant women under-nutrition. Factors such as main Source income, prenatal counselling provided, source of drinking water, level of knowledge and food security had significance association with pregnant mothers' under-nutrition. Majority of the respondents had poor nutrition knowledge and majority were from food insecure house holds.

7.2 limitations

- The result of the study might not be generalized to the general population since the study was conducted in the hospital.
- This study was also prone to recall bias.
- Besides, study adopted a quantitative method alone.
- The cross-sectional nature of the study might affect the establishment of a causal relationship between identified risk factors and undernutrition.

7.3 Recommendations

- Based on the findings of the study the following recommendations are forwarded to all responsible bodies.

Local and international NGOs

- Provide training on updated comprehensive ANC guidelines that help in improving counselling service.
- Avail necessary materials like measurement materials and guidelines.

Woreda health office and chancho hospital

- Develop strategies on sustainable and intensive information dissemination and behavioral change communication to improve knowledge.

- All pregnant need to get nutritional counselling during ANC visit. There fore, it is better to sustain the servise through availing templetes or que cards, making an ajenda on regular meeting and strengthen experience sharig among health care providers.
- Efforts should also be made to reduce women’s problem of food insecurity by creating awareness to practice income generating activities.
- Provide safe and clean source of drinking water in cooperating with water and irrigation office.
- Conduct continuous monitoring and evaluation on health facilities to enhance quality service by health care providers.

Health workers

- Give prenatal dietary advices for all women using cards and role models through incorporating counselling in ANC service package.
- Implement integration of nutritional screening with other services for all pregnant women and work jointly with program managers in reducing prevalence of undernutrition.
- Implement direction of WHO “Improving the health and nutritional status of women during pregnancy”.
- Use available updated ANC guidelines.

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9. Appendixes

Consent form

Respondent ID no.....

Introduction

My name is -----, I am student in St. Paul's millennium medical college. I am conducting study on Magnitude and associated factors of undernutrition among pregnant women. To attain this purpose, your honest and genuine participation by responding to the question prepared is very important & highly appreciated.

Confidentiality and Consent

Your answers are completely confidential. Your name will not be written on this form. The nurses, doctors, and other people will not be told what you said in connection to your name. You do not have to answer any question if you don't want to and you can stop the interview at any time. However, your honest answer to these questions will help us to better understand the experience of mothers related to nutritional status during pregnancy. We would greatly appreciate your help in responding to this study. The interview will take about 20 - 30 minutes. Would you be willing to participate? If yes, proceed If no, thank and stop here If you don't understand any of the questions, please don't hesitate to ask me for clarification. If you don't want to respond to any of the questions, you have the right to skip it. You are also entitled to quit your participation at any given moment. This interview may take about 20 minutes.

Shall we continue? 1. Yes 2. No

1. English version Questionnaires

I. Socio demographic characteristics questionnaire			Skip to
Client Code Number_____date_____health facility_____kebele_____			
Code	Questions	Response options	
101	How old are you?	----- in years	
102	Where is your place of residence?	1.Urban 2. Rural	
103	What is your religion?	1.Orthodox 2. Muslim 3. Protestant 4. Waqeffata 5. Other, specify _____	
104	What is your Ethnicity?	1.Oromo 2. Amhara 3. Gurage 4. Others, specify -----	
105	What is the highest educational level you completed?	1.No education 2. Primary school 3.Secondary school 4. More than secondary	
106	What is your current occupation?	1.House wife 2. Government employee 3.Merchant 3. Daily laborer 5. Self-employed 6. Others, specify-----	
107	What is your current marital status?	1.Single ----- 2.Married 3. Widowed 4. Divorced	→Q111
108	Who is the head of your household?	1.Mother 2. Husband 3. Both	
109	What is the highest educational level your husband?	1.No education 2. Primary school 3.Secondary school 4. More than secondary	
110	What is your husband occupation?	1.Government employee 2. Merchant 3. Daily laborer 4. Self-employed 5. Farmer 6. Others, specify-----	
111	How many people are living in your household (total number of family members)?	----- by numbers	
Socio economic characteristics questionnaire			
112	What is the main source of income to the family?	1.Farming or livestock 2. Trade and private enterprise 3. Employed (government and/or nongovernment) 4. Daily laborer 5. Other (specify-----	
113	What is your total monthly family (household) average income in ETB birr (approximately)?	_____ETB birr/month	
II. Pregnancy related characteristics questionnaires			
114	Month of your current pregnancy?	-----in month	
115	Is pregnancy intentioned?	1. Yes 2. No	
116	Number of ANC follow up?	-----	
117	Total number of pregnancies?	-----	
118	Number of live births?	-----	
119	Have you ever been received dietary intake counseling during your ANC visit?	1.Yes 2. No	
120	Were you informed when to return to the health facility?	1.Yes 2. No	

III. Healthcare, environmental and feeding characteristics		
121	What is the main Source of drinking water?	1.Tap water 2. Pumping water 3. Protected well 4. others, specify-----
122	Do you have a latrine in your household?	1. Yes 2. No
123	Do you Ever skip meals during this pregnancy?	1.Yes 2. No
124	Do you know that additional meal needed during pregnancy?	1.Yes 2. No
125	What is your daily meal frequency in the previous days	1. Above three meals 2. Three meals and/or below

IV. Nutrition Knowledge of the Pregnant Women (for questions 127 to 137, circle 'yes' if she knows at least one of the lists)

S. No	Variables	Coding categories
126	Know diversified diet ('yes' if she knows at least 5 food groups) - Grains, white roots and tubers - Pulses (beans, peas and lentils) - Nuts and seeds - Dairy and their products - Meat, poultry and fish - Eggs - Dark green leafy vegetables - Other vitamin A rich fruits and Vegetables - Other vegetables - Other fruits	1.Yes 2.No
127	Know benefit of diversified diet - Reduces pregnancy complications - Reduces incidents of birth defects - Ensures good health for baby - Ensures you recover stronger and healthier after delivery - Helps you lose weight faster	1.Yes 2.No
128	Know dietary sources of macronutrients carbohydrates? - Fruits like apples, oranges, banana, pineapple, sweet potatoes - Grains - Pumpkin, carrot, tomatoes, broccoli, barley, oats, rice.	1.Yes 2.No
129	Know dietary sources of macronutrient proteins? Beans and legumes, meat, egg	1.Yes 2.No
130	Know dietary sources of macronutrients, EFA (Essential Fatty Acid)? Fish, seed Oil, olive oil, Avocados	1.Yes 2.No
131	Know dietary sources of micronutrients iron? Fruit, chocolate, Organ meats, Soybeans, Lentils	1.Yes 2.No
132	Know dietary sources of micronutrients Vitamin A? Liver, dairy, Sweet Potato, Carrots	1.Yes 2.No
133	Know dietary sources of micronutrients iodine? Seafood, Iodized Salt, Nonfat Milk, Eggs, bread, Liver	1.Yes 2.No

134	Know dietary sources of micronutrients Vitamin C? • Orange, peppers, broccoli	1.Yes 2.No
135	Know the use of iodized salt during pregnancy? • Fetal development, brain development	1.Yes 2.No
136	Know the maternal complication of maternal under-nutrition? • Mortality, Risk of Miscarriage, Anemia	1.Yes 2.No
137	Know the fetal complication of maternal under-nutrition? • Stillbirth, Premature Birth, mortality	1.Yes 2.No

V. Dietary Diversity Questionnaire

INSTRUCTIONS ONE: Please describe the foods (meals and snacks) that you ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink of the morning. Write down all foods and drinks mentioned. When composite dishes are mentioned, ask for the list of ingredients. When the respondent has finished, probe for meals and snacks not mentioned.

Breakfast	Snack	Lunch	Snack	Dinner	Snack

INSTRUCTION TWO: When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed (**‘yes’ if she consumed at least one item from group**).

Sr. no	Food group	Items	Consumed Yes =1 No=0
138	Grains, white roots and tubers	Barley, corn, millet, oats, teff, wheat, potatoes, sweet potato, rice, potato and food made from this such as Porridge, bread, pasta or other foods made from grains.	___ yes (1) ___ no (0)
139	Pulses (beans, peas and lentils)	Lentils, soybean, or bean/pea products.	___ yes (1) ___ no (0)
140	Nuts and seeds	Any tree nut, peanut, pumpkin, sesame seed, linseed, Niger, sunflower seed.	___ yes (1) ___ no (0)
141	Dairy and their products	Milk, cheese, yoghurt or other milk products	___ yes (1) ___ no (0)
142	Meat, poultry and fish	Liver, kidney, heart or other organ meats or blood-based foods, from Cow, ox, sheep, goat, chicken, Fish	___ yes (1) ___ no (0)
143	Eggs	Eggs and foods prepared from eggs	___ yes (1) ___ no (0)
144	Dark green leafy vegetables	Cabbage, romaine and lettuce	___ yes (1) ___ no (0)
145	Other vitamin A rich fruits and Vegetables	Carrots, pumpkin, mangoes, papaya, beet root and fruit juice made from this group.	___ yes (1) ___ no (0)
146	Other vegetables	Green pepper, tomato, onion	___ yes (1) ___ no (0)
147	Other fruits	Avocado, banana, lemon, orange, pineapple, apple, strawberry, fruit juice	___ yes (1) ___ no (0)

VI. Food Security Questionnaire

No	Question	Response Options	Skip to
1	In the past four weeks, <u>did you worry</u> that your household would not have enough food?	___ 0 = No _____ ___ 1 = Yes	➔ 2
1a	How often did this happen?	___ 1 = Rarely (once or twice in the past four weeks) ___ 2 = Sometimes (3 to 10 times in the past four weeks) ___ 3 = Often (more than 10 times in the past four weeks)	
2	In the past four weeks, were you or any household member <u>not able to eat the kinds of foods you preferred</u> because of a lack of resources?	___ 0 = No _____ ___ 1 = Yes	➔ 3
2a	How often did this happen?	___ 1 = Rarely (once or twice in the past four weeks)	

		__2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
3	In the past four weeks, did you or any household member have to eat a <u>limited variety of foods</u> due to a lack of resources?	__0= No _____ __1= Yes	→ 4
3a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
4	In the past four weeks, did you or any household member have to eat some foods that you really <u>did not want to eat</u> because of a lack of resources to obtain other types of food?	__0= No _____ __1= Yes	→ 5
4a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
5	In the past four weeks, did you or any household member have to eat a <u>smaller meal</u> than you felt you needed because there was not enough food?	__0= No _____ __1= Yes	→ 6
5a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
6	In the past four weeks, did you or any other household member have to eat <u>fewer meals</u> in a day because there was not enough food?	__0= No _____ __1= Yes	→ 7
6a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
7	In the past four weeks, was there <u>ever no food to eat</u> of any kind in your household because of lack of resources to get food?	__0= No _____ __1= Yes	→ 8
7a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
8	In the past four weeks, did you or any household member <u>go to sleep at night hungry</u> because there was not enough food?	__0= No _____ __1= Yes	→ 9
8a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
9	In the past four weeks, did you or any household member go a <u>whole day and night without eating</u> anything because there was not enough food?	__0= No (questionnaire is finished) __1= Yes	
9a	How often did this happen?	__1= Rarely (once or twice in the past four weeks) __2= Sometimes (3 to 10 times in the past four weeks) __3= Often (more than 10 times in the past four weeks)	
149	MUAC	-----MM (milli meter)	

THANKS FOR YOUR COOPERATION!

Uunka Heyyama Hirmaannaa

Seensa

Maqaan koo ----- jedhama. Ani barataa kollejii meedikaala millenniyan phaawuloosi dha. Ani mata duree hanqina nyaataa dubartoota ulfaa fi ka'umsa isaa jedhu irratti qo'annoo gaggeessaan jira. o'annaa dubartoota ulfa ittatti hanqina nyaataa fi sababiiwwan isaa gaggeessaan jira. Dhimma kana fiixaan baasuuf gargaarsi fi hirmaannaan kee gaaffii kana deebisuun ati nuuf gootuu baayee barbaachisaa fi galatoomfamuu kan qabudh.

Ichiiti eeguu Fi Hayyamamummaa

Gaaffii dhuunfaa yookan waa'ee mataa keetii sii gaafannuuf deebii akka ati nuuf kennituuf si affeerra. Deebii kee namni biraa hindhagahu yookan ichiiti kee guutummaatti ni eegna. Maqaan kee waraqaa kana irratti hin barreeffamu. Narsooni, Doktorootatti ykn nama biraatti gaaffiishee gaafanneera jenne hin himnu. Gaaffii kana deebisuuf fedhii hin qabdu taanaan dhiisuu dandeessa ykn sa'atii barbaadetti dhaabuu dandeessa. Garuu gaaffii kana deebisuuf gargaarsa ati nuuf gootuu waa'ee haala nyaata hadhoollii yeroo ulfaa beekuuf nufayyada. Gargaarsa ati deebii kana deebisuuf nuuf gootuuf guddaa si galateeffanna. Gaaffii fi deebiin kun daqiiqaa 20-30 fudhataa. Irratti hirmaachuu ni barbaaddaa?

Yoo deebiin eyyee ta'e, itti fufi.

Yoo deebiin hin barbaadu ta'e asirratti dhaabi.

1. Gaaffilee Afaan Oromoo

I. Gaaffii waa'ee seenaa jireenyaa fi odeeffannoo haala dinagdee		
Lakk koodii mamilaa _____ guyyaa _____ dhaabbata fayyaa _____ ganda _____ gooxii _____		
	Gaaffii	Filannoo
1.	Umuriin kee meeqa?	-----waggaadhaan
2.	Haalli gaa'ilaa kee akkami?	1. kan hin heerumne 2. Kan heerumte 3. kan abbaan mana irraa du'e 4. kan wal hikaan
2.	Iddoon jireenya kessaan essaa?	1. Magaalaa 2. Badiyyaa
3.	Amantaan keessan maali	1.Ortodooksii 2. Musliima 3. Prootestaantii 4. Waageffataa 5. kan biroo, adda baasi_____
4.	Sabni keessan maali?	1. Oromoo 2. Amaaraa 3. Guraagee 4. kan biroo, adda baasi_____

5.	Sadarkaa barnoota kee maali (kutaa xummurte)?	1. Kan hin baranne 2. Sadarkaa tokkoffaa kan baratte 3. Sadarkaa lammaaffa kan baratte 4. Sadarkaa lammaadhaa ol kan baratte
6.	Hoogganaan/tuun maatii keessanni eenyuu?	1. hadhaa warra (lakk 9 arbii) 2. Abbaa warra 3. lachuu (lakk 9 darbii)
7.	Yoo hoogganaan matii abbaa warra ta'e sadarkaan barnoota isaa meeqa (kutaa xummure)?	1. Kan hin baranne 2. Sadarkaa tokkoffaa kan barate 3. Sadarkaa lammaaffa kan barate 4. Sadarkaa lammaadhaa ol kan barate
8.	Hojiin kee amma maali?	1. Hadhaa manaa 2. Hojjeettuu mootummaa ykn mitii mootummaa) 3. Daldaltuu 4. Hojjeettuu guyyaa 5. Kan biroo(ibsi)-----
9.	Hojiin abbaa manaa keessanii maali?	1. Hojjetaa mootummaa 2. Daldalaa 3. Hojjetaa humnaa 4. Hojii dhuunfaa 5. Kan biro/ibsa.....
10.	Mana keessaan keessaa namoota meeqatu jiraata?	_____ lakkoofsaan
11.	Mana keessaan keessaa daa'imman meeqatu jiraata?	_____lakkoofsaan
II. Gaffilee waa'ee odeeffannoo haala dinagdee gafachuuf qophaahan		
12.	Galiin maatii keessaani inni guddaan maal irraa argaman?	1. Qonna yookin hoorsiisaa beeladoota 2. Daldalaa 3. Hojii mootummaa 4. Hojii guyyaa irraa 5. Kan biro (ibsi)----
13.	Galiin ji'a maatii keessaanii gidduu galeessaan qarshii meeqa (tilmaama)?	qarshii
III. Gaffilee waa'ee ulfaa gafachuuf qophaa'an		
14.	Ulfii kee ji'a meeqa?	Ji'aan
15.	Ulfa kana barbaadde ulfooftee?	1. Eeyyee 2. Miti
16.	Hordoffiin ulfaa kun meeqaffaadha?	1. 1 2. 2 3. 3 >=4
17.	Ulfii kun meeqaffaadha?	
18.	Daa'imman lubbuun jiran meeqa deesse?	

19.	Yeroo hordoffii ulfaa gorsa waa'ee nyaataa fudhattee beektaa?	1. Eeyyee 2. Miti
20.	Yeroo hordoffii ulfaa yoom akka deebitan isinitti himamee turee?	1. Eeyyee 2. Miti
IV. Gaffilee waa'ee odeeffannoo haala dinagdee, Fayyaa fi Haala nyaataa gafachuuf qophaa'an		
21.	Maddi bishaan dhugaatii keessanii maali?	1.bishaan boombaa 2. Bishaan paampii 3. Burqaa dallaa qabu 4. kan biroo, adda baasi.....
22.	Maatii keessan keessatti mana fincaanii qabduu?	1. Eeyyee 2. Miti
23.	Yeroo ulfaa kana nyaata osoo hin nyaatiin irra dabrtanii beektuu?	1. Eeyyee 2. Miti
24.	Yeroo ulfaa nyaatni dabalataa akka barbaachisu ni beektuu?	1. Eeyyee 2. Miti
25.	Guyyaa darbe nyaata yeroo meeqa nyaattan?	1. yeroo sadii ol 2. yeroo sadii fi isaa gadi

V. Gaaffiilee beekumsa haadholiin nyaata irratti qaban gaafachuuf qophaa'e

S.lakk.	Gaaffilee	Filanoowwan
26.	Gosa nyaataa garaagaraa ni beektuu? - Kan firiin, jirmii fi hundee isaanii nyaatamu - Midhaan Dheedhii - Nyaata zaayitaa - Aannan fi bu'aawwan isaa - Foon, allaatiiwwan fi qurxummii - Hanqaaquu - Kuduralee baala magariisa qabaan - Nyataa biroo vaayitaminii A'n badhaadhaan - kuduralee (ija mukaa) fi muduralee (ashaakiltii) - Kuduralee(ija mukaa) biroo - Muduraalee (ashaakiltii) Biroo	1. Eeyyee 2. Lakkii
27.	Faayidaalee gosa nyaataa garaagaraa beektuu? - Miidhaawwan ulfaan wal qabtani dhufan hir'isuu - Carraawwan hir'ina qaamaa hir'isuu - Fayyummaa qaamaa dabaluu - Da'umsa booda fayya qabeettii fi cimtuu akka taatu carraa banuu - Ulfatinni qaamaa akka hir'atu gargaaruu fi kkf	Yes 2.No
28.	Nyataa kaarbohaaydreetiin badhaadhan beektuu? Firii mukaa kan akka appilii, burtukaana, muuzii, anaanaasii mixaaxissa	1.Yes 2.No

	• Midhaan dheedhii • duubbaa, kaarotii, timaatima, birookilii, baaqelaa, atara, garbuu, aajjaa, ruuzii fi kkf	
29.	Nyaata pirootiniin badhaadhan beektuu? • Baaqelaa fi atara, foon, hanqaaquu fi kkf	1.Yes 2.No
30.	Nyaata essential fatty acid 'n badhaadhan beektuu? • Qurxummii, zayita midhaan irraa argame, avokaadoo fi kkf ,	1.Yes 2.No
31.	Nyaata ayiraniin badhaadhan beektuu? • Firii mukaa, chokoleetii, foon qaamaa, atara fi baaqela fi kkf	1.Yes 2.No
32.	Nyaata vaayitaamin A'n badhaadhan beektuu? • Tiruu, bu'aawwan aannanii, mixaaxissa, kaarotii fi kkf	1.Yes 2.No
33.	Nyaata ayoodinii badhaadhan beektuu? • Nyaata bishaan keessaa argaman, ashaboo ayoodiniin badhaadhe, aannan dhadhaa hin qabne, hanqaaquu, daabboo, tiruu fi kkf	1.Yes 2.No
34.	Nyaata vaayitaamin C'n badhaadhan beektuu? • Burtukaana, qaaraa, birookilii fi kkf	1.Yes 2.No
35.	Yeroo ulfaa faayidaalee ashaboo ayoodiniin badhaadhee kennu beektuu? • Guddina daa'ima gara keessaaf, guddina sammuuf fi kkf	1.Yes 2.No
36.	Rakkooolee hanqinni nyaataa haadha ulfa irraan ga'u beektuu? • Du'a, ulfa garaadhaa baasuu, hir'ina dhiigaa fi kkf	1.Yes 2.No
37.	Rakkooolee hanqinni nyaataa yeroo ulfaa mudatu guddina ulfaa irraan ga'u beektuu? • Daa'ima du'ee dhalatu, daa'ima yeroon isaa osoo hin ga'iin dhalate, du'a fi kkf	1.Yes 2.No

VI. Gaaffilee waa'ee nyaata gosa gara garaa

Ajaja tokkooffaa: Nyaata kaleessa galgala ,guyyaa manatti ykn alatti nyaattee tarreessi .Nyaata jalqaba ganama nyaatte ykn dhugde waliin eegali.Gosa nyaataa fidhugaatii armaan gaditti ibsaman hunda isaanii barreessi.qabiyyeen isaanii yeroo ibsaman qabiyyee isaanii tokko tokkon ibsi jedhii gaafadhu.

Ciree	Oolchaa (maksasii)	laaqana	Oolchaa (maksasii)	Irbaata	Oolchaa (maksasii)

Ajaja lammaffaa: Gaaffileen kana gubbaa jiran erga guutamanii boodaa nyaata caqasaman gosa gosa dhaan gutii. Nyaata gosa kamiyyuu kan hin caqasamiin jiruu taanaan ,nyaataa gosa kana fayyadamuu isaanii gaafadhu.

Lakk.	Ramaddii nyaata	Fakkeenya	Deebii Eyyeen--1 Miti ---2
40a	Kan firiin, jirmii fi hundee isaanii nyaatamu	Garbuu, boqqoolloo, mishingaa, ajjaa, xaafii, qamadii, dinnicha, maxaaxissa, ruuzii, nyaata kanneen irraa hojjetaman kanneen akka marqaa, dabboo, mokoroonii, paastaa, buddeen ykn nyaata biroo firii irraa hojjetamu	__Eyyeen (1) __Miti (0)
40b	Midhaan Dheedhii (baaqela, atara fi missira)	Baaqelaa, ataraa, misira goggogaa fi nyaata isaan irraa hojjeta me	__Eyyeen (1) __Miti (0)
40c	Nyaata ocholonii fi zaayitaa	Biqiltuu zaytii qaban, Ocholonii, salixii, talbaa, nuugii, suufii, kkf	__Eyyeen (1) __Miti (0)
40d	Aannan fi bu'aawwan isaa	Aannan, baaduu, ittittuu, fi firiwwaan aannani kanneen biroo	__Eyyeen (1) __Miti (0)
40e	Foon, allaatiwwan fi qurxummii	Tiruu, kalee, oonnee ykn nyaata qaamaa ykn dhiiga irraa qophaa'an, Foon sa'aa, qotiyyoo, hoola, re'ee, lukkuu fi Foon qurxummii	__Eyyeen (1) __Miti (0)

40f	Hanqaaquu (killee)	Hanqaaquu fi nyaata hanqaaquu irraa hojjeetaman	Eyyeen (1) Miti (0)
40g	Kuduralee baala magariisa qabaan	Raafuu, raafuu maramaa, saalaxaa fi qosxaa	Eyyeen (1) Miti (0)
40h	Nyataa biroo vaayitaminii A'n badhaadhaan kuduralee (ija mukaa) fi muduralee (ashaakiltii)	karoota, duubbaa, Mangoo, pappaaayyaa, hundee diimaa, fi cuunfaa nyaatoota kanneen irraa hojjetaman	Eyyeen (1) Miti (0)
40i	Kuduralee(ija mukaa) biroo	Corqaa, Timaatimaa, qullubbii	Eyyeen (1) Miti (0)
40j	Muduraalee (ashaakiltii) Biro	Avoocadoo, muuzii, loomii, burtukaana, annanasii, appilii, cuunfaa kanneen irraa hojjetaman	Eyyeen (1) Miti (0)

VII. Gaaffilee Waa'ee Haala Nyaata Manaa

La kk.	Gaffii	Deebii
1	Torbaan afran darban kan keessaatti mana kessaan keessaatti rakoon hanqina nyaataa akka hin mudanneef yaaddoftee beekta?	0=lakkii(gara gaffii 2 darbi) 1= eeyyee
1a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (yeroo tokkoo yookiin lama 2=ji'a tokko keess Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
2	Torbaan afran darban kana keessaatti atii yookiin matiin kee kamiyyuu sabaaba hanqina nyaatan nyaata barbaadan/ddan nyaachuu dhabdani beektuu?	0=lakkii(gara gaffii 3 darbi) 1= eeyyee
2a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokkoo yookiin lama) 2=Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
3	Torbaan afran darban kana keessaatti atii yookiin matiin kee kamiyyuu sabaaba hanqina dhiyyeessaa nyaatan gostii nyaata nyaattanii/tani hira'aate beekaa?	0=lakkii(gara gaffii 4 darbi) 1= eeyyee
3a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama ji'a tokko keessatti 2=Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
4	Torban afran darban kan keessaatti atii yookiin maatin kee kamiyyuu sabaaba hanqina dhiyyeessii nyaataan nyaata nyaachuu hin barbaannee nyaattanii/tanii jiru/tuu?	0=lakkii(gara gaffii 5 darbii) 1= eeyyee
4a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama) 2=Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)

5	Torbaan afran darbaan kan keessaatti atii yookiin matiin kee kamiyyuu sabaaba nyaanni gahaan hin jirreef hangi nyaachuu qabdaan hir'atee jiraa?	0=lakkii (gara gaffii 6 darbi) 1= eeyyee
5a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama) 2=Yeroo murasa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
6	Torbaan afran darbaan kan keessatti atii yookiin matiin kee kamiyyuu sabaaba hanqina nyaatan guyyaatti yeroon nyaata itti nyaattaan xiqqatee beekaa?	0=lakkii(gara gaffii 7 darbi) 1= eeyyee
6a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko) 2=Yeroo muraasa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
7	Torbaan afran darban kana keessaatti sabaaba hanqina nyaatan waanti nyaatamuu kamiyyuu manaa dhabamee beekaa?	0=lakkii(gara gaffii 8 darbi) 1= eeyyee
7a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama) 2=Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
8	Torbaan afran darban kan kessa ati yookiin maatin kee kamiyyuu sabaaba hanqina nyaatan osoo beela'anuu osoo nyaata hin nyaatin rafaani beekuu?	0=lakkii(gara gaffii 9 darbi) 1= eeyyee
8a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama) 2=Yeroo murasaa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
9	Torbaan afran darban kan kessaa ati yookiin maatin kee kamiyyuu sabaaba hanqina nyaatan guyyaa fi halkan guutuu osoo nyaata hin nyaatin oolani beekuu?	0=lakkii 1= eeyyee
9a	Haalli kun yeroo hangamiif ta'ee?	1=Darbee darbee (ji'a tokko keessatti yeroo tokko yookiin lama) 2=Yeroo murasa (yeroo 3-10) 3=Yeroo baay'ee (yeroo 10 fi isaa ol)
	MUAC	_____mm

3. የአማርኛ መጠይቅ

I. የማ በራዊ ኑሮ ሁኔታ ለመዳሰስ የተዘጋጀ መጠይቅ		
ተ. ቁ.	መጠይቅ	አማራጭ መልሶች
1.	አድሜዎ ስነት ነዉ ?	-----አመት
2.	የጋብቻ ሁኔታ ምን ይመስላል?	1. ያላገቡ 2. ያገቡ 3. የሞተባቸዉ 4. የተፋቱ
3.	አሁን የሚኖሩበት ቦታ	1. ከተማ 2. ገጠር
4.	ሐይማኖትዎ ምንድነዉ?	1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ዋቄፋታ 5. ሌላ ካለ ይግለጹ.....
5.	ብሔርዎ ምንድነዉ?	1. ኦሮሞ 2. አማራ 3. ጉራጌ 4. ሌላ ካለ ይገለፅ.....
6.	ያጠናቀቁት ከፍተኛ የትምህርት ደረጃ ምንድነዉ ?	1. ያልተማረ/ መጻፍና ማንበብ የማትችል 2. ማንበብና መጻፍ የምትችል 2. አንደኛ ደረጃ 4. ሁለተኛ ደረጃ 5. ኮልጅና ከዚያ በላይ
7.	የቤተሰብ አስተዳዳሪ ማንዉ?	1. እናት (ወደ ጥያቄ ቁጥር 9 ይዘለል) 2. ባለቤት
8.	የባለ ቤት የትምህርት ሁኔታ	1. ያልተማረ/ መጻፍና ማንበብ የማትችል 2. ማንበብና መጻፍ የሚችል 3. አንደኛ ደረጃ 4. ሁለተኛ ደረጃ 5. ኮልጅና ከዚያ በላይ
9.	አሁን ስራዎ ምንድን ነዉ?	1. የቤት አመቤት 2. ሰራተኛ(የመንግስት/የግል) 3. ነጋዴ 4. የቀን ተቀጣረ(ላብ አደር) 5. የግል ስራ 6. ሌላ ካለ (ይገለፅ.....)
10.	የቤተሰብ አባላት ብዛት ስንት ነው (ጠቅላላ የቤተሰቡ አባላት ቁጥር)?	-----በቁጥር

11.	ስንት ህጻናት በቤት ውስጥ ይኖራሉ?	ህጻናት
12.	የባለ ቤት ሥራ	1. ሰራተኛ(የመንግስት/የግል) 2. ነጋዴ 3. የቀን ተቀጣሪ(ለብ አደር) 4. ስራ የልላት 5. ሌላ ካለ (ይገለፅ.....)

II. የእኮኖሚ ሆኔታ ለመዳሰስ የተዘጋጀ መጠይቅ		
13.	የቤተሰብዎ ዋነኛው የገቢ ምንጭ ምንድን ነው?	1. ግብርና 2. የንግድ ስራ 3. የመንግስት/የግል ስራ 4. የቀን ስራ 5. ሌላ ካለ (ይገለፅ.....)
14.	የቤተሰብዎ አማካይ ገቢ በወር ስንት ነው?	----- ብር/ወር
III. ከእርግዝና ጋር የተያያዙ ሆኔታ ለመዳሰስ የተዘጋጀ መጠይቅ		
15.	የፅንሱ ዕድሜ	-----ወር
16.	የህንጻ እርግዝና ያረገዝሽዉ ፈልገሽ ነዉ?	1. አዎ 2. አይደለም
17.	ለዚህ እርግዝና ስንት ጊዜ የቅድመ ወሊድ ክትትል አድርገዋል?	
18.	የአሁኑን ጨምሮ አጠቃላይ የፅንስ ብዛት?	-----
19.	ለቅድመ ወሊድ አገልግሎት የመጡት ጊዜ የምግብ አመጋገብ ምክር አግኝተዉ የዉቃሉ?	1. አዎ 2. አይደለም
20.	መቼ እንደሚመለሱ ተነግረዎታል?	1. አዎ 2. አይደለም
21.	ሥለ ምግብ የመረጃ ምንጭ ምንድነዉ?	1. ቲቪ 2. ራድዮ 3. ጎረቤት 4. ጤና ባለ ሙያ 5. ሌላ ካለ (ይገለፅ.....)

IV. የጤና፣ አካባቢ እና አመጋገብ ሁኔታ		
22.	ቤተሰብ የመጠጥ ዉሃን የሚያገኙት ከየት ነዉ?	1. የቧንቧ ዉሃ 2. የህዝብ ፓምፕ ዉሃ 3. የተከለለ ምንጭ 4. ሌላ ካለ (ይገለፅ.....)
23.	በግቢዉስጥ ሽንት ቤት አለ?	1. አዎ 2. አይደለም
24.	ከትናንት ጀምሮ ምግብ ሳትበይ ዘለሻል?	1. አዎ 2. አይደለም
25.	በእርግዝና ግዜ ተጨማሪ ምግብ እንደሚያስፈልግ ያዉቃሉ?	አዎ 2. አይደለም
26.	ትናንት ምግብ ስነት ጊዜ ተመግበዋል?	1. ከሶስት ጊዜ በላይ 2. ሶስት ጊዜና ከዛ በታች

V. የእርጉዝ ሴቶች በምግብ ላይ ያላቸዉን እዉቀት ለመጠየቅ የተዘጋጀ መጠይቅ

ተ. ቁ.	ጥያቄዎች	የመልስ አማራጮች
27.	የተለዩ የምግብ አይነቶችን ያዉቃሉ? • የእህል እና የእህል ዘሮች፤ ስራቸዉ የሚበላ • ጥራጥሬ (በቀለ፤ አተርና ምስር) • ለዉዝና የቅባት አህሎች • ወተትና የወተት ተዋጽኦዎች • ስጋ አሳ እና የሚበሉ አእዋፋት • እንቁላል • ቅጠላቸዉ የሚበላ ደማቅ አረንጓዴ • ቅጠላቅጠል ያላቸዉ አትክልቶች • በቫይታሚን ኤ የበለጸጉ ፍራፍሬ እና አትክልቶች • ልሎች አትክልቶች • ሌሎች ፍራፍሬዎች	1. አዎ 2. አይደለም
28.	የተለያዩ የምግብ አይነት ጥቅሞችን ያዉቃሉ? • ከእረግዝና ጋር የተያያዘ ተጨማሪ በሽታን ይቀንሳል • ሲወለዱ የአካለ ጎዶሎነት አጋጣሚን ይቀንሳል • ለህጻን ለጥሩ ጤና ማረጋገጫ ይሆናል • ከወሊድ በሃላ ጠንካራ እና ጤናማ እንዲሆኑ ይረዳዎታል • በፍጥነት ክብደትን እንዲቀንሱ የረዳል	1. አዎ 2. አይደለም
29.	የካርቦህይድሬት/ሙቀት ሰጪ/ ምግብ ምንጮች ያዉቃሉ?	1. አዎ

	• እንደ አጥል፤ ብርቱኳን፤ ሙዝ፤ አናናስ፤ ስኳር ድንች የመሳሰሉት ፍራፍሬዎች • ጥራጥሬዎች • ዱባ፤ ካሮት፤ ቲማቲም፤ ብሮክሊ፤ ባቄላ፤ አተር፤ ገብስ፤ አጃ፤ ሩዝ	2. አይደለም
30.	የፕሮቲን/ገንቢ/ ምግብ ምንጮች ያዉቃሉ? • ባቄላ እና ጥራጥሬ፤ ስጋ፤ እንቁላል	1. አዎ 2. አይደለም
31.	የልሂቅ ምግቦች ምንጭ ያዉቃሉ? አሳ፤ የዘይት እህሎች፤ ወይራ ዘይት፤ አባካዶ	1. አዎ 2. አይደለም
32.	የአይረን ንጥረ ነገር ምንጭ ያዉቃሉ? • ፍራፍሬ፤ ቸኮሌት፤ የአርጋን ስጋ፤ ምስር፤ አኩሪ አተር	1. አዎ 2. አይደለም
33.	የቫይታሚን ኤ ንጥረ ነገር ምንጭ ያዉቃሉ? ጉቦት፤ ወተት እና የወተት ተዋፅኦዎች፤ ስኳር ድንች፤ ካሮት	1. አዎ 2. አይደለም
34.	የአዮዲን ንጥረ ነገር ምንጭ ያዉቃሉ? • የባህር ምግብ፤ በአዮዲን የበለጸገ ጨዉ፤ እንቁላል፤ ዳቦ፤ ጉቦት	1. አዎ 2. አይደለም
35.	የቫታሚን ሲ ንጥረ ነገር ምንጭ ያዉቃሉ? • ብርቱኳን፤ ቃሪያ፤ ብሮክሊ	1. አዎ 2. አይደለም
36.	በእርግዝና ጊዜ በአዮዲን የበለጸገ ጨዉ መጠቀም ጥቅም ያዉቃሉ? • ለፅንሰ እድገት፤ ለአንጎል አድገት	1. አዎ 2. አይደለም
37.	የእናቶች የምግብ እጥረት በእናቶች ላይ የሚያስከትለዉን የጤና እክል ያዉቃሉ? • ሞት፤ የዉርጃ አደጋ፤ የደም ማነስ	1. አዎ 2. አይደለም
38.	የእናቶች የምግብ እጥረት በፅንሰ ላይ የሚያስከትለዉን የጤና እክል ያዉቃሉ? • ሞት መወለድን፤ ጊዜዉ ሰይደርስ መወለድን	1. አዎ 2. አይደለም

VI. የአመጋገብ ሁኔታለመዳሰስየተዘጋጀመጠይቅ

መመሪያ አንድ፡እባክዎን ትናንት ቀንም ሆነ ሌሊት በቤት ዉስጥም ሆነ ከቤት ዉጭ የበሉትን ወይም የጠጡትን ምግቦች ያብራሩ ። ሁሉንም ምግቦች እና መጠጦች ይጻፉ።

ምግብ	ቁርስ	መክሰስ	ምሳ	መክሰስ	እራት	መክሰስ	አስተያይቅ
የምግብ አይነት							

መመሪያ ሁለት፡ መልስ ሰጪው ሲታወስ ከዚህ በላይ በተመዘገበው መረጃ ላይ በመመርኮዝ የምግብ ቡድኖችን ይመሉ። ላልተጠቀሱት ማንኛውም የምግብ ቡድኖች ተጠቅመው ከሆነ ይጠይቁ።

ተ.ቁ	የምግብ ምድብ	ዝርዝሮች
40a	የእህል እና የእህል ዘሮች፤ ስራቸው የሚበላ	ስንዴ፤ በቆሎ፤ ገብስ፤ ማሽላ፤ አጃ፤ ጤፍ፤ ስኳር ድንች፤ ሩዝ፤ ማሽላ፤ ድነች፤ እና ከእነዚህ የሚሰሩ ምግቦች በሙሉ
40b	ጥራጥሬ (በቀላ፤ አተርና ምስር)	ባቄላ፤ አተር፤ ምስር፤ እና ከእነዚህ የሚሰሩ ምግቦች በሙሉ
40c	ለዉዝና የቅባት አህሎች	ኑግ፤ ተልባ፤ ሰሊጥ፤ ሱፍ፤ አቶሎኒ
40d	ወተትና የወተት ተዋጽኦዎች	ወተት፤ አይብ፤ ዕርጎ፤ አሬራ፤ አጉዋት፤
40e	ስጋ አሳ እና የሚበሉ አእዋፋት	የሰውነት ክፍሎች (ጉበት፤ ኩላሊት፤ ልብ፤ ደም ወይም ልላ አካል) የበሬ ፣ የበግ ፣ የፍየል ፣ የዶረ ስጋ እና የአሳ ስጋ
40f	እንቁላል	የዶሮ እንቁላል እና ከእንቁላል የተሰሩ ምግቦች
40g	ቅጠላቸው የሚበላ ደማቅ አረንጓዴ ቅጠላቅጠል ያላቸው አትክልቶች	ጎመን፤ ሰላጣ፤ ቆስታ፤ ሳማ፤ ጥቅል ጎመን
40h	በቫይታሚን ኤ የበለጸጉ ፍራፍሬ እና አትክልቶች	ማንጎ ፣ ፓፓያ፤ ካሮት፤ ቀይሶር፤ ዱባ፤ እና ከእነዚህ የተሰሩ ጭማቂ
40i	ልሎች አትክልቶች	ቲማቲም፤ ሽንኩርት፤ ቃሪያ
40j	ሌሎች ፍራፍሬዎች	ፖም፤ አሾካይ፤ ሙዝ፤ ሎሚ፤ ብርቱካን፤ አናናስ፤ እና ወዘተ ፍራፍሬዎች እና ከእነዚህ የተሰሩ ጭማቂ
41	MUAC	mm

VII. ስለምግብ ዋስትና ለማወቅ የተዘጋጀ መጠይቅ

ተ.ቁ.	መጠይቅ	አማራጭ መልሶች
1	ባለፉት አራት ሳምንታት የምግብ ችግር እንዳይከሰት ሰግተው ያዉቃሉ?	0=አይደለም (ወደ 2ኛ ጥያቄ ይለፉ) 1= አዎ
1a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ዉስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ)

		3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
2	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ ማነስ ምክንያት የምትፈልጉትን ምግብ ሳይመገቡ ቀርተው ያዉቃሉ?	0=አይደለም (ወደ 3ኛ ጥያቄ ይለፉ) 1= አዎ
2a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
3	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት የምትመገቡት የምግብ አይነት ቀንሶ ያዉቃል?	0=አይደለም (ወደ 4ኛ ጥያቄ ይለፉ) 1= አዎ
3a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
4	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት የማትፈልጉትን የምግብ አይነት ተመግባችሁ ታዉቃላችሁ	0=አይደለም (ወደ 5ኛ ጥያቄ ይለፉ) 1= አዎ
4a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
5	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት የምትመገቡት የምግብ መጠን አንሷል?	0=አይደለም (ወደ 6ኛ ጥያቄ ይለፉ) 1= አዎ
5a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
6	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት በቀን የምትመገቡት የምግብ መጠን አንሶ ያዉቃል?	0=አይደለም (ወደ 7ኛ ጥያቄ ይለፉ) 1= አዎ
6a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
7	ባለፉት አራት ሳምንታት በምግብ አቅርቦት ማነስ ምክንያት የሚበላ ምግብ ከቤት ውስጥ ጠፍቶ ያዉቃል?	0=አይደለም (ወደ 8ኛ ጥያቄ ይለፉ) 1= አዎ

7a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
8	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት አየተራባችሁ ሳትመገቡ ተኝታችሁ ታዉቃላችሁ?	0=አይደለም (ወደ 9ኛ ጥያቄ ይለፉ) 1= አዎ
8a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)
9	ባለፉት አራት ሳምንታት እርስዎ ወይም የቤተሰብዎ አባል በምግብ አቅርቦት ማነስ ምክንያት ቀንና ለሊት ሙሉ ምግብ ሳትመገቡ ቆይታችሁ ታዉቃላችሁ?	0=አይደለም 1= አዎ
9a	ይህ ሁኔታ ለምን ያክል ጊዜ ተከሰተ?	1=አልፎ አልፎ (ለአንድ ወይም ሁለት ጊዜ) 2=በአንድ ወር ውስጥ ለጥቂት ጊዜ (ለ 3-10 ጊዜ) 3=ለብዙ ጊዜ (ለ 10 ጊዜ እና ከዚያ በላይ)

Declaration

I, the undersigned student declare that this research project is my original work in partial fulfillment of the requirements for the degree of master of public health in **Public health nutrition**. I also declare that it has never been presented in this or any other higher institution and that all resources and materials used in the research work have been duly acknowledged.

Name of the student: _____

Signature: _____

Date: _____

Approval of advisors

This research work has been submitted for examination with my approval.

Name of the primary advisor: _____

Signature: _____

Date: _____

Name of the Co-advisor: _____

Signature: _____

Date: _____

Declaration

I, the undersigned student declare that this research project is my original work in partial fulfillment of the requirements for the degree of master of public health in **Public health nutrition**. I also declare that it has never been presented in this or any other higher institution and that all resources and materials used in the research work have been duly acknowledged.

Name of the student: _____

Signature: _____

Date: _____

Approval of Examiner

This research work has been submitted for examination with my approval.

Name of the Examiner: _____

Signature: _____

Date: _____