UNIVERSITY OF GONDAR
COLLEGE OF MEDICINE AND HEALTH SCIENCES
INSTITUTE OF PUBLIC HEALTH

DIETARY DIVERSITY PRACTICES AND ASSOCIATED FACTORS AMONG RURAL PREGNANT MOTHERS IN JILLE TUMUGA DISTRICT, NORTHEAST ETHIOPIA, 2017

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GONDAR, ETHIOPIA

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APPROVED BY EXAMINING BOARD

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EXAMINER

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ACRONYMS AND /OR ABBREVIATIONS

ANC	Anti Natal Care
AOR	Adjusted Odd Ratio
CI	Confidence Interval
COR	Crude Odd Ratio
DDS	Dietary Diversity Score
EDHS	Ethiopia Demographic and Health Survey
EPI DATA	Epidemiological Data
FAO	Food and Agriculture Organization
HFIAS	Household Food Insecurity
LMICs	Low and Middle Income Countries
MDD-W	Minimum Dietary Diversity for Women of reproductive age
OR	Odd Ratio
PCA	Principal Component Analysis
PSNP	Productive Safety Net Program
SD	Standard Deviation
SGA	Small for Gestational Age
SNNPR	South Nation Nationality Peoples Region
SPSS	Statistical Package for Social Science
UNICEF	United Nation International Children Emergency Fund
WHO	World Health Organization

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ABSTRACT

Back ground: Dietary diversity is an aspect of dietary quality that indicates general nutritional adequacy. Lack of diversified diets is a severe problem in the developing world, where diets are predominantly starchy staples. Nutritional status before pregnancy and Intake of diversified food during pregnancy are most important since they are known to affect pregnancy and birth outcomes. There is limited knowledge in the area of dietary diversity and. factors' affecting it among pregnant women.

Objective: The objective of this study was to assess dietary diversity practice and associated factor among rural pregnant mother age 15- 49 years in Jille Tumuga district April, 2017.

Methods: A community based cross sectional study was conducted among rural pregnant mother in Jille Tumuga district. A total of 647 subjects were included in the study by using cluster sampling technique. Data were collected using structured and pre-tested questionnaire. A 24-hour recall was used to collect information about dietary diversity. EPI data 3.1 software for data entry and SPSS version 20 for analysis was used. Both bivariate and multivariable analyses were employed. In multivariable analysis variables associated with dietary diversity was identified on the basis of adjusted odds ratio (AOR), 95% confidence interval (CI), and p-value less than 0.05.

Result: The adequate dietary diversity practice of pregnant women was found to be 31.4 %(95%CI: 27.8-35.2). Cereals were the most commonly consumed food groups. Food diversity practices of pregnant mothers was associated with primary and above educational level (AOR=1.84, 95% CI :1.19-2.86), food secure households (AOR= 3.27, 95% CI : 2.09-5.5), being wealthy(AOR =4.1, 95% CI : 2.91-7.59), and information about nutrition (AOR=3.39, 95% CI : 1.58-7.26) .

Conclusions: The dietary diversity practice of pregnant women was low in the study area. Education status of mothers, household food security status, household assets (wealth status), and information about nutrition had a positive significant relation with pregnant mothers' dietary diversity practices. Community based nutritional education and information about nutrition to improve the practices of pregnant mothers on maternal nutrition in the study area.

Key words: Dietary diversity, pregnant women, Jille Tumuga, Ethiopia.

1. INTRODUCTION

1.1. Statement of the problem

Dietary diversity is defined as the consumption of an adequate variety of food groups which has been accepted as an aspect of dietary quality and can indicate nutritional adequacy[1]. pregnancy is a critical period in the lifecycle during which additional nutrients are required to meet the metabolic and physiological demands as well as the increased requirements of the growing fetus[2].Lack of diversity is a particularly severe problem among poor populations in the developing countries. The vulnerability is serious in children and pregnant and lactating mothers[3].In developing countries diets of pregnant women predominantly are plant based(cereals),and provide unbalanced macronutrients and inadequate micronutrients[4].Nutrition during pregnancy is a significant public health concern[2].

Nutritional status before pregnancy and Intake of diversified food during pregnancy are most important since they are known to affect pregnancy and birth outcomes[5, 6]. During the prenatal period, the developing fetus obtains all of its nutrients through the placenta, so diversified dietary intake has to meet the needs of the mother as well as the products of conception, and enable the mother to lay down stores of nutrients required for the development of the fetus[7].

The quality of nutrition in the first 1,000 days starting from the mother's pregnancy through her child's until 24 months is a critical window when a child's brain and body are developing rapidly and good nutrition is essential to set the foundation for a healthy and productive future. If not get the right nutrients during this period, the damage is often irreversible and it then presents an inter generational cycle of ill health by increasing the risk of prenatal, infant, and child morbidity and mortality, poor long term physical growth, cognitive development and future learning capacity, and ultimately reproductive and lactation outcomes. Under nutrition during pregnancy, affecting fetal growth, is a major determinant of stunting and can lead to consequences such as obesity and nutrition-related non-communicable diseases in adulthood[8, 9].

Micronutrients deficiencies are result from lack of diversified diet. Globally there are around 2 billion people with micronutrient deficiencies, especially iron and vitamin 'A 'are common in women and can cause under-development and problems during childbirth[10]. Vitamin A and iron deficiencies are among the most common nutritional deficiencies in most developing countries probably second to Protein-Energy- Malnutrition [11].

Globally 32 million Small for Gestational Age (SGA) born babies annually represent 27% of all births in low and middle income countries (LMICs). Fetal growth restriction causes more than 800,000 deaths each year in the first month of life more than a quarter of all newborn deaths and micronutrient deficiencies are estimated to underlie nearly 3·1 million child deaths annual[9, 12].

Maternal and child under nutrition account for more than 10% of global burden of disease and anemia affects 42% of pregnant women worldwide[13].Maternal under-nutrition, common in many developing countries, leads to poor fetal development and higher percent of pregnancy complication[13].

Malnutrition is one of the main health problems faced by women and children in Ethiopia. The country has a higher rate of malnutrition than most sub-Saharan African countries. In Ethiopia, about 27% of women either thin or undernourished indicating that the level of chronic malnutrition among women is relatively high[14] The percentage of women ages 15-49 with anemia is 23 %, also one of the highest among sub-Saharan Africa countries. The percentage of under-five stunted and wasted is 44%, and 10% respectively[15, 16].

The government of Ethiopia has prioritized strengthening interventions to reduce malnutrition among the most vulnerable groups infants, children under five and pregnant and lactating women[17]. In line with national policies, strategies of the Ministry of Health (MoH) and different international organizations have joined efforts to change the nutritional status of the country. However, dietary diversity data of specific vulnerable groups such as pregnant women in Ethiopia is little studied. Therefore, the purpose of this study is to determine the dietary diversity practice and associated factors among rural pregnant women in Jille Tumuga district, Amhara region Northeast Ethiopia.

1.2. Literature Review

1.2.1 Dietary diversity practice

Dietary diversity is consumption a variety of foods across different food groups, is a good way to improve the quality of diets. Measuring dietary diversity and quality can be essential to tackle the problem of poor dietary quality[10].

A cross sectional study conducted in Pakistan among pregnant women showed that 93.2% knew that food is important during pregnancy, 57.3% increase in frequency intake practice, 17.3% no change in food intake practice. During pregnancy 22% of them avoid any food, 46% take additional food, 78% carving and 38% aversion to any sort of food in pregnancy. Dietary diversity score indicated that about half study participants were not consuming adequate food[18]. Other study in Pakistan among pregnant women show that medium dietary diversity were 89% and high dietary diversity were only 5% [19].

A study done in rural Bangladesh show that dietary diversity score (DDS) among pregnant women was low which was 2.1 [20]. Also in study conducted in South-western Bangladesh revealed that the mean diet diversity score was low at 4.28 [21]. Other study done in Northern Bangladesh shows two thirds of women had inadequate dietary diversity, which may contribute to the burden of undernutrition and micronutrient deficiencies[22].

A cross-sectional Study done in Nigeria pregnant women showed that, 57.7%, high dietary diversity 33.5%, medium dietary diversity and 8.8%. Low dietary diversity levels[23] . Other study conducted in Borno State Nigeria shows that 63.27% women increase their dietary intake during pregnancy. Sixty one percent avoid some diet like eggs, fruits the reason was cultural belief, ignorance, and religion[24].

A study done in Togo show that dietary diversity was low (< 5 food groups) and only less than 45% of pregnant mother have eaten 5 or more food groups the previous 24 hours. The most consumed food group in decreasing order cereals and starchy roots, flesh foods, vitamin A-rich dark green leafy vegetables, other vegetables, nuts

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and seeds, other vitamin A vegetables and pulses. Dairy products and other fruits were consumed by 6.37% and 8.36% of pregnant women respectively. Eggs were not eaten at all by pregnant women[25].Other study in Ghana show that 46.1% of pregnant women had good dietary diversity practices[26].

Study conducted in Kenya showed those pregnant women with high dietary diversity (≥6 food groups), medium (4-5 food groups) and low dietary diversity (≤3 food groups) was 60.6%, 37% and 2.4% respectively. The most commonly eaten foods were cereals (99.2%). Foods of animal origin were least consumed. In respect to food frequency, around 17.3% of the pregnant women had a meal frequency of below 3 times per day. Nearly all pregnant women are intake of iron and folic supplements[27]. Other study conducted in Kenya on Dietary Diversity and Nutritional Status of Pregnant Women ,Showed that the mean dietary diversity score (DDS) was 7.49 ±1.43 with 20% having high dietary diversity[28].

Study conducted in Tigray, Oromia, Amhara and SNNPR region contributes about 60.8% of the mothers had experienced change in their usual diet during pregnancy and lactation periods. Nineteen percent of them consume more number of meals with the same content as previous time while 28.5% of the mothers consumed more and diversified meals during pregnancy and lactation[29].

A study done in Guto Gida Woreda, East Wollega Zone, Ethiopia showed that only 33.9% have good nutritional practices during their pregnancy, Forty seven percent of pregnant mother had experienced any craving for items that they would not normally consume. Only (35.8%) had avoiding food during their pregnancy. 66.1%, 20.3% and 13.6% had diet frequency of meal 1-2 per day, 3- 4 per day and >5 per day respectively during their pregnancy[30].

A cross-Sectional Study conducted in Chuko Woreda Southern Nations, Nationalities and People's Region /SNNPR/, Ethiopia (91.9%) %) of pregnant mothers fed any type of food three times within the last 24 hours and the rest 8.1% only fed any type of food four times within the last 24 hours. Their Dietary practice is 83.9% consumed legumes within the last 24 hours,52.5% grain based food one time per day, only 16.5% were consume animal source food like meat with in the last

one week, 66.9% were had green leafy vegetables one time per day, while (64%) of mothers had yellow and red fruits one time per day[31].

Other study done in Wondo Genet on dietary practice and associated factors among pregnant women show that   about 21% of them were restricting their food intake and 75.2% of them did not take any additional meal during pregnancy [32]. Other Community based cross sectional study conducted in Gondar town showed that good dietary practice was found to be 40.1% during pregnancy[33].

1.2.2. Factors Associated with Dietary Diversity

 Several studies have been established significant association between dietary diversity of pregnant mother with socio demographic, socio economic, health care practice and morbidity factors.

Socio –demographic and Socio-economic Factors

Age [34] ,marital status,[28, 34] showed Significant differences with DDS. Based on marital status with the married more likely to have a higher DDS and the single had a lower DDS[28]

Maternal education is reported to be significantly associated in most of studies .In a study conducted in Southwestern Bangladesh, Rural Bangladesh ,Northern Ghana **,** Borno State Nigeria , Gondar Ethiopia showed that higher dietary diversity among pregnant women who are better educated[20, 21, 24, 33, 35, 36] .Other study conducted in Pakistan show that socio demographic, or socioeconomic status of pregnant women were not associated dietary diversity practice[19].

Socio demographic, or socioeconomic status husband occupation(business), who live in households of 4 or more family members, in   Bangladesh,   has high association with dietary diversity practice[21]. other study in Bangladesh indicate that household related factor (living standard index, smaller household size, food security, and ownership of a fruit grove, home garden) were positively associated with maternal DDS[20].Other study in Nigeria showed that a significant association between level of dietary diversity and employment status. Unemployed pregnant

women had a higher dietary diversity compared with their employed counterparts [23]. Household wealth index classification Women of high household wealth index had a mean DDS that was significantly different from those in low household wealth index. Those household with high wealth index had high DDS than household with low wealth index[35].Household membership structure showed significant association with DDS [34] .

There was a positive significant relation between information about nutrition and family size and nutritional practices of mothers during pregnancy. Information about nutrition and family size of mothers had a positive significant relation with mothers' nutrition practices [30].monthly income, nutrition information and dietary knowledge had a positive significant with pregnant mothers' dietary practices [33].

Health care practice and morbidity

 Morbidity pattern, showed that there were significant differences in the mean dietary diversity score among those who had reported being sick two weeks prior to the day of the interviews and those who had not fallen ill in the same period [35]. Among the factors that impede good dietary practice were cultural belief and poor socio-economic background while regular attendance of ante-natal clinic and good socio economic background enhance good dietary practice among the population[24, 35].Other study in Kenya show that ANC attendant and non attendant were not significantly different in DDS [37].

Conceptual framework

Socio-demographic

- Age
- Marital status
- Maternal education
- Husband education
- Occupation maternal and husband
- Family size
- Food security
- Wealth index
- Employment

Morbidity

Dietary diversity practice

Health care practice

- Nutrition information
- ANC follow up
- Number of pregnancy
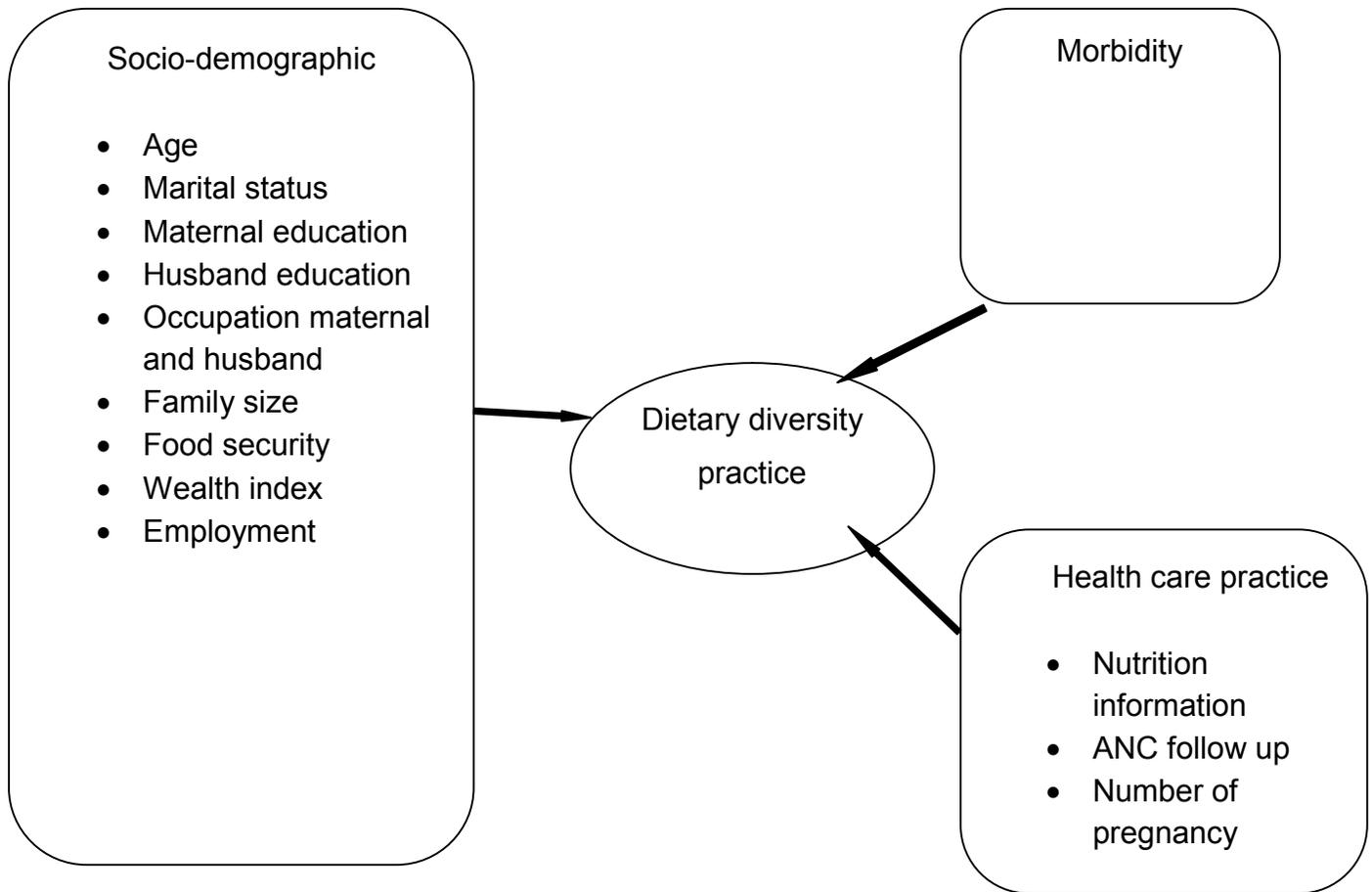
Figure 1:Conceptual framework on factors associated with dietary diversity practice [20, 21, 23, 24, 28, 33-36].

1.3. Justification

Maternal nutrition during pregnancy is crucial in reducing maternal and infant mortality which is the target area in achieving sustainable development goal. The first 1000 days are a critical period of window of opportunity to prevent and intervene the prevalence of under nutrition. Working on pregnant mothers is the best strategy to promote child nutrition. However, in the study area, there is lack of comprehensive information regarding dietary diversity practices of pregnant mothers and factors affecting it.

Therefore, this study was assessed the dietary diversity practice and associated factor among rural pregnant women in Jille Tumuga district, Northeast Ethiopia. The finding of this study will help health program planer and policy makers to understand various factors affecting dietary diversity practice among pregnant women and assist in implementation of nutrition programs which will decrease the risk of maternal and infant mortality cause as a result of under nutrition.

2. OBJECTIVE

2.1. General objective

➢ To assess the dietary diversity practice and associated factors among rural pregnant women age 15-49 years in Jille Tumuga district, Northeast Ethiopia, April 2017.

2.2. Specific objectives

➢ To determine dietary diversity practice among rural pregnant mothers in Jille Tumuga district
➢ To identify factors associated with the dietary diversity practice among rural pregnant mothers in Jille Tumuga district

3. METHODS

3.1. Study design, area and period

A community based cross-sectional study design was employed to assess dietary diversity practice among rural pregnant mothers in Jille Tumuga District from March to April 2017. Jille Tumuga district is located 265kms far from Addis Ababa, the capital of Ethiopia and 616kms away from Bahirdar (the capital city of Amhara regional state) and 62kms away from Kemisie the capital city of Oromia special zone.

 Based on the woreda administrative office 2016 report, the total population is 88159 (43198 are males and 44961 are females). Estimated number of pregnant women is 2971. Administratively; the woreda is divided in to 18 rural kebeles. In Jille Tumuga District, there are 4 governmental health centers and 21 health posts[38].

3.2. Source of population

All rural pregnant women who are resident in Jille Tumuga district

3.3. Study population

All rural pregnant women who were resident in Jille Tumuga district randomly selected clusters

3.3.1. Inclusion criteria

All pregnant women who live in Jill Tumuga district for at least 6 months.

3.3.2. Exclusion criteria

Pregnant mothers who were seriously ill and/or had difficulty to communicate were excluded

3.4. Sample size and sampling procedure

3.4.1. Sample size

Sample size was estimated using the single population proportion formula with the following assumptions: proportion of pregnant women who had dietary diversity 50%, as there was no similar study in the area, 95 % of confidence interval, and 5 % marginal error.

$$n = \frac{(Z\alpha/2)^2\, P\,(1-P)}{d^2} = 384$$

Sample size was calculated for most significant variables reported by other similar studies for internal comparison.

Table 1: Sample size for associated factor of dietary diversity practice

Variable	P_1	P_2	OR	CI	Power	Sample size
Husbands' occupation[21]	0.286	0.517	2.68	95%	80%	156
Family size[21]	0.274	0.452	2.19	95%	80%	248
Mother education [21]	0.23	0.549	4.07	95%	80%	84

Taking the largest sample size n=384 and 10% non- respondent rate and design effect (1.5) the final sample size became 634.
Since cluster sampling technique was used, all pregnant mothers in the cluster were included in the study. Therefore, the final sample size of this study was 664.

3.4.2 Sampling procedure

A cluster sampling technique was employed to recruit the study subjects. Clusters were Kebeles (the lowest administrative unit). From 18 rural kebeles, 7 kebeles or clusters were selected by simple random sampling from the total 18 rural kebeles. All pregnant women had found in the randomly selected clusters were included in the study.

3.5. Variables

3.5.1 Dependent variable

Dietary diversity practice

3.5.2. Independent variable

Socio demographic factor: Age, marital status and educational level, Occupation, wealth index, household food security status, and family size

Maternal and health care practice: - Nutritional information, number of pregnancies, and ANC follow up

3.6. Operational Definition

Minimum Dietary Diversity of women :consumption of food items from at least five out of ten defined food groups in the previous day or night(i.e. starchy staples, dark green leafy vegetables, other vitamin A rich fruits and vegetables, other fruits, other vegetables, meat and fish, eggs, legumes, nuts and seeds and milk and milk products[39].

Dietary diversity will be taken as adequate if pregnant mother take at least five food items out of ten defined food groups in the previous 24 hours; and inadequate: if pregnant mother do not take at least five food items out of ten defined food groups in the previous 24 hours.

Food secure households: if the individuals responded 'no' to all of the 9 items included on the HAFIS tool or just experience worry but rarely and insecure if the individuals responded 'yes' to at least one of the 9 items included on the HFIAS tool except experience worry but rarely[40].

3.7. Data collection procedures

3.7.1. Data collection procedures and materials

A structured and pre-tested questionnaire was used to collect data. The questionnaire was adapted from different literatures mainly Food and Agriculture

Organization (FAO) guidelines for measuring minimum dietary diversity women, 2016[39].

The questionnaire had six main contents: socio-demographic characteristics, feeding practice and other maternal and health related factors; dietary diversity related questions, wealth and food security status. The questionnaire was first prepared in English and then translated to oromifa and translated back to English to maintain its consistency. Finally, the questionnaire was pre-tested on 5 % of the total sample size in Artumafursi district and necessary modifications were made on the questionnaire based on the findings of the pretest.

Dietary diversity practice were collected and calculated as the sum of the number of different food groups consumed by the mother in the 24 hours prior to the assessment. A total of ten food groups were considered in this study (i.e. starchy staples, dark green leafy vegetables, other vitamin A rich fruits and vegetables, other fruits, other vegetables, meat and fish, eggs, legumes, nuts and seeds and milk and milk products. Finally, respondents with <5 food groups consumed were considered as having inadequate dietary diversity practice whereas those with ≥ 5 food groups consumed were considered as having adequate dietary diversity practice[39]. Six data collectors (diploma nurses) and two Bsc nurses supervisor were participated in data collection process.

Household's wealth index, adopted from EDHS 2011[14], was determined using Principal Component Analysis (PCA) by considering the household assets, such as livestock, type of house, durable assets, productive assets and agricultural land ownership. First, variables were coded between 0 and 1. Then variables entered and analyzed using PCA, and those variables having a communality value of greater than 0.5 were used to produce factor scores. Finally, the factor scores were summed and ranked into tertiles as poor, medium and rich.

Food insecurity access was measured using items from the HFIAS [40] The HFIAS consists of 9 items specific to an experience of food insecurity occurring within the previous 4 weeks. Each respondent indicated whether she had encountered the 9 items included in the HFIAS due to lack of food or money to buy food in the previous 1 month. Finally, individuals were classified as food secure if the individuals

responded 'no' to all of the items or just experience worry but rarely and insecure if the individuals responded 'yes' to at least one of the 9 items included on the HFIAS tool except experience worry but rarely.

Interviewers were visited from house to house. They were introducing themselves and explain the purpose of the study using specific statements in standard procedure.

3.7.2. Data quality control

Date quality was insured by translating the questionnaire from English to oromifa then back to English to see consistency using assistance from friends and colleagues fluent in Oromifa and English languages. Pre –test of questionnaire was performed on 30 individuals from Artimafurasi district (5%) of sample size and correction were made based on the pre-test result .Six date collectors and two supervisors were employed and trained   for two days to have consensus and same understanding of what to measured by each question in a questionnaire and how to approach participants ethically .The completeness ,accuracy   consistency of the collected data was check daily by supervisors and principal investigator. Two more additional visits were made if respondent was not found in the first visit.

3.8. Data processing and Analysis

The date was cheeked, coded and entered using EPI data 3.1 software and transferred to SPSS version 20 statistical packages for further analysis. Data entry was made by principal investigator. Date cleaning was preformed to check frequency, accuracy and consistency and missed values and variables.

Descriptive statistics were used. Bivariate and multivariable logistic regressions were be used to check variables associated with dependent variables. Variable having p-value up to 0.2 in the bivariate logistic regressions was fitted into the multivariable logistic regression models. Adjusted odds ratio (AOR) with 95 % Confidence Interval (C.I) was computed to assess the presence and strength of association. Variables having p- value less than 0.05 in multivariable logistic regressions were considered as significantly associated with the dependent variables. Hosmer-lemshow goodness of –fit test was used for model adequacy checking.

4. ETHICAL CONSIDERATION

Ethical clearance for the proposed study was obtained from the ethical review board of institute of public health of University of Gondar. Supportive letter was also obtained from Jille Tumuga district health office. Verbal consent was obtained from the mother after informing them all the purpose, objective, benefit, risk, and confidentially of the information and voluntary nature of participation in the study.

5. RESULTS

5.1 socio-demographic characteristics

A total of 647 pregnant women were participated in this study with a response rate of 97.4%.The mean age of the participants was 26.21 with (±4.61). Considerably high proportion of the respondents 407(62.9%) were in the age range of 25-34 years. Most of the participants were married 643 (99.4), the majority 576(89.1%) of the participants were Oromo by their ethnicity and almost all 643(99.4%) of respondents were Muslim by their religion. Majority of The respondents were not educated 442 (68.3%) and 638(99.4%) here were housewife by their occupation. Three hundred six five (56.4%) has 3-4 family members. In this study, 222 (34.3%) respondents were food insecure (Table 2).

Table 2: Socio demographic characteristics of pregnant women (n = 647) in Jille Tumuga district Northeast Ethiopia, April 2017

Variable	Frequency	Percent
Age		
15-24	214	33.1
25-34	407	62.9
>=35	26	4.0
Marital status		
Married	643	99.4
Widowed	4	.6
Religion		
Muslim	643	99.4
Orthodox	4	0.6
Ethnicity		
Oromo	576	89.0
Amhara	63	9.7
Argoba	8	1.2
Educational status of pregnant women		
No education	442	68.3
Read and write	60	9.3
Primary and above	145	22.4
Educational status of husband		
No education	381	58.9
Read and write	94	14.5

Primary and above	172	26.6
Occupation of pregnant women		
Housewife	638	98.6
Merchant	6	.9
Government Employee	3	.5
Occupation of husband		
Farmer	614	94.9
Merchant	11	1.7
Government Employee	6	.9
Daily laborer	16	2.5
Family size		
1-2	71	11.0
3-4	365	56.4
>=5	211	32.6
Productive safety net program beneficiary		
Yes	275	42.5
No	372	57.5
Food security status		
Food insecure	222	34.3
Food secure	425	65.7
Wealth index		
Poor	303	46.8
Medium	220	34.0
Rich	124	19.2

5.2. Maternal health related characteristics

Of a total respondents, 363 (56.1%) were experienced pregnancy for at least <= 3 times. The majority of the respondents 597(92.3%) had ANC follow up for the current pregnancy. Only 114 (17.6%) of respondents had experienced illness or sickness in the last two weeks preceding the study time. Five hundred eighty two (90%) of respondents had nutrition information during their pregnancy (Table 3).

Table 3: Maternal health related Characteristics of rural pregnant mother (n =647) in Jille Tumuga district Northeast   Ethiopia, April 2017

Variable	Frequency	Percent
Number of pregnancy		
<=3	363	56.1
4-5	195	30.1
>=6	89	13.8
Trimester of pregnancy		
First trimester	6	0.9
Second trimester	353	54.6
Third trimester	288	45.5
ANC follow up		
Yes	597	92.3
NO	50	7.7
Number of ANC follow up		
First visit	62	10.4
Second visit	306	51.3
Third visit	171	28.6
Fourth visit	58	9.7
Nutrition Information		
Yes	582	90.0
No	65	10.0
Illness or sickness in the last two weeks		
Yes	114	17.6
No	533	82.4

5.3. Meal frequency and feeding practice

Less than half, 284(43.9) of respondents had meal frequency of four and above per day. Two hundred eighty six (44.7%) of respondents had the habits of taking snacks, 136 (21%) of the respondents had habit of skipping meal and 158 (24.4%) of respondents had avoided some kind of food during pregnancy (Table 4)

Table 4: Meal frequency and Feeding practice of rural pregnant mother (n =647) in Jille Tumuga district Northeast   Ethiopia, June 2017

Variable	Frequency	Percent
Meals frequency during pregnancy		
<=three times	363	56.1
>= Four times	284	43.9
Habit of eating snack		
Yes	286	44.2
No	361	55.8
Habit of skipping meal?		
Yes	136	21.0
No	511	79.0
Reason to skip your meal?		
Tiredness	62	45.6
Busy at work so I forget	69	50.7
Not to increase weight	5	3.7
Fast during pregnancy		
Yes	2	0.3
No	645	99.7
Avoided Food during this pregnancy		
Yes	158	24.4
No	489	75.6
Reason to avoid to food		
Personal dislike (aversion)	113	71.5
Not allowed to pregnant woman to pregnant women (cultural)	45	28.5
Craving for any food		
Yes	131	20.2
No	516	79.8
Reason to crave for these food items		
Colour of food	13	9.9
Food odour	99	75.6
Desire of the fetus	15	11.5
I don't know the reason	4	3.1

5.4. Dietary diversity practice

This study revealed that a total of 203 pregnant women had adequate dietary diversity practices. The level of dietary diversity practices was therefore found to be 31.4% with (95% CI: 27.8- 35.2%). Starch staples 100% pulses (73.3%), other vegetables (49.8%), dark green leafy vegetables (46.2), dairy products (35.7%) were the most food group consumed by pregnant mothers in the previous 24h prior to the survey (Figure 2 and 3)
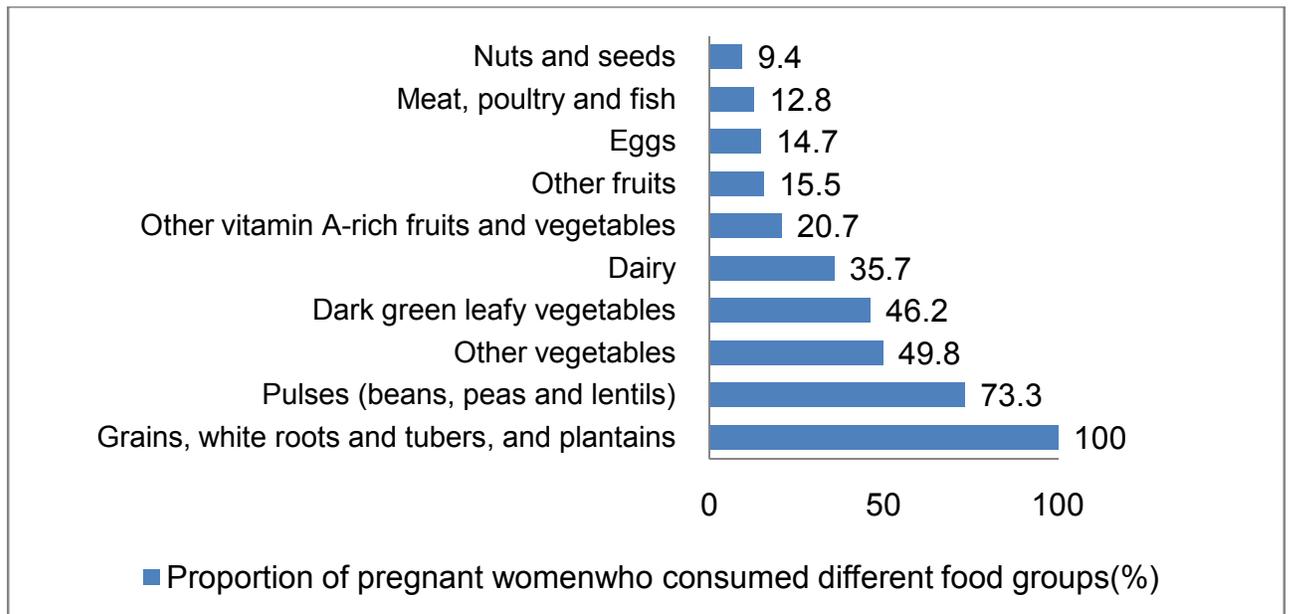
Figure 2: Proportion of pregnant women who consumed various food groups (10) during the preceding 24h (n=647) in Jille Tumuga district Northeast Ethiopia, April 2017

Dietary divesity practice

31.40%
Adequate dietary diversity

68.60%
Inadequate dietary diversity
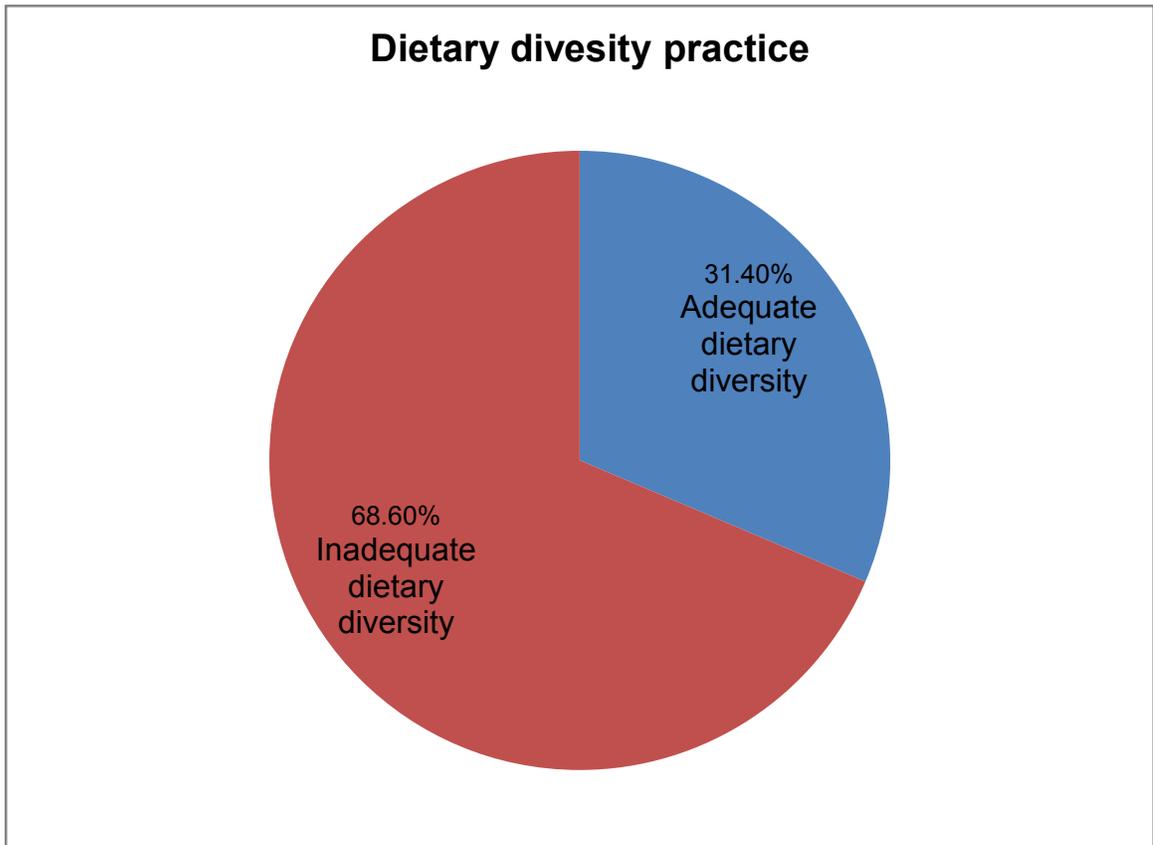
Figure 3: Proportion of dietary diversity practice among rural pregnant women during the preceding 24h (n=647) in Jille Tumuga district Northeast Ethiopia, April, 2017.

5.5. Factors Associated with Dietary diversity Practice of Pregnant

Mother education status, food security, productive safety net program beneficiary, wealth index, ANC visit, nutritional information, family size, age, husband education status, and trimester of pregnancies were analyzed by the bivariate binary logistic regression. Accordingly, mother education status, food security, productive safety net program beneficiary, wealth index, ANC visit, and nutritional information were selected for the multivariable binary logistic regression on the basis of p – value less than 0.2.Only maternal education, food security, wealth status, and nutrition information was statistically associated with the minimum dietary diversity practices of mothers by the multivariable binary logistic regression (Table 5).Dietary diversity practice was associated with educational status of the respondents. Pregnant mothers who able read and write had 2.45 times more likely to had adequate dietary diversity compared with their counter parts (AOR=2.45,95%CI:1.34-4.49) and the dietary diversity practice of mothers whose education level is primary and above was1.84times to be higher compared with illiterate mothers (AOR=1.84,95%CI:1.19-2.86).

The finding of this study also identified that food security status have strong statistical association with adequate dietary diversity practices of mothers during pregnancy. Those who had from food secure house hold had 3.26 times more likely adequate dietary diversity practice than food insecure mothers (AOR=3.26,95% CI: 2.09-5.50).This study show that wealth status had significant association with dietary diversity practice of pregnant mothers. Rich women practiced adequate dietary diversity than poor (AOR=4.7, 95% CI: 2.91-7.59) (Table 6).

This also explained that pregnant mothers who had nutritional information had practice dietary diversity than do not have nutritional information (AOR. 3.39, CI: (1.59-7.25) (table 5).

Table 5: Factors associated with dietary diversity practice of rural pregnant women in Jille Tumuga district   Northeast, Ethiopia April 2017.

Variable	Dietary diversity practice		COR with 95% CI	AOR with 95% CI
	Adequate	Inadequate		
Pregnant women's education				
No education	119	323	1	1
Read and write	27	33	2.22(1.28-3.85)	2.45 (1.34-4.49)**
Primary and above	57	88	1.76(1.19-2.60)	1.84(1.19-2.86)**
Food security				
Food insecure	33	189	1	1
Food secure	170	255	3.82(2.51-5.79)	3.26(2.09-5.05)***
PSNP beneficiary				
YES	64	211	1	1
NO	139	233	1.97(1.39-2.79)	1.32(.89-1.97)
Wealth index				
POOR	65	238	1	1
Medium	64	156	1.50(1.01-2.21)	1.39(.91-2.12)
Rich	74	50	5.42(3.45-8.51)	4.70(2.91-7.59)***
ANC VISIT				
No	8	42		
YES	195	402	2.542(1.17-5.53)	1.71(.61-4.83)
Nutrition information				
NO	10	55	1	1
Yes	193	389	2.73(1.36-5.47)	3.39(1.59-7.25)**
Number of pregnancy				
<=3	113	250	1	1
4-5	69	126	1.21(.84-1.75)	1.36(.90-2.04)
>=6	21	68	.68(.39-1.17)	.67(.37-1.21)

NB: -* statistical significant variables at $p < 0.05$, ** statistical significant variables at $p < 0.01$, *** statistical significant variables at $p < 0.001$, Hosmer and Lemshow test 0.094

6. DISCUSSION

The dietary diversity practice of pregnant mothers in Jille Tumuga district was determined by this study. The dietary diversity practice of rural pregnant women was 31.4 %(95%CI: 27.8-35.2%), this finding is lower than the finding of study conducted in Bangladesh 37%[21]; Togo 45%[25] and Northern Ghana 46.1[26]. This difference may be due to socio demographic factors. Most of the participants of this study had lower educational level compared with the participants of the aforementioned studies, which directly affects mother's knowledge and practice of dietary diversity. Moreover, the study subjects of the current study had larger family size. The food sharing habit of large sized families is high and so that pregnant mothers may not get diversified foods as required. Most of the study participants of this study were also house wives regarding their occupation. House wife mothers could not generate money by themselves; as a result they might not access to buy different food items.

In this study all of pregnant women consumed starchy staples (grains cereal) this was similar with previous study conducted in Kenya[36],Togo[25] and Southwest Bangladesh[21]. Conversely, other vitamin A-rich fruit and vegetables, other fruits and egg were least consumed foods which is also similar to the study in Southwestern Bangladesh[21].

The finding of this study identified that educational status of pregnant mothers have strong statistical association with adequate dietary diversity practice of mothers during pregnancy. The finding of this study is supported by other studies [20, 21, 24, 34, 36] in which the level of education had increased the chance of practice of adequate dietary diversity. This might be due to the contribution of education that results in access to information and advice from different sources giving rise to an increase in decision making ability of pregnant women about dietary diversity.

This study showed that dietary diversity was associated with household food security status. Food secured households are more likely to have adequate dietary diversity practice as compared to those food unsecured households. This finding is in

agreement with the study conducted in Bangladesh[20]. Regarding to household assets, wealth status had significant association with adequate dietary diversity practice. This finding is in line with study conducted in Bangladesh, Ghana and Kenya [20, 35, 36]. This could be due to the fact that people living with high wealth status may have the purchasing power for balanced, diversified and nutritious food and these people may be eating more frequently than their counterparts.

Another factor which was found to be significantly associated with the adequate dietary diversity practice was information about nutrition. Information about nutrition is essential to improve Knowledge, attitude and practice of pregnant mother. This study is supported by study conducted in East Wollega zone[30] and Gondar[33] in which nutrition information was important for nutritional practices. This may be due to the fact that those who get information about nutrition will have better knowledge and understanding about dietary diversity than those who do not.

7. LIMITATION OF THE STUDY

Recall bias since it considers only 24-h (twenty four hour) feed, it may not accurately reflect their past feeding experience. This study also did not take into account the amount of food consumed and social desirability bias. However, the limitations were minimized by clearly telling the objective and the importance of the finding of study to the participant.

8. CONCLUSIONS

Over all dietary diversity practice was low in the study area. Educational status of mothers, food security, wealth status and information about nutrition was associated with adequate dietary diversity practice of pregnant mothers.

9. RECOMMENDATION

Based on the study finding the following recommendation are suggested

To Amhara region health bureau

Increase mass media coverage and strengthen the role of disseminating information on appropriate dietary diversity practices.

To Jille Tumuga health office

Strengthen health education and promotion programs on dietary diversity practices and the need of adequate dietary intake during pregnancy.

Create strong multi-sectoral collaboration targeted at improving women educational status and increasing the family wealth.

To Jille Tumuga Education office

Encourage female education which may improve health care-seeking behavior and the use of health services

To Jille Tumuga agricultural, women, youth and child affair offices

Establishing income generation activities like saving at household level, skill training on agricultural and non agricultural activities and credit scheme to improve family income.

To Health professionals at facility and community level

Strengthen nutrition education for women development army (WDA) on dietary diversity practice. Counsel mothers who attend ANC to practice dietary diversity

To the community

Encourage community to share the responsibility and actively participated in nutrition education on dietary diversity.

To Researchers

Future studies need to include prospective data collection including both quantitative and qualitative components.

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11. ANNEX'S

Annex I: Information sheet

Title of the research project: Dietary diversity practices and association factors among rural pregnant mothers age 15-49 years in Jille Tumuga district, Oromia Zone, Northeast Ethiopia 2017

Principal investigator: Seid Aliwo (Bsc)

Advisors: 1. Mr. Zemicheal Gizaw (Bsc , MPH)

                   2. Mrs. Melkitu Fentie   (BSc. MSc.)

Name of the organization: University of Gondar, College of Medicine and Health sciences Institution of public Health

Sponsor: Amhara regional health

Introduction

My name is Seid Aliwo and student in University of Gondar for master degree I have been doing research on pregnant mother age 15-49 years as a part of my study course. I am going to give you information and invite you to be part of this research .before you decide to be part of the research you can talk to anyone you feel comfortable with about the research .

Purpose of the research

The purpose of this study is to assess the dietary diversity practices and association factors of rural pregnant mother's age 15-49 years in Jille Tumuga district and to the feeding habits of pregnant women thereby minimizing prevalence of malnutrition which affects the health of mother, new-borns and the child. For the purpose of decision making activities the findings from this study will be given for the program planner and implementers who are responsible for the improved health status of the community. We believe that this study will help to bring change in the nutritional status of mothers before, during and after pregnancy and their children by taking adequate and balanced diet during pregnancy.

Voluntary participation

Your participation in this research is entirely voluntary. It is you choice whether to participate or not. Whether you choose to participate or not, all the services you receive as any member of community will continue and not will change .If you

choose not to participate in this research, you will be offered all the services that are routinely offered. You may change you idea later and stop participating even if you agreed earlier.

Confidentiality

The information that collected for this research will be kept confidential. Information about you that is collected during the research will be put away and no one but researcher will be able to see it .Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and keep that information very secret that no one access see or know it .it will not be share with anyone.

Benefits:

If you participate in this research project you may not get direct benefits but your participation and the findings of this study is likely to give an insight which helps for policy and program implications regarding the health improvement of women and their children. However you will not be provided any incentives and payments to take part in this study.

Risk and side effects

There are no side effects and known risks related with this research so far .the only discomfort could be from sharing us few minutes (around 30 minutes) for the interview.

Whom to contact

This research will be reviewed and approved by the ethical review committee of the University of Gondar. If you wish to find about more or if you wish to ask questions now or later you can use the contact addresses below.

    1. Mr Seid Aliwo   Tel:+251911054898/+251945161664

                                   E-mail: seidaliwo99@gmail.com

    2. Mr Zemichael Gizaw (BSc, MPH)   Tel: +2519133448400

                                   E-mail:zemichael12@gmail.com

    3. Mrs Melkitu Fentie   (BSc. MSc.)   Tel: +251920511249

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Annex II: Consent Form

A questionnaire prepared by University of Gondar College of Medical and Health science Institution of Public health on dietary diversity practices and association factors among rural pregnant mothers.

How are you

My name is _____ I am here to collect information from you about your feeding practice.

Your participation in this research is entirely voluntary. It is you choice whether to participate or not. Whether you choose to participate or not, all the services you receive as any member of community will continue and not will change. Information about you that is collected during the research will be put away and no one but researcher will be able to see it. Your participation in this research may not directly provide you benefit as an individual .it may benefit all mother and children. There are no side effects and known risks related with this research so far .the only discomfort could be from sharing us few minutes (around 30 minutes).

Up to now you have given all information that I feel you should know regarding the research project that you are being asked to participate in. I think you have understood the issues in detail.

Thank you for your cooperation and listening

Are you willing to participate?

Yes   No

Name of data collector_____ signature_____

Name of supervisor _____ signature _____

Annex III: English version questionnaire

Questionnaire code number _____ Kebele _____ date _____

Section1. Socio –Demographic Characters

S.No.	Question	Response	Skip
101	How old are you? (age in completed years)	_____Age	
102	Your Marital status?	1. Single 2. Married 3. Divorced 4. widowed 5. Separated	
103	What is your religion?	1. Muslim 2. Orthodox Tewahdo 3. Protestant 4. Others(specify)_____	
104	What is your ethnicity?	1. Oromo 2. Amhara 3. Argoba 4. Tigre 5. Othersspecify_____	
105	Family size in number	_____	
106	Your Educational level	1.No education 2.Can read and write 3. Primary 4.Secondary 5.Higher (collage and above specify_____	
107	Your husband educational level	1.No education 2.Can read and write 3. Primary 4.Secondary 5.Higher (collage and above specify_____	
108	Your Occupation	1. Housewife 2. Merchant 3. Government Employee 4. Daily labourer 5. Other specify_____	
109	Husband occupation	1. Farmer 2. Merchant 3. Government Employee 4. Daily labourer 5. Other specify	

110	Are you supported by productive safety net program?	1. Yes 2. No	

Section2. Maternal health related Characteristics

S.No.	Question	Response	Skip
201	How many time your pregnancy? (including current pregnancy)	_____Times	
202	How many months of pregnant you are now?	_____ Months.	
203	Have you ever had ante natal care for this pregnancy?	1. Yes 2. No	If answer is "No" skip toQ.205
204	How many times you visited	_____ Times.	
205	Have you gotten pregnancy related nutritional information?	1. Yes 2. No	If Yes, from where? 1. Health provider 2. Family 3. Media 4. Friends 5. Others specify-
206	Do you have any illness or sickness in the last two weeks?	1. Yes 2. No	

Section3. Maternal dietary habit questions:

S.No.	Question	Response	Skip
301	How many meals do you usually eat within a day during this pregnancy?	1. Once 2. Twice 3. Three times 4. four times 5. five times	
302	Do you have a habit of eating snack	1. Yes 2. No	
303	What was your meal frequency within a day before this pregnancy?	_____ Times.	
304	Do you have a habit of skipping meal?	1. Yes 2. No	If answer is "No" skip to Q.306
305	What is your reason to skip your meal?	1. Tiredness 2. Busy at work so I forget 3. Not to increase weight 4. Other (specify)………	
306	Do you fast while you are pregnant?	1. Yes 2. No	
307	Is there any food item that You avoided after you became pregnant?	1. Yes 2. NO	If answer is "No" skip to Q.312
308	Which food item you	1. coffee	

		2. porridge, "atmit", bread, linseed 3. "shiro wot"(other legumes 4. Key sir, tomato, chilly (other *vegetables*) 5. egg, milk and milk products 6. banana or other fruits 7. banana or other fruits 8. meat 9. other(specify)_____	
avoid most?			
309	What is your reason to avoid this food item?	1. Personal dislike (aversion)	Ask Q.310
		2. Not allowed to pregnant woman to eat(Cultural belief)	Ask Q.311
		3. Religion 4. Other(specify) _____	
310	If personal dislike, what do you think is the reason for your dislike?	1. Smell/taste of food 2. Heart burn/discomfort 3. Feeling of nausea/vomiting 4. I don't know the reason	
311	What cultural reasons are given for forbidding the above food items?	1. Will make baby big & labour difficult 2. Will be plastered on fetal head &body 3. Fear of abortion 4. Evil eye 5. Fetal abnormality 6. Will bring fetal hair loss 7. Will bring fetal hair loss 8. Other(specify)	
312	Is there any food item that you desire strongly to eat especially this pregnancy?	1. Yes 2. No	.
313	What is your reason to crave for these food items?	1. Colour of food 2. Food odour 3. Desire of the fetus 4. I don't know the reason 5. Other(specify)_____	

Section 4- Dietary diversity practice

 Instruction: Ask the mother to recalls all the foods and beverages consumed yesterday during the day and night, whether at home or outside the home., underline the corresponding foods in the list under the appropriate food group and write "1" in the column next to the food group if at least one food in this group has been consumed and "0" if not consumed.

	Food categories	Description	Consumed Yes = 1 No= 0
1	Grains, white roots and tubers, and plantains	Any food Injera, porridge, bread etc made from grain such as millet, wheat, sorghum, rice, teff, maize	
		Any food made from roots or tubers such as white potatoes, beet root, onions, beets ,	
2	Pulses (beans, peas and lentils)	Any food made from lentils, beans, guaya, peas,	
3	Nuts and seeds	Any food made from nuts (lewz), or seeds (peas, sesame, selyit, chickpea)	
4	Dairy	Cheese, yoghurt, or other milk products	
5	Meat, poultry and fish	Liver, kidney, heart, or other organ meats.	
		Any meat such as beef, sheep, goat, chicken, or duck.	
		Fresh or dried fish, shellfish, or seafood.	
6	Eggs	Eggs	
7	Dark green leafy vegetables	Any dark green leafy vegetables (gommen, spinach, lettuce, merengue leaves/shifra, sama, kale, aleko) selata ,cabbage	
8	Other vitamin A-rich fruits and vegetables	Any food made from vegetables that have yellow or orange flesh such as carrots, pumpkin, squash,	
		red sweet potatoes, ripe mangoes, and papaya	
9	Other	Any other vegetables (tomatoes, peppers,)	

		vegetables		
10	Other fruits	Any other fruits avocado, lemon, green mango, banana	
11		Other food : please write down other food that respondent mentioned but are not in the list above -- -- -- ---	
		Total score	

Section 5: Questions to assess the current family wealth (economic condition)

Could you tell me if you have the following in your house?

Asset type	Number	
Domestic animals		
Ox		
Cow		
Calf		
Sheep		
Goat		
Camel		
Donkey		
Cock and Hen		
Mule		
Horse		
Durable assets		
Television	No (0)	Yes (1)
Radio	No (0)	Yes (1)
Electricity	No (0)	Yes (1)
Refrigerator	No (0)	Yes (1)
Conventional telephone	No (0)	Yes (1)
Mobile phone	No (0)	Yes (1)
Car	No (0)	Yes (1)
Motorcycle	No (0)	Yes (1)
Cycle	No (0)	Yes (1)
Cart	No (0)	Yes (1)
Saving account (bonk account)	No (0)	Yes (1)
Ownership of agricultural land	No (0)	Yes (1)
Area of farm land in hectares (TImade)		
Productive assets		
Plough plow	No (0)	Yes (1)
Axe	No (0)	Yes (1)
Hoe	No (0)	Yes (1)
Shovel	No (0)	Yes (1)
Sickle	No (0)	Yes (1)
Modern beehive	No (0)	Yes (1)
Traditional beehive	No (0)	Yes (1)

Housing characteristics		
Ownership of owned living house	No (0)	Yes (1)
pipe water	No (0)	Yes (1)
Type of flooring	Earth/dung (0)	Cement/raw wood (1)
Toilet facility	Unsanitary or traditional pit latrine/ no toilet (0)	Sanitary or improved pit latrine (1)
Other household materials		
Sofa	No (0)	Yes (1)
Bed	No (0)	Yes (1)
Table	No (0)	Yes (1)
Chair	No (0)	Yes (1)
Stove	No (0)	Yes (1)

Section 6: Questions to assess household food security condition (HFIAS)

Q. No	Questions	Response options (encircle one)		skip
601	In the past four weeks, did you worry that your household would not have enough food?		0 = No 1=Yes	If 0, Q 402
601a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks)		
602	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?		0 = No 1=Yes	If 0, Q 403
602a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks)		
603	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?		0 = No 1=Yes	If 0, Q 404
603a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks		

604	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No 1=Yes	If 0, Q 405
604a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks	
605	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No 1=Yes	If 0, Q 406
605a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks	
606	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No 1=Yes	If 0, Q 407
606a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks	
607	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No 1=Yes	If 0, Q 408
607a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks	
608	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No 1=Yes	If 0, Q 409
608a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks	

609	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food		0 = No 1=Yes	
609a	How often did this happen?	1 = Rarely (1X or 2X in the past four weeks) 2 = Sometimes (3x to 10x in the past four weeks) 3 = Often (>10x in the past four weeks		

Annex IV: Afan Oromo version (Participant Information Sheet and Informed Consent form for Selected Study Participant)

Akkam bultan/ooltan! Maqaan koo _____ jedhama. Anis sassaabduu raga qo'annoo ganda keessan irrati barataa digrii lammaffaa Yuniversitii Gondar kan tahe Seid Aliwo geeggeeffamuuti. Isinis garee qo'annoo keenyaa taatanii waan filatamtaniif waa'ee qo'annoo kanaa isii ibsuuf gurra fi qalbii keessan akkanaaf ergiftan kabajaan nan gaafadha.

Mata-duree qo'annichaa: Gucni gafi fi debii kuni kan qopa'e hawwaan ulfaa tajaajila fayyaa da'umsa duraa argata jiran irrati qoranaa nyata fudhatamufi sirna sorta fudhatamu fi rakkoolee wal qabatan kan Aanaa Jille Tumuga, Godina Saba oromo, Naannoo Amhara,Kababaha Itiyoophiyaa, bara 2017tti adeemsifamu.

Kaayyoo qo'annichaa: Argannoon qorannoo kanaa waajjiira fayyaa aanaa keessanifis tahe kanneen biroof sagantaa haala guddinaa haadhoolii ulfa fooyyeessuuf fayyadan qopheessuuf isaan gargaara. kunis haala fayyaa haadhoolii guutuummaatti foyyeessuuf ni gargaara.

Deemsaa fi yeroo fudhatu: Hirmaachuuf fedhii qabdu yoo tahe gaffiiwwan garaa garaa qo'annoo kanaaf qopha'an isiniifan dubbisa. Akkasumas ulfaatina fi hojjaa keessan nin safara. Baay'inni gaaffii walii galatti 60 kan hin caalle yoo tahu daqiiqaa 40 duwwaa fudhata.

Faayidaa fi miidhaa qo'anichaa: Rakkinni qo'annoo kana keessatti hirmaachuu keessaniin isin quunnamu baay'ee xiqqaa yoo tahu, innis yeroo keessan muraasa (daqiiqaa 40) qofaa fudhachuu taha. Qo'annoo kana irratti hirmaachuu keessaniin kaffaltiin kaffalamu tokko iyyuu hin jiru.Garuu bu'aan qo'annoo kanaa ragaawwan haarawaa waajjira fayyaa naannoo keessaniifi qooda fudhattoota biroof ni argamiisa.

43

Iccitii eeguu: Odeeffannoon isin nutti himtan hundi iccitiin qabama. Gaaffiin enyuummakeessan maqaan ibsu hin jiru. Argannoon qo'annaa kanaa hawaasa qo'annaa kana irratti hirmaatan akka walii galaatti kan ibsu yoo tahu, karaa kamiinuu dhimma nama dhunfaa hin calaqqisiisu. Haala kamiinuu namoota dhunfaa qo'annaa waliin walqabsiisuuf afaaniiniis tahe barreeffamaan ragaa hin waamsiifnu.

Mirga: Hirmaannaan qo,annoo kana keessatti gootan guutuummaan guutuutti fedhii irratti kan hundaa'e. Mirga hirmaachuu fi hirmaachuu dhiisuu ni qabdu. Hirmaachuuf yoo murteessitsn, mirga yeroo barbaaddanitti qo'annoo kanaa keessaa bahu yommuu qabaattan kana gochuu keessaniifis faayidaan isiin argachuu qabaattanii dhabdan tokko iyyuu hin jiru. Gaaffii deebisuu hin barbaadne deebisuufis hin dirqamtan.

Teessoo

Gaaffii yookiin qeeqa qo'annoo kana ilaallatuu kamiifuu, teessoo armaan gadiin gaafachuu fi quunnamuu ni dandeessu.

Qo'ataa muummee: obbo Seid Aliwo lakk. bilbila mobayilii:+*251911054998* yookiin E-mayilii, siedaliwo99@gmail.com.

Waajjira dhimma naamusaa qo'annaa fayyaa dhaabbatichaa (ERC) lakk.Poostaa 196, Gondar.

Mr Zemichael Gizaw (BSc, MPH) lakk. bilbila mobayilii:+2519133448400 yookin E-mail:zemichael12@gmail.com

 Mrs Melkitu Fentie (BSc. MSc.) lakk. bilbila mobayilii: +251920511249 yookin E-mail: mekitu12@gmail.com

Unkaa walii galtee fedhii irratti hundaa'ee:

Unkaan walii galtee hirmaattootaa naa dubbifameera/ dubbiseera.Kaayyoo qo'annichaa, deemsiisaa, faayidaa fi midhaa, dhimmi iccitiieeguu, mirgahirmaachuu fi teessoon qo'ataa illee natti himamee jira. Wanta ifa hin taane akkan gaafadhuuf carraan naaf keennamee jira. Akkan yeroo barbaade qo'annicha adda kutee bahuu dandahu yookiin gaaaffii deebisuu hin barbaannee deebisuu hin dirqamnes natti himameera. Kanaafuu, akkan qo'annaa kana irratti feedhii kootiin hirmaadhe mallattoo koo armaan gadiin nan mirkanneessa.

Lakk. _____Mallattoo hirmaattuu_____.

Mallattoo odeeffannoo sassaabduu_____.

Hub: Waliigalteen kun fuul-dura hirmaataa qo'annoo fi odeeffannoo sassaabduu itti malleettaffamuun, koopppiin isaas hirmaataa/ttu

                    Galatoomaa

Annex V: Afan Oromo version questionnaire

Ganda: _____   Lakk. _____

Maqaa ragaa sassaabduu: _____Mallattoo_____ Guyyaa: _____

Maqaa to'ataa/ttuu: _____ Mallattoo_____ Guyyaa: _____

Kutaa I: Gaaffiilee hawwaasummaa fi haala jireenyaa ilaallatan

S.No.	Question	Response	
101	Umuriin kee meqaa?	_____wagadhan	
102	Essa jirata?	1. Magaala 2. Badiyaa	
103	Haala gaa'eela kee kan ammaa kamtu ibsa?	1. Kan hin heerumne 2. Kan heerumte 3. Kan hiikte/ adda baate 4. Kan jalaa du'e 5. Nara demte/deme	.
104	Amantiin kee mali?	1. Muslima 2. Orthodoksii 3. Protestantii 4. Kanbiroo _____	
105	Sabnii kee mali?	1. Oromo 2. Amhara 3. Argoba 4. Tigre 5. Other specify_____	
106	Bayiini matii keeti meqa	_____	
107	Haala barumsa keeti	1. Hin barane 2. Dubbisuu fi barreessuu kan dandeessu 3. Sadarkaa duraa	

| | | 4. Sadarkaa lamaffaa |
| | | 5. Diploomaa fi isaa ol |

108	Haala barumsa abba manaa keeti	1. Hin barane
		2. Dubbisuu fi barreessuu kan dandeessu
		3. Sadarkaa duraa
		4. Sadarkaa lamaffaa
		5. Diploomaa fi isaa ol

109	Hojjin kee malini?	1. Dalagaa manaa
		2. Daldalaa
		3. Hojii mootummaa
		4. Hojii guyyaa
		5. Kan biroo (himi)_____

110	Hojji abba manaa keeti	1. Qotee bulaa
		2. Daldalaa
		3. Hojii mootummaa
		4. Hojii guyyaa
		5. Kan biroo (himi)_____

| 111 | Tajajila safitineti kesa jirata | 1. Eyee |
| | | 2. Lakii |

Kutaa II: Gaaffiilee tajaajila fayyaa haadhoolii ilaallata

S.No.	Question	Response	
201	Yeroomeqafil ulfoofte?(kan amaa dabalatee)	yeroo _____	.
202	Ulfi kee batii meeqa?	Batii_____	
203	Ulfa kanan rati ,Amma dura tajaajila fayya da'umsa duraa ni qabda?	1. Eyee 2. Lakkii	Yo lakki tahe'e gafi 205 darbi.
204	Tajaajila fayya da'umsa duraa	Yeroo _____	

	yeroo meqa argate?		
205	Ulfa kanaaf wa'ee sirna sorata irrati gorsi sif kename beka?	1. Eyee 2. Lakkii	Yo eyee tahe'e 1.Hogesa fayyara 2.Matii irra 3. Media 4.HIriyara 5.Kan biraa
206	Guyyaan kudhashan kankasate sidhokube bekka?	1. Eyee 2. Lakkii	

Kutaa 3: Barmatilee sorata hawan ulfaa : itti ansudhan gaffiwwan murasa barmatilee yeroo ulfaa kee fudhatutin si gafadha

S.No.	Question	Response	Skip
301	Guyyati yeroo meqa sorata sorata? Ulfe kanrati	1. Yeroo tokko 2. Yeroo lama 3. Yeroo sadhi 4. Yeroo afuri 5. Yeroo shani	
302	Yeroo ulfa keeti barmatile maksasa nyachuu ni qabda?	1. Eyee 2. Lakkii	
303	What was your meal frequency within a day before this pregnancy?	_____ Times.	
304	Barmatile sorata dhisu ni qabda	1. Eyee 2. Lakkii	Yo lakkii tahe'e gafi 306 darbi.
305	Sababni ati sorata itti dhiste maal ture?	1. Dadhabii 2. Iraanfachuu	

		3. Furdachuu dhabudhan	
		4. Kan biraa_____	
306	Yeroo ulfa keeti yeroo ati sorata it agaabde ni jira?	1. Eyee 2. Lakkii	
307	Yeroo ulfaa keetiti gosa sorata ati dhorgamte ni jira?	1. Eyee 2. Lakkii	Yo lakii tahee gafi 312 darbi.
308	Eyee yoo ta'e, gosa sorata kami?	1. Buna 2. Marqaa,buluqa,daboo 3. Itoo shiroo 4. Hude dimaa,timatima,corqaa 5. Hanqaqu,anaan fi bu'a anaani 6. Muzii fi kan biro 7. Foon 8. Kan biraa_____	
309	Sorata lagachuf sababni kee maal ture?	1.Na jibisise (aversion)	Gaafi lakosa 310
		2.Aadaadhan hadha ulfatif kan dhorkame (Cultural belief)	Gaafi lakosa 311
		3.Amantii 4.Kan biro _____	
310	Yoo jibitee ta'e sababni isaa mali?	1. Fooli/dhandham sorata 2. Wanlaphee na gubuf 3. Waan na haqisisuf 4. Hin beku	
311	Gosa sorata tuqame irra sababni itti dhorkamte Aadaa yoo ta'e, aadaa isa	1. Da'imti guda ta'a 2. Qamaa fi mataa irati kufama 3. Aboorshini sodachudhan	

		4. Ija sodachudhan 5. Qama hir'uu 6. Rifeensa dhabuu 7. Kan biro	
312	Ulfa kana booda gosa sorata ati siriti sorachuf fetu ni jira?	1. Eyee 2. Lakkii	.
313	Gosa sorata kana maalif siriti barbade?	1. Haluu sorata 2. Urgaa sorata 3. Garafulduratif 4. Sababa isaa hin beku 5. Kan biro	

Kutaa IV: Gaaffiilee haala soorata haadhaa ilaallatan

Seensa: Sa'atii 24 darbe keessatti manattis tahe manaan alatti akaakuuwwan nyaataa gaaffii lakkoofsa 401- 410 tti eeraman keessaa isa kam akka haati soratte ibsuuf gaafadhu. akaakuuwwan nyaataa caqasaman keessaa yoo tokko isaa soratteetti tahe, fuuldura akaakuuwwan nyaataa eeraman bira (bakka deebii jedhutti) lakkoofsa 1 barressi.

	Food categories	Akakuu nyaataa	Deebii Eeyyeen(1) Lakki (0)
401	Grains, white roots and tubers, and plantains	Buddeena,daabboo, kita, akaayii, marqaa, ruuzii, biskutii yookan akakuu nyaataa biroo midhaan dheedhii naannotti omishaman kan akka; misingaa, boqolloo, qamadii, taafii fi k.k.f. irraa hojjetaman	
		Dinnicha, mixaaxisii yookan nyaata walfakkaataa biroo hiddi isaanii nyaatamu Hunde dimaa	

402	Pulses (beans, peas and lentils)	Nhaata kamiyyuu kan atara, baaqelaa, missira, shumburaa irraa hojjeteme	
403	Nuts and seeds	Nhaata kamiyyuu kan atara, lawzii,	
404	Dairy	Itittuu, ayibii, aannan, yookin omisha aannanii kan biro	
405	Meat, poultry and fish	Foon qaama horii kan akka kalee, onnee yookin kan biro	
		Foon horii, jabbii, hoolaa, re'ee, lukkuu,	
		Qurxummii/sardiinii	
406	Eggs	Hanqaaquu/killee	
407	Dark green leafy vegetables	Kuduraalee baala magarisaa kan akka goommana, salaaxaa	
408	Other vitamin A-rich fruits and vegetables	Kuduraalee vitaminii 'A' dhaan badhaadhan kan akka dubbaa, kaarootii	
		Fuduraalee vitaaminii 'A' dhaan badhaadhan kan akka, maangoo, pappaayyaa,	
409	Other vegetables	Kuduraalee kan akka timatimi, choriqa	
410	Other fruits	Fuduraalee kan akka Lommii,muziy	
411		Kan boro kan nyate kan arma ollit kan hinjirei (hihimamene)-- -------------------------------------	

Kutaa V: Gaaffiilee haala qabeenya maatii ilaallatan

 Kanneen armaan gadii keessaa warren kamtu mana keessaniitti argamaa?

Gosa qabeenyaa	Deebii	
Beeylada	lakos	
Sangaa		
Sa'aa		
Jabbii		
Hoolaa		
Re'ee		

Galla		
Harree		
Gange		
Farida		
Lukkuu		
Meeshaalee dhaabbataa		
Televizinii	Lakki (0)	Eeyyeen (1)
Raadiyoonii	Lakki (0)	Eeyyeen (1)
Elektirikii	Lakki (0)	Eeyyeen (1)
Frijii	Lakki (0)	Eeyyeen (1)
Bilbila manaa	Lakki (0)	Eeyyeen (1)
Mobaayilii	Lakki (0)	Eeyyeen (1)
Konkolaataa	Lakki (0)	Eeyyeen (1)
Motarsaayikilii	Lakki (0)	Eeyyeen (1)
Saaykilii	Lakki (0)	Eeyyeen (1)
Gaarii	Lakki (0)	Eeyyeen (1)
Buki qusena (buki banki)	Lakki (0)	Eeyyeen (1)
Lafa qotisaa	Lakki (0)	Eeyyeen (1)
Qonna guyyan hammit	Lakki (0)	Eeyyeen (1)
Meeshaalee omishaa	Lakki (0)	Eeyyeen (1)
Maarashaa	Lakki (0)	Eeyyeen (1)
Qottoo	Lakki (0)	Eeyyeen (1)
Doomaa	Lakki (0)	Eeyyeen (1)
Akaafaa	Lakki (0)	Eeyyeen (1)
Hamtuu	Lakki (0)	Eeyyeen (1)
Gaagura kaannisaa kan amayyaa	Lakki (0)	Eeyyeen (1)
Gaagura kaannisaa kan aadaa	Lakki (0)	Eeyyeen (1)
Haala mana jireenyaa		
Mnna jirreny qubdu	Lakki (0)	Eeyyeen (1)
Bishaan ujummoodhan argamu	Lakki (0)	Eeyyeen (1)
Lafa mana keessaa	Biyyee (0)	Cimintoo/ xaawullaa (1)
Haala mana fincaanii	Qulqullina kan hin qabne/ gutumaatti kan hin qabne (0)	Kan qulqullina qabu (1)
Meeshalee manaa biroo		
Soofaa	Lakki (0)	Eeyyeen (1)
Siree	Lakki (0)	Eeyyeen (1)
Xarabeezzaa	Lakki (0)	Eeyyeen (1)
Taa'umsa	Lakki (0)	Eeyyeen (1)
Istoovii	Lakki (0)	Eeyyeen (1)

Kutaa VI: Gaaffiilee haala wabii nyaataa ilaallatan

	Gaaffii		deebii (tokko filadhu)	
601	Torban afran darban keessatti maatiin keessan nyaata gahaa hin qabu ykn jalaa dhuma jechuun yaaddooftanii turtanii?		0 = lakki 1=Eeyyeen	Yoo 0 tahe, →

				602
601.a	Yaaddoon armaan olii kun al meeqa isiin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
602	Torban afran darban keessatti isin ykn miseensi matii keessanii qarshii/ qabeenya dhabuun nyaata filattan osoo hin nyaatiin haftanii jirtuu?	0 = lakki 1=Eeyyeen	Yoo 0 tahe, → 603
602.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
603	Torban afran darban keessatti isin ykn miseensi matii keessanii qarshii/ qabeenya dhabuun akaakuu nyaataa muraasa qofaa nyaachuuf yeroon itti dirqamtan jira turee?	0 = lakki 1=Eeyyeen	Yoo 0 tahe, → 604
603.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
604	Torban afran darban keessatti isin ykn miseensi matii keessanii qarshii/ qabeenya dhabuun nyaata nyaachuu hin feene nyaachuuf yeroon itti dirqamtan jira turee?	0 = lakki 1=Eeyyeen	Yoo 0 tahe, → 605
604.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
605	Torban afran darban keessatti isin ykn miseensi matii keessanii nyaanni gahaan wan hin jirreef nyaata hanga sorachuu barbaaddaniin gaditti sorachuuf yeroon itti dirqamtan jira turee?	0 = lakki 1=Eeyyeen	Yoo 0 tahe, → 606
605.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
606	Torban afran darban keessatti isin ykn miseensi matii keessanii nyaanni gahaan wan hin jirreef guyyaatti yeroo muraasa qofa sorachuuf yeroon itti dirqamtan jira turee?	0 = lakki 1=Eeyyeen	Yoo 0 tahe, → 607
606.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii		

			ol)	
607	Torban afran darban keessatti qarshiin/ qabeenyi waan hin jirreef nyaata akaakuu kamiyyuu mana keessaa yeroon itti dhabdan ni jira turee?	0 = lakki 1=Eeyyeen		Yoo 0 tahe, → 608
607.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
608	Torban afran darban keessatti galgala galgala isin ykn miseensi matii keessanii nyaanni gahaan wan hin jirreef beela'aa ykn garaa duwwaa ciisuuf yeroon itti dirqamtan jira turee?	0 = lakki 1=Eeyyeen		Yoo 0 tahe, → 609
608.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		
609	Torban afran darban keessatti isin ykn miseensi matii keessanii nyaanni gahaan waan hin jirreef galgalaa fi guyyaa guutuu beela'aa ykn garaa duwwaa yeroon itti turuuf dirqamtan jira turee?	0 = lakki 1=Eeyyeen		
609.a	Rakkoon armaan olii kun yoo jiraate al meeqa isin mudatee?	1 = Yeroo muraasa (baatii darbetti al 1- 2 tti)		
		2 = Al tokko tokko (baatii darbetti al 3- 10 tti)		
		3 = Yeroo hedduu (baatii darbetti yeroo 10 nii ol)		

GALATOOM

Annex VI: Declaration

I, the under signed, senior MPH student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master degree in general MPH.

Name of the student: <u>Seid Aliwo</u>

Signature_____

Place of submission: Institute of Public Health, College of medicine and Health Sciences, University of Gondar.

Date of Submission: _____

This thesis work has been submitted for examination with my/our approval as university advisor(s)

Approval of the advisor (s)

Name of advisors	Signature	Date
1. Zemichael Gizaw (Bsc,MPH)	_____	_____
2. Melkitu Fentie (Bsc,MSc)	_____	_____