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CHRONIC ENERGY DEFICIENCY AND ASSOCIATED FACTORS AMONG LACTATING WOMEN IN SIMADA DISTRICT, NORTH WEST ETHIOPIA

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FACULTY OF CHEMICAL AND FOOD ENGINEERING

CHRONIC ENERGY DEFICIENCY AND ASSOCIATED FACTORS AMONG LACTATING
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BY:

ALEMU DEMEKE

July/2020

Bahir Dar, Ethiopia



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CHRONIC ENERGY DEFICIENCY AND ASSOCIATED FACTORS AMONG
LACTATING WOMEN IN SIMADA DISTRICT, NORTH WEST ETHIOPIA

BY÷

ALEMU DEMEKE

A Thesis Submitted to the School of Research and Postgraduate Studies,

Bahir Dar Institute of Technology, Bahir Dar University, in Partial

Fulfillment of the Requirements for the Degree of

Master of Science in Applied Human Nutrition

Advisors:

Prof. Tefera Belachew (MD, MSc, PhD)

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Declaration

This is to certify that the thesis entitled “Chronic Energy Deficiency and Associated Factors Among Lactating Women in Sidama District, North West Ethiopia”, submitted in partial fulfillment of the requirements for the degree of Master of Science in **Applied Human Nutrition** under **Faculty of Chemical and Food Engineering** ,Bahir Dar Institute of Technology , is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

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Date

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Approval of thesis for defense result

I hereby confirm that the changes required by the examiners have been carried out and incorporated in the final thesis.

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As members of the board of examiners, we examined this thesis entitled "Chronic Energy Deficiency and Associated Factors Among Lactating Women in Sidama District, North West Ethiopia" by Alemu Demeke. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of Masters of Science in "Applied Human Nutrition".

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Abstract

Background: Maternal chronic energy deficiency remains a persistent problem and an important contributor to morbidity, mortality and poor birth outcomes in developing countries. Despite this, there is scarcity of data on the burden of maternal chronic energy deficiency (under nutrition) and associated factors in Ethiopia and particularly in the study area.

Objective: The aim of this study was to assess the chronic energy deficiency and associated factors among lactating mothers under two years' old children

Method: A community based a cross-sectional study Supplemented on 599 currently lactating woman less than two years old children in Simada District. Study participants were selected using multi -stage sampling technique considering 1.5 design effects. Data were collected using semi structured interviewer administered questionnaire. The data were collected by six health extension workers and three supervisors who had first degree in nursing. Before the data collection pretest was done on 5% of sample. Data were edited and entered into Epi data version 4.4 and cleaned and analyzed using SPSS for windows version 23. Bivariate and multiple logistic regression were compute. Odds ratios and their 95% confidence interval were computed to determine level of significance. Statistical significance was declared at P values less than 0.05.

Result: The magnitude of chronic energy deficiency was found to be 34.1 % (30-38.2%, 95%CI). Multivariable logistic regression analyses showed that having additional meal during breast feeding was protective [(AOR=0.219, 95%CI :(0.114, 0.422), $p \leq 0.001$]. woman who had three and more under-five children [(AOR=5.026, 95%CI :(2.755, 9.169), $p \leq 0.0001$], Women who had not nutrition education [(AOR=24.319, 95%CI: 9.980, 59256), $p \leq 0.0001$], woman who did not have minimum and [(AOR=8.500 95%CI: 3.117, 23.179), $p \leq 0.0001$] were more likely experience chronic energy deficiency.

Conclusion: The prevalence of chronic energy deficiency among lactating women was found to be 34.1 % (30-38.2%, 95%CI). Number of under five children in the household, attending nutrition education, additional meal during breast feeding and minimum dietary diversity status of study subject were significant predictors if chronic energy deficiency.

Recommendation: nutrition promotion messages are needed to focus to improve diversification of food, additional meals during breast feeding, minimum dietary diversity.

Key words: Chronic energy deficiency, Lactating mothers, Associated Factors, Ethiopia

Acronyms and abbreviations

ABCD-----Anthropometry, Biochemical, Clinical, dietary methods

AOR-----Adjusted Odd Ratio

BMI-----Body Mass Index

CED-----Chronic Energy Deficiency

COR-----Crude Odd Ratio

ENA-----Essential Nutrition Action

HCT-----Hematocrit

ICSM-----International Council for Standardization Hematology

IDD-----Iodine Deficiency Disorder

IMCI-----Integrated Management on Childhood Illnesses

IQ-----Intelligence Quotient

IU-----International Unit

IUGR-----Intrauterine Growth Retardation

MPN-----Most Problem Number

NCHS-----National Center for Health Statistics

PEM-----Protein Energy Malnutrition

SD-----Standard Deviation

WHO-----World Health Organization

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1. INTRODUCTION

1.1 Background

Nutrition is the sum total of the processes involved in the intake and utilization of food substances by living organisms, including ingestion, digestion, absorption, transport and metabolism of nutrients found in food . A fundamental pillar of human life, health and development throughout the entire life span. Proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health and a wellbeing of all living things(1). According to the essential nutrition action(ENA), taking at least two additional meals per day during lactation is recommended for all lactating women (2).

Good nutrition is the cornerstone for survival, health and development for current and succeeding generations. However, the nutrition requirement varies with respect to age, gender and during physiological changes such as pregnancy, infant, lactating mothers and older age groups(3). Lactating mother was not only living for herself but for the infant, for the family and for the society and she carries great sole responsivity in the family(4). Given that the energy demands of lactation are higher than those of pregnancy, however, it is essential to increase energy intake and/or reduce energy expenditure during breastfeeding in order to protect women's long-term nutritional status stress(5)

Food consumption during pregnancy and lactation in Sub-Saharan African countries indicate that macronutrient intakes are low, in the range of 1,400 to 2,000 kilocalories (Kcal) of energy and 25 to 50 grams of protein daily, while vitamin and mineral intakes are often extremely low as well. The energy cost of activity, reproduction, and lactation can be partially met by mobilization of maternal tissue stores. The impact of low energy intake on fetal growth and lactation performance is less than might be anticipated. Given that the energy demands of lactation are higher than those of pregnancy, however, it is essential to increase energy intake and/or reduce energy expenditure during breastfeeding in order to protect women's long-term nutritional stress (6)

Lactating mothers from low income settings are considered as a nutritionally vulnerable group, due to nursing process, mothers are subjected to nutritional stresses. Frequent pregnancies

followed by lactation increase the health risk of mothers resulting in a high maternal mortality(7).

Women are generally vulnerable to chronic energy deficiency especially during lactation where the food and nutrient requirements are more during that period (8). Despite this, data on the magnitude of CED and its associated factors in Ethiopia particularly in the study area are scarce and has been studied less extensively.

1.2 Statements of the problem

About 14 million adolescent girls worldwide become lactating mothers each year and more than 90% of these very young and live in developing countries (1) An average regional fertility rate of 6.5 in women in Sub-Saharan Africa experience significantly higher fertility than women in any other region of the world. Food consumption during pregnancy and lactation in Sub-Saharan African countries indicates that are low. The energy cost of activity, reproduction, and lactation can be partially met by mobilization of maternal tissue stores. Given that the energy demands of lactation are higher than those of pregnancy, however, it is essential to increase energy intake and/or reduce energy expenditure during breastfeeding in order to protect women's long-term nutritional stress (6). Nearly 3.1 million child 3.5 million woman in developing countries died each year due to the underlying cause of under nutrition. Hunger and malnutrition have been found to increase both the incidence and fatality rate of conditions that cause up to 80% of maternal death(9). The ACC/SCN study finds 20 percent of African women to be chronic energy deficiency . More than 20 percent of women in Sub-Saharan Africa; and about 40 percent of women in South and Southeast Asia were excessively thin (10) . Chronic energy deficiency is a serious problem in Ethiopia & lactating mothers and children are the most affected segments of the population. One of every four lactate mothers in Ethiopia is chronic energy deficient(11).

According to Ethiopian demographic data of 2016, 22% of woman in reproductive age were experienced chronic energy deficiency. Twenty two point seven percent of the women in Amara region had CED(12). Lactating women have higher requirements of energy, protein, and other micronutrients. Poor maternal nutrition over this period risks depletion of the mother's own nutrient stores and health, and harms the nutrition and health of the growing child. Addressing nutritional needs of pregnant and lactating women is now entrenched with in the Sustainable Development(13).

chronically energy deficiency woman is likely to give low birth to an undernourished child, causing the cycle of undernutrition to be repeated over generations(14). Insufficient nutrient intakes before and during pregnancy and lactation can affect both women and their infants.

Even though different studies have been conducted to assess magnitude of maternal chronic energy deficiency in the world, there is scarcity of such study in Ethiopia particularly in the study area.

Therefore, this study was assess the magnitude of maternal chronic energy deficiency and associated factors in simada district, south Gondar zone, Ethiopia.

1.3 Significance of the study

In most developing countries, maternal chronic energy deficiency is persistent and an important contributor to morbidity, mortality and poor birth outcomes including low birth weight (LBW), neonatal mortality and subsequent childhood malnutrition. The Government of Ethiopia has made a firm commitment to address food insecurity and chronic energy deficiency, and has established various multi-sectoral groups to coordinate and support efforts including the Rural Economic Development and Food Security Sector Working Group (RED-FS), the Nutritional Development Partners Group, the National Nutrition Committee and the National Nutrition Technical Committee. Multiple nutrition programs are in place in the Ethiopia; including programs that directly address nutrition indicators and those that integrate corresponding sectors like agriculture, health, education, and water and sanitation. However, their scale and depth differ considerably. These programs have been implemented by a diverse range of players including respective government ministries, international agencies, non-government organizations and the private sector in the region(18). But maternal chronically energy deficiency is a persistent problem and an important contributor to morbidity, mortality and poor birth outcomes in developing countries due to different factors.

There are several studies done in the world on the magnitude of maternal chronic energy deficiency but there is scarcity of such study in Ethiopia and particularly in the study area, as a result this study were assess the magnitude of maternal chronic energy deficiency and the possible associated factors and provide objective evidence for health development planers to give special focus for the problem in designing strategy for preventing the problem and improving the health of the community. After completion of the study, results obtained will be peplished and used as a baseline for the coming researchers in the field as well.

1.4 Objective of the study

1.4.1 General objective

- The general objective of this study was to assess chronic energy deficiency and associated factor among lactating mother of whose child age under two years in Simada District, North west Ethiopia, 2019. Community based a cross-sectional study.

1.4.2 Specific objective

- To determine the magnitude of chronic energy deficiency among lactating mother having children under two years in Simada District, North west Ethiopia,
- To identify factors associated with chronic energy deficiency among lactating mother having children under two years in Simada District, North west Ethiopia.

2. LITERATURE REVIEW

2.1 Global Prevalence of Chronic energy deficiency

Woman living in every country irrespective of development status have been facing the problem of chronic energy deficiency. The study done in Vietnam, Burkina Faso and in India 14%, 19%, 28.4% respectively. (11),(19, 20). The prevalence of chronic energy deficiency in African country was 37.3% in Eritrea) and 20% in Ethiopia ((16, 21)

2.2 Chronic energy deficiency in Ethiopia

According to Ethiopian demographic data of 2016 the prevalence of chronic energy deficiency of woman's in reproductive age was 22%. The highest prevalent were in Afar (39.1%) and the lowest in Addis–Ababa= (13.4(12).

Another study conducted in Nekemt, Samre woreda, Adama, Rayita District, Ziway District, Dedo and Chekorso District and Wonberma Woreda in Ethiopia showed the prevalence of chronic energy deficiency among lactating mothers were 24 %,48.6%, 40.6% ,20.5%,19.5%,25% and 25.4% respectively (5), 8, (21), (22),(23),(24),(25).

2.3 Factors associated with maternal chronic energy deficiency.

Women in the youngest age group (15-19) and in the oldest age group (35-49) were more chronic energy deficient as compared with women in the age group 20-24 years. When age increases from 18 to 34 year prevalence of chronic energy deficiency also increase and age increases after 35 year prevalence of chronic energy deficiency decrease. Occupation of fathers and Mothers are another significant factor for chronic energy deficiency of lactating woman (24).

Marital status was the demographic variable affecting nutritional status of women and never married women were more prevalent for chronic energy deficiency than currently married women (25). Household economic status, employment status, and marital status of woman were found to be determinants of women nutritional status. The women in Somali= (31% and Benishangul-Gumuz=20% regions were more prevalent for chronic energy deficiency than Harari=25% counterparts. Women who resided in Tigray (34%) and Amhara regions (22.7%) were also more

prevalent for chronic energy deficiency than women in Harari Region (21%) and the difference was significant (12).

The women from very poor households were more prevalent for chronic energy deficiency than women of medium or higher economic status households, and unemployed women were more prevalent for chronic energy deficiency than women employed for cash (10).

The study of conducted in Medical College Hospital of Kolkata, West Bengal 28.4%, of the subjects had low BMI (< 18.5). Chronic energy deficiency was found to be more common among women less than 20 years of age (52.4%), Muslim mothers (29.2%), and those who had not taken extra meal (39.6%). Birth space differences were statistically significant. Mothers having spacing less than 3 years from last child birth (67.3%) in comparison to mothers having the interval more(36.2%). The difference was statistically significant. In this study more than half of the study population did not take extra food (6).

The factors which had strong association with chronic energy deficiency of lactating mother were occupation of mother, family income, family size and husband educational status e. Husband's educational status and family income of lactating mothers were weakly associate to the outcome variables but occupation of mother and family size of lactating mothers were strongly associated with nutritional status. Husband's educational status and family income of lactating mothers were weakly associate to the outcome variables but occupation of mother and family size of lactating mothers were strongly associated with nutritional status. Concerning husband education, those mothers whose husband has at least primary education were less likely to develop under weight than those husbands who has no formal education. Family income is another factor found to affect the nutritional status. Family of lactate mothers those who got monthly income greater than 2000 Birr and 1999 - 1,000 Birr were less likely exposed chronic energy deficiency than those who got less than 500 and respectively. More over family size of lactate mothers were another determinant factor that affects nutritional status. Those mothers who have family size of greater than three children were more likely exposed to chronic energy deficiency than who have less family size in the house hold (1).

The study of conducted in Adama District shows the prevalence of chronic energy deficiency among lactating mothers were 19.5%. Maternal education, advice from health workers on nutrition, hand washing practice after toilet utilization and time of postnatal service were significantly associated with chronic energy deficiency among lactating mothers. Accordingly lactating mothers who never

attended education were more prevalent than compared to those attended primary education and above with. Similarly those lactating mothers who hadn't got advice on nutrition were more prevalent to chronic energy deficiency than their counterparts. Also those lactating mothers not having a postnatal service from health professional within 72 hours after delivery were more likely to be chronic energy deficiency compared to those having postnatal services within a 72 hours after delivery (10).

When we see the study of done in Ziway District the prevalence of chronic energy deficiency BMI<18.5 was 48.6%. Women in the age group greeter than 35 years were more prevalent than woman age less than 35 years (22).

The study of dene in Samre Woreda south eastern zone of Tigray the prevalence of chronic energy deficiency lactating mother were 25%. The factors which have strong association with mothers' chronic energy deficiency were Educational states of woman, family size, maternal age, ANC visits and age of breast feed child were significant factor (8).

Community based a cross-sectional study conducted in Wonberma Woreda northern Ethiopia the prevalence of chronic energy deficiency lactating mothers were 25.4%.The factors which were having association with chronic energy deficiency of lactating women were large family size, younger age of the woman at first pregnancy, home delivery for the recent childbirth and the absence of nutritional education were significantly associated with u chronic energy deficiency among lactating women. Male involvement during antenatal care, attained post-natal visit and distance from health facility to home have not association (25).

2.4 Conceptual framework

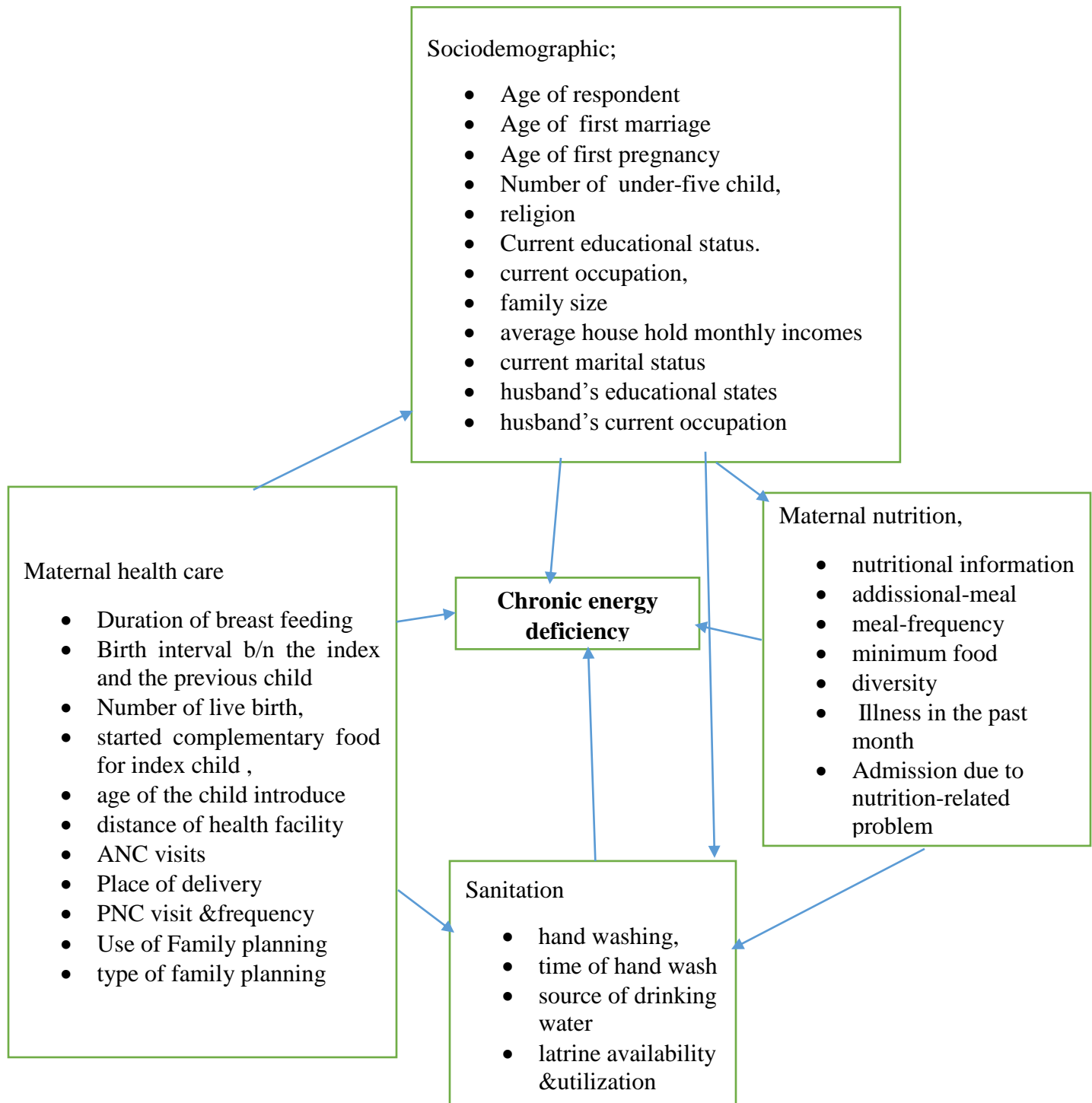


Figure :1 conceptual framework showing association of chronic energy deficiency with potential factors (26)

3. METHODOLOGY

3.1 Study area and period

The study was conducted at Simada District. Simada is located 770 kilometers of Addis Ababa, 202 km from Bahir Dar and 105 km from Debre Tabor Ethiopia. In the district tiffs, sun flower, flaccid, soya been are the major crops. The topography of this Woreda described as 10% highland, 30% mid highland and 60% low highland and 11.500 latitudes and 38.2500 longitudes. Based on 2007 national census total population of the woreda were 228271. Among this 114959 were females, 12,565 children under two years. Regarding the accessibility of health facility, there are 24 health posts, 6 health center and one district hospital currently giving function

3.2 Study design

Community based a cross-sectional study was employed.

3.3 Sours of population

All woman who had child less than two year live in Simada District.

3.4 Study population

Sample of lactating mothers whose child age less than two year who are living in Simada District during data collection period selected into the study.

3.5 Sample Size Determination

The sample size of the study was determined using the formula for single population proportion as by considering the expected prevalence of chronic energy deficiency among lactating mothers of (25.4%) reported by(23), 5% margin of error and 95% confidence level and none response rate of 10%...

$$n = \frac{z^2 p (1-p)}{d^2}$$

Where: n= sample size

z= Z value corresponding to a 95% level of significance=1.96

$p = \text{expected prevalence rate of lactating} = 25.4\% = 0.254$ $q = (1-p) = (1-0.254) = 0.746$

$d = \text{Absolute precision (5\%)}$

$n = (1.96)^2 \times 0.254 \times 0.746 / (0.05)^2$

$= 291.16 \approx 292$

$10\% \text{ of none respondent rate} = 292 \times 10 \div 100 = 29.2 \approx 30$

$\text{Total sample size of prevalence of chronic energy deficiency of lactating mother} = 292 + 30 = 322$

The sample size for the second objective was determined by considering the highly significant factor of under nutrition of lactating mothers (37.9%) (23). The expected prevalence the sample size was calculated with 5% margin of error and 95% confidence level and none response rate of 10%. Based on the above assumption, the sample size for the study was determined using the formula for single population proportion as follows. Based on the above assumption, the sample size for the study was determined using the formula for single population proportion as follows.

$n = (Z, 2) p (1-q) / d^2$

Where: $n = \text{sample size}$

$Z = z \text{ value corresponding to a 95\% level of significance} = 1.96$

$p = \text{expected prevalence rate of lactating} = 37.9\% = 0.379$ $q = (1-p) = (1-0.379) = 0.621$

$d = \text{Absolute precision (5\%)}$

$n = (1.96)^2 \times 0.379 \times 0.621 / (0.05)^2 = 0.9041551344 / 0.0025 = 361.66 \approx 362$

$10\% \text{ of none respondent rate} = 362 \times 10 \div 100 = 36.2 \approx 37$

$\text{Total sample size} = 362 + 37 = 399$

The second sample size were selected to minimize Sampling error.

Finally, the sampling method was multistage sampling. To gate the total sample size were multiplied 399 by design effect of 1.5.

$399 \times 1.5 = 598.5 \approx 599$

3.6 Sampling techniques and procedures

Multistage sampling technique was conducted to select the study participants. There are 24 kebeles in the woreda. These kebeles are grouped in to six clusters based on geographical location. Among this 6 kebeles were selected randomly. The calculated sample size was proportionally allocated to the selected kebeles based on their population size according to the average number of lactating mothers live in each kebeles. After that in the selected kebeles, villages were selected randomly and data were collected randomly and data were collected

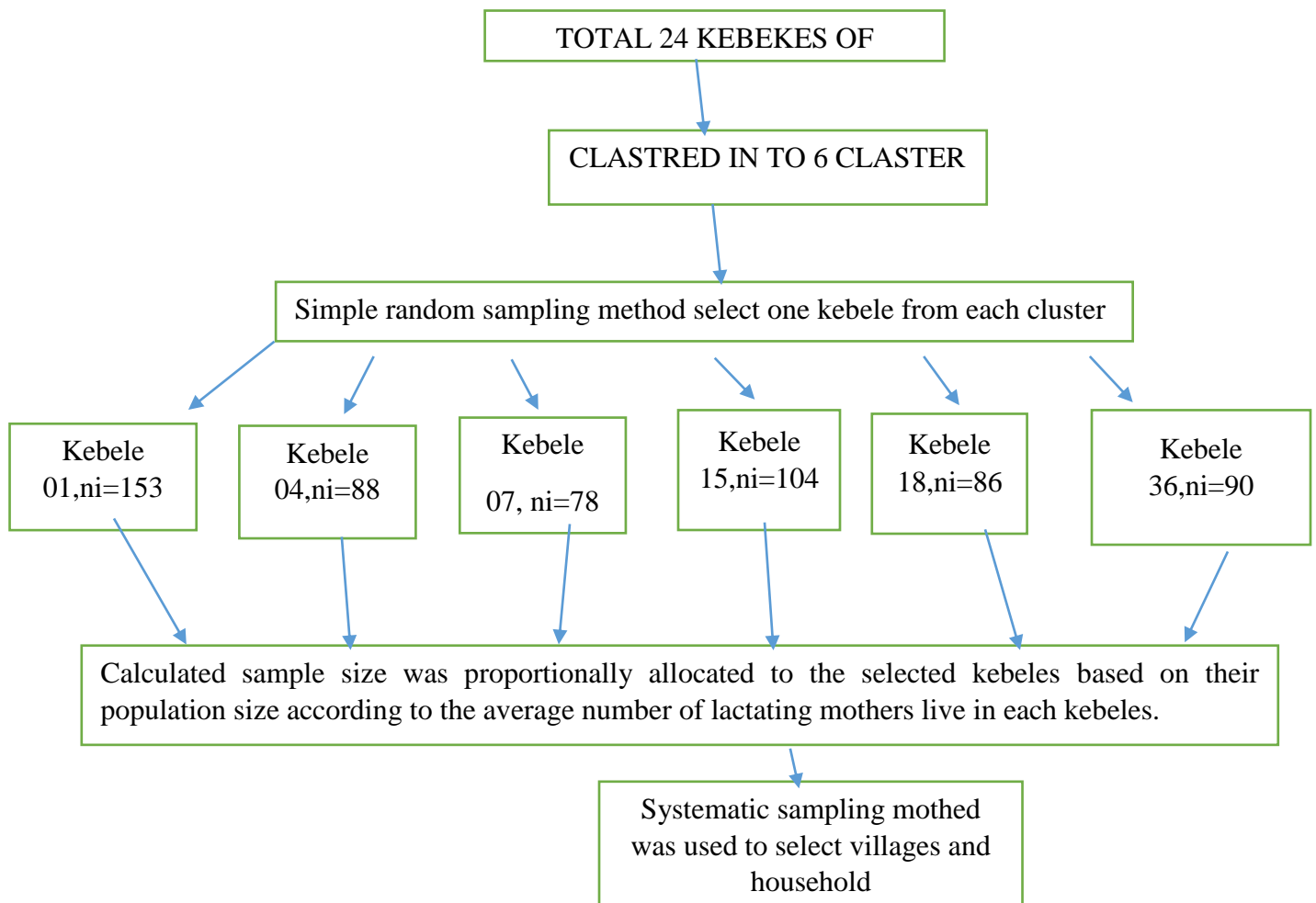


Figure 2: Sampling procedure

3.7 Inclusion and exclusion criteria

3.7.1 Inclusion criteria

All lactating mothers who had a child less than two year living in Simada District selected to the study.

3.7.2 Exclusion criteria

Lactating mothers who were critically ill, have hearing impairment and physical deformity during anthropometric measurements, mothers less than three month after delivery and having pregnancy during data collection time.

3.8 Study Variable

3.8.1 Dependent variable: chronic energy deficiency

3.8.2 Independent variables

Socio demographic variables (Age, sex, monthly income, marital status, age of marriage, occupation, religion, educational status, family size, age of breast feeding child, hand washing practice, latrine utilization practice and number of children age less than five year, weight, height .Health care variable (number of antenatal care, post-natal visit, place of delivery the current children, information of nutrition.

3.9 Operational definition

Sever chronic energy deficiency: lactating women having BMI<20.6kg/m²

Chronic energy deficiency: lactating women having BMI of <21.8Kg/m²

Overweight: lactating women having BMI of >23.1-24.5Kg/m²

Obese: lactating women having BMI of >24.5Kg/m² (26)

Minimum Dietary Diversity lactating women who consumed food items from at least five out of ten defined food groups the previous day or night which are Grains, white roots/tubers, plantains Eggs Pulses (beans, peas and lentils) Dark green leafy vegetables Nuts and seeds Other vitamin A-rich fruits & vegetables Dairy Other vegetables Meat, poultry and fish Other fruits(27)

Lactation: Lactation is the period of milk secretion for lactating mother.

Additional meal: lactating women who eat at least five meals in 24 hours

3.10 Data collection and quality assurance

The data were collected by using the semi structured questionnaire first prepared in English and translated to Amharic and then translated back to English to check its consistency. The points included in the questionnaire were used to assess the socio-demographic characteristics, feeding practice, maternal health services utilization and sanitation characteristics of the lactating mothers.

Height was measured with light clothes and without shoe with the participant to hold the head in a position where, she can look straight at a spot. The triangle was placed on the height rule and slide down to the head so that the hair (if present) were pressed flat and then using stadiometer the height were recorded to the nearest of 0.1 cm

Weight was measured with light clothes and without shoe. If subjects refuse to remove their clothes, at least an attempt was done to empty their pockets and weight were recorded to the nearest 0.1 kg. BMI were calculated as weight (kg) divided by the square of their standing height (m^2).

Trained female research assistants administered the pre-tested questionnaire to selected lactating mothers in the house to house visiting of kebeles. Pretest was conducted on kebeles where actual data collection was not done on 5% of sample size. Six health extension workers were recruited from the study. Training was given for data collectors and supervisors for two days on the objective, relevance of the study, confidentiality of information, respondent's right, informed consent and techniques of interview. Moreover, class room practical demonstration of the interview was carried out. Three Supervisors who have first degree in nursing supervise the data collection. They closely followed up the data collection process throughout the data collection period along with the principal investigator. Data collected from the field were revised each night every day with data collectors.

3.11 Data management and analysis

3.11.1 Data Quality management

Validated questionnaire from other studies with some modifications in local context were used for chronic energy deficiency assessment. Training for data collectors were given for 2 days regarding purpose of the study interview and measurement techniques (weight, height) and ethical issues during

data collection. Questionnaires were translated to Amharic language and then retranslated to English for its consistency by another person and were checked daily for accuracy, consistency and completeness by the supervisors and principal investigator and then necessary corrective actions were taken

3.11.2 Data analysis procedure

The collected data were checked for its completeness and coded then entered to Epi data manager version 4.4 and then exported to SPSS Version 23.0 for summarization and analyses of data. Frequencies mean, and proportions were used for the descriptive analysis of data. After bivariate analysis, variables of having $P < 0.025$ were entered into a multivariate logistic regression model to identify the independent contribution of each explanatory variable. Adjusted odds ratios and their corresponding 95% CI were reported to assess the association between individual variables and the outcome variable, and $P < 0.05$ were considered statistically significant. The model summary showed that the Hosmer and Lemeshow test was showing that the model was fit and 4 of the 13 variables were significantly associated.

3.12 Ethical Consideration

Primarily ethical clearance was obtained from Bahir Dar University, Department of Applied Human Nutrition, Research and Ethical Review Committee. The formal supporting letter that explains the objectives, rationale and expected outcomes of the study were written to Amhara regional public health & research institute from Department of Applied Human Nutrition, Bahir Dar University, which requests cooperation. Amhara regional public health & research institute wrote a Cooperation letter to South Gondar Zonal Health Departments and then South Gondar Zonal Health Departments also were written to Simada Woreda health office and Simada Woreda health office were written to selected kebele health post and kebele administrative and verbal consent were requested from each household during the time of data collection & the objectives of the study were explained to them. Confidentiality was also be assured for the information they provide.

4. RESULTS AND DISCUSSION

4.1 RESULTS

4.1.1 Socio-demographic characteristics

A total of 587 lactating women were involved with a response rate of 97.8%. The majority 268(45.7%) of the respondents were in the age group of 25–34 years. The mean age and standard deviation (SD) of respondents were 31.66 (\pm 6.575). The majority 541(92.2%) of the respondents were married by marital status. (Table 1)

Table 1. Socio demographic characteristics

Socio demographic characteristic		Frequency	Percent
Age	15-24	74	12.6
	25-34	268	45.7
	\geq 35	245	41.7
age of first marriage	\leq 18	228	48
	\geq 18	305	52
age at first pregnancy	\leq 19	219	37.3
	\geq 19	368	62.7
number of under-five child in house holed	1	100	17.0
	2	351	59.8
	3	136	23.2
Religion	Orthodox	358	61
	Muslim	229	39
educational status of respondent	cannot write and read	108	18.4
	Can write and read	102	17.4
	grade 1-8	158	26.9
	grade9-12	138	23.5

	graduated by 10+& above	81	13.8
current occupation of respondent	jobless	2	.3
	government employee	70	11.9
	Farmer	435	74.1
	daily laborer	7	1.2
	house wife	38	6.5
	Merchant	35	6.0
Number of family in the household	≤5	188	32.0
	≥5	399	68.0
Marital status of respondents	Married	541	92.2
	Single	6	1.0
	Divorced	40	6.8
Husbands educational status	cannot write and read	111	20.7
	Can write and read	110	20,5
	grade 1-8	127	23.6
	grade9-12	104	19,4
	graduated by 10+&above	85	15.8
Husbands current occupation	jobless	3	0.5
	government employee	73	13.6
	Farmer	410	76.4
	daily laborer	8	1.5
	Merchant	43	8
monthly income	<500	31	5.3
	500-999	433	73.8
	1000-1999	86	14.7
	≥=2000	37	6.3

Reference of classification (age ,age of pregnancy, age of marriage, family size and Household average monthly income),(25)

4.1.2 Sanitation characteristics

Majority 389 (66.3%) of respondent wash their hands during all critical time of hand washing, such as before preparing food , before eating meal , after eating meal and after cleaning baby's excreta . More than half of 325(55.4%) the respondent use unprotected spring and well water for drinking. Only 199(33.9%) of the study participants have toilet during the study time and 206(35.1%) reported that use their toilets (Table 2).

Table 2. Sanitation characteristics of lactating mothers

variables	category	Frequency	Percent
Hand wash	Yes	587	100
	No		
Time of hand wash	only before preparing and eating meal	198	33.7
	Before preparing food , after eating meal and cleaning baby's excreta	389	66.3
Source of drinking water	Tap and protected	252	42.9
	Un protected &well	325	55.4
	River	10	1.7
Latrine	Yes	199	33.9
	No	388	66.1
Use of latrine	Yes	206	35.1
	No	381	64.9

4.1.3 Obstetric history of lactating mothers

Among the respondents 405(69%) of lactating woman have ANC visits, more than half of 352(60%) lactating woman deliver their last pregnancy at health center. Majority of 497(84.7%) lactating woman do not have PNC visit during their last delivery. one hundred seventy six (33.6%) of lactating woman started complementary feeding for the index child before six month. The average distance of the nearest health facility from respondent's house was 5.8 km (Table 3).

Table 3. Obstruct characteristics of lactating mothers

variable	category	Frequency	Percent
birth interval b/n index child and the pre child	<24	95	16.2
	24-47	127	21.6
	>=48	365	62.2
started complementary food for the index child	Yes	340	57.9
	No	247	42.1
How far is your residence from the nearest health facility (k.m)	<5	126	21.5
	>=5	461	78.5
Attending ANC for the current child.	yes	405	69
	no	182	31
number of live birth	≤4	97	16.5
	>4	490	85.5
where did you deliver the last born child	Health center	352	60.0
	Home	161	27.4
	Hospital	74	12.6
do you have PNC visit	Yes	90	15.3
	No	497	84.7

do you use family planning	Yes	491	83.6
	No	96	16.4
type of family planning use	pills	7	1.2
	injectable	459	78.2
	Norplant	25	4.3

Reference of classification(25)

4.1.4 Health and nutritional status of respondents

The majority of 343(58.4%) of lactating woman did not attend nutrition education.565(96.3%) lactating woman did not have Illness in the past one month prior to the data collection period and 577(98.3%) woman did not have admission due to nutrition related problem in the past one month, the majority of 300(51.1%) of lactating woman did not have get additional meal during breast feeding. 373(63.5%) of respondents meal frequency were under five times per day, and 361(61.5%) of respondent did not get minimum diversified food (table 4).

Table-4 Health and nutritional status characteristics

Characteristics	category	Frequency	Percent
nutrition education	Yes	244	41.6
	No	343	58.4
illness in the past month	Yes	22	3.7
	No	565	96.3
admission due to nutrition related problem	Yes	10	1.7
	No	577	98.3
Additional meal during breast feeding	Yes	287	48.9
	No	300	51.1
meal frequency/24h	<times	373	63.5
	>=5 times	214	36.5
Minimum dietary diversity	Yes	226	38.5
	No	361	61.5

4.1.5 Prevalence of chronic energy deficiency

Overall the prevalence of chronic energy deficiency was 34.1 % (30-38.2%, 95%CI). Anthropometric status of the study participants the mean height (\pm SD), weight (\pm SD), and BMI (\pm SD) of the study participants were 154.67 cm (\pm 5.321), 50.4189 kg (\pm 0.128) and 25.7069cm (\pm 1.01808) kg/m², respectively. Almost one sixth of study participants (15.6%,95%CI) had a BMI less than 20.6 kg/m² (sever chronically energy deficient); whereas (16.8%,95% CI) of study participants had a BMI 20.6-21.8 (moderate energy deficient),(56.1%,95%CI) of study participants had BMI 21.9-23.0(normal weight),(4.3%) of study participant had BMI 23.1-24.5 (over weight) and (7.1%,95%CI) of participant had BMI greater than to 24.5 kg/m² (obese).

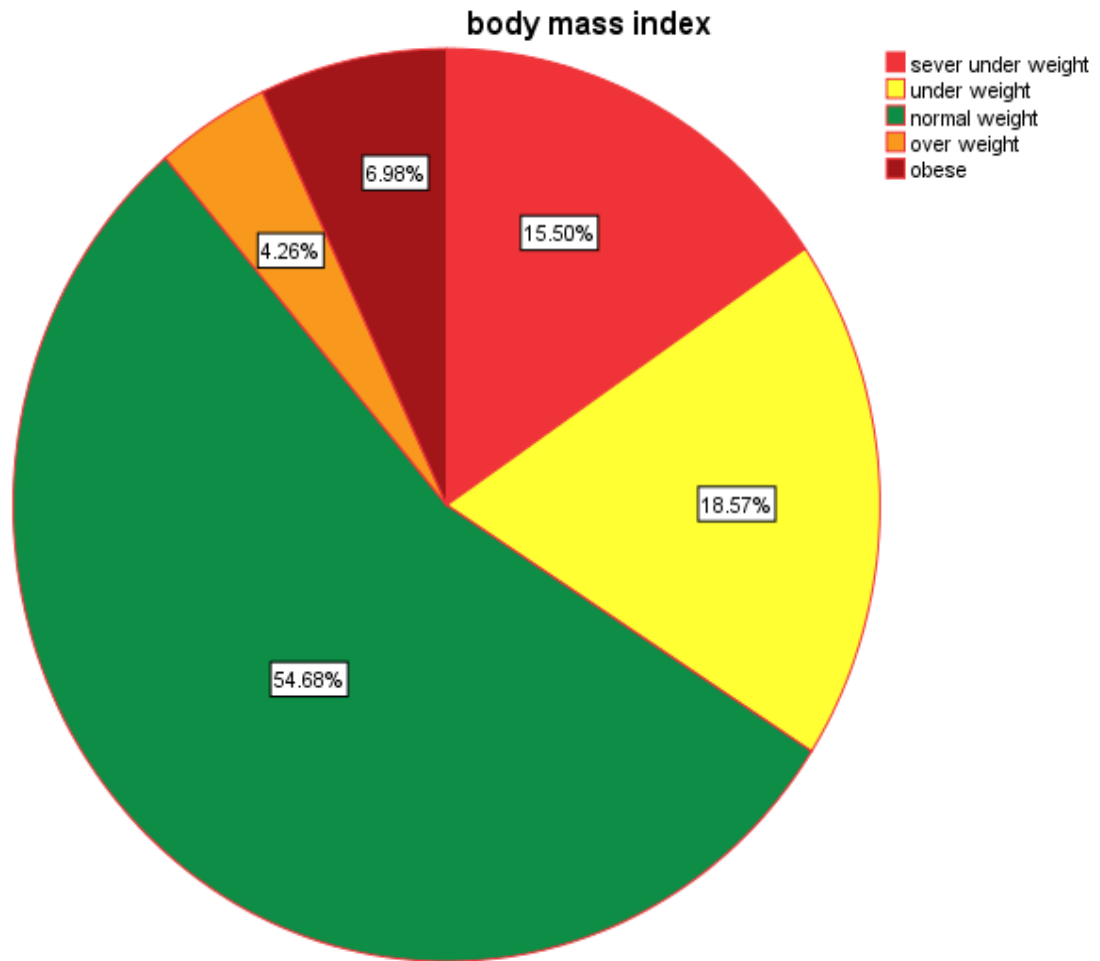


Figure 3: chronic energy deficiency status of respondents

4.1.6 Factors associated with Chronic Energy deficiency.

From total variables included in the multivariate logistic regression model, four variables were found to be statistically significant at the level of p value < 0.05 . Accordingly, number of under five in the house hold, attend nutrition education, additional meal during breast feeding and minimum dietary diversity status of study subject were demonstrated to have statistically significant association with chronic energy deficiency .Moreover identified that having more than or three under five child in the household was a risk for Chronic Energy deficiency compared to having one children. Thus, woman who had three child were 5 times at risk of having chronic Energy deficiency compared to had one children [AOR=5.026(2.755,9.169)], $p<0.0001$. woman who did not have nutrition education were 24

times more likely to chronic Energy deficiency compared to had nutrition education [AOR=24.319(9.980, 59.256), p<0.0001].lactating woman who had additional meal during breast feeding 0.2 times less likely to have chronic Energy deficiency compared to those who not had additional meal during breast feeding time [AOR=0.219, 95%CI (0.114, 0.422) p<0.0001]. Thus participants who not had minimum dietary diversity were 8.5 times more likely to have Chronic Energy deficiency compared to those who had minimum dietary diversity[AOR=8.500,95%CI(3.117,23.179) p<0.0001].

Some variables that show association with chronic energy deficiency in bivariate logistic regression analysis, like as age, time of starting complementary feeding, age of first pregnancy, source of drinking water, had of latrine and use of latrine, number of live birth child, PNC visit and distance from the nearest health facility have not demonstrated statistically significant association with chronic energy deficiency in final model. Therefore, they were not considered as potential independent factors of chronic energy deficiency (Table 5).

Table -5 Bivariate and Multivariable logistic regression analysis of factors associated with chronic energy deficiency of lactating women in simada woreda, Northwest Ethiopia(n=587).

variables	categories	chronic energy deficiency		COR,95%CI	AOR,%%CI
		Yes (%)	no (%)		
NO_<-five child	one	20(10%)	80(20.7%)	1.0	1.0
	two	81(40.5%)	270(69.8%)	0.833(0.481,1.443)	0.268(0.077,0.928) **
	three chilled	99(49.5%)	37(9.6%)	0.093(0.050,.173) *	5.026(2.755,9.169)
Age of first	<19 year	99(49.5%)	120(31%)	1.0	

pregnancy	>=19 year	101(50.5%)	267(69%)	0.459(0.323,0.651)	1.039(0.442,2.443)
drinking	protected	41(20.5%)	211(54.5%)	1.0	1.0
water	unprotected	159(79.5%)	176(45.4%)	4.649(3.125,6.918)	0.486(0.079,2.973)
time	before6(mon)	177(62.2%)	107(31.8%)	1.0	1.0
complemen	at 6 (mon)	27(14.4%)	167(49.7%)	0.649(.407,1.035)	1.381(0.658,2.899)
tary	after 6(mon)	44(23.4%)	62(18.5%)	4.389(2.505,7.691)	0.0498(0.220,1.124)
feeding					
age	15-24	40(20%)	34(8.8%)	1.0	1.0
	25-34	96(48%)		2.108(1.252,3.549)	1.039(0.442,2.443)
		172(44.4%)			
	>35	64(32%)	181(46.8%)	3.327(1.941,5.702)	1.941(0.776,4.854)
PNC visit	yes	3(1.3%)	87(22.5%)		1.0
	no	197(98.5%)	300(77.5%)	19.043(5.941,61.044)	0.446(0.115,1.730)
nutrition	yes	11(5.5%)	223(62.2%)	1.0	1.0
education	no	189(94.5%)	158(39.8%)	25.996(13.693,49.354)	24.349(10.188,58.196) **
additional	ye	83(41.5%)	204(52.7%)	1.0	1.0
meal	no	117(58.5%)	183(47.3)	1.571(1.113,2.219)	0.219(0.114,0.422) **
MDD	yes	15(7.5%)	211(54.5%)	1.0	1.0
	no	185(92.5%)	176(45.5%)	14.786(8.421,25.961)	8.500(3.117,23.179) **

* p -value < 0.25

** Statistically significant at p-value p <0.05

MDD= minimum dietary diversity

4.2. Discussion

This study was conducted to assess the prevalence of chronic energy deficiency and associated factors among lactating women in Simada district, North West Ethiopia. The prevalence of chronic energy deficiency in the current study was 34.1 % (30-38.2, 95%CI). Based on the anthropometric measurement of body mass index, severe chronic energy deficiency (15.5%), moderate chronic energy deficiency (18.56%), normal weight (54.68%), over weight (4.26%) and obese (6.98%). This

indicates that presence of large number of lactating mothers in the study area who were chronic energy deficiency. The result of this study is nearly similar to the study of in Eritrea (37.3%) (19) And EDHS 2016 report in Tigray region (34%) and Somalia region (31.2%) (12).

The finding of this study is higher when compared to institutional based cross-sectional study in India 28.4 % (19). the EDHS 2016 finding which was Oromia, Amhara, Dridewa, Benishangul Gumez, and Addis Ababa, 24.5%, 22.9%, 22, 1%, 20%, and 13.4% respectively (12). In addition to, it is high compared with the study findings in Samre woreda, 25% (8).Nekemt 20.5% (5), Adama District 19.5 % (24) and Wonberma Woreda northern Ethiopia 25.4% (25). The difference with the EDHS findings could be due to the sampling areas covered by the EDHS were all of rural and urbans, Study population, all woman participating were found in reproductive age. Secondly, WHO BMI cut off point was used in EDHS report, while in this study we used Ethiopian cut-off point of BMI.

The finding of this study is higher than study conducted in Rayita district of Ethiopia 24 % (20).The possible explanation for the difference with the previous study could be due to nutritional assessment method, the previous study used MUAC, but the current study used BMI. The study population in previous study includes all of pregnant and lactating mothers but the current study only lactating woman who had children age less than two year.

The prevalence of this study is also higher than study conducted in Nekemt and Samre woreda 20.5% and 25% (5, (8) respectively. The possible explanation for the difference with the previous studies could be due to the geographical difference.

The finding of the current study is higher as compared to the study which was carried out in Wonberma Woreda reported as the prevalence were 25.4%(25). The possible explanation for the difference could be due to using cut off point. The previous studies used the international BMI cut-off point, While the current study were used the newly developed Ethiopian cut-off point, for females.

The finding of this study is higher when compared with a study conducted in Adama District showed the prevalence of chronic energy deficiency among lactating mothers was 19.5 % (24). The possible reason for the difference in the findings could be due the difference in access to information, socio-economic status and infrastructures.

The finding of this study is lower whan compared with a Studies done in Ziway District Arise zone and Dedo and Chekorsa the prevalence of chronic energy deficiency were 48.6% (22) and 40.6% (27)

respectively. These differences might be due to the difference in the study period and study method. The current study was done after many intervention were applied. The previous study was using cross-sectional study and all reproductive age women were as study population and used BMI cut-off. The geographical difference may also explain the variations.

Factors associated with chronic energy deficiency of lactating women were identified. Accordingly, number of under-five children in the household, attending of nutrition education, additional meal during breast feeding and minimum dietary diversity of study were demonstrated to have statistically significant association with chronic energy deficiency.

Women who had three and more under five children were 5 times more likely to have chronic energy deficiency as compared with women who have one and two under five children. This is supported by the finding of study conducted in Womberma woreda, Northwest Ethiopia on Factors associated with chronic energy deficiency among lactating women(25). Women with less than five family size were less likely to be chronic energy deficiency when compared with women who have higher family size, five and above. This could be because of the food security issue in women with higher family size and related chronic energy deficiency and nutritional depletion of the mother due to successive pregnancies. Another a systematic review on the effect of birth spacing on maternal or child nutritional outcomes showed that short interval (less than 36 months) between pregnancies is associated with adverse outcome in women's chronic energy deficiency(23). The review showed significant association of short birth interval with increased risk for maternal chronic energy deficiency. This might be due to maternal nutrient depilation related with consecutive pregnancy and lactation, work load of child car, house hold food insecurity.

Woman who had greater than three meals per day were 0.22 less likely to have chronic energy deficiency than those who did not have three meals per day. Among woman who did not have more than three meal per day 58.5% were chronic energy deficiency. This is higher than compared with study conducted in West Bengal 39.6% (6). This difference might be due to study population, study method and sampling method. According to the essential nutrition action (ENA) taking at least two additional meals per day during lactation is recommended for all lactating woman(2). Lactating woman need 20-25% of additional energy than not lactating woman (1). The need of additional meal during lactation to meet her own body needs, provide enough nutrients in milk, furnish energy for

mechanism of milk production. (28). But, in the current study the energy needed were not met or below the requirement of lactating woman.

Thus participants who did not have minimum dietary diversity were 8.5 times more likely to have chronic energy deficiency compared to have minimum dietary diversity. Some 61.5% of woman did not have minimum dietary diversity. Among this 185(51.2%) had chronic energy deficiency. This could be due to depletion of macro nutrient and micro nutrient stored in the organs towing to the insufficient intake to meet the daily requirement for lactation. This finding is in line with previous study conducted in Dedo and Chekorsa District in Ethiopia (27).

But the finding of this study is lower when compared with a study conducted in Southern Ethiopia Enset (False Banana) Staple Areas: ninety four percent of mothers did not fulfil minimum dietary diversity this difference could be due to study area, cultural, social and study population .in the Southern Ethiopia Enset (False Banana) Staple Areas study, the study population were all of mathers age of reproductive but in the current study only lactating mathers (26).

Woman who had no nutrition education were 24 times more likely to have chronic energy deficiency compared to those who had nutrition education. This is higher than the study conducted in Nekemte Referral Hospital and Health Centers, East Wollega, Ethiopia. Some 42.2% of mothers had poor nutritional knowledge(29). The difference could be due to study time and study design, the privies studies were institution based while the current study is community based. This is supported by the finding of study conducted in Womberma woreda (25), which showed a lower prevalence of chronic energy deficiency in women who got health education about nutrition. This could be due to the positive effect of nutrition education on the healthy dietary behaviors of the community.

A study conducted in Kenya Nairobi ,Women Nutrition Education is one of the most importance factors that determine the nutritional status of lactating woman(30).The present study showed that nutrition education had direct association with nutritional status of lactating mothers. This might be due to the fact that women's knowledge about nutrition improves their nutritional status. Women who receive even a minimal education are generally more aware than those who have no education on how to utilize available resources for the improvement of their own nutritional status and that of their families. Education may enable women to make independent decisions, to be accepted by other household members (31). A comparative study on maternal malnutrition in ten sub-Saharan African

countries (32) and a study in the SNNPR of Ethiopia (33), showed that the higher the level of education, the lower the proportion of chronic energy deficiency of women.

4.3 Limitations and strength of the study

4.3.1 Limitations.

Seasonal variation in food consumption might exist to assess minimum dietary diversity, so that results regarding the dietary diversity information are only limited to the specific season of the year in which the study was conducted.

4.3.2 Strength of the study

This study used community based study which also used locally developed appropriate cut-off which enables to detect chronic energy deficiency as the international BMI cut-off was showed to overestimate chronic energy deficiency of woman.

This study were grouped 24 rural Kebeles in to six by considering the variations by geographical location of the district.

5. CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

Almost half of the lactating women (51.0%) who participated in the current study reported that they were not taking additional meal during the time of lactation. This study revealed that the additional meal intakes of the lactating women in Simada Woreda were below the recommended nutrient intakes of FAO/WHO/UNU [FAO/WHO/UNU(34).

Based on the anthropometric assessment, the prevalence of chronic energy deficiency (BMI <21.8 Kg/m²) among the lactating mothers was 34.1%, which is a high prevalence according to the WHO Expert Committee(35). Majority of the lactating woman (61.4%) who participated in the current study reported that they did not fulfil the minimum dietary diversity. Dietary intakes which were below the recommendation might lead the study subjects to poor nutritional status The important risk factors/ predictors of having a BMI <21.8Kg/ m²) were number of under five in the house hold, attend nutrition education, additional meal during breast feeding and minimum dietary diversity were the important predictors/risk factors for having a BMI of < 21.8 kg/ m².

5.2. RECOMMENDATION

Simada woreda health office and health extension workers

Give regular behavior change communication and promotion towards additional meal during pregnancy and lactation, use of family planning to minimize number of under-five child, importance of diversified food and how to prepare in the house.

For minister of health

Sever chronic energy deficiency lactating woman need Direct Nutrition Intervention like Promotion of Essential Nutrition Action. Targeted Supplementary Food (EOS/TSF) Therapeutic Feeding Program (TFP) and Micronutrient interventions and moderate chronic energy deficiency lactating woman needs indirect interventions.so federal minister of health give special concern to implement these intervention by coordinating other responsible sectors.

For minister of agriculture

Give special concern to implement agriculture related nutrition sensitive interventions like, integrated farming systems, exploiting the synergies of horticulture, improved household food preparation and livelihoods – i.e. Diversification of household food preparation for self-consumption in order to improve the nutritional quality of the family diet.

For food aiders

The food aid program implemented currently ignored lactating woman who have child greater than six month. But the prevalence of sever chronic energy deficiency in this study was high (15.5%). being chronic energy deficiency hinders women's productivity and can lead to increased rates of illness and mortality of Mothers and child.to prevent direct effect of maternal nutrition on the health and development of the next generation food AIDERS should include lactating woman in there program.

For the comer researchers

Further researchers using laboratory investigations for micro nutrient assessment are also recommended.

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Annexes

Annex I-Informed consent form

Hello dear, my name is ----- I came from Bahir Dar University I am one of the research of MSc department of applied human nutrition department bahir dar University. I would like to inform you at I will have a short questions concerning this study. Just before going to our question, you are requested to listen very carefully to what I am going to read you about the purpose and general condition of the study and tell me whether the agree or disagree to participant in this study. The purpose of this study is to assess the prevalence and associated factor of undernutrition among lactating mothers those child age of less than two year in Simada District at community level south Gondar zone North central Ethiopia.

(For data collectors: encircle the choice to show their willingness or unwillingness)

If yes continue the data collection process

1 yes

2=No

Data collectors name-----sign -----

Supervisor name ----- sign -----

Data collection date ----- questionnaire number -----

Annex II -English version questionnaire

Code number of the study participant _____

Table 10: SOCIO demographic characteristics

S.N	Questioner	Response	Code
D1	Age of respondent	_____ Years	
D2	Age of marriage		
D3	Age of first pregnancy	_____ years	
D4	How many child do you have age of under five	_____ children	
D5	What is your religion	1.=Orthodox 2.=Protestant 3.=Catholic 4.=Muslim 5.=others(Specify)	
D6	What is your current educational status	1.=Cannot write and read 2.=Can read& write 3.=Grade 1-8 4.=Grade 9-12 5.graguated by >10+3 and above	
D7	What is your current occupation	1.=Student 2=Governmental employee 3.=Farmer 4=Daily laborer 5=House wife 6=Merchant 7=other	
D8	How many family members live in the house	_____	
D9	How many child of live birth do you have m	_____	
D10	How many birrs the average house holed monthly incomes	_____Birr	
D11	What is the current marital status	1.=married 2.=single 3.=divorced 4.=windowed	
	If the answer of D10 is married go to the following questions		
D12	What is your husband's educational states	1.=Cannot write and read 2.=Can read& write 3.=Grade 1-8 4.=Grade 9-12 5.graguated by >10+3 and above	
D13	What is your husband current occupation	1.=Student 2=Governmental employee 3.=Farmer 4=Daily laborer 5=House wife 6=Merchant 7=other	

Table 11: Sanitation characteristics of respondents

S.N	Questioners	Response		Code
S1	When do you wash your hands?	1.Yes	0.No	
	After toilet			
	Before eating meal			
	Before preparing meal			
	After cleaning the baby's excreta			
S2	What is your drinking water source?	1= Tap and protected source 2=Unprotected spring and well 3=river		
S3	Do you have Latrine	0=no	1=yes	
S4	Do you use the latrine	0=no	1=yes	
	If no, why did you not use the latrine?			

Table 12: Anthropometric measurement of respondents

S.N	Quotations	Response	Code
AN1	Weight of woman	_____ : _____ kg	
AN2	Height of woman	_____ : _____ cm	

Table 13: Maternal health care and feeding practice of the study participants

S.N	Questions	Response	Code
HF1	How much was the time interval in year's between the birth of the index child and the previous one?	_____ Years	
HF2	How long did you have of breast feed this child?	1=< 6 months 2=6-11 months 3=12-24 months 4= >24 5=Did not remember	
HF3	Have you started complementary food for the index child	1=Yes 0=No	
HF4	What was age of the child when you introduce the complementary food?	_____ Months	
HF5	How far is your residence from health facility	_____ Km	
HF6	How many ANC visits did you have during the pregnancy of the index child?	_____ Times	
HF7	Where did you deliver the last pregnancy?	1=Health center 2=Home 3=Health post 4=hospital	
HF8	How many times do you have PNC visit?	_____ Times	
HF9	Do you use Family planning?	1.yes 0.No	
	If you are using Family planning, what type of family planning do is it?	1=Pills,2=Injectable 3=Norplant 4=IUCD 5= Condom 6= reast feeding	
HF10	Have you attended Nutrition education?	1=Yes 0=No	
HF11	Do you have Illness in the past month	1=Yes 0=No	

HF12	Do you have admission due to nutrition-related problem in the last one month	0=no 1=yes	
HF13	How many times do you eat in a day (24 hours)?	1=Yes 2=No	
Now, let me ask you about your experience in consumption of minimum diversified foods in a typical Daye.			
DO you have the following foods in a typical day (24 h)?			
HF14	vegetable per day	1=yes 2=no	
HF15	Fish, meat, egg	1=yes 2=no	
HF16	Pulses	1=yes 2=no	
HF17	Milk or milk products	1=yes 2=no	
HF18	Green leafy vegetables	1=yes 2=no	
HF29	Fruits	1=yes 2=no	
HF20	carrot, sweet potato	1=yes 2=no	
HF22	wheat, tef, barley	1=yes 2=no	
HF23	bean, peas, lentils	1=yes 2=no	

Tank you

Annex III -Amharic version questionnaire

I, የፈቃደኝነት ማረጋገጫ

ቃለ መጠየቅ ከመደረጉ በፊት ተሳታፊዎች ፍቃደኝነት መዋጠቁያ ፎርም

እኔ አቶ -----እባላለሁ የመጣሁት ከባህር ዳር ዩንቨርሲቲ ነው። ከዚህ የመጣሁት ይህን ጥናት ከሚያካሂደው በ/ዳር ዩንቨርሲቲ በማህበረሰባዊ ስነ ምግብ ዲፓርትመንት በሚሰራው ሳይንሳዊ ጥናት ተልኬ ነው። የዚህ ጥናት አላማ በስማዳ ወረዳ የሚገኙ አጥቢ እናቶች ያለባቸውን የምግብ እጥረት እና ተያያዥ ችግሮችን ለመለየት ነው። በቃለ መጠየቁ ስመዎትን አልመዘግብም፤ መመለስ የማይፈልጉት ጥያቄ ካለ አይገደዱም ፣ ቃለ-መጠየቁን ለመቀጠል ካልፈለጉ በማንኛው ሰዓት ላይ ማቋረጥ ይችላሉ፤ ከዕርሰዎ የሚጠበቀው በሚጠየቁት ጥያቄ መሰረት ሀሳብዎን ብቻ እንዲገልጹልኝ ነው። የሚሰጡትን መረጃ ከጥናቱ አገልግሎት ውጭ ለማንም በምንም ሁኔታ አይገለፅም።

ከዕርሰዎ የምናገኘውን መረጃ በጥናታችን መጨረሻ ላይ ለማወቅ ስለምንፈልገው ውጤት ከፍተኛ ጠቀሜታ አለው ። ቃለ መጠየቁን ለመጠየቅ የሚፈጀው ግዜ 30 እስከ 45 ደቂቃ ነው። ከቃለ መጠየቁ በመቀጠል የእርሰዎን ቁመትና ክብደት እንለካልን እንዲሁም በውይይታችን ወቅት በወረቀት ያሉትን ጥያቄዎችን እጠይቀውታለሁ።

ቃለ ምልልሱን ለማድረግ ፍቃደኛ በመሆነዎ እና ግዜውን ስለሰጡን አመሰግናለሁ።

የሚቀርብለዎትን ጥያቄዎች ለመመለስ ፍቃደኛ ነዎት ?

1 አዎ ()

2 አይደለሁም ()

መረጃ ሰብሳቢው ሙሉ ስም -----

ፊርማ -----

የተቆጣጣሪው ሙሉ ስም-----

ፊርማ-----

የመተየቅ ቁጥር-----

መጠየቁ የተሞላበት ቀን-----

II - የአማርኛ መጠይቅ

የጥናቱ ተሳታፊ መለያ ቁጥር : _____

ክፍል I. ማህበራዊ እና ዲሞክራሲያዊ ሁኔታን የሚመለከቱ ጥያቄዎች

ተ.ቁ	መልስ	መልሶች
ማ1	እድሜዎ ስንት ነው? (በአመት)	
ማ2	የመጀመሪያ ባል ሲገቡ ስንት ዓመት ወት ነበር	
ማ3	ለመጀመሪያ ጊዜ በስንት ዓመት ወት አረገዙ	
ማ4	እድሜአቸው ከ አምስት አመት በታች የሆኑ ስንት ልጆች አለዎት	
ማ5	አሁን የሚከተሉት ሃይማኖት ምንድን ነው	1.አርቶዶክስ 2. ፕሮቴስታንት 3. ካቶሊክ 4. ሙስሊም 5.ሌላ ካለ
ማ6	አሁን ያሉበት የትምህርት ደረጃ ስንት ነው	1.መጻፍና ማንበብ የማትችል 2. መጻፍና ማንበብ የሚችል 3. ከ1 እስከ 8 ኛ ክፍል የደረሰች/ች 4. 9-12 የደረሰች/ች 5.ድፕሎማና ከዚያ በላይ
ማ7	አሁን ያለዎት የስራ ሁኔታ ምንድን ነው	1.ተማሪ 2. የመ/ት ተቀጣሪ 3. አ/አደር 4. የቀን ስራተኛ 5. ቤት እመቤት 6 ነጋዴ
ማ8	አሁን በቤት ውስጥ የሚኖረው የቤተሰብ ብዛት ስንት ነው	
ማ9	አሁን ያለዎት አማካኝ የቤተሰብ ገቢ በብር ስንት ይሆናል	
ማ10	አሁን ያሉበት የትዳር ሁኔታ ምን ይመስላል	1.ያገባች 2. ያላገባች 3. የፈታች 4. ባሏየሞተባት
ይህ ጥያቄ መልሱ ያገባች ከሆነ ቀጣዩን ጥያቄ ይመልሱ		
ማ11	የትዳር አጋርዎት አሁን ያለበት ትምህርት	1.መጻፍና ማንበብ የማትችል 2. መጻፍና ማንበብ የሚችል

	ደረጃ ስንት ንው	3. ከ1 እስከ 8 ኛ ክፍል የደረሰ/ች 4. 9-12 የደረሰች 5.ድጥሎማና ከዚያ በላይ
ማ12	የትዳር አጋርወት አሁን ያለበት የስራ ሁኔታ ምንድን ነው	1.ተማሪ 2. የመ/ት ተቀጣሪ 3. አ/አደር 4. የቀን ሰራተኛ

ቅጥያ-ክፍል 2. - የንፅህና አጠባበቅን ሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	መልሶች	Code
31	እጅወትን መቸ ነው የሚታጠቡት?	1.አወ	0.አልታጠብም
	ከሺንት ቤት መልስ		
	ምግብ ከመብላቴ በፊት		
	ምግብ ከማዘጋጀቴ በፊት		
	ህፃናን ካፀዳደው በኋላ		
32	ለመጠጥት የሚሆን ውሃ የሚቀዱት ከምንድን ነው	1=ከቧንቧ 2=ንፅህናው ካልተጠበቀ ምንጭ 3=ከወራጅ ወንዝ	
33	ሺንት ቤት አለውት	1.አዎ 2. የለም	
34	ሸንት ቤት ይጠቀማሉ	1.አወ 2. አልጠቀምም	
	መልሰውት አልጠቀምም ከሆን የማይጠቀሙት በምን ምክንያት ነው		

የ ጥና ቱ ተ ሳ ታፊ መለ ያ ቁ ጥር _____

የሰውነት አቋምን ልኩት የሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	ምላሽ
	ክብደት	-----በኪ.ግ
	ቁመት	-----ሳ.ሜ

የእናቶችን የጤና ሁኔታ እና የአመጋገብ ልምድን የሚመኩ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	ምላሾች	መለያ
ጤአ1	አሁን ጡት የሚጠባው/የምትጠባው ልጅ እድሜ ስንት ነው(በወር)	_____ አመት	
ጤአ2	ልጅ የሚወልዱት በየስንት አመት ልዩነት ነው	_____ አመት	
ጤአ3	ይህንን ልጅ ጡት ካጠቡ ስንት ጊዜ ሆነውት	1.ከስድስት ወር ነታች 2=6-11 ወር 3=12-24 ወር 4= >24 ወር 5=አላስታውስም	
ጤአ4	ተጨማሪ ምግብ ጀምረውለታለ	1.የለም 2.አወ	
ጤአ5	በስንት ወሩ ነበር ተጨማሪ ምግብ የጀመሩለት	1.ከስድስት ወር በፊት 2.ስድስት ወር ላይ 3.ከስድስት ወር በኋላ 4.አላስታውስም	
ጤአ6	የመኖሪያ ቤትወት ከጤና ተቋሙ በምን ያክል ኪ.ሜ ይርቃል	_____ ኪ.ሜ	
ጤአ7	ለስንት ጊዜ ቅድመ ወሊድ ክትትል አድርገው ነበር		
ጤአ8	አሁን የሚጠባውን ልጅ የወለዱት የት ነበር	1.ጤና ጣቢያ 2.ቤት ውስጥ 3.ጤና ኬላ 4.ሆስፒታል ውስጥ	
ጤአ9	የአሁኑን ልጅ ከወለዱ በኋላ የድህረ ወሊድ ክትትል አድርገው የውቃሉ?	1.የለም 2.አወ	
	የወሊድ መቆጣጠሪያ ይጠቀማሉ	1.አወ 2.አልጠቀምም	
	መልሰውት አወ ከሆነ የሚጠቀሙት የወሊድ መቆጣጠሪያ የትኛው ነበር?	1=አልጠቀምም 2=ከኒን 3=መርፌ 4=ከክንድ ላይ ሚቀበር 5=በማህፀን የሚቀበር 6= ኮንዶም 7= ጡት ማጥባት	

ጤአ10	ስለ አመጋገብዎት መረጃ ሰምትው ያውቃሉ	1.የለም	2.አወ	
ጤአ11	አሁን ባሳለፍነው ወር ውስጥ ተመው ነበር	1=የለም	2.አወ	
ጤአ12	ከአመጋገብ ጋር በተያዘ ህመም ምክንያት ባሳለፍነው ወር ውስጥ በጤና ተቋም ውስጥ ተኝተው ታክመው የውቃሉ	1.የለም	2.አወ	
ጤአ13	ጡት በማጥባትዎት ምክንያት-በቀን ውስጥ(24 ሰአት) ምን ያክል ተጨማሪ ምግብ ይመገባሉ	1=አልመገብም	2=እመገባለው	
<p>አሁን ደግሞ የምጠይቀው የተለያዩ ምግቦችን ባሳለፍነው አንድ ቀን(24 ሰአት) ውስጥ የመመገብ ልምደውን የሚመለከቱ ጥያቄዎችን ይሆናሉ።</p> <p>የሚከተሉትን ምግቦች ባሳለፍነው ቀን(24 ሰዓት)ተመግበው ነበር ?</p>				
ጤአ15	ቀን አረነረጓዴ ቅጠል ያላቸውን አትክልቶች ይመገባሉ	1=አወቀን	2=የለም	
ጤአ16	ቀን ዓሳ፤ስጋ እንቁላል ይመገባሉ	1=አወቀን	2=የለም	
ጤአ17	ኑግ ፤ሱፍ፤ተለተባ ይመገባሉ	1=አወቀን	2=የለም	
ጤአ18	የወተት ዓስተዋፅዖ ይመገባሉ	1=አወቀን	2=የለም	
ጤአ19	አትክልት ይመገባሉ	1=አወቀን	2=የለም	
ጤአ20	ፍራፍሬ ይመገባሉ	1=አወቀን	2=የለም	
ጤአ21	ካሮት፤ስኳር ድንቸህ ይመገባሉ	1=አወቀን	2=የለም	
ጤአ22	ስንዴ፤ገብስ ጤፍ ይመገባሉ	1=አወቀን	2=የለም	
ጤአ23	ባቆላ፤አተር፤ምስር ይመገባሉ	1=አወቀን	2=የለም	

አመሰግናለው

Proportionally allocated formula to Calculate required sample size in the selected kebeles

$$n_i = n \times N_i / N$$

n_i = is sample size of the kebele

N_i = is population size of the kebele

n = the total sample size of district = 599

N = the total population size district = 12,565

The selected kebele of study were kebele 1,4,7,15,18 and 36

N of each kebele $k_1=3210$, $k_4=1846$, $k_7=1636$, $k_{15}=2182$, $k_{18}=1804$ and $k_{36}=1888$

$$n_i = n \times N_i / N,$$

$$k_1, n_i = 599 \times 3210 / 12,565 = 153.027 \sim 153$$

$$k_4, n_i = 599 \times 1846 / 12,565 = 88.002 \sim 88$$

$$k_7, n_i = 599 \times 1636 / 12,565 = 77.991 \sim 78$$

$$k_{15}, n_i = 599 \times 2182 / 12,565 = 104.020 \sim 104$$

$$k_{18}, n_i = 599 \times 1804 / 12,565 = 86.000 \sim 86$$

$$k_{36}, n_i = 599 \times 1888 / 12,565 = 90.004 \sim 90$$

$$n = n_1 + n_2 + n_3 + n_k, = 153 + 88 + 78 + 104 + 86 + 90 = 599$$